Papers Presented at the 8th Regional Seminar for Labour-based Practitioners

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OCTOBER 2000, CAIRO, EGYPT

Theme of the seminar:

The New Millennium — Challenges for Labour Intensive Investments
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Institutionalising a Participatory Approach to 
Rural Infrastructure Development in Nepal

Shuva K. Sharma 
Rural Development Manager 
Scott Wilson, Nepal

Paper presented at: 
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners 
October 2000 
Cairo, Egypt
1. Introduction

Lack of adequate basic rural infrastructures in Nepal is considered to be one of the reasons that farmers in the interior region continue to face poverty. Such facilities would have reduced isolation, stimulated crop production and marketing, encouraged better public services and, above all, facilitated socio-economic change and the transfer of technology. In the Ninth Five-Year Plan (1997-2002) of Nepal, poverty alleviation is the primary objective of HMG/N. Substantial opportunities for rural employment creation are projected through the promotion of employment-intensive programmes in infrastructure development and in the agricultural sector.

The Agriculture Perspective Plan (APP) 1995, has provided a framework for a period of 20 years for stimulating the agricultural sector to a sustained high growth path. One of the basic stimuli for increasing agriculture production (thereby increasing rural business and income levels) has been considered to be the expansion of the rural road network while irrigating more agricultural land simultaneously. Accordingly, a total of 6,200 km of road network and large number of irrigation schemes are envisaged for construction during the period. At the same time, greater emphasis is placed on the need for institutional strengthening to provide sustainable support for implementing, monitoring and maintaining rural infrastructure in the country.

Nepal being a developing country, there is still an increasing need for investments in infrastructure. Demand is highest for rural roads, small irrigation schemes and small market centres at a village or town level.

2. Objective of a Participatory Approach

A Participatory Approach is suggested as a method to understand local values, knowledge and experience; to win community backing for project implementation; and to help the community to resolve conflicts over resource use (World Bank Report 1992, p-93)

Participatory methods are usually conceived for involving targeted people into various pre-designed stages of the planned development process. Accordingly, participatory methods are also segmented in such a way that they can be fitted into various stages. For example, beneficiaries would be consulted while setting the goal, people's representatives would be consulted for implementation modalities, local communities would be mobilised for provision of local labour (with training if required) and eventually, the project would be handed over to the communities for operation and maintenance.

3. Major Institutions involved in Rural Infrastructure Development (RID) in Nepal

The Institutional framework for RID in Nepal is generally as follows.
A.  **Government Institutions:**

**Executing agency (EA):** A government line Ministry is the executing agency, which is responsible for overall project implementation. The major role of the EA is as follows:

- monitor the overall progress and impact of the project
- channel necessary funds to the DDCs on a timely basis
- procure equipment and materials, and,
- provide technical support and guidance to the DDCs.

A large number of government and donor-funded rural infrastructure projects are presently being implemented by the Government through local government institutions. For example, the annual expenditure on rural infrastructure sector is over NRs 4 billion (US$ 70 million) by the Ministry of Local Development alone (MLD: 1997).

**Central Project Steering Committee (CPSC):**
The government generally establishes an inter-ministerial CPSC chaired by the Secretary of the Ministry which would function as the central level coordination body to support the Project activities.

**Project Management Office (PMO):**
Within the Ministry, a PMO or Project Support Unit (PSU) is established to provide necessary support expected from the Government institutions and to manage the project and procurements.

B.  **Local Government Institutions (LGI)**

**District Development Committee (DDC):**
DDC is the main local government body at the district level. It comprises an elected body of representatives headed by the Chairperson and 13 elected members. DDC's Office has a Secretary who is a permanent employee of the central Government. There are 75 DDCs in Nepal.

**Village Development Committee (VDC):**
VDC is the grassroot local government institution that is also headed by an elected Chairperson. This is involved in village level development activities. There are about 4000 VDCs in Nepal.

C.  **Community Level Institutions**

These institutions are formed to mobilise local resources including local labour and to provide responsive feedback to the management about the aspirations of the beneficiaries. Depending on the nature of the project, different tiers of institutions exist. Furthermore, definition of the users may also vary for different infrastructures. For example, irrigation schemes and water supply projects have defined users or clients, and therefore, ownership and responsibility is also defined. However, in the case of roads, the term user becomes vague, as the ownership level can be extended from those residing near the road alignment to those vehicle owners and users who benefit from the road. The vagueness of users of road diminishes the level of ownership and resulting commitment for maintenance by local people. Therefore, institutions that are formed for roads generally adopt the term 'coordination' to define their function.
District User/Coordination Committee:
These bodies have a broader representation over the whole project level and assist the management team on policy and coordination matters. These have representation from other institutions such as political parties and business organisations in order to provide balanced representation of views. Generally there is one organisation of this nature for a project.

Local User/Coordination Committee:
These are more specific in nature and their function is to provide required labour, mobilise local resources, resolve disputes and organise interactive activities between the management and the local beneficiaries. There may be more than one such local institution for a project.

NGOs:
NGOs are increasingly involved in RID activities. At the district level, most of the NGOs are established by young entrepreneurs who have some specialist skills (such as in forestry, agriculture etc) or have good knowledge of the area. Though some are known to be income-oriented, most have begun to demonstrate some level of professionalism partly due to increasing competition. There is a distinct advantage in involving NGOs when bureaucratic delays of governmental agencies and the expensive services of the private consulting institutions are important factors to be considered.

1. Practical Considerations in Institutionalising Participatory Approach in RID

A review of the implementation of RID projects in Nepal yields examples of the following approaches being practiced:
- Government institutions implement alone
- Private sector/donor agencies implement alone
- Government institutions implement with technical advice from the Private Sector
- Private sector implements with Government institutions as the regulatory body

Traditionally, until two decades ago, most of the RID programmes were undertaken using the first approach with the belief that the government institutions were there to provide such infrastructure to the people. People's views were represented by politicians in the absence of any mechanism to reach the grassroots communities.

Over the last 10 to 15 years, bilateral and multilateral donor agencies such as GTZ, SDC etc have entered Nepal and piloted different approaches, mainly in road sector. These agencies worked outside the government institutions, but with the local government institutions as their local partners. Models such as the ‘Green Roads’ concept were developed with mixed success.

However, in order to achieve a sustainable rural infrastructure development, it is recognised that both the first and the second options on their own are not sufficient. A partnership approach involving government institutions, local government and community level organisations must be developed to ensure the successful implementation, operation and maintenance of RID programmes.
Major Institutional Constraints Observed

This, however, is not easy to achieve. While there are inherent weaknesses in the government institutions, the local government institutions are also institutionally weak and lack basic know-how. Though relatively efficient, the private sector in Nepal is also not fully developed in terms of provision of required level of professional services and accountability.

In summary, major institutional shortcomings can be stated as below:

- The government institutions are still inflexible and heavily bureaucratic.
- There is severe deficiency of required skills and capability at all levels
- The mechanisms to ensure transparency are either not in place or face organised resistance
- There is certain degree of mistrust between the central and local governmental institutions
- With no effective mechanism in place for screening of activities, there is a very low level of accountability.

In the participatory development process, there is an equal need for organisational building at the project level, which can sustain the development process once the external support is withdrawn. However, in government funded development activities, not much attention is paid to organisational building. This is a time consuming process which calls for a closer linkage between the targeted people and the implementing agencies. Due in part to a lack of co-ordination among implementing agencies themselves, the existing organisational and legal framework created at the project level is often exploited by the local leaders to realise their own objectives. When a project fails, the tendency seems rather to 'blame the victim' (Korten and Uphoff 1981).

Experience has shown that in government funded and implemented RID programmes, the organisational building and social mobilisation components are often neglected or given less priority as compared to more tangible outputs such as physical progress of works (km of canal or road, for example). Though it is understandable that physical output is key indicator of success of RID, it should not be at the cost of measures which can ensure long term operation and maintenance of such physical outputs. Experience has shown that development of responsible and capable organisations with a proper system that ensures inflow of funds and transparent expenditure can be effective in assuring the sustainable operation and maintenance of these physical assets.

General assumptions often concerning participation include:
- the beneficiaries are a homogeneous group in terms of knowledge and ability
- the stages of planned development require different forms of participation at different stages

However, there have been a number of studies which illustrate that the stages of planned development do not follow the progressing trend from one stage to other. In practice it tends to become rather more mixed and complex. Furthermore, project implementation in developing countries can entail conflict among the actors involved as they compete for scarce resources, with the outcome being determined by the strategies, resources, and power positions of the actors involved. Quite often such conflicts take place on the basis of inadequate knowledge, reaction, counter reaction and compromises.
5. Important Factors for Development of Participatory Approach

With such issues only just starting to be addressed openly, it is a challenging task to develop responsible, capable and accountable institutions. Most of the failures seen in many development activities have been due to absence of genuine participation by the beneficiaries. For genuine participation to be achieved, there are some fundamental issues that must be ensured in any RID efforts. Some TIPS for meaningful participation by the beneficiaries are:

T  Transparency
I  Integrity
P  Participation
S  Skills

Transparency and more Transparency!

Transparency can be considered as a key element in ensuring confidence of the local communities and institutions in the RID initiatives. Transparency brings ownership along with confidence. This can be achieved if the transparency measures help to develop feelings in people that they have access to such information about the project that they think only insiders would know. This may be simple information, but simply saying it aloud and publicly helps in developing public faith. Transparency in the RID context can be answers to broader public on the following:

General:
- What is being done in their locality?
- Who is doing it?
- How is it being done?
- Who is entitled to participate?
- How much money is being spent?
- When should it finish?
- Which individual should they talk to for more information about particular issues?

Specific:
- What are the procedures for measurement?
- How the work is being carried out?
- If contracted, what are the contract amounts?
- What bidding procedures are being followed?
- If the work is being awarded through community institutions, what are the selection criteria?
- Within a labour group, what wage should a labourers get for a given amount of work?

- The above information can be provided to the public through measures such as:
  - Public display boards located at public offices
  - Organising public meetings and providing information in that forum
  - Preparation and distribution of brochures, information pamphlets

Public Auditing:
This is an increasingly popular transparency tool used in RID programmes in Nepal where the project (through the NGOs) informs the public, project beneficiaries and the labourers on the above
issues through regular interactive meetings held at the work sites itself. This has been more useful in ensuring that the labourers get the wage that is in his share (which can be higher than normal daily wage rate depending on the work-intensity).

**Integrity**

Increased participation of the beneficiary communities in the implementation of RID activities warrants a transparent and fair conduct by the RID management. The level of participation very much depends on how much confidence the communities have in the management team.

This, then, relates to the professional and moral integrity of the individuals associated with RID intervention. Though society in Nepal is very close-knit and there is a tendency not to question the elders and/or senior members of the society, there are cases where projects have failed to generate enthusiasm due the integrity of programme managers being questioned by the communities.

**Participation**

Participation of the beneficiary communities in planning, implementation and maintenance of RID initiatives is increasingly emphasised as the key element in ensuring sustainable RID activities.

Participation of the beneficiary communities is generally organised following the bottom up approach which may include the following:

   STEP 1: There is mass sensitisation and social mobilisation process within the communities. Membership distribution activities take place to prepare base for membership based organisations.

   STEP 2: Potential groups within the communities suited for specific tasks are identified and engaged in discussion.

   STEP 3: Local community institutions are formed using stipulated procedures already known to community members

   STEP 4: Further mobilisation takes place to select potential members to work as Labour group leaders and labourers

   STEP 5: Transparency measures are discussed and an approach agreed. Skill development opportunities are analysed and agreed.

   STEP 6: Accountability issues at the community level are discussed and procedures established to ensure that any breach of responsibility is reported and discussed.

**Skills**

Only that participation which comes with minimum required levels of skill will bring about the desired impact in RID interventions. It is therefore essential that the issue of skills availability is taken seriously at the time when an initiative is planned.

In practice, it is not always feasible to develop skills within the target communities before the commencement of activities. There may be very wide range of skills required in some cases while in others a particular skill may be required of a large number of people.
Experience shows that areas where a fresh RID is planned is generally lacking in the required skills. However, a neighbouring district may already have such skills due to similar prior intervention. In such a case, it may be desirable to draw on such expertise to enable skills transfer.

6. A Case Study of RIDP

The Rural Infrastructure Development Project (RIDP) is a US$ 16.9 million initiative of the Government of Nepal with the financial assistance from the The Asian Development Bank (ADB). Its activities started from April 1997 within the decentralized policy framework. The major objectives of the Rural Infrastructure Development Project (RIDP) are to contribute to reducing rural poverty by generating off-farm employment opportunities, increasing agriculture productivity, and reversing the trend of environmentally destructive road construction methods in the hill region of Nepal. The project has provided support for:

- construction of 250 km of motorable, fair weather roads connecting villages with the national road network and market centres in Baglung, Tanahun and Kavre districts. Environmental impacts will be minimized with the use of a labour based and environmental friendly approach to rural road construction with full participation of beneficiaries in planning, construction and maintenance of the roads.
- construction of simple multipurpose buildings in about 90 villages to enhance village-level development activities. They will be used for the purpose of meetings, training programmes, workshops, informal education and will also function as a marketplace for agricultural and dairy products brought from other villages along the roads, and,
- awareness and training programmes to promote public awareness about the (i) advantages of the labour-based and environmental friendly approach to rural road construction and maintenance (ii) importance of local level self-help institutions for development (iii) need for women's active participation in community development and (iv) long term benefits of environmental protection, including forest management by forest users group.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Purpose</th>
<th>Goal</th>
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<tr>
<td>Capacity Building</td>
<td>Improved Rural Access</td>
<td>Improved Livelihoods of the rural poor</td>
</tr>
<tr>
<td>Physical Works</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation</td>
<td></td>
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</tbody>
</table>
6.1 Institutional Arrangements for RIDP

**A. Executing agency:**
Ministry of Local Development (MLD) is the executing agency, which is responsible for:
- monitoring the overall progress and impact of the project
- channeling necessary funds to the DDCs on a timely basis
- procuring equipment and materials, and,
- providing technical support and guidance to the DDCs.

**B. Project management and organization:**

**Central Project Steering Committee (CPSC):**
The government has established an inter-ministerial CPSC chaired by the Secretary of MLD, which functions as the central level coordination body to support the Project activities. Members of CPSC include representatives from National Planning Commission (NPC), MLD, Ministry of Finance, Ministry of Agriculture, Ministry of Forest and Soil Conservation, and the Department of Roads. The Project Manager of RIDP acts as the CPSC secretary.

**Project Management Office (PMO):**
While the agreement was signed, the DoLIDAR was not established. Thus the MLD established a Project Management Office in the Ministry headed by an Under Secretary. The PMO has a mandate to assist and guide DIUs.

**District Implementation Units (DIUs):**
The DIUs are established in each district headed by Local Development Officer with an engineer, 2 overseers and an accountant. The DIUs formulate annual work programmes and are responsible for the day-to-day project management. With the assistance from consultants recruited under the Project, the DIUs also prepare the local resources utilization plans for maintenance finance.

**District Road User Committee (DRUC):**
When the Project was initiated the necessity for a district level users committee was felt in order to coordinate various LRUCs of the road alignments and help DIU in effective implementation of the project. Accordingly, one DRUC was constituted for each road alignment from all the road beneficiaries.

**Local Road User Committee (LRUC):**
LRUCs are established in 7-15 km road sections for each of the 6 road alignments, mainly as a forum for public consultation and participation. The Committee also select *Naike* along with labour groups from among the beneficiary population for road construction and maintenance. At least 70% of the labour force, during the road construction must come from the areas of influence along the proposed road alignment. At least 20% should be female labourers. The concerned VDCs would finance the administrative expenses required for LRUCs. Both DRUC and LRUC would be registered in the CDO Office.
Number of DRUCs and LRUCs in 3 districts

<table>
<thead>
<tr>
<th></th>
<th>Baglung</th>
<th>Tanahu</th>
<th>Kavre</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRUC</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>LRUC</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
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</table>
Executive Members of LRUC will be elected from amongst the Beneficiaries/ Users i.e. the Households within the Influence area for an average 10-15km length of road alignment.
Executive Members of the DRUC will be elected by the

Note:
1) LRUC = Local Road Users’
2) DIU’’’ = District Implementation Unit
3) DDC = District Development
4) MP ’’’ = Member of Parliament
5) GA = General Assembly
Linkage of Road Users' Committees

District Road Users' Committee for Sector/or whole length of the 7-11 Members

More or less
Equal Representation

LRUC (7-11)

Beneficiaries
Users

LG (15-20)

Elected

LRUC (7-11)

Beneficiaries
Users

LG (15-20)

Elected

Local Road User Committee (7 - 11)

More or less
Equal Representation

Sub-Committee

Beneficiaries User (H.H.) for an average 10 km length road alignment (General Assembly)

Labour Group (15-20)

Nominated

LRUC (7-11)

Beneficiaries
Users

LG (15-20)

Nominated

Note:
1) District Road Users' Committees (DURC) will be based at District
2) LRUC = Local Road Users' Committee (see Figure No.)
Central Level

Ministry of Local Development

Central Project Steering Committee

DoLIDAR
- PMO
  - Project Manager - 1
  - Engineer - 1
  - Accountant - 1
  - Support staff

PMO
- Team Leader - 1
- ESC - 1
- Social Adviser - 1
- Bioengineering specialist (6 months)
- Support staff

DDC (Technical Manager)

District Level

DIUs
- Engineer - 6
- Overseer - 26
- Accountant - 3
- Support staff

DCOs
- Resident Engineer - 4
- Senior Overseer - 4
- Bioengineering Facilitator - 4
- Support staff

DRUCs

LRUCs

Naike

DGU

Acronyms:
DIU: District Implementation Unit
DDC: District Development Committee
TM: Technical manager
PMO: Project Management Office
DRUC: District Roads Users Committee
LRUC: Local Roads Users Committee
DCO: District Consultants Office
NGO: Non Governmental Organization
PICO: Project Implementation Consultants Office

Legend
→ Line Management
↔ Assistance
6.2 Activities covered by RIDP

The activities covered by RIDP are:

<table>
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<th>Roads</th>
<th>250 km of new construction</th>
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<td>Community Buildings:</td>
<td>Ninety community buildings in three districts.</td>
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6.3 Labour Based Environment friendly Participatory (LEP) Approach

RIDP follows the LEP approach. This is characterised as follows:

- Work is done by human labour using simple hand tools (i.e. avoiding use of heavy equipment)
- Work is done in single phase in those areas where the slope is mild and favourable. Those areas which are characterised by steep slopes are subjected to phased construction approach.
- Use of explosives is discouraged.
- The work is achieved in a participatory manner involving local communities and organisations. However, works involving skilled manpower may be undertaken through local competitive bidding (LCB).
- Local resources and materials are used to the extent possible.
- Technical standards are simple and appropriate for low traffic volume of light vehicles.

6.4 Major Lessons learned from RIDP

- Sustainability and maintenance have to be rooted in effective local institutions
- Transparency is essential to local institutional development and requires attention and specific project interventions.
- Poverty reduction and gender equity objectives require specific attention and programs are best implemented through NGOs.
- Participatory labor based construction methodology requires clear and effective accountability for technical design and construction supervision.
- Development impact of rural roads is increased through ancillary interventions responsive to local needs to be identified during project implementation under a process approach.
- Environmental friendly approach is effective and economic.

6.5 Poverty alleviation impact of RIDP

The road adopted labour-based technology, which generated substantial opportunities for labour employment. The project had aimed to generate 11,000 person years of employment during the
project implementation period. As shown in Table 3.4 the project has generated 4,832 person years of labour days in all 3 districts during the past 3 years, which is about 44% of the target. Although limited road lengths have yet been opened to traffic, significant measurable socio-economic benefits are already apparent, notably in the form of enhanced farm gate prices and new roadside construction.

### Table 3.4: Employment generation through RIDP

(Up to July 2000)

<table>
<thead>
<tr>
<th>District</th>
<th>1997-98</th>
<th></th>
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<tr>
<td></td>
<td>Skilled</td>
<td>Unskilled</td>
<td>Total</td>
<td>Skilled</td>
<td>Unskilled</td>
<td>Total</td>
<td>Skilled</td>
<td>Unskilled</td>
<td>Total</td>
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<td>268407</td>
<td>10511</td>
<td>499775</td>
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<tr>
<td>Tanahun</td>
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<td></td>
<td>99435</td>
<td>99435</td>
<td></td>
<td>196378</td>
<td></td>
<td></td>
<td>326727</td>
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<tr>
<td>Kavre</td>
<td>1019</td>
<td>115455</td>
<td>116474</td>
<td>2010</td>
<td>140952</td>
<td>142961</td>
<td>2763</td>
<td>27934</td>
<td>275397</td>
<td></td>
</tr>
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</table>

Grand Total: 1,763,611

Total person year (divided by 365 days) = 4832

7. Case Study of Community Irrigation Schemes in Nepal

The tradition of community irrigation schemes dates back to before the eighteenth century (Regmi 1978). This tradition has culminated in farmer managed irrigation systems (FMIS) that now cover more than 70% of the country's total irrigated area. FMIS are location-specific, indigenous in their management practices and representative of local organizational needs and services to be provided (FMIS Promotion Trust 1999). These systems are generally small in nature and simple to make and operate. The areas served by each system are generally less than 50 ha.

The successful community managed schemes generally have a strong formal management structure. This usually takes the form of one or more committees: responsibility for maintenance and operation is often separated (Howarth and Pant 1987). The committees have power to fine farmers, or even to ban them from using water, if they infringe scheme regulations.

In the case of Sim-Belbote Irrigation System, a small FMIS, various factors were active in the initiation of the system by the farmers. The two major factors are (Parajuli and Ghimire 2000):

1. Intentional Factor
2. Enforcement Factor

Intentional factor is that factor which is purposely done by the farmers to support the sustainability of irrigation system. This further includes:

- Good cooperation among the farmers
- Leadership
• Intention to produce more (Multi crop system)
• Attraction to paddy production
• Less dependency on external resources
• The introduction of spring paddy
• Familiarity with the natural system

Enforcement factor, on the other hand, is which compelled the farmers to support the sustainability of irrigation system and this includes:

• Insufficient food system
• Investment cost
• Increase in population
• Government support to FMIS.

**Risks in Irrigation System Management**

Traditional irrigation schemes used to develop gradually over many years, while modern schemes are conceived and implemented rapidly without there being appropriate time for social institutions to evolve. Furthermore, responsibility for construction is often not in the hands of the farmers. Widespread lack of faith in the success and value of many projects discourages many people form cooperating in them. Such schemes are now widely perceived as being risky.

Irrigation schemes, as compared to Road projects, have the distinct advantage of having well-defined users. This, in turn, has the following institutional advantages:

1. The membership base for the committees can be manageable and defined.
2. The level of benefit that each household gets from a scheme can be assessed
3. The selection of committees could represent the interest and benefit level assessed as above

This helps form a relationship between the irrigation system and its managers. However, as with roads, there are cases where political pressure has given the management responsibilities to political figures who have no direct interest in the scheme- and the schemes have failed due to loss of direct involvement and accountability (Howarth and Pant 1987).

### 8. Recommendations

**Changes in Community Institution Formation Process**

Committed and accountable community organisations are the key to successful RID interventions. Many of the weaknesses can be corrected through these organisations. However, this can be achieved only through good representation in these organisations. To ensure this, the following activities should be undertaken:

- The DRUC and LRUC should be constituted by the beneficiaries only after a thorough social mobilization work at the ground level so that the people as well as the officials themselves internalize why the committees are formed.
• These committees should be member based, i.e. they must be elected by members whose membership would be free to all within a specified geographical location.

**Local Government Institutions to be made more accountable**
• Confused messages can arise if one organisation is not assigned a regulating responsibility with defined procedures to ensure compliance. In RIDs, the District Development Committees, can perform this role effectively. However, this must be discussed with each of the DDCs in detail with the implication for non-compliance clearly spelled out.

**Emphasis on Skill Development**
• Before commencing any RID works, a detailed Training Needs Assessment must be conducted. It is important to know what knowledge, skills and attitudes are present and which are deficient in each participating institution. Any deficiency must be addressed either through training or through controlled import of suitable external personnel.

**Define Responsibility and Develop Accountability**
• Lack of clarity on institutional responsibility and accountability of the large number of institutions involved in project implementation must be addressed. Lack of understanding of responsibility encourages misuse of resources which in turn develops distrust between the communities and the management. To check the misuse of resources and the lack of quality control, a clear Terms of Reference for each staff must be developed and procedures for disciplinary actions must be stated.

**Transparency of transactions and decisions/activities**
• Time-bound Payment of Wages to Labourers: Some of the malpractices such as payment of lower amount of wages to labourers and contracting the work to other person by the *naike* could be avoided to a greater extent if payment of wages to labourers become regular and time bound.

• *Naike* should be made to present all labourers at the time of Payment of Wages: The presence of all the labourers providing labor for the work contracted by a *naike* must be made a pre-condition for the payment of full amount of wages to the *naike*. He or she should be made to produce a statement of wages payable to all the labourers, who are present on the occasion to receive payment.

• Once the work is certified for payment, the figure involved should be communicated to all the labors through LRUC, concerned supervisor and personally to every worker if he or she desires to know about the same.

• The list of persons acquiring the work from the programme and the amount of contract must be placed in a public place for general public to view.

**Ensure the Involvement of More Local Labourers in the Construction Activities:**
• It becomes more difficult to pay lower amount of wages to a local labourer than to an outsider. The project should therefore introduce measures to ensure that local labourer is used to the
extent possible. Introduction of identity card could be an option to be seriously considered to ensure this.

ABBREVIATIONS

ADB  Asian Development Bank
CPSC  Central Project Steering Committee
DCO  District Consultant Office
DDC  District Development Committee
DIARS  District Infrastructure and Agriculture Roads Section
DIU  District Implementation Unit
DoLIDAR  Department of Local Infrastructure Development and Agricultural Roads
DRCC  District Road Coordination Committee
DRUC  District Road Users Committee
ESC  Engineering Supervision Consultant
GTZ  German Development Cooperation
FMIS  Farmer Managed Irrigation System
HMG/N  His Majesty's Government of Nepal
LDO  Local Development Officer
LEP  Labour-based Environment Friendly Participatory
LRUC  Local Road Users Committee
MLD  Ministry of Local Development
naike  Labour Group Leader
PAM  Project Administration Memorandum
PICO  Project Implementation Consultants Office
PMO  Project Management Office
RE  Resident Engineer
RID  Rural Infrastructure Development
RIDP  Rural Infrastructure Development Project
SDC  Swiss Development Cooperation
SIC  Site In-charge
TA  Technical Assistance
TNA Training Needs Assessment

VDC Village Development Committee

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SOCIAL EXCLUSION AND RURAL TRANSPORT: GENDER ASPECTS OF A ROAD IMPROVEMENT PROJECT IN TSHITWE, NORTHERN PROVINCE

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INTRODUCTION

This paper presents a case for the reorientation of the way rural transport needs are perceived, planned and provided for, with a view to better targeting of interventions, particularly with regard to addressing the mobility and accessibility needs of rural women. It also seeks to critically appraise the sustainability of poverty alleviation properties attributed to the labour-based road works, especially in respect of their impact on women. In addition it explores the role that non-motorized modes of transport could play in reducing the transport burden of the Tshitwe community.

The transportation burden faced by developing communities in rural South Africa on a daily basis is real and substantial. This lack of mobility and accessibility of goods and persons has had the effect of limiting their participation in the mainstream economy, thereby entrenching their isolation. The problem is not transitory. Rather, it is postulated that because of these inadequacies in the transportation system, rural South Africa will continue to reproduce individuals who are socio-economically deprived, that unless there is radical intervention, this situation will continue ad infinitum.

It is also pertinent to observe that socio-economic and political relations in South Africa are characterised by dualism and a high degree of heterogeneity, especially when comparisons are made between urban and rural areas, developed and developing rural areas and between women and men. This dualism is chronic and not merely due to one sector needing time to catch up with the other.

In addition to the foregoing, observations and research appear to indicate that activities, resources, and opportunities associated with rural South Africa are significantly influenced by the socio-economic and cultural aspects related to being female or male. For example, the transport burden is largely shouldered by women (Howe, 1997; Mashiri, 1997). It is thus important to consider the reduction of this burden as an indicator of the success of interventions aimed at improving the quality of rural life. However, this can only be accomplished where a premium is placed on unravelling the nature of this burden; how it is distributed between men and women; who has the greater burden; and how this creates special gender specific needs.

Gender in society

In order to understand the transport needs of women, it is important to review gender constructs in society. Gender roles exist in all spheres of society beginning with the division of labour in the family. For example, women are allocated almost all domestic chores, which work is not only unpaid, but it is also not reflected in economic indicators such as gross domestic product. These roles for men and women are socially determined and culturally maintained. From these gender roles, transport needs emerge which correspond with those roles.

Understanding the needs of rural communities

It has been contended that for rural communities, transport is perceived not as a problem in itself, but always as part of a far more general socio-political and economic problem (Tarrius, 1984). The significance of seeking to understand the needs of rural communities as a basis for generating innovative solutions to rural transport and development has been grossly underrated by decision-makers, as will be illustrated by the Tshitwe road upgrading project discussed in this paper. For this
reason, it has been noted that the analysis of transport systems has been pursued to the exclusion of the study of rural household transport characteristics, and yet the household is the locus of the transport demand (Bryceson & Howe, 1992). This has been exacerbated by the fact that innovative integrated planning has largely been sacrificed in the name of sectoral planning despite the many shortcomings associated with adherence to a narrow sectoral approach.

It must be remembered that the greatest access problems are experienced by the poor, the majority of whom are women. Conventional transport policies, however, tend not only to treat communities as homogeneous without due regard to the fact that they could have widely varying mobility and accessibility needs, but also tend to equate their current travel patterns with their needs. Accessibility in this paper is understood to be a relative concept, in respect not only of affordability but also to availability of socio-economic opportunities. Where there are gross inequities in income distribution, as is the case in South Africa, effective demand alone will be nowhere near describing the real needs of communities. In view of the two conditions set out above and, in particular, the issue of affordability, one of the most revealing sights in rural areas is a new or upgraded road that is bordered by a well-beaten footpath (Mashiri et al, 1998). The paper will show that a conventional approach was employed in the planning and implementation of the Tshitwe project.

It is also particularly pertinent to note in this regard that very often those who might be expected to have the greatest need for transport, given their rural socio-economic conditions, are also those who ask for nothing, or at least, their voice is not heard. This is a critical problem on which the techniques for establishing needs based on sampling methods, such as origin-destination surveys and activity logs, come to naught. The method used has to enable non-demand from this disadvantaged social strata to be interpreted. In other words, what indicators of transport would enable this virtual reality to be interpreted? There is therefore a need to revisit the traditional definition of transport to mean (Bryceson & Howe, 1996; Ali-Nejadfard, 1997).

A....the movement of people and goods for any conceivable purpose, including the collection of water or firewood, by any conceivable means, including walking and headloading....".

This definition is undergirded by three strands of thought: [i] the mode of travel used need not necessarily be motorised or conventional but must be realistic, suitable, cost-effective and environmentally sound [ii] the choice of mode needs to be catered for in planning, no matter how unimportant it may seem to planners [iii] trip purposes should not be disregarded at the discretion of planners (Dawson & Barwell, 1993). This overarching definition of transport as it relates to gender issues will be discussed against the backdrop of the Tshitwe road upgrading project, which is reviewed in this paper.

Problem Statement

Although the conventional definition of transport as referring to roads and vehicles has been found to be inappropriate for rural areas where most travel and transport is on foot and away from roads (Dawson & Barwell, 1993), it still holds sway in the transport sectors of many provinces. Consistent with this observation, it is also germane to realise that although women in Tshitwe are responsible for most of the transport demand, they have not been recognised by policy-makers as transport stakeholders in their own right, with specific sets of transport needs and concerns. In assessing the level of transport demand and the concomitant resources for these, women's and indeed the community's needs have been routinely ignored. In this regard, the Tshitwe community's current travel
patterns have been confused with their travel needs. Conventional transport planning with its unambiguous emphasis on roads as the panacea for all transport problems, is thus, at best, an incomplete response. The need to pay greater attention to the examination of the real access needs of rural dwellers differentiated by gender, cannot be over-emphasised. Put differently, there is a need to complement road investment with other measures which address, in a more holistic manner, the totality of communities accessibility needs. It is also in this context that non-motorised transport modes have been found not only to have synergistic linkages with other transport modes, but also that they could, in the short-term, ameliorate the transport burden of Tshitwe women and men and ultimately act as a catalyst for sustainable long-term socio-economic development. 

It is also germane to note that where data have been collected on the travel and transport burden experienced in the rural areas of the Northern Province, it has tended to be highly generalised and aggregated. It is thus important to seek to understand how this burden is distributed by gender, which calls for a gender-sensitive approach to project planning and implementation.

Study Aim

The aim of this paper is to present a case for the reorientation of the way rural transport needs are perceived, planned and provided for, with a view to better targeting of interventions, particularly with regard to addressing the mobility and accessibility needs of rural women, children and the elderly. It seeks to critically appraise the sustainability of poverty alleviation properties attributed to labour-based road works, especially in respect of their impact on women. It also briefly explores the role that non-motorised modes of transport could play in reducing the transport burden of the Tshitwe community.

The fundamental concern is with improving the material conditions of rural women through improved access. However, it is logical to start by understanding their travel needs, and the extent to which lack of access is a constraint to the fulfilment of those needs. It is also critical to investigate how gender and gender relations affect transport deprivation and how this deprivation can be remedied through more appropriate and more gender-sensitive interventions.

STUDY FIELD SURVEY

Study area

The village of Tshitwe, situated in the far north of the Northern Province of South Africa, was chosen for this study because it typifies the great majority of settlements in the Northern Province, which are relatively remote and characterised by relatively high population densities, an underdeveloped and inadequate agricultural base, and high levels of out-migration. It is situated in the former homeland of Venda. The nearest higher order settlement is forty kilometres away at Makhado. Tshitwe is bounded by the perennial Njelele river for eight kilometres on its western side. This river becomes a formidable barrier to access other villages and schools in the rainy season. The Northern province is one of South Africa's least urbanised and least developed provinces, with more than eighty-three per cent of the total population of 4.8 million living in rural areas. This province has the highest poverty levels in South Africa (Baber, 1996), and it incorporates three former homelands, which were themselves characterised by graft, corruption and abject poverty. It must be emphasised here that poverty is not only a problem of access to resources and distribution, but also a result of poor
Interviewer-administered questionnaires

The study involved investigations through structured interviewer-administered questionnaire surveys, unstructured interviews, observations and discussions. Base data on socio-economic characteristics with specific reference to the local transport system, were collected largely from adult household members. The design of the questionnaire was influenced by the overall objectives of the study, including the need to measure the differential impact on gender as well as the time and financial limitations imposed by its lengthy nature. Students from the University of the North were selected and trained for a day as enumerators to undertake the survey.

One hundred and forty households were interviewed by the students, closely monitored by the authors of the paper. This exercise yielded a total sample of close to a thousand persons. Specific households were randomly chosen. No attempt was made to consciously screen out households. This procedure was followed to eliminate sampling bias as much as possible under the circumstances.

Target group orientation

Because gender relations vary over space and time in rural South Africa, the needs of females and males are not homogeneous. Thus, in order to effectively reach certain rural groups or sections, a target group approach was employed in the data collection. This relates to the investigation of sub-sections of a population in regard to their social coherence, similarity of interests, group formation and leadership structure in order to assess their potential for assimilating certain ideas and taking certain actions (Marais 1987). Target group orientation means that support and assistance are based on the needs, available resources and freedom of action of specific target groups. Target group orientation was employed within the context of a gender analytical framework. Essentially, the gender analytical framework highlights roles and responsibilities of women and men and the incentive structure within which they operate, that is, the gender-based division of labour and gender-based access to and control of resources and benefits.

Activity-based approach

It is germane to note here that an activity-based approach as employed in this study is different to conventional demand-based analysis of travel behaviour, where travel is treated as a discrete activity and analyzed in isolation of other activity areas on the basis of recorded number of trips. The method followed in Tshitwe was designed to be qualitative and to be indicative of the community's travel patterns and its transportation needs as they relate to access to socio-economic opportunities. In other words, the travel behaviour of the sample households, differentiated by gender, was assessed largely from the point of view of access to an opportunity and the ability of communities to get to, or be reached by, the opportunity. It thus treats travel explicitly as a derived demand.

STUDY RESULTS

Inventory of the existing situation
The Tshitwe road upgrading project commenced in March 1997 with a budget of approximately US$300,000 to upgrade fifteen kilometers of road. The project recruited local labourers [47 women and 67 men] on a rolling basis, largely from within walking distance of the road to entrench a sense of community participation and ownership, reduce costs and institute equity in the distribution of employment opportunities. Women's tasks on this project were non-technical and largely menial, for example, carrying stones, largely because all tasks which remotely resembled elementary technology were taken by men. Clearly, project supervisors, who are generally male, should thus be trained to be more aware of and sensitive to gender issues. These men and women upgraded the road from a not so well-engineered gravel road to a bitumen surface of mostly four meter paved width.

The Tshitwe road upgrading, especially its projected year-round operability and substantially lower costs of operating freight and passenger vehicles, were expected to benefit the agricultural economy in the project through higher farm-gate prices, lower costs of delivering productive inputs [fertilizer, seeds, etcetera] cheaper, more reliable availability of trucking services and better accessibility to agricultural extension services. However, overall levels of agriculture activity and land productivity has not improved. Off-farm employment, except for food vending which ended with the projects closure, has not been sufficiently stimulated, which does not augur well for long-term poverty alleviation objectives of the provincial government. The supply of road passenger services has not improved at all - there is no bus nor combi-taxis - only occasional vans passing by. The access time to markets and other socio-economic activities has not changed because no significant additional transport services have been attracted to the road. The long-term prospects of the road, given its location on the slopes of the mountains which form natural boundaries of Tshitwe, is suspect. In addition, maintenance is likely to be a problem given that, other than carrying stones, women [who would be expected to help in the maintenance exercise] did not learn any skills that could come in handy for maintenance.

It is pertinent to note here that road investment such as the upgrading of the Tshitwe road is only likely to induce a response in production when the costs of moving produce to the market are reduced, giving rise to higher farm-gate prices. However, it is unlikely to have much effect if it merely improves the quality of the road surfaces and its all weather capabilities, as peak transport demand occurs in the drier periods of the year (Hine, 1984). By contrast, investment in building minor, low level and foot bridges, minor drainage works and other small scale remedial spot improvements which extend vehicle access and keep routes open to motor vehicle traffic, are likely to be more cost-effective (Hine, 1993; Howe, 1997).

Fuel for both cooking and lighting is a major concern. While women and children walk upwards of five kilometers to collect firewood for domestic use, men usually use animal-drawn carts to collect wood for sale. This commercialization of firewood has placed increasing demands on women's labour-time for fuel wood collection as they have to walk even further to collect firewood for household requirements. Some pupils walk relatively long distances especially to high schools. For higher order goods and services, Tshitwe residents walk eight kilometres to access motorized transport and then pay US$2 round trip to Makhado, which is relatively expensive for most households. The nearest health centre for regular visiting is ten kilometres away. Given that rural health centres have become conduits for the dissemination of vital development information since the advent of the new political dispensation, it may well be that the Tshitwe community is deprived of vital development information.

It is of interest to note that the roles that have been reserved for Tshitwe women have a powerful influence on their travel and transport patterns. The women engage in a range of activities that require
transport, as follows [i] domestic - fetching water and firewood [in larger households, women have to repeat these trips several times]; cooking; caring for children and the elderly, trips to the grinding mill [ii] economic - marketing goods and services at pension pay points and other places; tilling, sowing and weeding the fields and gardens; harvesting and carrying harvests from the field to the homestead or market; retailing and trading; sewing; brewing beer; and so on [iii] social - taking children to schools, taking sick people to health centres and babies to the clinic for weighing and vaccination; attending funerals, religious meetings, society and community projects.

While women from developing communities have both domestic and economic roles, much of their time, as the Tshitwe study reported, is spent in the transport component of those roles, leaving little or no time for other productive socio-economic activities. The magnitude of these women’s transport burden has been exacerbated by the fact that southern Africa has experienced a steady decline of readily accessible firewood supplies through massive deforestation. There has also been a decrease in the availability of reliable and potable water resources through recurring droughts, which have substantially increased the women’s transport burden.

The extend to which these tasks would be eased depended on the flow of services following the upgrading work. However, it is clear from the Tshitwe study that services do not follow automatically, unless they are specifically planned for. In addition, there was no effort made to integrate the project with other existing sectoral development strategies. As a result, the poor, largely women and children, still walk great distances to access, for example, rural health centres, funerals or weddings. In addition, although agricultural practice is characterised by small volumes of modern inputs, such as extension services and fertilizer, access to these inputs is still limited. The transport burden has not been reduced at all. In fact, it has increased, particularly where higher agricultural yields are achieved, as the majority of headloading chores that women and children perform, remain.

Distribution of population by gender

The greater majority of the respondents, who were more often than not, household heads, were female. In many households, women are either de facto household heads largely because their spouses are migrant workers, or are the sole providers for their families because of separation or divorce, that is, de jure household heads. To a large extent, this could explain the preponderance of youth and women in the population distribution. Women also outnumber men because men often seek employment and reside in urban areas. It is of interest to observe that a significant number of women-headed households were banished from other populous Venda villages and deported to Tshitwe after being suspected of witchcraft [a phenomenon largely associated with women]. Households headed by females were also a lot less financially endowed than male-headed households. In addition, these households, particularly the de jure female-headed ones were often on the extreme end of the poverty spectrum.

Household size, age-sex distributions and access to socio-economic activities

The greater majority of the households had between five and eight members, which appears to suggest a relatively high dependency ratio. Clearly, most households are hard-pressed to make ends meet, given their financial circumstances as described below. The age-sex distribution shows a preponderance of school-going youths. The relatively limited agricultural pursuits [dryland cropping and animal husbandry], pension income and the relatively meagre remittances have combined to positively influence the relatively high school attendance ratio. However, the drop-out rate, especially
of girls, is correspondingly high for a variety of reasons, including distance to schools and affordability. In addition, the quality of education has not improved either as the schools are unable to attract quality teachers. As indicated elsewhere in this paper, the presence of students in a household implies regular travel demand as well as greater demands on the household’s disposable income. In fact, the greater majority of the trips generated in Tshitwe are school-related. While a considerable number of pupils walk upwards of five kilometres to a primary school, secondary school students travel much longer distances. Thus the improvement of accessibility to schools could significantly alleviate the transport problems of Tshitwe. This could perhaps be done by way of increasing the use of non-motorised transport, such as bicycles, improvement of related infrastructure and the provision of credit facilities to purchase non-motorised transport modes. The upgraded Tshitwe road has not and is unlikely to relieve the scholar transport problem, largely because what scholars need is not a high quality road surface but the introduction of an efficient transport service.

**Tshitwe household income sources and affordability**

The study indicated that some households had at least one member who earned a regular income, largely as a migrant worker. The presence of income-earning members in a household implies regular travel demand. Many villages thus depend on an outside system of economics as it is extremely difficult to produce consistently for their subsistence needs. A significant number of Tshitwe households depend entirely on subsistence agriculture for survival. Women sometimes barter their crops or livestock for daily necessities at the local corner shop. Villagers, especially women, also supplement their incomes by way of a variety of income sources, including the sale of beer, crops, livestock and livestock products; remittance from migrants; local employment; non-farm activities; pension and transfers from household members. Inevitably, and as indicated elsewhere, most households find it extremely hard to make ends meet. Against this backdrop, it is not surprising that their travel and transport is largely geared and limited to procuring subsistence living. Clearly, the labour-based road upgrading project has alleviated, albeit temporarily, the financial woes of Tshitwe women and men alike. To this extent, one of the objectives of the project has been fulfilled. However, this financial windfall has only been temporary.

**Mode ownership and use**

In terms of vehicle mode ownership and use, the study established that most villagers owned wheelbarrows and animal-drawn vehicles as well as bicycles and donkeys. This is not surprising as there is nothing more efficient, in developing rural areas, than the cart and the bicycle because the technologies are known in the village and need little resources external to the village. These non-motorised vehicles are largely used for carrying goods. Walking is by far the dominant mode. As indicated elsewhere in this paper, Tshitwe residents have to walk upwards of eight kilometres just to access motorized transport. It is also of interest to note that the incentive for a village to produce surplus relates to the marketability of its produce, and this in turn, depends much upon transport. Priority should thus be given to ensuring continuous and hardened tracks and paths to enable efficient cart and bicycle transport to the nearest major road. This observation is in stark contrast to the solution advocated by provincial officials of a well-engineered bitumen road.

**Gender and social exclusion**
The socio-economic survey conducted in Tshitwe indicated a clear differentiation by gender in terms of access to the means of production, such as land, agricultural implements, livestock and extension services, as well as finance, information, training and markets, which impacted negatively on women’s socio-economic pursuits. The foregoing notwithstanding, a woman’s day in Tshitwe consists of upwards of eighteen hours of activities which sustain the household, but which are less central to the market, such as collection of water and firewood, subsistence farming, and informal sector activities.

And, because these activities are invisible, particularly in the eyes of policy makers who then become conveniently unaware of the technical and support services needed, women, some of whom are the sole household bread winners, invariably suffer as inaction is institutionalised. This has been exacerbated by the fact that in rural South Africa, more than sixty-three per cent of women live in poverty. It is thus critical to classify women as an explicit target group for purposes of instituting specific measures (Lacher & Dikito, 1991).

Impact of poor accessibility

Poor accessibility levels as perceived by the villagers and the lack of transport services have negatively affected them in many ways. For instance, although the majority of respondents indicated that they would have liked to travel further afield to improve their lot in such endeavours as marketing their products, services and labour to a wider and diverse market, as well as undergoing further education and training, it was not always possible because of accessibility problems. This is particularly the case with women. This latent demand for transport, which is invisible to market forces because it is not manifest, remains unfulfilled. Inaccessibility thus breeds a vicious cycle founded on poverty and nurtured by inaccessibility. It is thus not surprising that in view of the woefully inadequate access to socio-economic opportunities, most respondents showed a willingness to permanently emigrate to other areas where these opportunities are perceived to exist.

Scope for small, medium and micro enterprises

Small, medium and micro enterprises [SMMEs] constitute a link between traditional and modern, between rural and urban and between those who have very much and those who have very little. The lack of adequate roads and transport services makes travel too cumbersome and time-consuming for women to profitably engage in economic activity involving travel. Consequently they often lack access to markets and are unable to participate in wage labour or trade or access the health care system. However, enterprising Tshitwe women were able to sell various goods and services for local and foreign personnel working on the project largely because there is not much start-up capital required. However, they are unable to access credit to undertake small enterprises beyond petty food vending or for agricultural inputs for a variety of reasons, including the fact that Tshitwe women are functionally illiterate; lack financial education; are unable to present projects in a way acceptable to financial institutions; are not used to banking language and requirements; and are bound by restrictive family regulations. These factors have conspired to elevate informal sources of credit, such as family borrowing, savings, savings clubs, friends, unscrupulous money lenders, to favoured status.

Women’s propensity and opportunity to participate

Tshitwe women generally have limited savings because they often spend most of their meagre resources on the daily necessities of the household, which means that affordability of labour-saving
devices is heavily compromised. Their access to credit was limited largely because their creditworthiness, in the eyes of formal institutions, is either weak or non-existent, which negatively influences their ability to afford and access transport, thereby accentuating their isolation. In many such households, children, particularly girls, became, of necessity, labour resources from an early age, leaving little time for other activities that could positively influence their formative years. Thus women’s propensity and opportunity to participate in socio-economic activities is influenced and ultimately limited by the inadequacies of opportunities for participation occasioned by their isolation.

In addition, women are at a disadvantage, both in their ability to utilize family savings, even savings they might have, ironically, accumulated themselves, to access credit to finance investment. This should be viewed against a backdrop of a traditional land tenure system that discriminates against women in the sense that land in communal areas is invariably allocated to male members of the household. This is worsened by the fact that divorced women tend to have no right to the land they had been cultivating whilst married. It is contended that, without the financial inputs necessary to leverage meagre cash holdings and to purchase inputs, women will continue to work at inefficient levels. It is thus critical to encourage and strengthen financial clubs dominated by women, which could be used as a substitute for collateral; finance long-term investment in agriculture and the informal sector; provide a cushion for economic down-turns and income gaps; and serve a function similar to a line of credit to provide for liquidity. This is the essence of traditional self-help relations.

**Infrastructure development**

Under conditions of small scale agriculture as is characteristic of Tshitwe, a functioning infrastructure is, on the one hand, a precondition of access to inputs and information, as well as for the sale of market produce. On the other hand, a minimum infrastructure is a precondition for the implementation of a poverty-oriented development strategy because this sector frequently presents the only opportunity for additional jobs with consequent multiplier effects in the short-run. Clearly, the choice of response measures is critical to the success of intended rural projects. Interventions should focus not only on the improvement of the physical infrastructure, but also on the means of transport, land use-transport planning and quality of services. This should be done within the ambit of integrated rural development through a multi-sectoral approach which starts with the condition of the poor, their resources, aspirations and problems.

**CONCLUDING REMARKS AND RECOMMENDATIONS**

In conclusion, it is clear from the study that the provision of infrastructure and services in remote and sparsely populated areas, such as Tshitwe, which are economically not well-endowed, is not only cost-inefficient, but also only marginally improves the economies of these settlements. The value-for-money concept is thus not maximized. What is of interest in terms of spatial reorganisation though, is that a significant proportion of the Tshitwe population is willing to give up its current life to settle in areas with better opportunities. Without reading too much into such an opinion, it may well be that spatial reorganisation of the rural communities, with a view to matching the resource base of the province with the population distribution, could be implemented with the support of the communities.

The project reviewed in this paper reflects a preoccupation of policy makers with high technology fixes
and efficiency rather than the thorough examination of the needs of the beneficiary communities. The latter could have resulted in a different, less expensive, but more sustainable gender-sensitive solution to the same problem. It is thus critically important to realise that ignoring, underplaying or misunderstanding gender differences in the economy of the household, and by extension of the village, could lead, as is currently the case in Tshitwe, to expensive and irrelevant development projects. It is also necessary to target interventions not only with regard to improvement of the physical infrastructure [where the roles of all types of infrastructure are recognised], but also on the means of transport [including non-motorised transport modes], and the quality of services. This should be done within the ambit of an integrated rural development framework by way of a multi-sectoral and gender-sensitive approach which starts with the condition of the poor, their resources, aspirations and problems.

Finally, a strand of thought that filters through this paper is that Tshitwe women share specific problems related to their unequal access to resources and services and their relatively limited participation in public life, with their responsibilities as custodians of basic household livelihood predominating. Thus strategies tailored to women’s specific needs and circumstances can make an important contribution to meeting both their practical and strategic needs. It is therefore necessary to develop policy guidelines and strategies for the various levels of government for including women in the assessment of their own transport needs. This would improve the planning, dissemination, and implementation of transport solutions with a view to ensuring that women’s transport needs are addressed. It is also critical to specifically train officials to be sensitive to gender issues.
REFERENCES


URBAN POVERTY AND EMPLOYMENT PROMOTION THROUGH COMMUNITY INFRASTRUCTURE UPGRADING

The cases of Hanna Nassif & Tabata Projects in Dar es Salaam

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Cairo, Egypt
Abstract

Poverty is not only the major cause and consequence of environmental degradation, but also one of the sources of social ills, upheaval and political instability currently prevalent in many African countries. According to UNFPA estimates, 42 percent of the urban population in sub-Saharan Africa lives below the poverty line (UNFPA 2000). Over the last three decades, urban poverty has been increasing, making living conditions for most urban settlers in the sub-Saharan region miserable. Alleviating poverty has therefore become one of the top priority tasks confronting most sub-Sahara African countries and the Third World in general.

The construction industry can significantly contribute towards the alleviation of poverty through the deployment of abundant human resources in meaningful employment and income generating activities. Reflections on the performance of the Hanna Nassif and Tabata community labour based infrastructure improvement projects support existing evidence that infrastructure projects have substantial capacity to increase employment among low-income urban communities. However, unless concerted efforts are taken to mainstream the labour-based approach in community infrastructure projects, and re-orient the current generation of technocrats (including engineers and other key actors), the adoption of labour intensive approaches shall continue to face challenges. Reorientation is a precondition to the employment potential inherent in the construction industry meaningfully contributing towards poverty alleviation. The key players comprise donors, training institutions, professional bodies and policy makers.

1. Introduction

With a population of nearly 30 million, a low per capita income of US$120 (1996) and a life expectancy of 51 years at birth, Tanzania is ranked as the third poorest country in the world. It is also amongst the most rapidly urbanising countries. Table 1 shows that the urban population has been almost doubling every ten years. Presently, approximately 41 per cent of the population live in urban areas. It is anticipated that by the year 2010, about 50 per cent of the population in Tanzania will live in urban areas.
Factors that contribute to high urban population growth rates include high natural birth rates, declining mortality rates, and slow adoption of family planning (birth control) measures. Sustained rural-urban migration, which results from “push and pull” factors (Holm, 1995), also contributes to high urban population growth rates.

In 1967 there were 21 urban centres in Tanzania (i.e. areas with at least 5,000 inhabitants). The urban population was hardly 700,000, equivalent to 5.7 per cent of the total population. By 1978 and 1988, the total urban population had soared to 12.8 per cent and 27.7 per cent respectively, while the number of urban centres increased to 62 and 281 respectively (URT 1996). Between 1980 and 1991 the urban population in the country grew by 10.1 per cent per annum. This was the highest growth rate amongst low-income economies (WB 1993:298). While high population growth rate was sustained, the overall performance of the national economy was poor.

Consequently, the urban scene in most urban centres is characterised predominantly by poor quality of life and environment, increased misery and lack of basic urban services. All of these depict increased poverty amongst most urban households. Macro-economic policy reforms, including structural adjustment programmes and the elimination of public subsidies on medical services, education and transport, have worsen living conditions in Third World cities. Dar es Salaam is no exception (Rakodi 1995: 407; Beall 1995:433; Kombe 1995; Habitat 1996:92; Wangwe 1999).

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Table 1: National Urban Population and Growth Rates (in %) 1948 – 1996

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total National Population</td>
<td>7,480,500</td>
<td>8,788,500</td>
<td>12,231,342</td>
<td>17,036,449</td>
<td>22,533</td>
<td>28,104,673</td>
</tr>
<tr>
<td>Total Urban Population</td>
<td>197,266</td>
<td>316,072</td>
<td>677,780</td>
<td>2,203,000</td>
<td>6,250,173</td>
<td>11,749,820</td>
</tr>
<tr>
<td>% of Urban Population</td>
<td>2.4</td>
<td>4.7</td>
<td>5.7</td>
<td>12.8</td>
<td>27.7</td>
<td>41.8</td>
</tr>
<tr>
<td>Urban Growth Rate %</td>
<td>6.9</td>
<td>6.5</td>
<td>11.3</td>
<td>11.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Urban Poverty and Its Manifestation in Tanzania

Past attempts to study urban poverty have adopted the Poverty Line (PL)\(^1\) as a measure of the degree of poverty in the community (Rakodi 1995:408). Poverty has been categorised as absolute or relative. Absolute poverty is associated with the lack of subsistence food; relative poverty refers to unsatisfied basic needs (Shubert 1996:3). The Poverty Line as a measure of poverty has, however, come under attack because it fails to capture the intensity or political dimension of poverty, including aspects such as households’ or individuals’ inability to participate in the decision making process, illiteracy or ill-health. Besides, the use of PL to differentiate the poor from the non-poor is an over-simplification of a phenomenon that is highly complex and varied (UNCHS 1996:108).

Urban poverty can be characterised by several factors including rising unemployment in the formal sector, falling real wage income, growing malnutrition, growing dependency (including indebtedness), low life expectancy, and a high level of infant and child mortality.\(^2\) Other manifestations of poverty are proportionally higher expenditure on food, increasing vulnerability to social and economic problems (begging, street living etc.), illiteracy, falling access to basic social infrastructure and health facilities, and overall deterioration of housing conditions, including overcrowding (Kironde 1996; Mehta 1996:56; Rakodi 1995:411).

Most of these indicators are prevalent and have been intensifying in many urban areas in Tanzania. As poverty has increased among urban households, societal norms and social values including security and health have been eroded.

In order to obtain further insights into the scope of urban poverty in Tanzania, its manifestation is outlined below:

- **Raising unemployment in the formal sector**

The 1990 – 1991 Tanzania labour force study estimated that there were 8.9 million people aged between 15 and 64 who were economically active, about 10.7 per cent of whom were unemployed. Wangwe and Tsikata (1999) note that the proportion of economically active labour force has been growing at a higher rate than population growth. For instance, between 1978 and 1988 it grew by 3.2 per cent and in the 1990s it was estimated to be growing at a rate of over 3 per cent, whereas the national population growth rate was 2.8 percent. During the same period, the dependency ratio also increased (ibid.).

In 1992 the Ministry of Labour and Youth reported that about 700,000 people enter the labour market annually, but only about 30,000, obtain employment in the formal sector. The World Bank (1996) estimates that between 400,000 and 600,000 new job seekers enter the market per annum in the

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1 Poverty Line refers to the divide line between the poor and the non-poor. The cut-off point is the minimum necessary per capital monthly/daily expenditure. Although figures may differ depending on calorific intake, local norms and the prices, most discussions refer to 1US$ per day as the minimum per capita expenditure (Kironde 1998).

2 Expansion of the informal sector activities has also been reported as an indicator for urban poverty (Kironde 1996). This position is contestable because the escalation of informal activities may be a characteristic of economic diversification rather than an indicator of increased urban poverty.
country. Differences in figures apart, the fact remains that only a small proportion (i.e. between 4 and 7 per cent) of the job seekers are absorbed in the formal sector.

Whilst the capacity of formal employment sector has been dwindling, informal sector activities have been increasing. It is estimated that the informal employment sector has a capacity to employ about 62.5 per cent of the annual increase in the labour force, while the formal sector can absorb only 8.5 per cent (URT 1997). A recent ILO report (1999:4) shows that with a few exceptions, overall unemployment has been increasing in sub-Saharan Africa and wages have steadily declined. Tanzania is one of the countries in the region whose urban informal sector caters for more than 50 per cent of total employment (Ibid.). The 1991 informal sector survey in the country confirmed this, reporting that 56 per cent of the total urban employment was engaged in the informal sector.

- **Decline of real wages for the majority of urban settlers**

Real wages for the majority of urban dwellers have been declining, while prices for food have been increasing (Kironde 1996 citing Mtatifikolo 1994; WB 1989). Citing Stein, Kironde (1998) adds that wages in Tanzania declined by 65 percent in real terms between 1974 and 1988. Furthermore, between 1970 and 1988 the price index increased tenfold. Because most households in Tanzania spend around 70 per cent of their income on food, the impact that declining real wages has on households and individual survival in the monetarised urban economy are worsened by severe cuts of public subsidies on food and social services, including health, education and transport. In 1980, the minimum monthly income for salaried employees (i.e. TShs. 470/=) could buy about 190 kilogram of beans, the main source of protein for most urbanites. In 1999, the minimum monthly salary could buy at most half the 1980 amount (i.e. between 70 and 90 kilograms depending on the season and place). Wangwe and Tsikata (1999) report that over the 1975 – 1987 period, average real wages declined by 13.7 percent per annum. This trend continued in the 1990s (Ibid.). Similar trends were reported in other East African countries. For instance, in Uganda, the real wage fell by 90 percent between 1972 and 1990. The real wage could buy only a quarter of a family’s food needs. Suffice to note that the intensification of social ills in recent years including crime, prostitution, divorce and child labour in urban centres are largely a consequence of increasing household economic hardships. Massive retrenchments, divestiture and the overall reduction of employment in public sector have exacerbated impoverishment of the urban households. Between 1993 and 1996, 61,000 workers were retrenched from the government employment sector (Wangwe and Tsikata 1999).

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3 Over the 1991 – 1995 period, informal employment sector in Dar es Salaam, the Primate City increased by about 9.5 percent i.e. at about 2.4 percent per annum.

4 Schubert (1995:501) citing World Bank notes that households which spent more than 60 per cent of their total expenditure on food fall in the absolutely category.


6 Kironde citing Wagao and Kigoda (1993) asserts that in the past one member in a family earned enough income to feed the family. In recent years more households members, including women and children, have been forced to work or take up income generation activities in order to boost family income.
Declined access to basic social infrastructure services

With a barely 10 million people living in urban areas, Tanzania is amongst the countries with the highest proportion of urban population living in informal or unplanned settlements. Most of the informal settlements are without access to clean water, good access, adequate shelter, sanitation, drainage or effective solid waste collection and disposal systems. In most urban centres, only a small fraction of the solid waste generated is collected. It has been reported that about 30 per cent of the urban population has no portable water (Hoek-Smit 1991). Discussing the role of municipalities in dealing with urban poverty in Tanzania, Kironde (1988) reports that the proportion of the population with access to safe water has declined since 1967. In urban areas, the proportion declined from 90 per cent in 1969 to 55 per cent in 1993 (Ibid.). Unfortunately, it is the poor who suffer the most in terms of poor health and loss of economic opportunities resulting from lack of basic infrastructure services (WB, 1999:27)

Proliferation of informal and slum settlements

One of the glaring manifestations of urban poverty is the excessive proliferation of informal and slum settlements. As shown on table 2, between 40 and 80 per cent of population in most cities and towns in Tanzania are accommodated in informal settlements. The shortage of planned and serviced plots, coupled with the failure by the formal public sector to provide sufficient suitable sites for building and affordable rental accommodation, are some of the key factors fuelling the rapid growth of informal housing.

Table 2: Proportion of Unplanned Settlements in Selected Urban Centres in Tanzania

<table>
<thead>
<tr>
<th>Name</th>
<th>Jurisdiction Area in Kilometres</th>
<th>Built-up Urban area in Hectare</th>
<th>Unplanned Area in Hectare</th>
<th>Ratio Unplanned to Built-up in %</th>
<th>Population in Unplanned Area</th>
<th>Population in Unplanned Area in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dar es Salaam</td>
<td>1,393</td>
<td>14,878</td>
<td>5,197(1992)</td>
<td>35</td>
<td>1,400,000</td>
<td>70</td>
</tr>
<tr>
<td>Mwanza</td>
<td>1,277</td>
<td>8,675</td>
<td>944(1996)</td>
<td>11</td>
<td>213,646</td>
<td>58</td>
</tr>
<tr>
<td>Arusha</td>
<td>9200</td>
<td>9,198</td>
<td>3,493(1992)</td>
<td>40</td>
<td>76,332</td>
<td>68</td>
</tr>
<tr>
<td>Mbeya</td>
<td>184</td>
<td>4,400</td>
<td>1,843(1990)</td>
<td>42</td>
<td>114,380</td>
<td>86</td>
</tr>
<tr>
<td>Morogoro</td>
<td>110</td>
<td>5,345</td>
<td>275(1996)</td>
<td>5</td>
<td>63,000</td>
<td>44</td>
</tr>
<tr>
<td>Dodoma</td>
<td>2618</td>
<td>4,733</td>
<td>681(1994)</td>
<td>14</td>
<td>42,001</td>
<td>45</td>
</tr>
<tr>
<td>Tanga</td>
<td>360</td>
<td>4,025</td>
<td>356(1992)</td>
<td>9</td>
<td>57,703</td>
<td>38</td>
</tr>
<tr>
<td>Iringa</td>
<td>162</td>
<td>5,980</td>
<td>679(1990)</td>
<td>11</td>
<td>26,848</td>
<td>38</td>
</tr>
<tr>
<td>Tabora</td>
<td>117</td>
<td>6,278</td>
<td>683(1996)</td>
<td>11</td>
<td>92,175</td>
<td>82</td>
</tr>
<tr>
<td>Moshi</td>
<td>77</td>
<td>5,679</td>
<td>346(1992)</td>
<td>6</td>
<td>16,715</td>
<td>16</td>
</tr>
</tbody>
</table>

Efforts taken so far to check the proliferation of informal (unplanned) settlements have largely proved ineffective.

3. Poverty Alleviation Initiatives

The increasing incidence of urban poverty and its manifestations, in particular unemployment, has been one of the key issues of concern to policy makers and bureaucrats alike. In Tanzania, unprecedented efforts have been taken, mainly focused on employment and income generation. Some of the measures are:


  The act denounced loitering in urban areas and legislated that all able persons must engage in productive employment. Through this Act the government embarked on resettlement projects for urban people to engage in agricultural activities in selected rural areas. This policy has not had a significant impact so far (Mjema 1999). The strategies used by the government to execute the provisions in the Act, have subjected people to state coercion (Kironde 1996). This may have evoked a negative attitude towards farming work, thus limiting the achievements of the Act.


  These are recent policy developments, which are still to be fully operationalised, mainly due to lack of sufficient resources. In the short term, economic reforms including the restructuring of public institutions have impeded employment promotion strategies envisaged in the 1997 policy. However, in the long run the reforms are expected to have positive results (URT 1999).

- **Establishment of a National Income Generation Programme (NIGP)**

  This is a programme which was established by the government with the support of the UNDP and other donors to create employment and income through the mobilisation of resources for supporting micro-enterprises, small business activities, petty trade, farming construction and the improvement of economic infrastructure such as roads, drains, and markets. By pioneering the improvement of basic infrastructure through labour-based approaches, NIGP has been one of the key actors in the urban poverty alleviation campaign in Tanzania. As will be discussed shortly, the labour-based community infrastructure improvement approach has been successfully tested in Hanna Nassif, where thousands of man-days of employment were generated.

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7 There are also other institutions both in the Public and Private sector that are involved in poverty alleviation. These include IPP (SKUVI) and VETA (Training of Artisans).
4. Community Infrastructure Upgrading vs. Poverty Alleviation

Before 1993, most of the strategies for improving community infrastructure services in urban low-income housing were based on the top-down approach. For instance, all the squatter upgrading site and service projects which were undertaken in the country during the 1970s and 1980s, with a financial assistance from the World Bank, were implemented by the central government agencies and contractors with little or no active participation of the respective local governments or communities. Subsequently, these projects failed to significantly respond to the “shelter and employment needs” of the urban poor as envisaged and stated in the project document. Besides, they lacked a local base and local support. Low levels of participation, and the subsequent lack of support from beneficiaries, are the key factors that have impeded government efforts to eradicate poverty (URP, 1998).

In 1994, the community-based, labour intensive infrastructure improvement approach started as a pilot project in Hanna Nassif, Dar es Salaam. One of the main objectives of the project was to create employment and generate income. The phase I project ended in 1996. In 1997, the phase two project commenced. Parallel with this project, there are other on-going community infrastructure-upgrading projects in the city. These include the Kijitonyama and Tabata feeder roads projects under the CIP, and the Buguruni low cost sanitation project implemented by Plan International. The Community Infrastructure Programme Unit (CIP) of the Dar es Salaam City Council (DCC) is the organisation coordinating and supervising infrastructure improvement projects in the city.

4.1 The Hanna Nassif Project: An Overview Socio-economic context

The Hanna Nassif unplanned area is one of the over 54 informal settlements in the city. It is located 4km from the city centre. It covers 45ha, accommodating 22,000 people living in over 2,200 households. The inhabitants are predominantly low-income, with very few middle-income earners.

Using labour-based construction methods, community contracts and in partnership with local communities, the Phase I project (1994-1996) improved several storm drains, roads and footpaths. In so doing, about 70% of the flooding problem prevalent in the area was resolved. A total of 24,600 worker-days, comprising 15,990 (65%) man-days and 8,610 (35%) woman-days were generated over the two-year project period.

Owing to the impressive results of Phase I, and in order to further consolidate the achievements, the Phase II project started in 1997. One of the key objectives of Phase II was to consolidate the use of employment/labour intensive techniques to improve basic infrastructure including stormwater drains, roads, water supply and low cost sanitation. The total initial budget for Phase II was about US$1 million, of which UNDP contributed nearly 75 per cent. The balance was contributed by the Ford Foundation, the Hanna Nassif Community and UCLAS. The key stakeholders in the Phase II, and their roles, are as outlined below.

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8 For details on the objectives of the upgrading projects see World Bank (1997:11).
• Key Actors and Project Execution Process

The main actors in the project and their roles are as outlined in table 3.

Table 3: Key Actors and their Roles

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Local Community Organisation CDA | - Mobilises and sensitises the residents and resources  
- Executes community contracts  
- Procures construction materials – sand, aggregates and cement  
- Selects and pay workers  
- Participated in selection of contractor  
- Selects supplier of construction materials | CDA has participated in all stages of the project including problem identification, design and implementation |
| Dar es Salaam City Council | - Chairs Project Steering Committee Meeting | Provides overall guidance and support |
| UCLAS | - Implementing agency  
- Trains CDA & Community as a whole  
- Provides technical support including quality control | Overall co-ordination-technical and financial resources |
| ILO | - Associate agency | Provides technical support |
| NIGP/UNDP & Ford Foundation | - Major Funding Agencies  
- NIGP (participated in tendering and monitoring processes) | Ford Foundation is also supporting the credit scheme |

In the Hanna Nassif project, it was envisaged that poverty alleviation would be realised through the adoption of labour-intensive strategies in the construction activities, training and imparting technical skills among the communities. Therefore, whilst the agenda is to improve basic housing infrastructure services, recognition and mitigation of poverty problems form a primary objective of the project.

By learning labour-based skills, many under-employed youth, both men and women, have found employment opportunities on the project. To date, most of the civil works, including the construction of drains, water supply and some gravel roads have been constructed. The equipment used includes shovels, hoes, headpans, wheelbarrows, hand-rammers etc.
It is worthy to also note that, even though several stakeholders from both within and without the area are involved in the project, the Community Development Association (CDA) in Hanna Nassif has played the pivotal role at all stages of the project including problem identification and prioritisation, planning, design and implementation. The CDA has also played an active role in mobilising residents to contribute in cash or in kind e.g. negotiating with landowners to freely contribute land required for utility services, negotiating and arbitrating disputes, as well as marshalling political support necessary to facilitate decision making, particularly during the critical project implementation stages.

Tasks such as procurement of construction materials and equipment, administration of funds allocated to specific packages, negotiations and signing of community contracts, recruitment of labour and payment were activities also undertaken by the CDA. Resource inputs (size of the workforce, materials execution time and costs) were estimated and agreed upon with the CDA construction on committee. Admittedly, very few, if any, employment opportunities were created from these engagements. But these activities facilitated capacity building, particularly enhancing confidence amongst the community leaders.

- **Main Project Achievements**

The main project achievements are summarised as follows:

- Construction of 150m outfall (1+2) – using gabion wires.
- 4,500m of side drains built
- 27,000 worker days (employment) generated
- 2.0 km of gravel roads built
- 3,200m water supply pipelines and five water kiosks built
- Key community members have been trained to manage the water vending kiosks.
- Three women’s groups from the project area have been contracted by the City to manage solid waste in Hanna Nassif and other parts of the City.
- The credit scheme, with repayment of over 95%, has been successfully operated for over 4 years. 180 women and 92 men have had access to the credit facility.

Unprecedented efforts have been taken to build the local capacity of the inhabitants in the project area. Many residents have been trained and have acquired construction and plumbing skills. By empowering the CDA to take the lead in the construction of the infrastructure, a high sense of ownership has been generated. Most residents identify themselves with the improved civil works. Local capacity to undertake similar projects elsewhere has been created. Already a number of residents, who were trained through the project, have found jobs in the construction industry in other areas in the city.

- **Popular Participation and Community Training**
As outlined earlier, substantive participation of the residents in all stages of the project constituted a critical factor from the inception of the Hanna Nassif project. Subsequently, extensive animation and mobilisation of residents were some of the key assignments, which have been continuously undertaken. Parallel with this, training sessions were conducted to prepare the Community Development Association (CDA) leaders to appreciate and take over their roles in the project implementation, operation and maintenance. Also, deliberate efforts have been taken to empower the CDA, and put in place a mechanism for transferring some responsibilities to the local government leaders at Ward and Mtaa levels. By exploring and forging the partnership arrangements with grassroots leaders, the powers of the CDA have been consolidated, and a mechanism for enforcing locally evolved by-laws put in place.

Income generating activities including water vending, credit-scheme facility and secretarial services are operational and may become sources of income necessary to sustain CDA activities. Revival of the road toll will remarkably enhance resource mobilisation required for maintenance.

The Hanna Nassif Project exhibits important features emanating from the very conception and planning of the project. From the outset, the project was initiated with full community participation and with local institution-building in-mind, which seems to have enhanced linkages with the actors at the grassroots. The animation campaigns and periodic seminars conducted by the Technical Support Team (TST) have consolidated horizontal linkages at the local level. The credit-scheme facility has been an instrumental tool and important stimuli for residents’ participation. This facility also helped to further legitimise CDA’s role in the community.

4.2 The Tabata Project: Main Features of the Project

Socio-economic context

The Tabata Community infrastructure project comprises improvement of the local and feeder roads in an area covering 171 hectares, with a total population of 13,700, living in 2,283 households. Like Hanna Nassif, the owners occupy most of the houses, but 50% of the housing stock accommodates tenants. Most of inhabitants are self-employed, mainly in petty trading activities. The settlement is occupied predominantly by low-income people (Kyessi, 2000).

The road improvement project owes its history to the formation of the Tabata Development Fund (TDF), a community organisation (CBO) which was established 1989. The TDF started as a pressure group, primarily to mobilise residents to pressurise the City Council to close the nearby waste dump, which was increasingly becoming a nuisance and a threat to public health due to air pollution.

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9 The project team included three animators, one of them being full time in the field.
10 This is part of the World Bank funded Urban Sector Infrastructure Rehabilitation Programme (USIRP) in the country. In Dar es Salaam, the programme includes Tabata and Kijitonyama Projects.
After the registration of TDF in 1993, the organisation assumed full responsibility for spearheading community infrastructure improvement in the area. Since its formation, TDF has successfully initiated and embarked on a number of initiatives geared towards improvement of community well being. Such initiatives include water supply, tree planting, drainage and road improvement projects.

The decision to embark on road improvement (including side storm drains) as the key priority issue emanated from the interviews conducted by TDF among the residents. Through collaborative efforts of the Dar es Salaam City Council (DCC) and the Prime Ministers Office (PMO), the World Bank (WB) agreed to provide financial support to the project.

The entire project involves construction of a bitumen (local) road measuring three kilometres and gravel (feeder) roads measuring 5.2 kilometres. The construction of the local road was done by KONOIKE (a class I contractor) and is completed.

The total cost of the project is estimated to be TShs.774 million. Out this, Tshs.570 million is for gravel roads. The residents are required to contribute 5 per cent of the cost i.e. TShs. 38.7 million. The World Bank is providing 85 per cent and the Government of Tanzania 10 per cent. The project was scheduled to start in November 1996, but because the government did not contribute its share on time, construction of the bitumen road started in January 1999 and construction of gravel roads started in March 2000. For the purposes of discussions here, reference will only be made to the feeder roads improvement component.

**Key Actors and Project Execution Process**

The key actors involved in the feeder road project improvement are: the Project Steering Unit (PSU) of the Prime Ministers’ Office (PMO); The Community Infrastructure Programme (CIP) Unit of the City Council; the Tabata Development Fund (TDF); the World Bank (WB); the Contractor and the residents. The roles played by these actors are as summarised on table 4.
### Table 4: Key Actors and their Roles

<table>
<thead>
<tr>
<th>Actor</th>
<th>Role(s)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEDCO</td>
<td>Prepared the engineering designs</td>
<td>Not significantly involved in the implementation</td>
</tr>
<tr>
<td>Prime Ministers’ Office (PMO)</td>
<td>- Main negotiator for the WB financial support.</td>
<td>Chairs the Project Steering Committee for all Urban Sector Rehabilitation Programme (USRP)</td>
</tr>
<tr>
<td>USRP</td>
<td>- USRP pays the contractor</td>
<td>CIP project engineer issues certificates</td>
</tr>
<tr>
<td>DCC &amp; CIP</td>
<td>- Project supervision and Co-ordination (CIP)</td>
<td>CIP links the TDF with the financiers</td>
</tr>
<tr>
<td></td>
<td>- Tendering and appointed the Contractor (CIP)</td>
<td>DCC chairs the project steering committee meeting</td>
</tr>
<tr>
<td>TDF</td>
<td>- Identified priority infrastructure improvement issue</td>
<td>- TDF is the main initiator of the project. Their role in the implementation is however, limited. TDF is more or less an on-looker.</td>
</tr>
<tr>
<td></td>
<td>- Evolved strategies to solicit/mobilise financial support from within the community and without.</td>
<td>- Weak working relationship between the key actors. TDF vs. contractor; TDF vs. CIP</td>
</tr>
<tr>
<td></td>
<td>- Mobilise residents to contribute in cash (5%)</td>
<td>- TDF leaders feel marginalised or by-passed in critical decision-making stages of the project. Their involvement in performance monitoring role if informal.</td>
</tr>
<tr>
<td></td>
<td>- Monitors contractor performance and report anomalies to the CIP.</td>
<td></td>
</tr>
<tr>
<td>Contractor Chinese Geo-Engineering</td>
<td>- Sole contractor for the feeder roads improvement</td>
<td>Retains the discretion on the choice of casual labourers, and tools to be used and size of work.</td>
</tr>
<tr>
<td></td>
<td>- Selects casual workers</td>
<td>The gravel road improvement includes provision of culverts, 5.2km road and 5.2km side drains.</td>
</tr>
<tr>
<td></td>
<td>- Decides on the task rates and payment modalities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Purchases all the materials</td>
<td></td>
</tr>
<tr>
<td>World Bank</td>
<td>- Funding agency</td>
<td>Participates in the Project steering committee meetings</td>
</tr>
<tr>
<td></td>
<td>- Participated in the selection of the contractor</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Discussion with TDF leaders, September 2000

Although TDF is the local institution that initiated the project, and the organ representing the community, it was not involved in the negotiations and other critical decision making stages that preceded the selection and appointment of the contractor.
TDF had also proposed that execution of the feeder roads component should be undertaken by the labour-based approach so as to create employment for the abundant but unemployed youth in the area. TDF leaders elaborated this position in an interview:

“We can understand the rationale for granting M/S KONOIKE to construct bitumen road for it requires heavy equipment, high technical and managerial competence. But why do we need to engage a contractor to undertake the construction of side drains or gravel feeder roads which we have all along repaired ourselves without a contractor. TDF has a technical committee with competent people including engineers. But, CIP engineers do not trust us. They engineers even tendered out the construction of this building (referring to newly built TDF offices). We complained about this, because we thought TDF could do this, but our complaints did not help. Fortunately, the lowest bidder quoted TShs. 48 million whereas the budget ceiling was only TShs. 15 million. It was therefore resolved that the work be undertaken by the TDF. There are many artisans (masons and carpenters) in Tabata. But CIP engineers think that because they are not graduates, they cannot do a good job”.

Asked what the specific measures were that the TDF took to impress upon the CIP to adopt labour-based methods in the implementation of the feeder road component, the interviewed TDF leader noted: “TDF was very keen to emulate what our colleagues have done in Hanna Nassif. We know and have visited Hanna Nassif. CDA leaders have also visited our project. We know how the residents have benefited from the project. We wanted to be contracted to implement the project. However, the implementers (meaning CIP engineers) were not interested. Our views were not considered. Decision to engage a contractor was made without involving us (TDF). To date, we do not exactly know who made this decision. We are simply told “….the financiers (WB) agreed that a contractor is awarded the work. You know once a contractor is appointed, he simply does what is in the contract. We can therefore do nothing at this stage”.

Asked whether TDF is involved in the mobilisation of casual labourers or negotiation of task rates, interviewed TDF leaders hastily responded:

“No, no the Chinese are responsible for everything. They pick whoever they want from the pool of job seekers every morning. They also decide on the terms of payment. Recently the contractor (M/S Chinese Geo Engineering) complained to us that there were residents stealing materials from their site. We could not help them because we were not involved in the agreement. We advised them to give their employees some incentive including overtime because we have heard labourers complaining that they are over-worked”.

These quotes are but a snapshot depicting the level of residents and their community organisation involvement and in the decision-making process. Even though the project is being undertaken in an area with one of the most reputable and well-organised CBOs in the city, i.e. an organisation with

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11 Discussions with Mr. Seif Mbekae, September 2000.
12 A skilled labour (artisan) is paid TShs. 1800/= (US$2.25) whereas unskilled is paid TShs.1300/= (US 1.6) per day.
13 Discussion with Mrs Lekule and Seif Mbekae, deputy TDF Secretary and treasurer respectively, September 2000.
proven (enlightened) leadership qualities and knowledgeable of local capacity, problems and priorities, the beneficiaries have not participated in the decision making processes which led to implementation of the project\textsuperscript{14}.

Even though two community members, including the TDF Chairman, are members of the Project Steering Committee, their ability to influence decision-making has been insignificant. Asked why TDF has been marginalised in the decision-making on critical stages of the project implementation, the TDF chairman observed:

“There were initial pre-contract discussions where we participated. For instance we participated in deciding the total lengths as well as the identification of the actual roads to be improved. During this period, it was also agreed that the contractor should be preferably from within Tabata. We made it clear that we wanted the feeder roads improvement component to be undertaken using labour intensive skills. To our surprise discussions were held and decision made on the appointment of the contractor, we were bypassed. As a result when the contractor hired graders, compaction rollers or wheel loader, instead of employing the loitering youths, we could not ask him. TDF did not participate in the process. After all, the meeting to appoint the contractor was held in Arusha. Therefore our views and demands were not heard. We do not know what transpired there, but we know this is a partnership project and we are contributing our part. Because residents are contributing money they expect us (TDF) to play active role on how their contributions are being used. This is not the case\textsuperscript{15}.”

In a response to the questions “how many women were employed at the working site” and “why do you prefer to use equipment such as caterpillars, rollers and loaders instead of deploying the abundant human labour available”, the contractor (project manager) commented to this author:

“ We have do not have women in our project. I prefer machines because the quality is better\textsuperscript{16}.”

This quote depicts a common misconception and a myth amongst some contractors that the labour-intensive approach is inferior and is an outdated technology and cannot therefore deliver competitive outputs.

Asked to comment on the arguments raised earlier that it is World Bank which directed that the work be executed by a contractor, the TDF chairman commented reservedly:

“If the community was given opportunity to participate in the entire process, particularly during the tendering and selection of the contractor, our voice would be heard by the World Bank representatives. I believe this would have changed their position, if it is true that the decision to hire a contractor originated from the World Bank. Our feeling is that decision making process has not been transparent”.

\textsuperscript{14} Residents’ participation is limited to the contribution of the “required” TShs. 17,000 per house-owner or plot-owner. Two members of the community including the TDF Chairman are members of the Project Steering Committee. However, the TDF Chairman acknowledges that their role in influencing decision has been insignificant.

\textsuperscript{15} Discussions with Mr. Kessi, TDF Chairman, September 2000

\textsuperscript{16} Discussions with Mr. Jerry Zon, October 2000
The implications of marginalising residents’ roles in the critical project implementation stages will most likely lead to unintended consequences. Interviewed TDF leaders and residents said that the disinterest or low willingness among most residents to contribute towards the agreed community 5 percent share of the project cost is, at least partly, due to their marginalisation in key decision making process.

Project Achievements

- Construction of the 3 kilometres bitumen road completed
- Construction of almost all storm water drains (5.2 km.) completed
- Re-shaping of some roads has commenced
- Between 900 and 1,000 man-days generated per month.
- About 30 per cent of the community contribution collected.
- 60% of the work (almost all storm drains) has been completed within an eight-month period.
- Only 2 women have been employed.

Based on the number of labourers employed per month, by the end of the project in February 2001, a total of 12,000 man-days of employment will have been provided. However, since more machines and fewer people will be engaged during the road construction stage, this figure is possibly on the high side.

Are the Project Outputs Likely to be Sustained?

It is admittedly too early to assess how the Tabata project will fair in the future. However, from the discussions held with the TDF leaders and a few community members, one is tempted to speculate that even though a memorandum of understanding exists, which commits the community (TDF) to be responsible for maintenance and operation after the construction, the future, especially the maintenance requirements of the improved infrastructure, is gloomy.

The project is yet to be successful in mobilising the required local community contribution. So far only about 30 per cent of the contribution has been collected. Since the improvement of feeder roads in Tabata is being undertaken merely as a technical exercise, with weak institutional-building dimensions, one sees limited opportunities to sustain the outputs of the project. On the whole the project implementation has not been based on organised participation! Besides, there are weak partnerships between exogenous (contractor/TDF) and local institutions (TDF/CIP).

There are already reservations and discontent amongst some residents and TDF leaders because their needs and demands were not articulated in the project. For instance, TDF leaders were recently asked by the CIP engineer to appoint an engineer from within the community to be attached to the project so as to represent or be a watchdog for the community. However, the TDF leaders declined the offer, arguing that they were not ready to take responsibility at this stage, when they have not participated in the critical stages of the project.
5. Emerging Issues and Lessons

There is increasing documented evidence, based on real life experience, of the advantages of involving local communities in development projects. The accumulated evidence of the ability of Labour Based Technology (LBT) to generate employment and income, as well as the invulnerability of its outputs, continue to challenge those who debase labour intensive approaches in favour of conventional approaches in urban infrastructure improvement works. In the 1970s and 1980s we witnessed what appeared to be an almost universal solution to unplanned housing improvement - Squatter Upgrading and Sites and Service Schemes. Soon we realised that without improving household income, improved infrastructure would be jeopardised. But, despite success stories and looming poverty, we still see today little commitment to community participation and the adoption of LBT.

From the snapshot of the two projects presented, the following observations are reiterated:

- Labour-based infrastructure improvement using community contracts can generate more opportunities for employment than private contracts. Most importantly, community-based contracts seem to be more effective in deploying human labour without gender discrimination. Women accumulated at least 40 per cent of the man-days generated in Hanna Nassif. Furthermore, about 40 per cent of the total women employed comprised either skilled or semi-skilled workers. The rest were unskilled. On the other hand, there are hardly any women employed in the execution of civil works on the privately managed contracts in Tabata. The socio-economic impacts of improving women’s income in low-income settlements such as Hanna Nassif are too many to warrant discussion here.

- Community contracts are cheaper than private contracts. A recent study in Hanna Nassif showed that the few packages that were contracted to private contractors were more expensive than community contracts by between 30 and 60 per cent. Quality and timeliness are comparable.

- Improvement of basic infrastructure, whether undertaken through a private or a community contract, is an expensive undertaking. It is an exercise that requires heavy capital investment, which often is unavailable locally. This is particularly true in low-income informal housing, because inhabitants are predominantly poor, and public resource allocation priorities for such settlements are low. Replicating what has been realised in Hanna Nassif therefore requires combined efforts involving the state, donors, communities and the private sector.

- Preconceived opinions about the quality of and outputs from labour-based works can be counter-productive. The doubts expressed by the contractor in Tabata underlines the common myth among contractors and engineers. Often, such reservations are intended to optimise personal gains or profits.

- Despite extensive animation and community mobilisation campaigns, which were conducted from the feasibility studies to the implementation of the Hanna Nassif project, maintenance remains an unresolved problem. The culture of maintenance seems to be a far-fetched concept
that will take time to rekindle. An effective mechanism for mobilising financial resources from users for undertaking routine maintenance is still to be developed. This is an aspect requiring critical appraisal in community infrastructure upgrading projects. Incorporating a “maintenance fee” in the municipal service charge collections could be one option. Such fees would be levied in all areas that have been upgraded. The collected revenue would be remitted back to the community to be used for routine maintenance.

- Comparing the two projects, one can notice that in the Hanna Nassif project, residents and CDA leaders assumed direct responsibility in the project from the very beginning, i.e. they were actively and substantively involved in the decision making processes. As a result, most of the time consuming negotiations including resolution of conflicting interests were undertaken by the CDA. It would be too ambitious and probably unrealistic to expect TDF to be in a position to address similar problems that are emerging in Tabata, because there has been neither capacity building for the local institution, nor meaningful partnership between the grassroots leaders and project implementers.

Formation or existence of a strong community organisation seems to be prerequisite to successful planning, design and execution of community-based infrastructure upgrading. It would therefore appear logical that in selecting a settlement for replication of a community-based infrastructure-upgrading project, one of the decisive factors should be existence of a strong CBO, with proven commitment, willingness and some ability to contribute cash or kind towards solving commonly problems.

**Conclusion**

As stated earlier, the inability of labour-intensive technology to compete or find zealots in urban infrastructure improvement projects is closely associated with the persisting attitudes towards LBT. Mainstreaming LBT in the urban improvement programmes would require integrated policy measures at the national level. In short, we urgently need a policy environment which requires each actor or investor (public, private, popular, donor etc.) in the urban development sector (and not least those engaged in the construction sector) to answer the fundamental question “to what extent has the programme or project alleviated poverty” i.e. how has it contributed towards employment or income generation for the urban poor?
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URT, (1997). The National Employment Policy, Ministry of Labour and Youth

CASE STUDY OF MANSHIET NASSER: LABOR-INTENSIVE PROVISION OF BASIC INFRASTRUCTURE AND PARTICIPATORY UP-GRADING OF A DENSE LOW-INCOME URBAN SETTLEMENT

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and
David Sims (BUS Consultants)

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October 2000
Cairo, Egypt
Abstract

This paper reports on an ongoing urban upgrading project of a pilot area of Manshiet Nasser called Ezbet Bekhit. The project is a collaboration of Cairo Governorate and German Development Cooperation. The implementation phase began in January 1999 and is being executed by the District of Manshiet Nasser.

Ezbet Bekhit is a mature informal settlement of 44 feddans (18 hectares) with a population of over 30,000 inhabitants. It has very high residential densities, narrow streets, difficult topography, and is lacking in most basic services. Various social indicators highlight the fact that it is one of the poorest areas in Cairo. Ezbet Bekhit exhibits characteristics which are similar to those found in the rest of Manshiet Nasser (population of over 350,000).

The Project aim is to fundamentally improve the livelihoods of the inhabitants through integrated urban re-planning, combining a number of “hard” and “soft” engineering measures which are practical and sustainable. The success of the effort in Ezbet Bekhit will demonstrate the feasibility of this form of upgrading, which could then be applied to the rest of Manshiet Nasser and to other similar informal and poor urban areas of Egypt.

The paper reviews the various aspects of the project and also discusses some of the development issues which arise from it.

INTRODUCTION

The “Participatory Urban Upgrading of Manshiet Nasser Project” involves the integrated upgrading and development of Ezbet Bekhit as a pilot area of the larger informal settlement of Manshiet Nasser. It is a joint collaboration of Cairo Governorate and German Development Cooperation.

Responsibility for project implementation has been assigned to the District of Manshiet Nasser, one of 32 districts of Cairo Governorate. Other associated entities of Cairo Governorate support the project, notably the Physical Planning Administration, the General Organization for Greater Cairo Water Supply (GOGCWS), the General Organization for Greater Cairo Sanitary Drainage (GOGCS), and the office of Vice Governor Western Zone. It is noteworthy that this is the first time in urban Egypt that the management of a donor-supported project has been decentralized to the lowest level of local administration. Cairo Governorate is shouldering a sizable share of the financial burden of the project, particularly in providing alternative housing for some families and the off-site infrastructure mains.

Two different arms of German Development Cooperation are directly involved in the Project. KfW (The German Bank for Reconstruction) has made a grant for the construction of on-site potable water and wastewater networks as well as for roads and public space improvements. GTZ (the German Agency for Technical Cooperation) is financing a program of technical assistance to the District of Manshiet Nasser as well as social facilities and community development activities. This represents one
of the rare instances in Egypt where these two arms of German Development Cooperation are involved in a single project.

The project was first scoped in 1995-96. Formal bilateral agreements were signed in 1997 (KfW) and 1998 (GTZ). The technical assistance component began in mid-1998, with GTZ in-house advisors established within the District administration by January 1999. The Project Executive Committee, headed by the Chief of the District, was formed by Governor’s Decree in August 1999. The KfW infrastructure design and supervision consultants began work in September 1999. Detailed design of the infrastructure networks and associated tender documents were completed in March 2000 and tendering announcements were published in August 2000. The detailed physical plan for upgrading of Ezbet Bekhit was submitted to Cairo Governorate in October 1999 and was approved by a Governor’s Decree in April 2000.

EXISTING SITUATION

Location, Topography, and History

Ezbet Bekhit is a sheikha of Manshiet Nasser covering 44 feddans (20 hectares) which is located at the northern extreme along the Autostrad at the intersection with Tayaran St. To the east is Duweika and to the west the tombs of Sultan Barquq (See Figure 1).

The topography of Ezbet Bekhit is characterised by sharp level differences and limestone cliffs (see Figure 2) which are the result of quarrying over the centuries. The lowest areas are at an elevation of 50 m. and the highest next to Duweika are at an elevation of 101 m.

Ezbet Bekhit first began to be settled in the late 1950's and early 1960's, mainly by Upper Egyptians who had been living and working in the nearby Darrassa -- Gamalia areas. They began by building simple houses along the Autostrad, slowly extending uphill to the east as more migrants arrived. In the late 1960's the late President Gamal Abdel Nasser ordered that water and electricity be extended to the area to serve the growing population, even though it was State land that was being encroached upon.

Population

The 1998 population of Ezbet Bekhit was estimated at 28,900 persons in 6,493 households, according to the Social Affairs Department of Cairo Governorate, which carried out a complete social survey in April-May 1998. There is some concern that the survey may have missed a number of persons, and the actual population may be in the 35,000 – 40,000 range. There is no comparable historical data, but most local information sources agree that the population has been relatively stable, especially since the stringent ban on new construction came into force in 1996.
Socio-economic Characteristics of Population

A rich amount of information on Ezbet Bekhit is available from the 1998 Social Survey carried out by the Social Affairs Department of Cairo Governorate. A summary of the more important socio-economic characteristics is given in Table 1, which shows living standard levels considerably below national urban averages.

Land Tenure

Almost all of the land in Ezbet Bekhit is State-owned and managed land. Persons who have built houses there are registered and pay a property tax (awaid) to the Revenue Dept of the Governorate, and on this basis can have water and electricity connections. But the State has the right to take and reuse the land at any time, and any new construction is illegal. Thus the tenure status is currently quite precarious and confused. There are only approximately 5 plots of land in Ezbet Bekhit for which freehold ownership has been granted. There are another 50 to 100 plots for which the ownership process has been started but frozen.

Table 1 Main Socio-economic Characteristics of the Population of Ezbet Bekhit

<table>
<thead>
<tr>
<th>Sex:</th>
<th>male: 56,10%</th>
<th>female: 43,99%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age:</td>
<td>&lt; 20: 46,89%</td>
<td>20-40: 34,81%</td>
</tr>
<tr>
<td>Regional background:</td>
<td>Upper Egypt: 78,64%</td>
<td>other: 21,36%</td>
</tr>
<tr>
<td>Average family size:</td>
<td>rural: 67,55%</td>
<td>urban: 32,45%</td>
</tr>
<tr>
<td>Educational levels:</td>
<td>&lt; primary: 60,32%</td>
<td>&lt; second.: 20,83%</td>
</tr>
<tr>
<td>Employment:</td>
<td>government: 12,20%</td>
<td>free-lance: 57,83%</td>
</tr>
<tr>
<td>Basic income:</td>
<td>&lt; 150 LE 15,25%</td>
<td>&lt; 200 LE 50,05%</td>
</tr>
<tr>
<td>M2/housing unit:</td>
<td>&lt; 10m2 8,58%</td>
<td>&lt;20m2 27,17%</td>
</tr>
<tr>
<td>Number of rooms/unit:</td>
<td>1 room 34,18%</td>
<td>2 rooms 39,15%</td>
</tr>
<tr>
<td>Kitchen:</td>
<td>private 55,61%</td>
<td>Shared 17,60%</td>
</tr>
<tr>
<td>Bathroom:</td>
<td>private 37,10%</td>
<td>shared 23,19%</td>
</tr>
<tr>
<td>Toilet:</td>
<td>private 46,65%</td>
<td>shared 43,74%</td>
</tr>
<tr>
<td>Ownership:</td>
<td>owner: 44,69%</td>
<td>tenant: 52,92%</td>
</tr>
</tbody>
</table>

Housing Types and Quality

Ezbet Bekhit contains a wide variety of housing types due to the topography and the many plot configurations. However, it is possible to classify three general types of housing structures, each of which represent roughly one third of the housing stock:

Type One: These are older structures, and tend to be on larger plots. They are all single-storey, generally with a rectangular courtyard off of which are separate rooms, each representing a
dwelling unit for a family. Rudimentary toilet facilities are shared and cooking and washing takes place in the common courtyards. The structure is usually of rubble stone and mortar load-bearing walls with small doors and windows. The roofing is usually of light material, such as wood or tree-branch beams carrying reed and mud. Most structures are built without proper foundations. This type can be considered the poorest quality housing in the area.

*Type Two:* These are mostly older structures, and tend to be on medium size plots. They are usually of two to three storeys, with one or more apartment units per floor using a common staircase. Apartment units are usually of two or three rooms, and toilet facilities are sometimes shared and sometimes private. The structure is usually of brick load-bearing walls. The roofing is usually of reinforced concrete slab. Although there is much variation, the quality of this type can be considered from poor to fair.

*Type Three:* These are mostly newer structures, and tend to be on small to medium size plots. They are usually of three to five storeys, with one or two apartment units per floor using a common staircase. Apartment units are usually of two to four rooms, and toilet/kitchen facilities are usually provided as part of the unit. The structure is usually of reinforced concrete frame with floors of integrated concrete slabs. Walls are of red brick. Although there is much variation, the quality of this type can be considered from fair to good.

### Site Problems and Analysis

The analysis of the site problems of Ezbet Bekhit has been carried out on three levels (refer to Figure 2):

**Macro Level:** This concerns the relationship of Ezbet Bekhit to the surrounding areas. One problem is that posed by the Autostrad and the difficulty for pedestrians to cross this road. Another problem is the disused railway line and embankment which makes difficult the provision of entrances to Ezbet Bekhit. Furthermore, on the east and south limits of the area are serious topographical constraints which make vehicular links to surrounding areas practically impossible.

**Meso Level:** This level concerns the area inside the *shiakh* of Ezbet Bekhit and the relationship of its three main geographical blocks -- (A) the block of El Goura, served by Salaam St., (B) the block facing the Autostrad and served by Luxor and Aruba Streets, and (C) Upper Bekhit, the elevated block adjacent to Duweika. The problems at this level are the difficulties of vehicle entry and circulation between blocks due to narrow streets and difficult slopes, insufficient sewerage and water mains networks, and the low elevation of El Goura and the subsequent collection of wastewater there.

**Micro Level:** This level concerns the problems found inside each of the three blocks, and includes (a) difficulties in providing utilities networks, (b) misuse and under-use of land, (c) street level problems, and (d) encroachment onto public ways.
Community Organisations and Main Interest Groups

The 8-member local popular council for all of Manshiet Nasser District was elected in 1997 but a court has recently declared this election void and new elections are to be scheduled. Five traditional community associations which have been established along regions of origin are found in Ezbet Bekhit, but they confine their activities to arrangements in case of death and weddings.

The main groups with conflicting interests concerning upgrading measures are house owners and tenants. While house owners would directly benefit from the upgrading process, tenants tend to favour demolition combined with the entitlement to new apartments in government housing projects. Both groups are, however, not homogeneous in themselves but are further divided into sub groups according to differences in the social, economic and educational background and affiliations with different political parties. Furthermore, women and youth should be regarded as important social groups with potentially distinct interests. Due to the prevailing traditional patriarchal values, however, they do not play a significant role in public life so far.

Infrastructure

Ezbet Bekhit is deficient in all forms of infrastructure. Although there is a potable water network and a sewerage system, the systems do not serve the whole area and in addition they are overloaded and badly maintained. Household surveys report that 59% of households have access to the public water system. The remaining households are served by neighbours sharing water or by commercial water sellers. Water pressure in the system is also low and households in the upper area receive water only during the night hours (22.00 – 04.00 hours). The level of maintenance is low and leakage from the system is estimated to be high. Due to leakages and low pressure, water in the system is frequently contaminated.

Similarly, 56% of households have access to the sewerage network. The remainder are served by septic tanks or the ubiquitous cesspits, which require regular emptying at significant cost. The existing sewers are hydraulically insufficient to cope with the amount of sewage generated and are in poor condition (clogged and silted pipes, broken manhole covers). Most have been informally constructed by the residents in their efforts to improve the health situation. Sewage overflowing into the streets is a very common problem, especially in el Goura area.

Practically no roads are paved, and many are hardly passable due to potholes and level differences. There are no sidewalks and few kerbs. The inhabitants themselves have levelled pedestrian lanes and built steps and retaining walls in some places.

The electricity system is in relatively good shape, with almost all houses having metered connections. Due to recent improvements the electrical supply to the area has been upgraded and voltage drops and power cuts are rare. There are a limited number of telephone lines in the area, but it is understood that the area’s line capacity will be significantly increased soon.
Solid waste is collected from houses and streets are cleaned through a contract with a private company under contract with the Cairo Cleaning and Beautification Authority. This collection service is considered by inhabitants to be poor. Transport of solid waste out of the area is carried out by the Authority, but this service is irregular and solid waste accumulates in many places.

**Government Administration & Social Services**

Ezbet Bekhit is one of seven shiakhas of the District of Manshiet Nasser and represents roughly 10% of the District's population. The District of Manshiet Nasser is one of 32 districts of Cairo Governorate, and it is under the supervision of the Vice Governor for the Western Zone. There are no local administrative units specific to Ezbet Bekhit, and all administrative affairs take place at the District level.

The District of Manshiet Nasser is headed by a chairman appointed by the Ministry of Local Administration. Under him are a number of executive and service departments, some of which are technically linked to governorate-level directorates or to independent authorities. The District has a vehicle fleet and a maintenance yard.

Apart from one primary school, no public services are available in Ezbet Bekhit. Several preparatory and secondary schools, a youth center, a cultural center, a post office and two health care centers providing ambulant health care are located in adjacent areas of Manshiet Nasser and serve the whole district. The capacity of these public services to cope with the large numbers of inhabitants seems to be insufficient. A few kindergartens have been established through private initiatives in the area.

**Main Problems Facing the Inhabitants**

In a series of community workshops and meetings carried out in 1998 and 1999 the population of Ezbet Bekhit listed and ranked their main problems as follows:

- insecure land tenure and uncertain future
- accumulating raw sewerage and lack of sewerage lines
- lack of basic services such as education and health
- danger of falling rocks
- accumulating garbage

**OVERALL PROJECT APPROACH**

The aim of the project is to fundamentally improve the livelihoods of the inhabitants of Ezbet Bekhit by sets of “hard” and “soft” interventions which address outstanding environmental and social problems and which, at the same time, lay the institutional bases for sustainable improvements over the long term.
This implies a strategy for the phasing of activities. Table 2 gives a schematic breakdown of project activities into roughly three phases.

**Table 2 Stages of Upgrading**

<table>
<thead>
<tr>
<th>Period</th>
<th>Main Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage One</td>
<td></td>
</tr>
<tr>
<td>(Short Term)</td>
<td>Years 1 - 2</td>
</tr>
<tr>
<td></td>
<td>• Remove houses for urgently required street space for utilities and rehouse</td>
</tr>
<tr>
<td></td>
<td>affected families</td>
</tr>
<tr>
<td></td>
<td>• Infrastructure detailed design</td>
</tr>
<tr>
<td></td>
<td>• Begin executing infrastructure</td>
</tr>
<tr>
<td></td>
<td>• Set up community representation and administrative procedures for land</td>
</tr>
<tr>
<td></td>
<td>adjustment &amp; ownership</td>
</tr>
<tr>
<td></td>
<td>• Launch community development activities, especially “trust-building”</td>
</tr>
<tr>
<td></td>
<td>activities</td>
</tr>
<tr>
<td>Stage Two</td>
<td></td>
</tr>
<tr>
<td>(Medium Term)</td>
<td>Years 2 - 4</td>
</tr>
<tr>
<td></td>
<td>• Remove houses in dangerous zones and rehouse affected families</td>
</tr>
<tr>
<td></td>
<td>• Complete installing infrastructure and begin street/pedestrian improvements</td>
</tr>
<tr>
<td></td>
<td>• Build required social services</td>
</tr>
<tr>
<td></td>
<td>• Finish landscaping</td>
</tr>
<tr>
<td></td>
<td>• Complete land adjustment and ownership and begin to issue building permits</td>
</tr>
<tr>
<td></td>
<td>• Deepen community development activities</td>
</tr>
<tr>
<td>Stage Three</td>
<td></td>
</tr>
<tr>
<td>(Long Term)</td>
<td>Years 5 - 10</td>
</tr>
<tr>
<td></td>
<td>• Private rebuilding of houses on approved building lines</td>
</tr>
<tr>
<td></td>
<td>• Community development activities continue on self-finance basis</td>
</tr>
<tr>
<td></td>
<td>• Manage local development fund</td>
</tr>
</tbody>
</table>

A core strategy in the upgrading of Ezbet Bekhit is to maximize the participation of the inhabitants of the area in all phases of the process, from the planning stage through implementation of infrastructure and roads and continuing during the development of community services. The reasons are twofold: First, from a purely technical point of view, the project objectives will be met quicker, more smoothly and at less cost with strong community involvement. Secondly, people's participation will create effective (representative) community structures and will heighten community “ownership” of improvements and thus responsibility for maintaining and improving their neighborhoods.

The ultimate aim of the Ezbet Bekhit project is to demonstrate the feasibility of this cost-effective approach which could be replicated in other similar urban areas of Egypt, and in particular the main parts of Manshiet Nasser where over 300,000 persons currently reside in poor housing and environmental conditions.

The project approach is elaborated in the following paragraphs, organized into one section dealing with
“hard” and another dealing with “soft” engineering solutions. As will be seen, there are a number of interrelations between the two.

HARD ENGINEERING SOLUTIONS -- WATER DISTRIBUTION, SEWERAGE, AND ROADS

Past studies have proven that adequate water supply and sanitation have a fundamental impact on public health. Child mortality rates are often used to demonstrate this and, on a regional basis, mortality rates of up to 200 per 1000 have been reported in Egypt in the recent past. These rates have dropped over time with the massive investment that has been made to improve public health infrastructure since the mid 1970’s. Health and mortality statistics cannot be isolated for Ezbet Bekhit, but the existing sanitation is poor and the impact on the health and life expectancy of all people in an area of inadequate sanitation are affected. Few human beings will live in squalor, with its inherent accumulations of dirt and disease, out of free choice, and inhabitants will do all within their power to improve inadequate conditions.

The only truly adequate sanitation in densely populated areas is conventional piped sewerage and water distribution systems. Alternative sanitation such as standpipes, pit latrines, septic tanks, etc. cannot cope with the density of population, lack of space and impact on the environment in an area like Ezbet Bekhit. In any event, conventional sewerage and water systems are the standard that has been adopted throughout Cairo.

Implementing these works will have a strong positive impact on the local inhabitants, that “at last something is being done to help us”. This will aid the overall perception of the project. These services will be taken for granted after a while, but, by then, the longer term “soft engineering” will have taken effect to improve the overall life style in the area.

Both water and wastewater networks will be implemented under a conventional construction contract by an Egyptian contractor. Labor intensive methods are encouraged and it is to be stipulated that 80% of the labor will be employed from within the district. Construction will cause considerable inconvenience by blocking the roads and alleyways, but experience on similar projects have shown that inhabitants are prepared to accept this and participate for the benefits that they will receive – improved health, living conditions and environment.

The water supply is designed in two pressure sub-zones. The lower area will be supplied from an 800mm main running along the Autostrad which is already under construction by the GOGCWS. The upper area will be supplied from a separate main in Tayaran Street. The system has been designed according to Egyptian codes and GOGCWS requirements, and GOGCWS will adopt and operate the system on completion. The requirement to provide for a fire fighting flow of 30l/s determined the minimum pipe diameters. The system as designed includes 9,570m of distribution pipes (DN100 – DN400) and 1,660 house connections.
The sewerage system is designed as a gravity system, connecting to a 1800mm diameter collector under final stages of construction in the Autostrad. The lower El Goura area cannot be connected directly by gravity and a pump station of 66l/s capacity is included to serve this area. Also, various individual houses could not be connected by gravity due to the difficult topography. 12 mini lifting stations have been included in the project to serve these houses, but the final solutions at each location will be determined on site in consultation with the contractor (what is practical) and the house owners / occupiers (what is acceptable). The system also includes 8,532m of gravity sewer, 464 manholes, 385m of pumping main and 1,500 house connections. The system will be adopted and operated by GOGCSD on completion.

The topography, narrow streets and soil conditions will all make construction difficult and hand excavation is expected to be widely used. Note that construction will take place before the widened streets are introduced and all pipelines will be constructed in the existing street ways.

Reinstatement of some roads and construction steps and safety walls around the cliffs in parts of Ezbet Bekhit are also included in the construction contract. These measures are discussed below.

Although it is desirable to be able to quantify the project benefits in terms of health and mortality, it has not been possible to establish baseline social indicators which can be used to measure project impact, due to the imprecise recording methods and the fact that there is considerable geographic overlap. Thus the need for adequate sanitation in the urban environment, given the present deplorable conditions, is taken for granted.

There will be partial cost-recovery of water and wastewater connections through subscription/connection fees, and running costs are more or less covered by water consumption charges. In any event, cost recovery and rates for utilities are a Cairo-wide issue. Investigations show that most households should have the ability to pay for both standard connection and consumption charges, (connection charges can be paid in installments), assuming that the burden is spread over all households in a particular building.

Although the labor-intensive nature of network installation (mostly hand excavation and backfilling) will generate considerable temporary employment in the area, this is seen as a secondary benefit. “Soft” forms of participation of the inhabitants in area improvements are considered to have more sustainable benefits, as discussed below.

**SOFT ENGINEERING SOLUTIONS**

A number of measures are underway or planned which address basic problems in the Ezbet Bekhit and will have the long term effect of improving the social, economic, and housing conditions. They are complementary to the main infrastructure improvements described above.
Cliff Faces and Danger Zones

The main problem posed by the geomorphology of Ezbet Bekhit is the chance of the collapse of cliff faces and the resulting threat to lives and property. Although the limestone cliffs are in themselves mostly stable, collapse can be caused by leakage of water from higher areas (such as Duweika) into the ground and thus into swelling clays found interlayered with the limestone rock. A number of buildings or portions of buildings will need to be removed from both the top and base of cliffs, with the area of removal depending on the degree of danger, as shown in Table 3. To ensure the stability of the cliff faces after building removal, straightforward engineering treatment need to be applied (mostly cut and fill).

Table 3  Danger Zones and Required Setbacks from Cliff Edges

<table>
<thead>
<tr>
<th>Degree of Danger of Slopes</th>
<th>Safety Area Above the Cliff</th>
<th>Safety Area Below the Cliff</th>
</tr>
</thead>
<tbody>
<tr>
<td>High danger</td>
<td>From 10 to 12 meters</td>
<td>From 10 to 12 meters</td>
</tr>
<tr>
<td>Medium danger</td>
<td>From 6 to 7 meters</td>
<td>From 6 to 7 meters</td>
</tr>
<tr>
<td>Low danger</td>
<td>From 4 to 5 meters</td>
<td>From 4 to 5 meters</td>
</tr>
</tbody>
</table>

Street Hierarchies, Circulation Networks, and Street Widening

Due to the difficult topography of the area, there will be no vehicular links from Ezbet Bekhit either east to Duweika nor south to the main part of Manshiet Nasser. Thus in Ezbet Bekhit there will be no through traffic, and vehicular circulation is needed only to provide local access to residences and businesses inside the area. This local access to within a reasonable distance of residences must be provided for the vehicles listed in Table 4. After considering these requirements and also expected future general traffic volumes, the following three level street hierarchy has been incorporated into the planning of the area, with rights of way (ROW) indicated.

- **Main Streets**: ROW 8.5 to 10.0 meters, Two-way traffic
- **Feeder Streets**: ROW 5.0 to 6.0 meters, One-way traffic
- **Pedestrian Lanes**: ROW 3.0 to 4.0 meters, Pedestrian movement & emergency access
Table 4  Vehicular Circulation Norms

<table>
<thead>
<tr>
<th>Vehicle Purpose</th>
<th>Typical Vehicle Specifications</th>
<th>Accommodated on Proposed Street Hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Fire fighting vehicles</td>
<td>up to 8.5 m. length all-purpose fire trucks</td>
<td>Street Type A</td>
</tr>
<tr>
<td>(b) Security forces trucks</td>
<td><em>Nasr</em> 5 m. wheel base &amp; 7.5 m length or <em>Mercedes</em> (new) 5.5 m. wheel base &amp; 8.5 m length</td>
<td>Street Type A</td>
</tr>
<tr>
<td>(c) Security patrol cars</td>
<td>1/2 ton pickups</td>
<td>Streets Type A &amp; B</td>
</tr>
<tr>
<td>(d) Ambulances</td>
<td>American standard</td>
<td>Streets Type A &amp; B</td>
</tr>
<tr>
<td>(e) Heavy Garbage trucks</td>
<td>Ford 5 m. wheel base &amp; 8.5 m. length</td>
<td>Street Type A</td>
</tr>
<tr>
<td>(f) Occasional deliveries</td>
<td>1/2 ton pickup</td>
<td>Streets Type A &amp; B</td>
</tr>
<tr>
<td>(g) Taxis and private cars</td>
<td>Peugeot 504 standard</td>
<td>Streets Type A &amp; B</td>
</tr>
<tr>
<td>(h) Micro vehicles</td>
<td>Suzuki 1/4 ton pickup, hand carts, two-wheeled vehicles</td>
<td>Lanes Type C (occasional only)</td>
</tr>
</tbody>
</table>

In determining the optimum solution for street networks, maximum use has been made of space gained from building removal required, in any event, to minimize geotechnical risk. The optimum solution, which gives acceptable circulation but minimize building demolition for A and most B streets are shown in Figure 3. As can be seen, the street system is made up of a series of loops which provide for smooth traffic flow. For the remaining C lanes and neighborhood open spaces, the final layouts are being determined in close collaboration with the affected inhabitants.

In a dense and poor area such as Ezbet Bekhit it is important that there be excellent provision for convenient and safe pedestrian movement into and throughout the area, with as little conflict with vehicular traffic as possible. With minor improvements, the existing network of lanes and corridors can provide this. Stair access will be provided to allow convenient movement from the upper zones to lower zones and to the social services complex found to the south of Ezbet Bekhit. Particular attention is paid to entering and leaving Ezbet Bekhit, and it is essential that a safe pedestrian crossing of the Autostrad be provided.
By assigning vehicle ownership factors suitable for the income levels of the population and adding needed parking space for vehicles generated by commercial and workshop activities, the needed total parking requirements can be calculated as 550 spaces (day and night). Such a total number of parking spaces can be easily accommodated, partly by off-street parking (along landscaped cliff areas and major perimeter streets) and partly by on-street parking.

Apart from the demolition of a small number of dwellings required to reduce cliff dangers and to open up crucial main streets and public spaces (discussed in the next section), many streets and lanes will require minor widening to raise their standards to design ROWs. For this modified building lines are being laid down for the whole of Ezbet Bekhit on a street-by-street basis, with participation of the concerned residents. (See Figure 4 for an example of applied building lines.) Owners are expected to execute the setting-back themselves, either in the short run (if the structures are single-storey) or in the future when they rebuild (if the structures are multi-storey). Given that owners will gain freehold title to their plots of land as a result, such an arrangement is perceived as acceptable.

Resettlement Needs

Based on the analysis of danger zones, the requirements for vehicular circulation, the needs for public spaces and services, and the need to introduce water and sewerage networks, it is estimated that approximately 8 to 10% of the existing residents of Ezbet Bekhit will need re-housing due to required building demolition. There are also a number of shops and workshops which are found within buildings to be demolished (perhaps 60 units in total). Note that there is also long term adjustment of building lines, to be carried out when owners re-build their properties. These actions do not require any resettlement of families nor do they incur any demolition costs to the State.

It should be pointed out that most of the families needing resettlement are currently renters, usually living in one or two rooms, often in very substandard structures. They thus stand to enjoy considerably improved housing conditions after moving to public housing. But there are also a number of building owners who will loose their property and, if absentee owners, will receive no benefit in terms of alternative housing.

The resettlement solution for Ezbet Bekhit will follow standard Cairo Governorate practice of providing alternative public housing. The Governorate has already assigned to the project a number of vacant and recently refurbished units in the existing El Harrafiin project (roughly 1.5 km. from Ezbet Bekhit) which will accommodate short term relocation needs. Longer term relocation will be accommodated in some of the new 6200 units to be built in eastern Duweika on land vacated by the State Security (at a distance of 2 kms. from Ezbet Bekhit). Thus all required relocation will take place within the general Manshiet Nasser area. In this way work and social relations of those affected will be maintained, something which is crucial for poorer residents of Ezbet Bekhit.
Future Land Use, Residential Densities, and Housing Quality

Calculations of land use and physical standards before and after development in Ezbet Bekhit are shown in Table 5. Total public space will increase by 85%, thereby resulting in a full 31% of the net residential area being devoted to open space and circulation, plus a small amount for social services.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Before Development</th>
<th>After Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m²</td>
<td>%</td>
</tr>
<tr>
<td>Private Residential</td>
<td>153700</td>
<td>82.8</td>
</tr>
<tr>
<td>Circulation (streets &amp; lanes &amp;</td>
<td>27000</td>
<td>14.5</td>
</tr>
<tr>
<td>pedestrian spaces)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social and Community Services</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Open Space (landscaping &amp; play areas)</td>
<td>4900</td>
<td>2.7</td>
</tr>
<tr>
<td>Total Land Area</td>
<td>185600</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: the total land area increases by roughly 7000 m² due to cut and fill operations at the eastern and southern limits of Ezbet Bekhit.

Preliminary estimates show that, after long term development, both total population and overall residential densities will be reduced by roughly 30% from 450 persons per feddan to 320 persons per feddan. This is due to a decrease in private residential area and also by a progressive improvement in the housing stock. The granting of ownership and bringing properties under the proper legal framework will, over time, guarantee that the housing stock of the area will improve, particularly in terms of proper room size, internal access, and provision of light and air. The provision and quality of sanitation, kitchen, and bathing facilities will also improve greatly, in part due to the provision of high quality water and sewerage networks to the area.

All aspects of the Building Law (Law 106 of 1976 and amendments) will apply in the area. Minor adjustments to the building regulations would be promulgated to fit the unique conditions of the site, as Governorates are allowed to due under the Planning Law (Law 3 of 1982 and amendments).

The upgrading process will create dynamic land and housing markets in Ezbet Bekhit. The provision of high standard infrastructure, wider streets, and secure land tenure will lead to higher demand for private plots of land, and some plots may be sold to new investors. However, land prices should remain below those of other similar markets in Cairo, since (1) the strict application of building codes (and in particular, building height limits), will limit allowed exploitation (Floor Area Ratios), and (2) the area will remain a popular area.
Public Space and Social Services

According to priorities expressed by the population and following intensive investigations, the needed social facilities and services can be accommodated in three new buildings, to be financed in part by a German grant. There will be (1) a multi-purpose community center, (2) a separate women’s center, and (3) a cluster of workshops and offices. Sites have been chosen, clearing operations are underway, and preliminary designs have been made. The workshop cluster is to be run by a specialized government agency (such as the Social Fund), whereas the two centers are to be run by Community Development Associations (CDAs). Care is being taken to ensure that there are means to generate revenues to cover future operating costs.

As discussed above, a number of buildings will need to be removed and the cliff areas treated for safety reasons. This will create space which will be used for circulation and parking and also for light uses such as landscaping and play areas. Many interesting landscaping solutions which take maximum use of terracing can be applied. It should also be noted that a tree planting program will be applied along streets and public spaces throughout Ezbet Bekhit, except where the water draining from such a program might threaten the stability of cliff faces.

Conferring Land Ownership & Building Rights

Conferring land ownership for plots which conform to the planning lines will begin immediately following completion of the setting down of building lines for the whole of Ezbet Bekhit and the official endorsement of these lines by Cairo Governorate. Residents are expected to pay nominal prices for the land on a square meter basis according to official pricing schedules, and easy installment payments are allowed over 15 years. A special office of the Amlak Department of the Governorate will be established in Ezbet Bekhit to allow rapid processing of documents and easy accessibility for inhabitants. It will also include representation from the District’s Building License Administration (part of the District’s Housing Zone), as a service to those citizens wishing to begin rebuilding immediately along recognized building lines.

It should be pointed out that conferring land titles to residents is considered a crucial part of the whole upgrading process. It will resolve one of the main concerns of the residents, insecurity about the future, and is a precondition for the long term improvement of the housing stock. It is also the main incentive for residents to participate in various aspects of the upgrading program.

Effective Community Participation

No active community organizations are found in Ezbet Bekhit. Members of the local popular council of Manshiet Nasser have been co-operating with the project, but its member are not able to bear the sole responsibility for organizing popular participation for Ezbet Bekhit itself. Therefore, measures have to be undertaken to stimulate further organization of the inhabitants of Ezbet Bekhit in order to promote effective participation.
Small social service activities have been initiated to mobilize different strata of the population to actively take part in the civic works, a process which has led to the identification of natural leaders. (Activities include illiteracy eradication, health and environmental awareness, civil registration, etc. and the training of trainers for these services.) This has led to the idea of establishing of a service CDA for Ezbet Bekhit for youth and women, and steps are underway for its registration with the Ministry of Social Affairs. Street or area committees are also being set up which are participating in detailed street planning and will be important liaison points during the execution of infrastructure networks.

It is envisioned that the proposed CDA would be responsible for running the multipurpose community center and also perhaps the women’s center. Also, formulae are being investigated for a community-run solid waste collection system.

**Economic Development**

Ezbet Bekhit’s prime location within Greater Cairo gives residents access to a wide number of potential employment and business opportunities. Also, with over 700 registered business enterprises, there is already a significant level of small scale enterprise activities in the area. However, these advantages need to be better utilized and supported, and three kinds of activities are envisioned to be set up in Ezbet Bekhit:

- The workshop cluster to be built by the project will not only provide space for new and expanding businesses in Ezbet Bekhit. It can also serve as a small business “incubator” with support provided through specialized agencies on vocational training, business management, and information on machinery and markets.

- Discussions are underway with the Ministry of Information and Communications to set up a pilot “community information technology access center” in Ezbet Bekhit which would give youth opportunities for a range of IT training as well as provide important information on government services, employment opportunities, etc.

- An information and outreach service is to be set up to inform potential entrepreneurs of the various micro and small enterprise credit programs in Egypt for which they might qualify. Assistance would be offered in preparing applications and obtaining necessary documentation, and there are possibilities to channel credit programs through the CDA which is in the process of being set up.

**Global Project Cost Estimates and Financing Arrangements**

It is estimated that the complete physical and social upgrading of Ezbet Bekhit will require public investments of LE 29 million at current prices. Another LE 18 million is the value of alternative housing needed for residents requiring relocation, yielding a global investment cost of LE 47 million. This translates to a per capita cost of complete upgrading of roughly LE 1,300 per inhabitant or LE 5850 per family.
A preliminary financing plan for the full development of Ezbet Bekhit has been prepared. Investments to be covered from German grant contributions amount to about LE 25 million, whereas contributions from Cairo Governorate in cash and kind (mostly rehousing units, but also contributions from the District budget for various improvements) will amount to LE 22 million. However, there will be considerable future returns to the State budget in the form of installment payments from citizens. These have been estimated in present value terms as follows:

- Land payments by installment by building owners in Ezbet Bekhit: LE 5.4 million
- Installs on relocation housing: LE 4.3 million
- Installment payments for water and sewerage connections: LE 3.5 million

Total: LE 13.2 million

Thus the real shares of the financing of the complete upgrading of Ezbet Bekhit can be calculated as the following:

- Egyptian State Budget: 19%
- German Cooperation: 53%
- Population of Ezbet Bekhit: 28%

100%

Were the proportionate off-site costs of recently installed water and sewerage mains included in these calculations, the State’s share of project financing would increase significantly. However, these facilities are installed to serve the wider community and are part of the overall masterplan for Cairo.

CONCLUDING REMARKS

The project provides a low cost and low-disruption means to upgrade the existing settlement that has largely been built through the previous self efforts of the local people looking to achieve an acceptable place to live for their families. The collective efforts of the project will reinforce the local initiative and encourage organic development of the area to acceptable standards over the long term. It is hoped that, through a sense of belonging, this will help integrate these people into the wider society and urban structure that is Cairo. This is preferable to the alternative of wholesale relocation and redevelopment of the area, which would place the whole onus of responsibility on central authority, would reduce the element of individual choice, and would imply huge financial costs (estimated to be at least seven times more expensive) and even greater economic and social costs.
Linking hard with soft solutions (i.e. financing of infrastructure with more social and institutional development) has several advantages, especially in terms of credibility vis a vis the host agency and the population. Infrastructure construction will be the first “concrete” indication that the situation is improving, balanced against the longer term objectives of social development. But it also means that, should the hard solutions experience delays, the soft solutions do also (as is the case here), thereby compromising the aim of rapid replicability in other similar areas.

Infrastructure needs urban planning, while social development needs infrastructure. Is it better to disassociate the linkage and forego complementarity and accept potential conflicts, or is it preferable to accept the linkages and plan for the timeframes needed by each?
INCLUSION OF WELFARE DISTRIBUTION OBJECTIVES IN THE ECONOMIC EVALUATION AND CHOICE OF URBAN TRANSPORT PROJECTS

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Cairo, Egypt
ABSTRACT

This paper provides an outline of how the economic evaluation and choice of urban transport projects can be complemented by social evaluation with a view to achieving a more equitable welfare distribution within South Africa. The present inequality of income distribution is dealt with briefly, followed by a discussion and analysis on the use of equity weights in project evaluation to help bring about a more equitable welfare distribution. The paper is supplemented by an example that illustrates a ranking of urban transport projects based on equitable welfare distribution considerations.

1 INTRODUCTION

The aim of this paper is to illustrate how the economic evaluation of urban transport infrastructure projects can be supplemented by social evaluation to accommodate a higher degree of equitable welfare distribution in project selection.

Economic evaluation is the conceptual procedure to determine the viability of investment projects by considering all benefits and costs regardless of to whom they accrue within a country. A benefit is regarded as any gain in utility emanating from the operation and use of a facility, and a cost is any loss of utility associated with the investment needed to establish a facility, where utility is measured in terms of opportunity costs. (The term economic evaluation is used interchangeably with cost-benefit analysis and does not include financial evaluation.)

Investment in urban transport facilities usually involves large amounts of money. These investments must therefore be very carefully evaluated. In order to ensure that economically justified projects are selected, the assessment of alternatives must be undertaken on the basis of their effectiveness and efficiency. An effort must be made to attain the highest level of effectiveness (satisfying specified standards/travellers' requirements) in the most efficient way (with minimum input/scarc resources).

In a paper delivered at an International Road Federation Conference the author (Pienaar, 1994:A29) stated that with respect to accessibility and mobility there can be little doubt that any urban transport policy should strive towards three ultimate goals. It should:

(1) Enhance the quality of urban life through adequate (but not wasteful), effective and safe transport.

(2) Support and promote other urban functions and policies. (Transport is a means to an end and not an end in itself. It is a function of other human activities. Therefore it has a derived demand. It may be argued that transport is a prerequisite to wealth creation.)

(3) Contribute towards a desired mixture of equity (through a redistribution of accessibility and mobility opportunities) and efficiency (e.g reasonable costs, appropriate technology and no unnecessary duplication of services).

Kane (1998:114) argues that the existing assessment tools in place in South Africa are no longer appropriate for the prevailing political climate. In particular:
insufficient attention is paid in assessments to public transport and non-car schemes;
- in many cases assessment procedures do not allow for the evaluation of packages of schemes (which may include, for example, information provision, or development of secure areas for public transport passengers);
- the procedures often do not allow for the comparison of private transport and public transport schemes; and
- there is no linkage between the new policy objectives in place, and the outcomes of the assessments.

The question is, how should new assessment procedures be developed in South Africa to answer these concerns? According to Kane a quantitative approach in evaluation offers many advantages. Quantification usually introduces rigorous, detailed and systematic work which is often necessary. Furthermore, an appropriately developed economic evaluation can be a very useful tool to support decision-making.

2 URBAN TRANSPORT PROJECT EVALUATION WITH RESPECT TO WELFARE DISTRIBUTION

Transport plays a significant role in the social and economic development of any country. The Government has recognised transport as one of its five major priority areas for socio-economic development - in fact, after education it is regarded as the most significant catalyst for development (National Department of Transport, 1996:1). Unfortunately the provision of transport infrastructure, especially road transport facilities, is being hampered severely in South Africa by inadequate funding. In turn, this hampers economic growth (Maharaj, 1995:1).

According to the World Bank (1994:3) infrastructure can deliver major benefits in economic growth, poverty alleviation and environmental sustainability - but only when it provides services that respond to effective demand and does so efficiently. Given the fact that one of the priorities of the South African Reconstruction and Development Programme is to address economic development, economic growth and welfare inequality through investment in infrastructure, the social evaluation approach set out below assumes that redistribution of welfare can be more efficiently done through investment in transport infrastructure than through direct transfer payments, such as subsidies (Botes & Pienaar, 1995:A.2).

The Gini coefficient is a popular indication of income inequality, which varies in value from one in the case of total inequality and zero in the case of total equality. (The terms in italic in the text are defined in Appendix 2.) Making international comparisons of income inequality is always fraught with the danger of non-comparability. Data sources are often very different and definitions of incomes differ. It is nevertheless interesting to make such comparisons and the fact that South Africa frequently has the highest Gini coefficients is evidence of the highly inequitable income distribution that characterises the South African economy (Whiteford & McGrath, 1995:12). South Africa's Gini coefficient during 1993 equalled 0,69.

The World Bank (Deininger & Squire, 1996:574-577) in a later study than that of Whiteford & McGrath estimated the Gini coefficient for four countries in sub-Saharan Africa. Although the World Bank study indicated that the Gini coefficient for South Africa had between 1993 and 1996 come down from 0,69 to 0,62, it still ranked highest among the countries analysed. The Gini coefficients were as
follows: Ghana 0.35; Kenya 0.54; South Africa 0.62; and Zimbabwe 0.59.

The creation and use of urban transport facilities and services, such as passenger transport terminals and transfer facilities, especially in lower-income areas, can lead to a more equitable distribution of welfare and income. The fundamental point of departure is that additional income is relatively more valuable to lower-income groups than to higher-income groups. The users of public transport facilities and services, for example, are mostly transit-captive travellers as they more often than not do not have the ability to pay for travel by alternative modes of transport and they are, by implication, the more needy component of the community.

Seeing that the appreciation of lower-income groups of the marginal utility of their income (i.e. the additional utility acquired from one additional unit of income) is considerably higher than that of more prosperous individuals, the net economic benefits that a transport project has for them should be weighted accordingly to reflect the true social benefit of the project. From a distributive efficiency viewpoint this will ensure that in selecting a project, that project which can make the greatest net contribution to welfare distribution is selected for implementation. It is therefore advisable that all transport infrastructure projects should also be evaluated on the basis of a social analysis in order to reveal the effect of the implementation of such projects on a region within the country or a province, such as a metropolitan area or within sub-regions of the latter.

3 TREATMENT OF EQUITY IN ECONOMIC EVALUATION

The purpose of any economic evaluation (of transport projects) should be, through the transport planning process:

a. to ensure the optimal allocation of scarce resources (economic or allocative efficiency through a potential Pareto improvement in social welfare); or

b. to bring about the achievement of the maximum possible equality of welfare benefits (distributive efficiency).

Economic evaluation (as in a. above) has traditionally focused on the maximizing of economic efficiency by the minimizing of consumption. The discounting process was used to determine the net impact on consumption, after which economic efficiency was used as the only criterion in project selection. Based on the assumption that income distribution was optimal within the community, in other words that the marginal utility of the income of all individuals is equal, the striving for equity was automatically left out of consideration. Traditional economic evaluation practice has thus traditionally proceeded from the point of view that all benefits and costs related to a project carry the same weight, regardless of the level of income and consumption of groups affected by it.

A familiar critique of cost-benefit analysis is that its reliance on willingness to pay biases the method in favour of the existing distribution of income (Waters, 1994:249). Cost-benefit analysis is calculated on the basis of potential compensation, i.e., those who gain can, in principle, compensate those who suffer, so that everybody can be better off. But compensation normally is not paid. Therefore, a government following cost-benefit analysis allocative efficiency criteria could carry out a sequence of projects which benefited high-income groups at the expense of low-income groups, but because compensation was never paid, the net result would be to aggravate the distribution of income.
Although investment in transport infrastructure will not always directly or automatically raise the disposable income of low-income groups, such investment usually results in time savings, greater convenience and safety, improvement in the quality of transport services and possibly also lower travel expenditure.) If income-related differences are reflected in the evaluation of investments, for which users do not pay directly, a vicious circle is created. High-income areas usually yield high project returns, which attract investment, which further increase income in the affluent areas at the cost of disadvantaged areas. With respect to the propagation of such disparities, the World Bank (Gwilliam, 1997:4) comments that with the valuation of time savings this can be avoided by using national average wage rates for major categories of labour and applying national average income in valuing leisure time savings. It is recommended that such an 'equity value of time' be used, especially where poverty alleviation or regional redistribution of income is a national objective.

An alternative method whereby the real social benefit of a project can be reflected includes the use of differential or variable discount rates (specific discounting rates according to specific levels of income) in the economic evaluation techniques. By applying a decreased discount rate to lower-income groups, the net benefits attained may be represented as greater. This will ensure that in project selection the project which makes the greatest real contribution to social welfare (in terms of marginal utility) will be chosen for implementation.

Poverty relief - this is the attempt to achieve an equitable distribution of consumption among contemporaries - is one of the country's most important economic development objectives. Channelling investments in transport infrastructure in such a way as to lead to an increase in the consumption expenditure of lower-income population groups and the indigent, or which will at least not affect this negatively, is one of the ways in which this objective may be achieved to a degree. Accommodating welfare distribution through socio-economic or social evaluation (as in b. above) as a means of striving for equity can also be done by adjusting the benefits of projects according to weights calculated for specific income groups.

Social evaluation (based on equity or distributive efficiency) may be performed parallel to economic evaluation (based on economic or allocative efficiency), complementing it - not replacing it. Seen in transport economic terms, the inclusion of equity in the evaluation process is geared to creating equal accessibility and increased mobility for lower-income groups in terms of marginal utility. From a non-transport or general economic point of view, it is geared towards allotting potential economic activity and its returns to lower-income communities.

Any weighting system is subjective and contains value judgements. What is not always realised is that the decision not to use a weighting system is equally so: giving equal weight to all groups is just one weighting system among many, although it does of course happen to be the simplest to apply. In economic evaluation the omission of all explicit weighting is associated with allocative efficiency and the acceptance of the prevailing income distribution. Therefore a decision to apply the economic efficiency criterion is itself a value judgement (Snell, 1997:195).

4 WEIGHTING IN PROJECT EVALUATION TO ACHIEVE EQUITABLE WELFARE DISTRIBUTION
Social and economic evaluation can be regarded as sensitivity analyses complementary to one another. Therefore, if the decision-maker is intent on paying due regard to both types of analysis, a project should go ahead if it is shown to be viable both with and without the application of equity weights. Although such weighting usually depends largely on political decision-making, it should nevertheless be related to the marginal utility that additional income has for each of the groups (CEAS, 1989:28). From an economic viewpoint it would, however, not be prudent if an inefficient project, despite its potentially positive effects on income distribution, is implemented if the redistribution effect can be achieved at lower cost by making use of another form of income transfer, such as direct subsidies (Georgi, 1973:50).

In practice redistribution cannot be effected by lump-sum transfers. It normally requires taxation which imposes a burden upon those taxed, representing a loss of efficiency in the economy (Layard & Glaister, 1994:47). Moreover, there may be political objections to cash redistribution, and it is often administratively difficult to devise a tax which falls specifically on the beneficiaries of a project and a transfer which goes specifically to the losers. If redistribution to offset the losses due to the project is not implemented, then the project cannot be justified on the grounds that it is a Pareto-improvement, since at least some people are worse off. Then a wider criterion has to be introduced to decide whether or not the project increases social welfare - a criterion in which the changes of income to each of the parties affected are weighted by the marginal social values attaching to the income of each group.

The question of the criteria for a welfare improvement is discussed in detail by Layard and Walters (1994:179-198). They show how welfare changes for individuals can be estimated, but that the question of whether a social gain has occurred cannot be separated from the issue of the social valuation of benefits to the affluent compared with benefits to the disadvantaged.

The ethical principle on the basis of which the use of weights in project selection can be justified is utility. The user acquires utility from the application of his disposable income. Additional income brought about by a project creates opportunities for increased consumer spending from which the user derives additional utility. Additional income thus has greater marginal utility for the user. If a project holds monetary benefits, expressed as $dy_1, dy_2, ..., dy_n$, for individuals 1, 2, ..., $n$, respectively, and the marginal utility which these individuals attach to the additional income is equal to $MU_1, MU_2, ..., MU_n$, respectively, then the net change in total utility or social welfare ($dU$) brought about by the project can be expressed as follows:

$$dU = MU_1dy_1 + MU_2dy_2 + ..., + MU_ndy_n$$

The net change in total utility or social welfare is thus equal to the weighted sum of the changes in individual income, where the weight allocated to each individual is equal to the marginal utility of his income (Sugden & Williams, 1987:205).

The traditional economic evaluation treats increases in consumption directly caused by a project as cost and/or disbenefits, regardless of the income status of the spender. Changes in consumer spending may be the consequence (1) if providers of project inputs such as labour, for example, are paid for at a higher rate by the project than at any other place, and/or (2) by changes in the consumer surplus caused by the lower prices of output with the project than without the project.

In cases where the recipients of the benefit of higher consumption live in almost absolute poverty, it can
be argued that their additional consumer benefits represent net social benefits rather than net social costs. This argument forms the basis for the use of weighting whereby the benefits related to a project, according to the higher marginal utility of those to whom they accrue, are weighted. The break-even point above which the benefit of higher consumption represents a net social cost and below which it represents a net social benefit is known as the critical level of consumption. This level is generally regarded as situated at the income level at which the payment of income tax becomes compulsory (Ray, 1984:17).

Welfare distribution weighting can be calculated on the basis of income or consumption. According to Floor, Pienaar and Botes (1993) the calculation of welfare distribution weights should ideally be based on per capita consumer spending rather than income for the following reasons:

- the relationship between income and welfare is not very clear, while per capita consumption provides a relatively good indication of welfare;
- it will take a considerable amount of calculation to deduce disposable income from total income as all transfer payments to and from individuals are not reported in total income statistics; and
- it is difficult to determine the percentage of income transferred to and from the specific area being studied.

Official data on consumer spending is available in South Africa but may not be readily available. The deficiencies of the official data on wages, salaries and consumer spending, and the need for comprehensive, up-to-date information (e.g., for wage bargaining purposes) created scope for private enterprise to collect and disseminate such data. Nowadays most employers and employee organisations (for example trade unions) subscribe to the information of a variety of private firms which specialise in this field (Mohr, 1998:164). For this purpose it is necessary to note that consumption expenditure is a function of disposable income, which in turn is a function of total income, albeit in varying proportions.

The welfare distribution weighting can be expressed as follows:

\[ Y_w = \frac{C_p}{C_u} \]

where

- \( Y_w \) = the welfare distribution weight;
- \( C_p \) = the average per capita consumer spending of the population; and
- \( C_u \) = the average per capita consumer spending of those whom the project benefits.

It is clear that the calculated weight will be consistently progressive - the lower the level of consumption spending, the greater the weight. The social benefit of a public transport facility or service can then be determined by multiplying the calculated weight with the economic benefits offered by the facility or service. An example of how this can be calculated is shown in Appendix 1.

5 CONCLUSIONS

According to the traditional economic evaluation approach all benefits and costs related to a project are
evaluated in terms of their scarcity value. The traditional approach can be supplemented to accommodate a striving for equity. This can be done by weighting the benefits of a project according to weights calculated for specific consumer expenditure groups. In transport economic terms the inclusion of equity in economic evaluation is geared towards creating, in terms of marginal utility, equal accessibility and increased mobility for lower-income groups. In general economic terms it is geared towards allocating potential economic activities and returns to lower-income communities. The social analysis must be carried out separately from the economic analysis, and the findings and recommendations with respect to both the analyses must be represented in the project evaluation report.

If the decision-maker is intent on paying due regard to both economic and social analysis in investment decisions, all independent projects within the limits of the available budget should go ahead if they are shown to be viable both with and without the application of equity weights. Although such weighting usually depends on political decision-making, economically inefficient projects should go ahead only if their positive effects on welfare distribution are regarded as essential and cannot be achieved at lower cost through alternative forms of transfer.
REFERENCES


APPENDIX 1: EXAMPLE OF A RANKING OF PUBLIC TRANSPORT PROJECTS BASED ON WELFARE DISTRIBUTION CONSIDERATIONS

A metropolitan authority has obtained a loan of R100 000 000 from a development institution to implement a number of public transport infrastructure projects. The conditions under which the loan is granted are that the selected projects should maximally improve the accessibility of lower-income groups, given that all the projects are efficient.

For economic development purposes the metropole is divided into five socio-economic regions. The population and total annual household consumption within the regions are as follows:

<table>
<thead>
<tr>
<th>Region</th>
<th>Total household Expenditure (xR10⁹)</th>
<th>Population (x 10⁶)</th>
<th>Expenditure per Capita (xR10³)</th>
<th>Equity weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0,825</td>
<td>0,275</td>
<td>3,0</td>
<td>8/3</td>
</tr>
<tr>
<td>2</td>
<td>1,5</td>
<td>0,375</td>
<td>4,0</td>
<td>8/4</td>
</tr>
<tr>
<td>3</td>
<td>2,6</td>
<td>0,325</td>
<td>8,0</td>
<td>8/8</td>
</tr>
<tr>
<td>4</td>
<td>5,0</td>
<td>0,500</td>
<td>10,0</td>
<td>8/10</td>
</tr>
<tr>
<td>5</td>
<td>6,875</td>
<td>0,625</td>
<td>11,0</td>
<td>8/11</td>
</tr>
<tr>
<td></td>
<td>16,8</td>
<td>2,100</td>
<td>8,0</td>
<td>8/8</td>
</tr>
</tbody>
</table>

*R = South African rand: approximately R7 = US$1*
Sixteen functionally independent projects which are all economically viable (i.e. efficient) have been identified and their details are given below:

<table>
<thead>
<tr>
<th>Region</th>
<th>Project</th>
<th>Present worth of initial cost (xR10^6)</th>
<th>Present worth of benefits (xR10^6)</th>
<th>Efficiency B/C ratio</th>
<th>Equity weights</th>
<th>Weighted equity benefits</th>
<th>Equity B/C ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>15.0</td>
<td>15.75</td>
<td>1.05</td>
<td>8/3</td>
<td>42.0</td>
<td>2.8</td>
</tr>
<tr>
<td>1</td>
<td>B</td>
<td>8.0</td>
<td>8.8</td>
<td>1.1</td>
<td>8/3</td>
<td>23.467</td>
<td>2.93</td>
</tr>
<tr>
<td>1</td>
<td>C</td>
<td>10.0</td>
<td>12.0</td>
<td>1.2</td>
<td>8/3</td>
<td>32.0</td>
<td>3.2</td>
</tr>
<tr>
<td>1</td>
<td>D</td>
<td>7.5</td>
<td>10.5</td>
<td>1.4</td>
<td>8/3</td>
<td>28.0</td>
<td>3.73</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>12.0</td>
<td>15.0</td>
<td>1.25</td>
<td>8/4</td>
<td>30.0</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>13.0</td>
<td>15.6</td>
<td>1.2</td>
<td>8/4</td>
<td>31.2</td>
<td>2.4</td>
</tr>
<tr>
<td>2</td>
<td>C</td>
<td>9.5</td>
<td>12.825</td>
<td>1.35</td>
<td>8/4</td>
<td>25.65</td>
<td>2.7</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>10.0</td>
<td>11.0</td>
<td>1.1</td>
<td>8/4</td>
<td>22.0</td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>20.0</td>
<td>60.0</td>
<td>3.0</td>
<td>8/8</td>
<td>60.0</td>
<td>3.0</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>18.0</td>
<td>55.8</td>
<td>3.1</td>
<td>8/8</td>
<td>55.8</td>
<td>3.1</td>
</tr>
<tr>
<td>4</td>
<td>A</td>
<td>22.0</td>
<td>55.0</td>
<td>2.5</td>
<td>8/10</td>
<td>44.0</td>
<td>2.0</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
<td>25.0</td>
<td>65.0</td>
<td>2.6</td>
<td>8/10</td>
<td>52.0</td>
<td>2.08</td>
</tr>
<tr>
<td>5</td>
<td>A</td>
<td>30.0</td>
<td>81.0</td>
<td>2.7</td>
<td>8/11</td>
<td>58,909</td>
<td>1.96</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>35.0</td>
<td>98.0</td>
<td>2.8</td>
<td>8/11</td>
<td>71,273</td>
<td>2.04</td>
</tr>
<tr>
<td>5</td>
<td>C</td>
<td>32.0</td>
<td>92.8</td>
<td>2.9</td>
<td>8/11</td>
<td>67,491</td>
<td>2.11</td>
</tr>
<tr>
<td>5</td>
<td>D</td>
<td>30.0</td>
<td>90.0</td>
<td>3.0</td>
<td>8/11</td>
<td>65,455</td>
<td>2.18</td>
</tr>
</tbody>
</table>

Had efficiency been the sole project selection norm, projects 3B, 5D, 3A and 5C ought to have been chosen. (Projects are chosen in descending order of efficiency benefit/cost (B/C) ratios up to the point where the sum of the present worth (PW) of their initial costs utilises the whole capital loan amount.) In this case the total efficiency net present value (NPV) of the four projects is given by:

\[
\text{NPV(four projects)} = \text{PW benefits} - \text{PW initial costs} = \text{R298,6m - R100m} = \text{R198,6m.}
\]

With distribution also a project selection norm, projects 1D, 1C, 3B, 3A, 1B, 1A, 2C and 2A are chosen. (Projects are chosen in descending order of equity B/C ratios.) In this case the total equity NPV of the eight selected projects is given by:

\[
\text{NPV(eight selected projects)} = \text{R296,917m - R100m} = \text{R196,917m.}
\]

With efficiency and the limit on investment expenditure as the only norms, no transport infrastructure investment would have taken place in regions with below-average consumption. With a combination of efficiency and equity norms, six projects (1D, 1C, 1B, 1A, 2C and 2A) which are situated in regions with below-average consumption are selected. This implies a reallocation of an investment amount totalling R62m from average and above-average consumption regions to below-average consumption.
APPENDIX 2: LIST OF TERMS

Allocative efficiency: A measure of how the selection of inputs minimizes the cost of producing products (i.e. goods and services) to satisfy given wants. (This kind of efficiency is synonymous with "economic efficiency" or simply "efficiency".)

Benefit/cost ratio: The ratio between the sum of the discounted benefits and the sum of the discounted capital (i.e. investment) costs of a project, where the value of the benefits forms the numerator and the worth of the costs forms the denominator. All proposals with a ratio value greater than one are viable.

Consumer surplus: The difference between what a consumer is willing to pay and what he or she actually pays for a product (i.e. a good or a service). The maximum amount that a consumer is willing to pay is reflected by the utility that a product is expected to offer the consumer. If a consumer acts rationally, the actual amount paid is less than the total utility that the product is expected to offer - hence a surplus is gained.

Disposable income: Personal income plus transfer income (e.g. dividends) net of all taxes levied on incomes available for expenditure and saving.

Distributive efficiency: A measure of how the allocation of economic resources among groups or individuals within a country (or community) contribute to an equitable or a socially desirable distribution of welfare. (Distributive efficiency is usually used synonymously with "equity").

Gini coefficient: The Gini coefficient is the ratio of the area between the diagonal of a triangle and the Lorenz curve divided by the total area of the triangle in which the curve lies. The Lorenz curve is constructed by plotting the numbers of income recipients, starting with the poorest, on the horizontal axis in cumulative percentages and with cumulative personal income percentages on the vertical axis. The lower the Gini coefficient, the better (closer to equity) the income distribution.

Independent projects: Independent projects are projects which fulfil different functions. They do not form alternatives for one another and are therefore not mutually exclusive. The selection of a certain (functionally) independent project can at the most postpone, but not exclude, the selection of another (functionally) independent project.

Net present value: The net present value of a project is obtained by subtracting the sum of its discounted investment costs from the sum of the discounted benefits it will achieve. If a project's discounted future benefits exceed its discounted investment cost, it has a positive net present value and is therefore regarded as viable.

Opportunity cost: Opportunity cost is the value of the most favourable (i.e. best) alternative forgone by choosing a particular activity. Opportunity cost arises from the scarce or limited nature of resources. If resources were limitless no action would be at the expense of any other - all could be undertaken - and the opportunity cost of any single action, the value of the next best alternative, would be zero.
Pareto improvement: Making at least one person in a community better off without anyone else being made worse off.

Utility: The satisfaction derived from an activity, particularly consumption.
Development of a
Policy for Rural Roads

Suos Kong
Under-Secretary of State
MINISTRY OF RURAL
DEVELOPMENT

Paper presented at:
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
Royal Government of Cambodia

Ministry of Rural Development (MRD)
Development of a Policy for Rural Roads
Suos Kong
Under-Secretary of State
MINISTRY OF RURAL DEVELOPMENT
Introduction

- Background
- Rural Infrastructure
- Rural Roads Policy
- Rural Roads Department (RRD)
Background

- Cambodia situation

11.4 million people
24 Provinces
180 Districts
1,584 Communes
13,272 Villages

Source - 1998 Census
Cambodia

• GDP $280
• Poverty Rate 36.1%
  – Rural 40.1%
  – Urban 29.9%
• Infant Mortality - 110 (per 1,000 live births)
• Access to safe drinking water - 13% of population
• Life expectancy - 54.4 (1996)

Programmes of Rural Infrastructure Rehabilitation

- **Phase I - Emergency response**
  

- **Phase II - Rehabilitation phase**
  
  (1996 - 1998)

- **Phase III - Development phase**
  
  (1998 - present)

- Labour Based projects with food-for-work component.
- Technology Choice
  - Evolution of LBAT in rural infrastructure rehabilitation as an employment generation tool.
  - Choice of MRD for infrastructure works.
The Rehabilitation Phase

- 5 year Socio-Economic Plan
- Extension of ILO LBAT project
- Implementation of TRIP (MRD/KfW/WFP)
- Implementation of RIIP (MRD/ADB)
- Other Implementing partners
  - WFP, EU, WB, USAID/CARE, NGOs.
The Development Phase

- The RGC’s Policy and Strategy on Poverty Alleviation
- The Upstream Project: MRD/SIDA/ILO
- Extension of the Rural Infrastructure Improvement Programmes (RIIP & TRIP)
Government Policy Statement

- Poverty Alleviation
- Development Priority
- Positions of the Royal Government of Cambodia
  - Promotion of LBAT
  - Decentralized Decision-Making
  - Strengthening of Policy-Making
  - Use of Private Sector/Contractors
  - Improving Maintenance Researching
  - Gender, Disabled and Disadvantaged Groups
Why have a Policy?

• To set out responsibility of MRD
• To focus senior management
• To act as a benchmark
• To enable a structure to be developed
• To help MRD staff understand
• To help recipients understand
• To enable all stakeholders to co-operate
What should a Policy include?

- **Statements on all important relevant issues to set out the agreed position of MRD**
- **However Policy making is a process, subject to periodic reviews.**
POLICY DEVELOPMENT PROCESS

1. IDENTIFY & AGREE ISSUES
2. IDENTIFY & INVOLVE STAKEHOLDERS
3. GATHER & ANALYSE BACKGROUND DATA
4. DEVELOP POLICY OPTIONS, PREDICT & QUANTIFY CONSEQUENCES
5. WORKSHOP TO REFINE & AGREE POLICY OPTIONS
6. DRAFT POLICY DOCUMENT, FINALISE & GAIN APPROVAL
7. DEVELOP IMPLEMENTATION STRATEGIES & PUT THEM INTO ACTION
8. MONITOR IMPACT & ADJUST POLICIES & STRATEGIES IF NECESSARY
Policy will be able to provide ‘guidance’ for:

- **General issues** (what responsibilities, who are the stakeholders, what are the assets)
- **Ownership**
- **Asset Management and Maintenance**
- **Asset Development**
- **Appropriate Technology**
Policy will be able to provide ‘guidance’ for:

- **Resources**
- **Standards and Monitoring**
- **Private Sector Role**
- **Environment and Sustainability**
- **Road Safety**
- **Consultation**
Development of Rural Roads
Policy to date:

- **Ministry of Rural Development (MRD) has defined its policy towards rural roads.**
  
  “MRD will facilitate the improvement of social and economic conditions in rural areas by increasing rural access through cost-effective investments in the maintenance and development of rural roads.”

- **MRD has also agreed with the Ministry of Public Works and Transport (MPW&T) that MPW&T are responsible for all roads with an average daily traffic of 50 vehicles per day (vpd) or more (the main roads), and MRD will be responsible for all roads that carry 50 vpd or less (the rural roads).**
In simple terms, this means that

- **MPW&T will** maintain, repair, rehabilitate, improve, build and govern all primary, secondary and part of the tertiary roads and their structures, in short **all main roads**, and that

- **MRD will** have under its responsibility the maintenance, repair, rehabilitation, improvement, and construction of part of the tertiary roads, and the sub-tertiary roads and paths and their structures, in short **all rural roads**.

- **MRD will** manage this responsibility through the Provincial Departments of Rural Development, the Communes and the Villages who will become owners of the rural roads network.
Road Ownership and Management

MRD, jointly with MPW&T will introduce legislation to assign ownership of the roads. For rural roads, this is intended to be

- the organization most able to carry out the maintenance, repair, rehabilitation, improvement, construction and governing the roads, that is to manage the roads,

- and at the same time able to mobilize resources.

This means that

- **Provincial Departments of Rural Development (PDRDs) would own and manage the tertiary rural roads and structures**
- **Comunes would own and manage the sub-tertiary 1 and 2 roads and structures, and**
- **Villages would own and manage the sub-tertiary 3 paths and structures.**
### RURAL ROADS
(traffic of 50 vpd or less)
**OWNER / MANAGER**

<table>
<thead>
<tr>
<th>GOVERNMENT LEVEL (owner)</th>
<th>TERTIARY District-District</th>
<th>SUB-TERTIARY 1 District-Comune</th>
<th>SUB-TERTIARY 2 Comune-Comune</th>
<th>SUB-TERTIARY 3 Comune-Village</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDRD</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Commune</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Village</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Financing Road Management

MRD will allocate, through the PDRDs, budget funds to owners for the management of the roads under their responsibility. HOWEVER, it will be necessary to supplement these resources with funds generated by STAKEHOLDERS (owners), therefore

- Owners will have to allocate funds, or in-kind contributions of their own, especially for the maintenance of their roads

BUT,

- MRD will assist owners in mobilizing the necessary resources
- and, it is expected that stakeholders will be able to raise revenues of their own.
Technology for Road Management

• MRD has adopted labor-based appropriate technology (LBAT) as the preferred method of carrying out works on rural roads and paths. This is to encourage employment creation and poverty reduction, as well as saving in costs, without compromising in quality and effectiveness. Works will have to comply with current standards and specifications.

• MRD will encourage use of LBAT CONTRACTORS to carry out the maintenance, rehabilitation, improvement or construction works.
Standards and Specifications

• **MRD will develop, in consultation with MPW&T, appropriate design and construction standards for rural roads, and their respective specifications.**

• **Standards will recognize the technology being used, traffic, accessibility, materials, climate, costs, etc. and will be set in accordance with international and regional best practice.**
Compliance with, and Enforcement of Standards and Specifications

OWNERS will have to comply with the standards and specifications for rural roads issued by MRD.

and

MRD is committed to strictly enforce the standards and specification, if necessary, withholding funds from owners that do not comply.
Planning the Roadworks

• Planning will be the responsibility of the owner (manager) of the roads and maximization of economic rates of return will be required

HOWEVER,

• where cost-effective, MRD/PDRD will assist owners with the hiring of local consultants.

BUT,

• routine (including spot improvements) and periodic maintenance, are expected to receive top priority in recognition of their superior cost-effectiveness
Development of Human Resources

- MRD will assist owners in developing the technical and management skills that their staff will require to carry out the management of the road network.
Environmental Impact

- Maintenance, rehabilitation and construction will be carried out in accordance with Cambodian policies and directives, and international standards on environmental impact.
Performance Monitoring

MRD will arrange for the regular independent monitoring of:
- the maintenance, rehabilitation, improvement and construction works
- cost-effectiveness
- appropriate use of resources,
- compliance with standards and specifications, and
- compliance with environmental, gender, and social vulnerability directives.
The MRD Needs a Rural Roads Department (RRD) within its Ministry.

First, and most important, because there is a large network of roads that needs to be looked after:...
1999 Road Condition

- Not Passable Year Round: 45%
- Passable Year Round: 47%
- Good: 8%
This basic network is in bad shape, and below it there are an estimated 24,000 km of unidentified tertiary roads and access paths that eventually would also need to be improved and maintained.
In short, of the 4,000 km of identified rural roads 1,100 km or so, are effectively being maintained or rehabilitated. MRD will initially deal with the 4,000 km of identified rural roads. This will be the starting network and MRD needs to organize itself to deal with it.
ALSO, considerable investments in rural roads will be added to on-going projects in the next 5 years:
MRD also needs an effective and properly placed structure to deal with donors, international lending agencies, NGOs, and other government Departments on planning issues and the execution of rural roads projects.
For all these reasons there is a need for a RRD. But before it is created, the following questions need to be answered:

**WHAT KIND OF STRUCTURE SHOULD IT HAVE?**

**WHAT RESPONSIBILITIES SHOULD BE CENTRALIZED AND WHICH DECENTRALIZED?**
HOW FAR DOWN SHOULD IT BE DECENTRALIZED?

HOW SHOULD IT BE STAFFED?
AND
HOW MANY STAFF SHOULD IT HAVE?

WHAT SHOULD THE OPERATIONAL AND REPORTING PROCEDURES BE?

THESE ARE THE QUESTIONS ON WHICH MRD ARE NOW SEEKING OPINIONS ON FROM ALL THE STAKEHOLDERS.
BY DECEMBER THIS YEAR
MRD WILL HAVE A CONCRETE
PROPOSAL
TO PUT TO
THE INTER-MINISTERIAL COMMITTEE
AND TO
THE COUNCIL OF MINISTERS
Summary

- Cambodia Situation
- Rural Infrastructure Programmes
- Rural Roads Policy
- Rural Roads Department
Floods in Mozambique

Planning the Labour-based Contribution to Recovery

Jorge Muonima
&
James Markland

Paper presented at:
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
Introduction

In February 2000 Mozambique was the victim of the worst flooding since records have been kept. A series of climatic coincidences conspired to make hundreds of thousands homeless and left a repair bill of over 400 million USD. Thousands of people who had struggled to rebuild their lives after a devastating civil war were suddenly faced with a new challenge.

The damage caused to roads, many only recently rehabilitated, was extensive, and continues to be an inconvenience to the daily lives of many people. The National Road Administration (ANE) was faced with the task of re-establishing access to the many thousands of people isolated by the floodwaters. The paper contains a little of that story, more particularly in respect of the Tertiary Road network.

Impact

The impact of the floods was immediate and dramatic. Mozambique's limited resources were thrown into the rescue and relief efforts. Many of the major transport routes were cut, and economic activity reduced dramatically. Rising prices and food shortages became the order of the day. Hundreds of thousands of people sought food and shelter in hurriedly constructed resettlement camps.

First problem faced by ANE was to discover the extent of the damage. In the days, and indeed weeks, immediately following the rains, surveys by helicopter or light aircraft were the only means to get an overall picture of what was happening. The main roads serving the flood-affected areas were the priority for reconnaissance and initial repair works. It was therefore difficult to assess the condition of many of the Tertiary Roads that had been damaged.

The intensity of the rain during February 2000 was far higher than in normal years, with more than 300 mm falling in the heaviest of the storms. The resultant damage required repairs far more extensive than those resulting from a normal rainy season. Unpaved roads suffered various types of damage:

- Major erosion gullies due to the passage of large volumes across or along roads
- Road flooded and impassable
- Softening of the road surface due to high groundwater levels
- Washouts of culverts and small bridges
- Loss of the gravel surface due to the exceptionally heavy rain
- Deposition of large volumes of eroded material on the road

Paved roads did not fair much better.

The gravel roads constructed under the Feeder Road Programme performed remarkably well. Except for the roads that remained completely submerged, cuts tended to be restricted to places where the heavy run-off or rivers had crossed the roads.

Crisis Response

As soon as the international community began to appreciate the scale of the disaster, offers of assistance started to arrive. The pressure was on to define what assistance would be necessary, both in
the short and longer terms. Based on the few initial inspections that it was possible to make, estimates were prepared for the repair of tertiary roads in the affected provinces. These estimates, together with a strategy for carrying out the repairs, were presented to donors at a meeting called by the Minister of Public Works and Housing on 3 March, a week after the floods peaked. For Tertiary Roads, the total repair bill came to nearly USD8.5 M for the initial estimate of 3,800 km of damaged road.

Due to lack of access and the involvement of Road Administration staff in the emergency repair of major roads, it was not possible to produce detailed budgets for repair costs within such a short timescale. Costs were therefore estimated based on average levels of repair, categorising roads depending on the general level of damage they were reported to have suffered. It should be noted that these were estimates for the repair of all aspects of the damage that had been suffered, and not just for the emergency repairs necessary to open up the roads.

<table>
<thead>
<tr>
<th>Damage Category</th>
<th>Damage Sustained</th>
<th>Repair Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Significant amount of major damage. Severe erosion along the road, blockage of drainage ditches and culverts, wash-out of culverts, saturation of the road</td>
<td>6 250 USD per km, assuming that 25 % of the road length will require complete reconstruction and 75 % periodic maintenance with a new gravel surface and reopened ditches</td>
</tr>
<tr>
<td>Medium</td>
<td>Isolated sections of serious damage: erosion along the road, silting up of ditches, substantial loss of gravel surface from a significant length of the road</td>
<td>2 100 USD per km, assuming that 5 % of the road length will require complete reconstruction, 25 % periodic maintenance with a new gravel surface and reopened ditches and the remaining 70 % will need an enhanced level of routine maintenance</td>
</tr>
<tr>
<td>Light</td>
<td>Small sections with some damage: majority of road with an increased level of normal maintenance work such as minor erosion damage on verges, some silting of ditches</td>
<td>1 625 USD per km, assuming that 25 % of the road length will require periodic maintenance with a new gravel surface and reopened ditches and 75 % will need an enhanced level of routine maintenance</td>
</tr>
</tbody>
</table>

The estimates were regularly updated during April and May as more detailed survey information became available from the provinces, and proved invaluable in aiding decision-making.

As part of the response to the Mozambican Government’s requests for assistance, DFID (UK) and Sida (Sweden) expressed an interest in financing emergency repair works on Tertiary Roads. Additional funding for definitive repairs was promised at an international donor conference held in Rome in May. NGOs such as Save the Children, World Vision and Oxfam are involved in the repair of roads associated with their general emergency relief activities.

An impressive example of the peoples' desire to overcome their problems and return to normality were the efforts made by transporters, shopkeepers and communities in general to work together to re-
establish at least the minimum of access to permit supplies to be delivered to those affected by the floods. This was noted whilst carrying out the survey work. On a more formal level, the ECMEPs (state-owned contractors), worked seven days a week to repair major breaches in main roads. Emergency repair contracts were hastily prepared without the need to tender, and this flexibility allowed much to be achieved.

By the end of May, it was clear that the funding that was readily available and would allow contracts to be let was of the order of USD1.1 M. Clearly this fell well short of the complete repair bill, and it would therefore be necessary to focus on emergency repair measures, designing a programme that fell within this budget.

Although funding was forthcoming for work on National and Tertiary Roads network, finding donors prepared to support the repair of extensive damage to urban roads has been more difficult.

**Definition of the Works**

Taking decisions on the priority roads that were to be included in the programme proved to be more difficult than might have been expected. Initially little concrete information was available, and was often conflicting. The priorities of the relief agencies that were able to provide data during the early stages of the disaster altered at regular intervals.

Assessment of the major roads was relatively straightforward. The flooding tended to cut roads in several places, usually at the approaches to structures, making access for inspections difficult and helicopter reconnaissance was often necessary. Initial priority was given to the major roads, as they were essential for the establishment and supply of the accommodation centres set up for people displaced by the floodwaters. The situation on tertiary roads took much longer to evaluate - many of them were inaccessible because main roads were cut. Others simply remained under water for months after the initial flood. Only in May and June was it possible to get access to many of the areas needing work. Even then, water levels often remained high.

With time, and not a little hair-raising exploration by land and air, the key roads for emergency repair were identified. They could be divided into two types: the repair of roads that had been previously rehabilitated, and the opening up of alternative routes to areas where the normal access was completely submerged.

Close collaboration with the provincial road departments allowed final priorities to be established with some degree of confidence.

**Repair Strategy**

The following criteria were important in the determination of the repair strategy to be adopted:-

- Restoration of basic access to isolated areas was top priority
- Creation of employment for people in the flood-affected areas was important
- Emergency repairs should be completed to sufficient quality to survive the next year’s rains, until longer-term repairs could be put into place
• Permanent repairs should be carried out to drainage structures
• Provision of opportunities for the Mozambican private sector to be involved in the works, whilst recognising their limited experience in labour-based methods
• The majority of experience of labour-based work in the regions affected by the floods lay with the state-owned Feeder Road Programme contractors, the ECMEPs

The quantities of work that were identified were in excess of the capacities of the companies involved in the Feeder Road Programme. It was therefore decided to package the works into discrete components, tendering the more straightforward of the contracts on the open market. Four principal activities were identified:-

• General repairs
• Transport of fill material
• Spreading and compaction of imported fill material
• Construction of culverts

Based on successful experience in repairing damage after extensive flooding in Inhambane Province the previous year, it was decided that a combination of mechanical and labour-based techniques was the most appropriate for repairs requiring large volumes of imported fill. Soil would be hauled and stockpiled by equipment intensive methods, then spread and compacted using labour-based methods. This technique would be used in the many areas where it was necessary to raise the road surface or fill breaches.

Another major item of work was the construction and repair of cross drainage structures. Many roads had become impassable in places where culverts had been insufficient or non-existent. Concrete culverts and headwalls would be constructed.

Although much importance was attached to provide employment for people affected by the floods, labour-based methods were not appropriate for all of the repair activities, hence the use of mechanised methods for haulage. Much of the repair work included the importation of substantial volumes of fill, often from distances of over 20 km away.

It was decided that contracts for the transport of fill and culvert construction, consisting of easily defined works, would be awarded by competitive tender to national contractors, whilst the contractors that had been involved in the FRP would be awarded the labour-based components of the works, the general repairs and spreading and compaction.

The Contract Details

Based on the division of work into the four main activities on each road, a total of 39 packages were identified. To restrict the number of contracts to a manageable level, activities were grouped by province and type into contracts. Simple tender documents and bills of quantities were provided for tenderers, and site visits were arranged. In order to encourage the involvement of small private contractors, tenderers were not required to quote for work on all the roads in a particular contract.
Contracts for spreading and compacting the imported fill material and general repair works were awarded directly to the FRP contractors, the ECMEPs. Prices were determined using the ANE’s standard formulae for the calculation of costs.

Two weeks were allowed for tendering, with a week for the preparation of the tender evaluation report. An average of 11 contractors purchased copies of the documents for each of the tenders, with an average of 6 of them submitting bids. However the response of small contractors was disappointing, with only 6 small companies tendering.

Quality of the submitted bids was mixed, which was not surprising, as many of the companies had little previous experience of tendering. Negotiation and final approval of some of the contracts has delayed the award of some of the contracts.

The Implementation

Emergency repair works on individual roads to carry out provisional repairs started as and when possible. Initially funds were used from the annual maintenance budgets that were available to the provinces. These works permitted the establishment of precarious access along many of the most important of the tertiary roads. The roads selected normally coincided with those included in the formal emergency works programme. Meanwhile negotiations on funding continued, and by mid-May agreement had been reached on sufficient funding to carry out the emergency repair works.

Mobilisation of the contractors on the full-scale emergency programme was less rapid, largely because of a reluctance to begin work without a formal contract. This has proved to be an important disadvantage of the introduction of more formal contractor-client roles.

Supervision of the works is being carried out by the inspectors and technicians of the Provincial Road Departments. An independent consultant is monitoring the programme on behalf of the donors and providing support to the Road Departments. Reporting and payment systems have been put in place.

Conclusions

The recent floods that devastated parts of the south and centre of Mozambique have provided yet another opportunity for Mozambicans to demonstrate their resilience and determination to overcome adversity. Although the access situation is far from being completely resolved, it has improved dramatically over the past months.

ANE expressed the wish to be responsible for the management of recovery activities, and staff of the Directorates of National Roads, Regional Roads and Provincial Road Departments worked hard and learnt much while putting the programme into operation. Similarly, the ECMEPs and many other contractors have worked long hours to restore traffic to roads.
The Hidden Story

Feeder Roads in Mozambique

Atanásio Mugunhe
James Markland

Paper presented at:
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
Introduction

The Feeder Road Programme in Mozambique is now one of the largest of the labour-based road programmes in Africa. By the end of 1999, over 50 brigades of varying sizes were engaged in the rehabilitation and periodic maintenance of tertiary roads using labour-based techniques. Although the programme has grown steadily since its commencement in 1981, it has remained hidden in the Mozambican countryside, relatively isolated due to language from the mainstream of labour-based programmes.

It has often seemed that the progress of labour-based work in Mozambique lagged behind countries with more highly publicised programmes. As the current institution-building and financial support draws to a close, the opportunity arises to reflect on what has been achieved, and put the record straight. The use of labour-based methods in the road sector is welcomed by senior politicians and has now been enshrined in national policy documents. Labour-based brigades operate in 9 of the country’s 10 provinces, and they form a key part of the strategy for the maintenance and rehabilitation of minor roads over the coming years.

We hope it will be helpful to share with you some of the secrets of our success, as we start to introduce this technology into other sectors of Rural and Urban life. This paper will detail some of the lessons learnt during the implementation of the Feeder Roads Programme in Mozambique.

History

Labour-based works started in 1981 when the Mozambican Government initiated a pilot project in Zambézia province to investigate alternative forms of road construction making the maximum use of local resources. This project was funded by NORAD, with technical assistance provided by the ILO. Although it began well with the rehabilitation of 90 km of road, the intensification of the civil war forced the transfer of project staff and equipment to Maputo province at the end of 1982. There followed a period of experimental work and training, funded by Sida, to develop suitable labour-based methods for the treatment of the loose, single-sized sands which occur throughout much of Mozambique. Available 'gravels' are often of poor quality, being sands with only limited clay content. Nevertheless the resulting methods allowed the transitivity of roads to be greatly improved, albeit with the need for substantial amounts of routine maintenance.

Based on the success of this initial work, the National Directorate of Roads and Bridges decided to implement the programme on a country-wide basis. As the first phase in this process, construction work by labour-based brigades started in Gaza and Inhambane provinces in 1987 with construction and staff costs being financed by the Government, and UNDP paying for equipment and technical assistance. Brigades were established in Manica Province in 1989, with support for the purchase of equipment from KfW.

Again, the results were positive and a model for operations was developed which could be adopted in other provinces. Particularly important was the fact that this was a technique that needed the minimum of external assistance, and had the potential to become a tool that individual provinces would use to resolve some of their access problems. The selection of
roads for rehabilitation was done at provincial level, being linked to priorities for access and questions of security.

Proposals for a national programme were presented to Donors in 1989. The response was positive, and after a succession of bridging projects the Feeder Road Programme was launched in 1992. It was supported by a consortium of donors, coordinated by a programme management team advising the Government on the execution of the programme. Although many of the donors preferred to restrict their support to individual provinces, the presence of a national coordinating unit proved to be a valuable resource during implementation. Principal financier of rehabilitation and maintenance works was the Government of Mozambique, whilst external funds for equipment and technical assistance support came from EU, KfW, Sida, UNDP and WFP. Programmes funded by DFID and USAID began in 1995 and 1997 respectively. Total value was over 100 million USD, with the Government of Mozambique funding over 25% of this. The ILO has been involved in the programme from the start.

As a part of their support package to the National Road Administration (ANE), Sida provided partial reimbursement of the cost of labour-based rehabilitation and maintenance works financed by the Government of Mozambique through the Road Fund. The level of reimbursement started at 50%, and has been reduced annually by 5%. This recognised the budgetary problems that the government has faced, and is providing valuable assistance until such time as Road Fund income reaches a sufficient level to meet Mozambique’s maintenance budget. By making the reimbursements directly to the Road Fund, institutional procedures were reinforced and not duplicated.

Signature of the peace accord in 1992 gave a new urgency to the programme; access was needed to reopen the productive rural areas that had been largely abandoned during the war. The programme is playing a major part in the rehabilitation of the countryside, although it was not always possible to use labour-based methods to carry out the rapid reopening of the roads to permit the resettlement of refugees. The generated employment opportunities provided a valuable stabilising influence for the resettling rural populations. By 1996, labour-based work was in progress in 9 of Mozambique’s 10 provinces, with 2 397 km of road being rehabilitated. Over 900 km of road was rehabilitated in 1999.

**Lessons Learned:**

- Gradual growth of the programme from pilot projects has allowed procedures and working methods to be well tested before being put into practice on a national scale
- Continued support from Ministers, donors and in particular the National Director of Roads has provided the driving force for the growth of the programme
- Phased implementation meant that Provincial and Central Governments, implementers and donors all had time to come to terms with the advantages and disadvantages of labour-based works, and to develop ownership of the programme
- Labour-based methods have made a positive contribution to the post-war recovery programme in Mozambique
Close cooperation between Government and donors has been essential to the programme's success

Targeted financial support can be used to support institutional procedures and encourage maintenance

Practical Implementation

Until recently the majority of work under the FRP has been implemented by provincially based state-owned contracting companies. The development of small contractors has become an increasingly important part of the programme, with the support of both Government and donors. Training and capacity building under the Feeder Road Programme have resulted in at least two brigades being operational in each province, with minimal need for external support. Supervision of and payment for the work are the responsibility of the Provincial Road Departments, which have not benefited from the same level of support as the contractors. This has resulted in an imbalance of capacities between contractors and clients.

The labour-based brigades were created within the state-owned road maintenance companies that operated in each province, known as ECMEPs. The construction sector was particularly badly hit by the war, and the ECMEPs were amongst the few companies that remained operational. The existence of their administrative and logistical infrastructure greatly facilitated the creation of the labour-based brigades.

It is worth examining in a little more detail the ECMEPs. They were state owned companies, operating mid-way between a direct labour organisation and a private contractor. Contracts were awarded on a fixed rate basis, the contractor being paid for monthly invoices of completed production. Companies were responsible for managing their own finances, receiving no additional income from the Government.

In 1995, a contractor development initiative funded by DFID began in Zambezia province, following on from work being carried out by the NGO, IBIS. Although two challenges remain to face ANE and the provincial authorities, this project has proved to be a success. The first of these challenges is to make full use of this valuable resource which has been created, the contractors, in addressing the maintenance workload which exists. The second is to replicate the project in other provinces. Negotiations with donors are in hand in order to achieve this.

A nationwide contractor development programme to build up road maintenance capacity began in 1996, with over 40 contractors being involved by the end of 1999.

It is interesting to contrast the different levels of support for these two projects. The DFID project trained a total of 9 contractors over 5 years with a technical assistance staff of 4, compared with a maximum of 5 technical assistance staff for the nationwide maintenance project, supporting a total of 45 contractors over 3 years. Whilst the DFID project had its own funds for construction works and has been able to make regular payments to contractors, the contractor development programme relied on the Government's Road Fund to fund construction works, which resulted in delays to payments. The development of contractors within a sheltered project environment has produced impressive results. However, many
contractors have made efforts to diversify into other areas and to build roads for private sector clients, as they do not see the road sector as an attractive business proposition.

The importance of the development of the local contracting industry has been highlighted in the Road Policy, and a contractor's association EMPREMO has been established.

In an effort to improve the value for money of maintenance works, ANE has introduced level-of-service contracts. By focussing on the end-product, the quality of the road as a result of the maintenance, the contractor has freedom to work in a more cost-effective manner, and the level of inspection of the works can be reduced. The system has not been without its problems, but has been proved to be effective. First of the points that must be taken into account when using such contracts are that the road must either be in a maintainable condition when handed over to the contractor, or a programme of initial repairs should be included in the contract.

The contract should specify both a level of service, for example, average speed, and also maximum acceptable level of defects, for example, the allowable extent of potholes. An extensive training programme is necessary for both contractors’ and clients’ staff to convey the concepts and details of the contract, which are completely different to those of a conventional measured contract. To gain the full cost benefit from this type of contract, it should be at least two and preferably three years in duration.

**Lessons Learned:**

- Development of private sector contractors is the only realistic way to maintain Mozambique’s road network. Labour-based methods widen the pool of contractors, removing many of the obstacles for entry to the market.

- An overall policy must exist that coordinates the creation of capacity with opportunities in the marketplace.

- Creation of capacity to manage contractors must be considered in the conception of contractor development projects.

- Support and facilities offered under contractor development programmes should relate as closely as possible to the ‘real life’ situation.

- Level of service contracts offer a useful new tool in managing labour-based road maintenance.

**Institutional Issues**

The new millennium has seen the introduction of a new system for the administration of roads in Mozambique. However, the implementation of these reforms has proved to be a lengthy and complex process. A fundamental first step was the preparation of a new Road Policy that laid down some basic rules for activities. The policy recognizes the importance of the balanced development of the road network, taking into account the need to coordinate investments with other sectors, and prioritizes the maintenance of previously-rehabilitated roads. Requirements to deconcentrate the management of tertiary and unclassified roads to
provincial and district levels, and to promote the use of labour-based methods and local resources, either human or material, are included within the Road Policy. A firm basis has been established for the development of small contractors using labour-based methods. The organisational structure that has been adopted is outlined below.
<table>
<thead>
<tr>
<th>Directorate of National Roads</th>
<th>Directorate of Regional Roads</th>
<th>Road Fund</th>
<th>Directorate of Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Major Works on Primary and Secondary Roads</td>
<td>- Policy and procedural definition for work on Regional (Tertiary, Unclassified and Urban) Roads</td>
<td>- Management of all road sector funding</td>
<td>- HR management</td>
</tr>
<tr>
<td>- Budget Preparation</td>
<td>- Advice on and monitoring of work on Regional Roads</td>
<td></td>
<td>- ANE property management</td>
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<tr>
<td></td>
<td>- Global planning and budgeting</td>
<td></td>
<td>- Poverty Alleviation, Gender and AIDS Unit</td>
</tr>
<tr>
<td></td>
<td>- Research into Regional Road issues</td>
<td></td>
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</tbody>
</table>

**Figure 1. Outline of Structure and Responsibilities of the National Road Administration**
Following approval of the Road Policy by the Council of Ministers, drafting of the legislation to establish the new system of road administration could be concluded. A Road Board, ultimately responsible to the Minister of Public Works and Housing, is responsible for the management of ANE. Operations within ANE fall under the Directorates of National Roads, Regional Roads and Administration. The Directorate of National Roads has executive responsibility for the major roads. The Road Fund, presently a part of ANE, is expected to become independent by the end of 2000.

The Directorate of Regional Roads is responsible for advising and monitoring the Provincial Governments, District Administrations and Municipal councils that execute works on tertiary, unclassified and urban roads respectively. In practice, a considerable degree of decentralisation has always existed, with the provinces defining their priorities for the work they will execute in any given year. As a result of these reforms, the Feeder Road Programme has achieved a firm institutional position within the Directorate of Regional Roads.

Lessons Learned:

The careful formulation of the Road Policy has provided a fundamental base for the balanced development of the road sector and the definition of the system for the administration of roads

Devolution of much of the execution of the FRP to the provinces has functioned successfully.

Technology Transfer

The development of national capacity to implement and manage labour-based works has always been high on the Mozambican Road Administration’s list of priorities. Since Independence in 1975, there has been a chronic shortage of trained and experienced engineers in Mozambique. In 1991, the National Road Administration employed 3 graduate engineers. By 1999, this number has risen to 60. Technical colleges and the Eduardo Mondlane University train technicians and graduate civil engineers. The Road Administration offers sponsorships and work experience to students. However, practical experience is something that takes longer to develop, and the Feeder Road Programme has played its part in providing supervised work experience for Mozambican engineers and technicians.

Starting in the early 90's, major investments were made in all parts of the road sector. These investments were accompanied by substantial technical assistance inputs which were designed to increase the managerial capacity of the Road Administration and its provincial Road Departments. In order to increase the effectiveness of the various technical assistance teams in training national engineers, a technology transfer system was introduced in 1995. Each technical assistance staff member was assigned to work with a national counterpart engineer. The aim of this system was the progressive handing-over of responsibility for management functions to counterparts. Necessary skills and training needs were identified for each engineer, and individual training programmes produced. Progress in implementation of the programmes was reported on a quarterly basis.

While the system is effective when used over short periods, eventually the reporting process becomes mechanical and is seen as chore rather than a useful tool. The provision of regular
feedback on reports helps to avoid this, but represents a formidable workload. Since its creation in the beginning of 2000, the Directorate of Regional Roads has adopted a system of training based on the preparation of workplans and the nomination of staff responsible for the implementation of activities. Technical assistance staff act as advisors to those responsible for carrying out the tasks. Work progress, and not training progress as such, is followed up through team meetings.

The definition of activities within the Directorate followed naturally from its responsibilities as set out in the new road administration system. The advantage of this method of working is that it reflects more closely the functioning of the organization, and automatically establishes a participative and modern system of management.

What is most important is that technology transfer is discussed openly and acknowledged, rather than too much importance being attached to the respective advantages of one method over another. Relationships between counterparts and technical assistance staff can often be difficult, but it is important to establish a learning environment if the transfer of technology is to happen.

The principal training emphasis of the Feeder Road Programme has been on the technicians and supervisors working for the ECMEPs in the provinces, and staff involved in the management of the programme at central level. In recent years this training has extended to staff in the provincial road departments who are responsible for the day-to-day management of the road network.

**Lessons Learned:**

*Technology transfer must be placed firmly on the agenda. All the players must recognise its importance*

*Technical assistance staff should not occupy positions with line responsibility for project implementation*

**A Social Perspective**

Increasing the number of women employed by the Feeder Roads Programme has been taken seriously by the National Road Administration. A gender unit was created in 1997, and has recently expanded its responsibilities to the areas of poverty alleviation and AIDS / HIV. Since 1994, the proportion of women employed in labour based brigades has increased from 4% to 16%. 25% of the engineering staff in the Directorate of Regional Roads are female.

Working groups have been established in each province with responsibilities for promoting the recruitment of women and monitoring and resolving the difficulties they face once recruited. These groups, made up of representatives from the ECMEP, the Provincial Road Department and a brigade, are succeeding in making it more socially acceptable for a woman to work as a member of a road construction gang.

Health workers are employed in all of the brigades, and in coordination with the national AIDS programme have been given training to sensitise labourers in measures which should be taken to prevent the spread of HIV.
Lessons Learned: Changing human behaviour is never a simple task. A strategy of regular sensitisation has been found to be most effective.

The road network is an important tool for development, and the agencies responsible for the management of roads need expertise in social and development issues as well as engineering.
Trainig for Labour-Based roadworks for the Kenya national programmes and international clients

Experiences and lessons learnt

Barnabas G. Ariga
&
James Manyara
KIHB – Kisii Training Centre

Paper presented at:

ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
1. Towards Technology Choice for Sustainable Economic Development: -
   the application in the Kenyan context

Labour-based work methods of construction and maintenance are taking centre stage in many
engineering projects. The bulk of these are in the rural areas, although the urban centres are
also slowly coming into this sphere. However, experience seems to indicate that this trend is
not prevalent in the academic field, particularly in institutions of higher learning. This lack of
progress may be attributed to lack of sensitisation of key players in the sector or purely a belief
that these methods are primitive, and may not be given the respectability of academic approval.

As part of the Ministry of Roads and Public Works, the Kenya Institute of Highways and
Building Technology derives it's training objectives from the existing National Manpower
Training Policy which includes the following: -

- To redress the imbalance of training professionals, technicians, craftsmen and artisans
- To provide skills for self reliance
- To ensure a continuous supply of required skills in the roads and building sectors.
- To create capacity for increased and sustained productivity.
- To improve the performance of craftsmen, technicians and supervisors by offering them
  suitable skill improvement courses.
- Ensuring a continuous supply of required technical skills - working in collaboration with
  National Polytechnics and the Directorate of Industrial Training.
- To assist in improving management and supervisory capacity by offering tailor-made
  courses for other ministries, parastatal bodies, and other foreign countries on request.

2. The History of the Kenyan Labour-Based Experience

2.1 Programme Development and Training

Labour-based road works in Kenya began in 1974 in 4 selected districts of this diverse country.
The districts were selected to provide sites representative of all regions being considered for
inclusion in a larger programme. They were representative in respect of topographical, climatic
and socio-economic factors.

These Districts were: -
Nyeri: for highland and wet regions
Kwale: for coastal regions
South Nyanza: for Lake Victoria regions
West Pokot: for semi-arid regions

During the period 1974 to 1976 the "Pilot Projects" in these districts operated independently.
There was a lot of expatriate input with few Kenyan engineers in the programme. Kenyan
engineers viewed labour-based work as a second-class form of engineering, still having an aura
of relief work. The controlling ministry soon realised that work methods, techniques, and
procedures in the various districts should be standardised if the programme was to be put into
effect on a national scale. The results thus far had been very encouraging, and a national
programme of labour-based road construction and improvement was introduced. This national programme became known as the Rural Access Roads Programme (RARP).

The objective of standardising the works led to the formation of a training site in one of the initial districts. The district chosen was Nyeri. Standard methods and procedures were agreed upon and put into practice on the Nyeri sites. The Nyeri sites were then used as demonstration sites for these standard methods. From these beginnings, the labour-based training unit was born. It was quickly realised that one essential feature for national success of this type of programme was to involve national engineers. As the programme grew, all new engineers coming into the programme were attached to the training unit before being appointed to implementing units in other districts.

As the programme expanded, the training unit was moved to Kisii district. A small purpose-built temporary facility was constructed at Suneka with the help of Swiss funding and more formalised training for the programme began. The original objective of standardising the work methods and procedures remained top priority but now training was also aimed at maximising efficiencies within the programme.

The Rural Access Roads Programme was so successful, both in terms of its own objectives, and in terms of national political enthusiasm, that labour-based methods were brought onto the classified road network in 1985 with the creation of the Minor Roads Programme (MRP). To cope with the training for MRP, a more permanent training centre was built at Kisii. This complex is the present day Kisii Training Centre (KTC), where all labour-based roads training for Kenya is carried out and the International Labour Organisation (ILO/ASIST) international courses have been conducted.

Throughout the period since the first training unit was set up in Nyeri, these sites have been used as technology development and research sites. Technology development in Kenya programmes has gone hand in hand with training.

The training unit has always been the centre for trials of new methods and procedures within the labour-based programmes in Kenya. This has meant that research results could be immediately incorporated into the training syllabi. Over the years the unit has been closely involved with the development of standards and methods for dealing with steep gradients, roads with existing camber, sunken sections, alternative pavements, compaction (or rather non-compaction) etc. Continuous trials are still going on the subject of compaction.

Amongst the notable successes in this area was the development of the "Full Road Template" for use in areas of existing camber. This development has given an average saving of 250 man-days per kilometre for the task of reshaping of a minor road cross-section (5.4m carriageway), and a 400 man-days saving for full construction (of a similar road).

2.2 Programme Achievements

The Rural Access Roads and Minor Roads Programmes have achieved wide success and fame within Kenya. Together these programmes have constructed and improved a total of 12,000 km of access and feeder roads in the most agriculturally productive regions of the country. At their
height they were providing 20,000 person-years of employment per year to the rural population in areas of high population, and under-employment. Land-use patterns in these areas have been affected, and a change from subsistence to cash crops noted.

Kenya, through the Ministry of Roads and Public Works, has managed to run a huge programme of labour-based road works covering the majority of the country for the last twenty years. The programme has built up a cadre of experienced engineers. Labour-based work in Kenya is no longer considered as a sub-standard form of engineering. Road building skills utilising labour-based methods have been transferred to the local communities at grass roots level. Many other local roads ("Harambee roads") have been constructed by the communities on a self-help basis using the same technology. Productivity within the programme has been maintained, not only throughout the country, but also throughout the many years of the programme. Productivity figures fluctuate greatly from year to year, but an overall trend can be observed. MRP figures over a ten-year period show full gravel road construction in 1984 to be 2,797 person-days per km and in 1993, 2,630 person-days per km.

The other key success of these programmes has been the increase of political awareness amongst the country's leaders of the potential of labour-based methods, not only to build roads and provide jobs, but also to win votes.

The beneficiaries from the training for these programmes have been both direct and indirect. Direct beneficiaries have included individuals trained to be able to carry out their jobs to a high level of success. Indirect beneficiaries have included local, rural communities who have benefited from access to markets for cash crops, jobs, and improved services. Other sector ministries have benefited from easier access to the communities (health, education etc.). The communities served have undergone a general increase in economic activity over the period of the two programmes.

Certainly, a large part of all these successes was due to the vast amount of training that went on and continues within the field of labour-based road works in Kenya.

2.3 Institutionalising Labour-Based Training in Kenya

The Kenya Institute of Highways and Building Technology (KIHBT) of the Ministry of Roads and Public Works (MOR&PW) has over the past 20 years fully incorporated labour-based roadwork methods into their training curricula.

Recently, a new Road Construction Craft course was developed and was officially launched with the commencement of formal training from September 2000. This accredited craft course is probably the first of its kind not only in Kenya, but also the rest of sub-Saharan Africa, as it equally covers equipment and labour-based work methods.

A similar initiative was recently completed to include labour-based methods into the curricula of the civil engineering diploma of the Kenyan national tertiary institutions. The bulk of this work was funded with the support of the Swiss Agency for Development and Cooperation (SDC). The materials developed have been made available to the ILO/ASIST office in Nairobi, with a view to having the curriculum internationalised for use in other countries.
Within the Kenyan context, the courses will be run under the auspices of the Kenya Institute of Education (KIE), and will be examinable nationally by the Kenya National Examination Council and the Directorate of Industrial Training respectively.

2.4 International Training

During the period of the Rural Access Roads Programme, requests for training from other neighbouring countries were received by the training unit. Some of these requests were fulfilled and various individuals, mainly from Tanzania, were accepted onto RARP courses. This was a useful experience for these individuals, but did not go far in meeting the training needs of the developing labour-based roads programmes in these countries. When the KTC training centre for MRP was being planned and designed, capacity for a small number of site supervisors from other countries was foreseen.

From 1985 KTC dealt with a number of requests for specific training courses for the foreman, overseer, gang leader (FOG) cadre of participants from a number of projects and programmes in neighbouring countries. Most of these courses were conducted at KTC in Kisii, but a few courses were conducted by KTC trainers in the project countries, mainly Tanzania.

In 1988 the ILO, with Swiss funding, developed and ran an international course for engineers at KTC. This course was based on the Kenyan Engineer’s Course and had the added features of topics on inception of a labour-based programme and further information on projects from other countries. From this first pilot course, an international course for engineers and managers was formulated. The ILO continued to run more of these courses at KTC over the next two years, using KTC staff, consultants and lecturers from both ILO and Kenya Government programmes.

In 1990, the Swiss funded an ILO project for training and information services "TIPS" and SIDA and NORAD funded an ILO project for advisory support to projects in Sub-Saharan Africa "TAS". These two projects were joined together under a new project management structure now based at Nairobi and Harare known as "ASIST".

ASIST has conducted international courses each year at KTC for engineers and managers of labour-based roads projects and for senior technicians and trainers. Under the ASIST project, senior managers also receive familiarisation study tours of projects including visits to MRP in Kenya.

KTC continues to run courses for "FOG" cadres of supervisor, and has conducted training for a number of site supervisors from (and in) Tanzania, Uganda, Sudan and Botswana.

3. Analysis of the Success of Labour-Based Training in Kenya

We consider that there are five main factors that have contributed to the achievement of training for these labour-based works in Kenya:

- Well trained and experienced training staff
The fact that the training authority has also been in direct control of a practical road works unit.

The fact that all levels of staff are trained by the same authority.

Continual revision of content and refresher courses.

Technology development linked to the training centre.

In addition, for the international courses the following factors have been crucial for their success.

- A pool of some 25 lecturers experienced in labour-based management is available for KTC to draw upon for each international course.
- The fact that the courses are encouraged and fully supported by the Kenya Government and the MOR&PW in particular has eased the administration procedures.
- ILO/ASIST support and input to the training process and to the administrative function of the international courses has been crucial.
- The back up of the formal training courses with study tours has added an important dimension to the training.

The main beneficiaries of the programme of international training have been the labour-based projects and programmes in the region and beyond. Due to the training, new projects have a shorter learning curve. A project can be up to peak efficiency in a much shorter time than if it had to learn the hard way. An ongoing project benefits from the broadening of their staff and the cross fertilisation of technology. Not everybody needs to re-invent the wheel. The Zimbabwe project, for instance, already started using the full road profile, developed at KTC, from the beginning, saving many person-days. The Kenya MRP contractor-development project has used the principles developed in the Ghana Feeder Roads Programme. The sharing of ideas and experiences through the training courses and other interactions benefits all projects in the region.

4. Training course for site supervisors of labour-based & community managed upgrading of urban low income settlements- capacity development issues:

The Kisii Training Centre is traditionally a labour-based training institute that specialises in rural projects. However, it has had the flexibility to adapt to new changes involved in this technology. Towards this end, it has, with support of ILO/ASIST, been training for community-based programmes in Suba, Kisii, Narok and Isiolo districts in Kenya. These were labour-based programmes managed by communities themselves, and aimed at a participatory approach to poverty reduction.

A second area of co-operation with ILO/ASIST was in the teaching of rural travel and transport concepts. This has now been incorporated in both local and international training programmes run at KTC.

The Kisii Training Centre's interest in urban unplanned settlements is new. This is an extremely important facet in the provision of services and infrastructure to the urban poor. ILO/ASIST has greatly assisted in the development of curricula, lecturing staff and in marketing. This has
been done through attachments of KTC lecturing staff to the Hanna Nassif project in Dar-es-
salaam Tanzania, implementation of the Kawangware and Dandora urban projects in Nairobi,
and the Daraja mbili to Nubia community project in Kisii.

Statistics available indicate that nearly a third of the world's population is living in a state of
poverty. In Nairobi, 55% of the urban population live in unplanned settlements. The unplanned
settlements are expanding rapidly- at a growth rate between 13% and 24% a year. The growing
settlements are characterised by poor or non-existent public infrastructure and unplanned
development. In addition, the community is faced with rampant under-employment and a
resultant rise in insecurity. Local authorities lack adequate capacity to provide the much-
needed resources within these settlements.

Studies have shown that labour-based and community-managed approaches can offer solutions
for upgrading unplanned and low-income settlements, considering the poor state of
infrastructure and unemployment. Herein lies the potential for training in quality control and
assurance.

City and municipal councils are facing enormous challenges as they seek partnership with local
communities to upgrade, repair and maintain the physical infrastructure with the rapidly
growing settlements. While much of this work can be done by well-trained personnel and
labour-based methods, there is lack of practical experience and supervisory skills to achieve
adequate standards in a cost effective and timely manner through the use of labour-based
technology.

The Kisii Training Centre and the Kenya Water Institute (KEWI) are developing a new course
entitled "Labour based & community managed urban upgrading" with support from the
international Labour organisation (ILO) through the ASIST project. The aim of the course is to
equip site supervisors with knowledge and skills to supervise urban infrastructure upgrading
projects in low-income settlements. The target group includes site supervisors from
communities, municipalities and contractors. The training programme is divided into two
courses, namely the Basic and Skills Courses, each with a duration of three weeks.

The first Basic Course is programmed to take place at KTC from 13th November to 1st

The courses are being run at the same level of expertise as the existing international courses.
KTC intends to re-focus its training capacities in this needy area in order to assist communities
living in these areas to receive basic infrastructure.

5. Institutional capacity building:

The Kisii Training Centre has built its lecturing capacity over the past few years through: -

a) Sponsoring of lecturers to institutions of higher learning to improve their academic
   qualifications
b) Attachment of lecturers/instructors to projects and programmes as counterparts across the
   region.
c) Attachment of lecturers/instructors as counterpart consultants to ILO/ASIST missions.
d) Skills training through training of trainers courses/seminars/workshops/consultancy.
e) Development of curriculum for new training areas.
f) Provision of consultancy services to projects and programmes in the sub-Saharan region.

6. **Training for the private sector - capacity building:**

In the early 1970s the Kenyan Government embarked on a policy whose object was to assist up and coming African contractors join the contracting industry. This was in the building and civil works sectors. The main executing agency was the National Construction Company of Kenya (NCCK) who sub-let all their works to the small-scale contractors. This arrangement had limited success in the building sector, while having a very insignificant effect on the larger infrastructure sector.

In has been realised that the continual non-participation of local Kenyans in the key sector of infrastructure development is not healthy economically and in the long run it is going to be injurious to the overall economic empowerment of the Kenyan people. No nation can expect to be continually developed by foreigners, no matter how noble their intentions.

Because of the nature, complexity and restricted entry requirements to this sector, it would be unrealistic to expect that one major policy change would automatically achieve local Kenyan participation in the sector. It has to be a series of simultaneously applied policies whose net effect could slowly but surely bring the Kenyan entrepreneur into the sector. A lot has to be learnt from other African countries that have been through this process successfully.

It is proposed to formulate policy changes including:

- Setting aside a substantial amount of money from the fuel levy budget and other GOK routine maintenance budgets specifically for small-scale contractors to undertake contracting works.

- All contractors and consultants undertaking work in Kenya must be registered by the Engineers' Registration Board. The ERB must take a leading role in regulating the construction industry.

- To encourage the participation of professionals, engineers and other professionals in the field who wish to try their hand in contracting should be given unconditional sabbatical leave (unpaid leave) for up to three years with an option of rejoining the service if this excursion proves unsuccessful.

- The GOK should transform the mechanical department into an equipment leasing/lending agency, where up and coming contractors could borrow equipment for the jobs they are given, thus avoiding the costly exercise of buying new equipment.

- In order to simplify the cumbersome requirements of open bidding, the GOK should revert back during this capacity building stage to fixed rate contracts.
In order to enable emerging local small-scale contractors to enter this restrictive market, maximum utilisation of labour-based work methods should be incorporated in all relevant terms and conditions of contracts involving infrastructure projects.

A basic training programme for small-scale contractors should be put in place. This would form the entry point for all those who wish to enter the industry. Funding for this should be available from GOK sources and from external donor agencies (see attachment 2).

Mentorship should be encouraged in the industry by issuing guidelines for terms and conditions of contracts to be modified, to make it compulsory for 25 per cent of the total volume of work in terms of finance and workload to be sub-let to small-scale contractors.

7. Training for Labour-Based works - current status and future challenges.

The Kenyan Roads 2000 programme is a further step in the overall use of this technology in the road sector. The full implementation of R2000 techniques (labour plus appropriate equipment) will bridge the gap between the use of labour only methods for rural, minor roads and the use of equipment-based methods for trans-national highways. Engineers and technicians in Africa will have cost effective and appropriate technologies to be applied to all situations.

Through KTC training courses, a strong positive influence will be made in the progress of the development of the roads sector in a large part of Africa, with minimum financial input. The effect of training for both the model for Road Maintenance (R2000) and the International Courses with ILO/ASIST will influence the way many countries move forward with their road network maintenance activities in the next few years. This is particularly the case for countries coming out of civil strife.

In order that the goal of increased use of labour-based and appropriate methods can be achieved, the present and potential users of these methods must perform well and efficiently. In this way they act as models for the rest of the profession and show that the methods are both cost effective and profitable. Therefore, the overall goal of KTC will continue to be to improve the performance of the users of labour-based methods. This includes both government staff and contractor staff.

For KTC, important aspects and considerations of the training will be:

a) The regional impact of the effective use of labour based methods through training. This brings the development advantages of improving rural infrastructure, while saving foreign exchange, protecting the environment and increasing rural community development.

b) The development and efficient implementation of the RMI policies.

c) The promotion of this appropriate technology in the region through the successful implementation of R2000, as an example to other practitioners.

d) The commercial viability and sustainability of the Kisii Training Centre, through dedicated training funding and commercialisation of activities.

The regional aspects of the work of KTC are immensely important. This has been accomplished through: -
Links with ILO/ASIST, whereby KTC has trained over 429 engineers and technicians from 23 different countries in Africa and Asia. The demand for this training is enormous, and will continue to be met as part of KTC’s capacity building process. (Attachment 1)

The success of the RARP and MRP programmes in Kenya, which would not have been possible without the input from KTC. This support will continue in respect of the roads 2000 maintenance strategy.

The KTC will concentrate on training functions to promote the change to a public-private partnership in the roadworks sector both in Kenya, and the wider region. This means developing courses and procedures for the training of roadworks by private contracts, community contracts, petty contracts and commercialised road maintenance. The course components will include the further development of the training modules for the environmental impact assessment of roadworks activities, and the promotion of gender sensitivity in the process and procedures of employment for labour based technology.

The current capacity of the KTC includes single bed accommodation for 60 participants and training-site accommodation for 40 participants. The centre has an experienced cadre of lecturers and instructors. In addition, it has provision for the acquisition of external expertise whenever this is necessary.

8. Lessons Learnt and Challenges

- There is a need for quality control and assurance of all the course products. It is essential to continue offering quality service to clients as the only sure way of retaining their demand.
- Continuous curriculum development and training for change is essential.
- Aggressive marketing of the products is essential, especially when dealing with external international clientele.
- The continuation of joint donor audits, both financial and technical, to ensure donor confidence, is paramount.
- There is a need to source dedicated funding for capacity building.
- Regularly meet with clients to review their training needs.
- Back-stopping by both ILO/ASIST and clients is essential
- Quality assurance mechanism must be in place.
- It is necessary to continue to offer a flexible training product e.g. rural travel and transport, training for unplanned urban settlements etc.
- Invest in training of trainers and provide opportunities for exposure.
### Annex 1

**INTERNATIONAL TRAINEE DATA FOR KTC - PERIOD 1988 - 2000**

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Annex 2

DEVELOPMENT OF SMALL-SCALE, LABOUR-ONLY, ROUTINE MAINTENANCE CONTRACTORS

1. THE REASON

R2000 will require the development of contractors to carry out routine maintenance on all roads. The large international or national contractors that already exist and are well able to compete in the market will deal with the carriageway work on main trunk roads.

The routine maintenance work on district and minor roads, plus the off-carriageway work on the main roads, will best be carried out by labour-based contractors. They will either be contracted for the small roads directly, or sub-contracted to the main contractors on trunk roads.

These small labour-based contractors do not exist in Kenya today.

If development of the contracting industry is to benefit the majority of road users and the population in general, then the need for these small labour-based contractors to provide jobs in both the rural and urban areas should not be underestimated.

Commercialisation of the road sector and the stimulation of public-private partnerships in the maintenance of the infrastructure including roads will only be successful with the involvement of large portions of the general population in these activities. The decentralisation of responsibility and ownership of roads to the local communities through local authorities and other agencies of the Executive Roads Authority will be stimulated by the use of local labour-based contractors for the maintenance work. These contractors will provide a basic level of cash income to rural areas. This in turn will lead to a sense of responsibility and ownership of local roads by the local people. Eventually with this system, the supervision task of the Roads Authority will become easier as they will only need to carry out a technical audit to determine “was the work actually done?” rather than detailed supervision of the specifications, as this will be carried out by the local community. The Roads Authority can then concentrate its supervision activities on the trunk road network.

2. THE STRATEGY

The development of contractors, especially labour-based contractors, can only be a bottom-up process. The contracting industry cannot develop from the top down. Labour-based contractors will develop from the very people who have seen the success of the method for themselves. A large or medium scale conventional contractor is not going to change successfully to labour-based methods, while his capital is tied up in expensive machinery and his whole organisation is geared to keep those machines working. An existing machine-based contractor will also balk at the supervision-intensive nature of labour-based work. Only a contractor growing up in a mainly labour only environment will be able to develop
The labour-based practitioners can be converted into a private industry with minimal inputs in training and development, but with patience and mentoring over the next decade.

The starting point should be in the conversion of the first line supervisors of routine maintenance work into small-scale, labour-only, routine maintenance contractors. This will allow local people with the basic skills to have the opportunity to try out the small business environment in the road sector. It will also have the immediate effect of reducing the direct labour wages bill of the Ministry of Roads and Public Works.

The contract award can be by fixed rates to begin with on small sections of the road network. The contracts will expand and move to competitive bidding as the new contractors gain experience. The successful ones will continue to expand and reach an optimum zone of influence. The less competent ones will gradually be forced out of business and join the others as employees or sub-contractors.

The idea to let a whole district’s road maintenance to one contractor for a whole period is contrary to successful development of the industry as a whole. It sidelines the small contractor, prevents the use of labour-based methods, acts against true competition and stimulates corrupt practices. This is not only against government of Kenya policy directives, but acts against the overall development of the country in terms of employment strategy, de-centralisation and local community development and responsibility. Local communities should be moving towards a situation where they not only pay for, but also control and carry out the maintenance of the district roads in their region.

3. **THE PROCESS**

**APPROPRIATE CONTRACT DOCUMENTS**

The persons who are targeted to become small-scale contractors for routine maintenance are villagers with a minimum of primary level formal education and some experience of labour-based road works. A prime example would be former MRP headmen/headwomen. It is obvious that any attempt to utilise the normal civil engineering form of contract documents based on FIDIC or ICE conditions would be futile. A short form of contract based on a schedule of rates, (as formally used by MOR&PW for gravelling contracts), and the MRP
routine maintenance activities schedule, has been drafted by KTC for use during training of small contractors.

This document, sets out the basic conditions and risk sharing, the requirements for the work and the rates and quantities of the job. The whole contract is 2-3 pages long. Initially during the training and trial contract stage of contractor development the client will set the rates. After the initial round of trial contracts, 3 to 5 months, the contractors should have enough experience to tender in competition with each other for the rates. The quantities will be measured by the client or consultant staff prior to the document being prepared, and no variation to the quantities will be allowed during the contract period.

During the development period, the successes and shortcomings of the contract documents will be monitored and amendments made. Activities may be added to the list, rates may be changed, but this should only be done when sufficient evidence has been collected and changes approved.

TRAINING

The Kenya institute of highways and building technology has developed a training course for labour only small contractors for routine maintenance. The course is aimed at MRP headpersons, and trains them for the transition from being employed as direct labour to being contractors and employers of a small number of labourers themselves. This course has a duration of 2 weeks in the classroom and one-month on site carrying out a training contract. The course deals very little with the technicalities of road maintenance, since the participants know the job. The main content of the course is business management, accounting, and employment conditions/ labour law. A major aspect of the course is in explaining the contract document and what it means for the contractor. The course also goes into detailed advice on money management, planning for wage payments, investments in tools etc. before taking profit. The participants are also reminded of the 11 routine maintenance activities and how to perform them.

The first of these courses took place in Kisii in May 1998.

CONTRACT AWARD

Training contracts will be awarded to the participants of the training course. These initial contracts will be small (up to 3km) in length and detailed in terms of quantities. The contract will be of a 1-month duration. During the training contract the trainee contractors will be helped with both technical and business advice. Those who perform well will then be awarded a second contract of 1 month on another section of road. These contracts will be on a fixed rate basis. The rates will be fixed by the client (KTC), taking into account fair wage rates, tools purchase and repair, and a reasonable profit margin.

The first training contract will automatically contain a heavy workload for maintenance operations on the first section of road, to bring that section back to reasonable condition. After the one-month contract, the initial section of road will be left without further work and its condition monitored to observe when further work becomes necessary.
The next contract awarded will be on a different section of road, near the trainee’s home. Again the one-month contract period will be kept and the rates fixed by the client. This process will continue until such time as it is deemed necessary to return to the initial section of road for further maintenance work. It is estimated that this period will be between 3 and 6 months. The process of leaving sections without work for short periods during the year and then returning in a routine cycle is designed to have a cost saving effect while keeping the road in constant reasonable condition.

Round 2 of contract awards can then be initiated. During this round of contracts, the length of sections and period of contract can be extended, and contractors will prepare competitive tenders for the rates to be used.

Contracts will be awarded through the normal procedures applicable at the time, either through the DC’s office or through an agency of the Executive Roads Authority.

Supervision, particularly of road condition on the completed sections will be intense and consideration should be given to contracting out this supervision to small consultant companies formed from former Ministry of Public Works and Housing roads Inspectors.

Using this method of contract award it will soon become clear that contractors will obtain zones of influence where they dominate the market. It will be at the borders of these zones that the strongest competition will develop. Good successful contractors will expand their zones and perhaps purchase motorcycles for supervision. The less successful contractor’s zones will shrink until they are taken over by others.

**FURTHER DEVELOPMENT**

When a contractor has grown to a level were he is now ready to invest in some appropriate machinery, he can then be re-trained as a gravelling and spot improvement, labour plus machine contractor. He will move on to other activities, leaving a gap to be filled by new emerging small labour-based contractors, or expansion of his over-powered rivals. In this way, the development of the labour based contracting capacity will be assured, without losing the existing human resources in labour-based methods.

A human-based contracting industry will expand from the bottom up.
IRAP as a Rural Road-Planning tool: The Lao PDR Experience

Souksakhone Sontannouvong
Project Manager
Lao PDR IRAP Project

Paper presented at:
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Introduction

The Integrated Rural Accessibility Planning (IRAP) is a simple planning tool applied since 1995 in Lao PDR as a capacity-building instrument for provincial and district development planning activities. IRAP takes the rural households’ access to basic goods, services and facilities as a basis for determining local development needs. IRAP’s application in 8 of the 17 provinces resulted in the generation of a body of information to help understand how the rural communities avail of the basic facilities provided in their respective areas. It can be said that such understanding facilitated the identification of villages that experience difficulty in availing potable water, health, education and transport services. This eventually led to appropriate actions by concerned local governments and the donor community to address the identified needs such as the provision of basic infrastructure including village roads, elementary schools, health dispensaries and communal faucets in IRAP-identified priority areas.

IRAP comes as a technical assistance package directed at provincial and district technical staff. Through its application they can generate information, and together with local decision- makers and beneficiaries, analyze and interpret the findings and formulate appropriate programs and projects. The IRAP package is also designed to facilitate sharing of information between the major actors of local decision-making by providing an analytical procedure that can be easily understood and applied. This sharing is complemented with information packaging and presentation techniques designed to effectively convey the information to concerned functionaries. Thus, the application directs the way to consensus building through people empowerment and beneficiary participation - development strategies that are very much in line with the government’s policy of decentralization and more local development decision-making responsibilities.

IRAP’s application in Lao PDR provided information about existing levels of accessibility in districts and provinces, presented in both statistical and graphical formats. These are in: accessibility data bases (ADBs) containing IRAP-generated data; accessibility profiles describing current accessibility conditions; a prioritized list of villages and districts by sector; district maps showing the distribution of households in relation to basic goods and service facilities and how they are linked; and district development action plans with specific recommendations regarding appropriate programs and projects to address the identified and prioritized sectoral needs.

The outputs of the project were used not only by the local government units but also by donors providing development assistance in the country. One noteworthy result is the inclusion of IRAP road priorities in the Lao-Swedish Road Sector Project (LSRSP) Phase 1 where community and district roads identified by the IRAP procedure were actually adopted and implemented.

Basic Principles of IRAP

The concept of using access to basic goods, services and facilities for the identification and prioritization of rural development needs resulted from a study conducted by the International Labour Organization (ILO) in late 1985. The study, conducted in several developing countries, focused on the daily travel pattern of rural households in a bid to understand why their conditions remained the same in spite of the massive investments made in roads, bridges and/or irrigation facilities. The study revealed that most of the travel activities of the rural household is to avail of
basic goods and services and that majority of such activities do not involve the use of motorized vehicles on paved roads. Rather transport typically involves walking, head loading and using intermediate modes of transport. The study also provides a better understanding of the elements of rural transport, which consists of: mobility or how people move around, and proximity or the selection of sites for basic service facilities. This understanding easily leads to conceptual interventions in improving accessibility, either by improving transport services to the facility, or by bringing the facility closer to the people. The first one is related to mobility, while the second intervention is concerned with the selection of appropriate sites for putting up a service facility. Such understanding of the relationship between rural transport elements and interventions, and the translation of the said interventions into site-specific access-improvement infrastructures are the key activities in accessibility planning.

The ILO study further studied how rural household members, as part of their daily travel activities, have to spend time to fetch potable water, go to school, avail of health service, go to markets, reach a road to get transport service or collect firewood for cooking. The IRAP concept envisages that the amount of time spent to avail of these basic goods and facilities, if reduced by improving access, can be spent on other productive endeavors that can likewise improve their living conditions. For instance, improving access to potable water supply may lead to increased water consumption and better sanitation practices, improving access to elementary schools may lead to increased enrolment for school-age children, improving access to health service may reduce infant mortality through better nutrition practices, or improved access to transport services may encourage more agricultural production and thus, income.

As a local level-planning tool, IRAP is best applied at the lowest level of development decision-making where local needs and local resources are matched. IRAP helps planners and technical staff to identify and prioritize community needs on a sectoral basis, and to formulate interventions based on available resources as well as on their technical and managerial capacity. In all these activities, IRAP calls on the major actors of local decision-making to prioritize programs and projects for incorporation in the area development or investment plans. This completes the IRAP technical assistance package by providing the forum for productive deliberations between leaders, beneficiaries and potential sources of financial assistance through a process that encourages people participation and consensus building. It must be noted that at local government unit level, the use of meager resources is always a major issue to consider and the participation of target beneficiaries during deliberations gives a sense of ownership of the access-improvement projects to ensure use of the facilities as well as participation in their maintenance.

The application of IRAP in Lao PDR resulted in the construction of elementary schools, communal faucets, rural roads and health dispensaries. The government, through the Ministry of Communications, Transportation, Post and Construction (MCTPC), took notice of the use of the IRAP prioritization procedure for the road sector and recommended that it should form part of the prioritization process to be adopted nationwide.

IRAP as a Rural Road Planning Tool

The Lao Government has declared as a policy that the road sector should be the spearhead of growth and development in the country. Since 1985, massive investments in roads connected the country’s provincial capitals, as well as the neighboring countries of Vietnam, Cambodia, Thailand
and China. The national roads that run from north to south form the backbone that facilitates the political, physical, social, economic, environmental and tourism development of the country. To sustain the momentum that has been started in addressing rural poverty, the country is now focusing on rural road network improvement. It is envisaged that roads will link rural communities to district centers, to the various sources of basic services, and to livelihood opportunities like markets, agricultural inputs and new technology, as well as to credit facilities that will sustain production. The roads also enhance access to schools, health dispensaries, pharmacies, hospitals, government services and employment centers. The government assigns a high priority to rural infrastructure, particularly in the form of rural access and farm to market roads, as these will accelerate development and alleviate rural poverty.

The government prescribes that for the development of this rural road network, an effective rural road-planning tool has to be utilized to guide investments. The use of the IRAP priorities in the on-going Lao-Swedish Road Sector Programme (LSRSP) Phase 1 proves the usefulness of the IRAP road prioritization procedure and government expressed official recognition in its Strategic Direction for the Development of the Road Sector for 2000-2015 presented in June 2000. As such, the said prioritization procedure forms part of the capability-building program designed to enhance local level planning.

At present, the rural road network in Lao PDR is not in good shape. The majority of the provincial and district roads need rehabilitation before routine and periodic maintenance could even be contemplated. New construction of additional road links should only happen after a system for maintaining the rehabilitated network has been developed and effectively implemented. IRAP subscribes to the following strategy:

- **First Priority**: rehabilitate the core road network and bring it to a maintainable condition
- **Second Priority**: develop and implement a proper maintenance system to sustain the core road network
- **Third Priority**: construct additional road links

IRAP developed a road prioritization procedure to identify the core road network and prioritize specific road links for rehabilitation. The procedure is used to identify which among the rural roads in a certain area should be improved. The process of defining priorities consists of the following steps:

1. **Screen** road links according to five set criteria, as detailed below
2. Use **socio-economic ranking** to identify links for rehabilitation or for new construction
3. Conduct **technical assessment** of the prioritized link

**Screening** is first applied to eliminate individual road links that do not satisfy the following basic criteria:
the road link must run through an area inhabited by a minimum number of people per kilometer;
the link should connect to an all-weather road and be part of a network leading to local or provincial markets and/or district centers;
the link must not be closely parallel to or in the area of influence of another all-weather road;
the link can be maintained using labor and materials (gravel and sand) from the village served; and
the road link should serve the people at large and not only a special interest group such as a logging or mining firm.

**Socio-Economic Ranking.** This seeks to identify priority rural road links for rehabilitation and/or construction activities that are to be subjected to a more detailed technical assessment. IRAP recommends a simple socio-economic ranking based on the number of people in the area of influence, the expected socio-economic impact per person and the total cost of the road rehabilitation or construction. A formula to calculate the cost-benefit ratio is prescribed to rank the roads as follows:

1. Identify the road link for rehabilitation or new construction *(from the screening)*
2. Estimate the total cost of rehabilitation or new construction *(apply unit standards of the ILO)*
3. Estimate the number of people within the area of influence *(people within 5-km distance on both sides of the road)*
4. Estimate the socio-economic impact within area of influence *(use prescribed scoring for access indicators, with the people providing corresponding weights to these indicators)*
5. Calculate cost-benefit (c-b) ratio using the following:

   \[ \text{indicator} \times \text{weight} = \text{benefits}; \quad \text{c-b ratio} = \frac{\text{total cost}}{\text{population} \times \text{benefits}} \]

6. Prioritize the rural road

**Technical Assessment** is later applied to the identified road link. Road engineers inspect the priority roads to determine technical feasibility of rehabilitation and to undertake a technical road inventory for the appropriate design. This assessment will also result in a more detailed cost estimate and plan of work.

**Official government recognition of IRAP**

Government recently enacted the *Road Law*, which clearly defines the duties and obligations of institutions and organizations concerned with the “…management, use, planning, survey, design, construction and maintenance of public roads…” The Law also prescribes activities that have to be undertaken by concerned agencies, one of which is the Ministry of Communication, Transportation, Post and Construction (MCTPC).
In the MCTPC, the Division of Local Roads was recently created and designated as the new base of the IRAP project. The said division is under the Department of Roads and is tasked with providing administrative and technical support to the Department. In addition, the government decreed during the Sixth Session of the Central Party Committee in March 1999 that in development, the province shall be a strategic unit, the district the planning and finance unit, and the village the implementing unit. The decree thus provides a new framework that prescribes greater local level participation in development.

Recently, the MCTPC presented the Strategic Directions for the Development of the Road Sector for 2000-2015, and includes “integrated rural development and poverty reduction through active participation in the IRAP project and inter-sector coordination” as one of its objectives. The document further states that, “work sponsored by UNDP, SIDA and the ILO has shown that viable IRAP systems can be set up to provide a planning function at local levels with minimal central government support,” and that the “socio-economic benefits of providing road access to rural communities can only be fully realized by coordinating road development with investments in health, support to education and agriculture.”

IRAP is thus embodied in the vision, and its future application must heed the direction set by the new policy pronouncements, as well as by the institutional and organizational developments. The Ministry officially recognizes IRAP as a tool for planning and prioritization of investment decisions in the local road system.

The Road Law also calls for participation of the villages in the maintenance of rural roads. It is prescribed that those that directly benefit from this transport infrastructure must also be responsible for its maintenance. The Ministry recognizes the need to prepare the villagers for their new role in road sector development and this task has been given to the Division of Local Roads. This can be addressed by IRAP by providing relevant and easily understood information, thus encouraging the villagers to participate in consensus-building, and hopefully in project implementation – thus enhancing their sense of ownership of the infrastructure, which leads to utilization and maintenance.

An assessment of past applications in relation to future demands and current development trends indicate that IRAP should encourage wider community participation, empower the rural households to make sound decisions and promote coordination with concerned government agencies and departments at local and national levels.

**Future Direction of IRAP in the Local Roads Division (LRD)**

The IRAP’s mandate prescribes that road sector concerns become the focus of its application. As one of the 7 Divisions under the Department of Roads, the LRD is responsible for preparing the provincial and district staff of the MCTPC to operationalize the strategic direction set of the road sector. The technical assistance will thus focus on building the capacity of the field personnel of the Ministry for their broader role in rural road sector development. The IRAP interventions must therefore focus on how to apply the Road Law, particularly on the areas of rural road documentation, road classification, road prioritization and village participation in road maintenance. The technical field staff must also be proficient in monitoring and evaluation of road construction and maintenance, as they will responsible for overseeing these activities.
The “new” application of IRAP will also entail close coordination with the various Divisions under the Department of Roads. These include the Planning and Technical Division (PTD) for the development of road classification procedures, and the Road Administration Division (RAD) for road rehabilitation and maintenance schemes. Coordination will also be required with on-going foreign-assisted projects like the Lao-Swedish Road Sector Programme (LSRSP) for the integration of the IRAP road prioritization process, and with the Road Maintenance and Monitoring System (RMMS), a computer program for identifying and prioritizing road segments for maintenance.

Looking back at IRAP’s application over the past 5 years, the following outputs are highlighted:

- trained personnel from the various government agencies like those from Planning, Road, Water, Health and Education;
- progress with consensus-building between beneficiaries, decision-makers and donor representatives through the sharing of IRAP-generated information;
- accessibility documents like data bases, maps, provincial and district profiles, list of priority access-improvement projects; and
- small access-improvement infrastructure projects implemented and now utilized by the intended beneficiaries.

IRAP’s new application, focused on rural road sector concerns, will still be maintained as a capacity-building technical assistance package but will be substantially reduced in terms of activities and outputs. However, this does not mean less work. On the contrary, more work lies ahead as the application will now go down to the village, with the overall intention of making the districts, where technical capacity is acknowledged to be limited, the planning unit in development. The work ahead can be divided as:

- Modifying the IRAP technology and its application;
- Integration of IRAP information and procedures into other on-going initiatives under the Department of Roads;
- Development of relevant training modules;
- Conduct of training; and
- Monitoring and evaluation

Modifying the IRAP technology and its applications would mean developing practical procedures that can simplify it further but still maintain its usefulness in implementing the road sector development thrusts. For instance, IRAP has produced district road maps for each of the 8 provinces covered. These maps indicate all existing roads and their present condition, the location of villages and their respective population, the presence or absence of service facilities like schools, health dispensaries, markets and potable water sources. The maps are produced in MapInfo and can easily be updated, modified or shared with interested users.

These maps will surely find practical use in deciding on how to identify a core road network at district and provincial levels, and on how to classify roads based on criteria of significance and utilization. Through the use of GPS and digital images, improvements can be made in map information updating procedures, thus facilitating deliberations between and among the decision-makers, beneficiaries and donors.
Integration of IRAP information and procedures into other on-going initiatives is in line with the government’s “one nation, one system” approach to development. The IRAP database can be integrated with the RMMS as they complement each other. The level of detail of the IRAP information, both in statistical and graphical formats, can be added to the RMMS-generated data on road technical characteristics and be considered in the identification and prioritization of road segments for maintenance. The IRAP maps and its practical use in road classification will be a significant overlay on the RMMS database and be utilized in convincing affected beneficiaries on the road classification which has implications on village maintenance responsibility.

Development of relevant training modules will cover research, design, pre-testing, finalization and application throughout the country. The LRD has yet to develop a body of information on community organization and mobilization, small contractor development, contract management, community-based road maintenance using labor-based methods, and monitoring and evaluation of road sector projects. At this stage, the LRD has embarked on research activities and is gradually developing the LRD library. The IRAP technical assistance also provides inputs on training program development, conduct and management and is demonstrating to concerned LRD staff practical skills on training design and application.

The training modules may be developed in collaboration with teaching and training institutions, both in the capital Vientiane and in the provinces, to establish expertise that will remain in place even after the ILO technical assistance package ends.

A pool of trainers at provincial level will handle the conduct of training activities. The application of IRAP in 8 provinces resulted in the formation of IRAP teams who have since been providing technical assistance to concerned local staff in sharing their findings and recommendations to decision-makers and donor representatives. A similar approach will be implemented under the LRD for technical assistance delivery to districts and villages. A pool of trainers will be developed at provincial level, tasked with making the districts and villages engage in road classification, prioritization and maintenance activities. Training package will include modules that will provide the field staff with practical skills in organizing and mobilizing the community to participate in road maintenance activities.

Monitoring and evaluation procedures will also be part of the technical assistance package for the Ministry field personnel. As these field staff will be responsible for overseeing the implementation of activities and projects within their respective areas of jurisdiction, a training module on this stage of project implementation is necessary. The concerned staff will monitor activities based on workplans and agreed schedules, and furnish the district and provincial DCTPCs regarding the progress of road sector development activities.

Conclusion

The IRAP application in Lao PDR can be described as a transition from a multi-sectoral approach to a sector-focused activity brought about by the recognition and acknowledgement by government of the procedure’s significance and usefulness for a specific sector. Although it started in 1995 as a planning tool that provides a better understanding of rural household needs in the water, health, education and road sectors, its application saw the evolution of various techniques for sectoral data processing and analysis, which eventually found its way into the decision-making processes of government and other development initiatives.
Recent changes in government development thrusts and the latest policy pronouncements that directly affect the application of planning tools like IRAP necessitate the reorientation of the procedure’s focus, effectively institutionalizing it as a local level planning tool for the road sector.
Mainstreaming Labour Based Programming in Indonesia

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Introduction

Based on the ILO project proposal for the wider and improved use of labour-based technology in infrastructure programmes in Indonesia, this paper describes the three-year programme of technical support and training. The programme is oriented to achieving policy and technical management reforms across the entire infrastructure sector. The technical assistance will focus on assisting the State Ministry of Public Works and the Department of Settlement and Regional Development (Kimbangwil)\(^1\) to develop their capacity as the national technical focal point for labour-based technology. The programme will be extended outside the Kimbangwil where appropriate, in particular to the Department of Home Affairs (Local Government) and eventually to the private sector. The Kimbangwil will also chair a National Technical Committee (Task Force) on the national Labour-Based Technology programme. The committee will comprise representatives from the public and private sector, as well as research and academic institutions.

The technical assistance will be based on refinements of existing practices, and will: assess the existing and proposed regular civil works programmes for their suitability for either labour-based and equipment-based technology; undertake a basic review of policy and programmes; develop an affirmative, impartial and fair procurement process to refine existing procedures; ensure that public works are targeted for meeting poverty alleviation objectives, good governance, infrastructure needs and unemployment; facilitate the amendment of legal constraints, and; devise packaged contractual systems (using labour-based and equipment-assisted methods) that will allow the contracting process to follow the basic principles of good governance. This may involve utilising fair conditions of work, including, where appropriate, the unbundling of contracts for smaller contractors and providing incentives.

The objective of the project is to attain optimal employment generation and poverty alleviation through the realisation of cost-effective, and well-managed, labour-based and labour-intensive construction programmes, within the mainstream of regular recurrent works programmes of central and local government and the private sector.

The main immediate objectives of the project will thus be to develop appropriate institutional arrangements, effective management mechanisms and training systems, in order to rapidly disseminate and bring into effect labour-based and labour-intensive technologies.

The paper then discusses in more detail the project’s four main components: (i) Strengthened Labour Based Programmes (ii) Technology Innovations for Labour-Based Programmes (iii) Strengthened Training and (iv) Poverty Reduction Demonstration Programmes.

1. Macroeconomic and Employment Context in Indonesia’s Development

Indonesia has been amongst the hardest hit in the current Asian economic crisis. Based on World Bank and IMF estimates\(^2\), the short-term economic prospects are not encouraging. The Gross Domestic Product (GDP) was estimated to have declined by 15.6% in the 1998/99 financial year. The construction sector suffered the most (a 40% decline), financial services declined by 27% and the trade, hotel and restaurant sector declined by 21%. Only the agriculture and mining sectors have

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1 Please note that from September 2000, public infrastructure is administered by the Department of Human Settlement and Regional Infrastructure, which is likely a result of a merger between the State Ministry of Public Works and the Department of Human Settlement and Regional Development (Kimbangwil).

not been severely affected, although non-oil export earnings fell by 8.8%, notwithstanding severe depreciation of the Rupiah. In the face of ongoing financial sector problems, corporate dislocation and lower international commodity prices, positive economic growth is not expected for 1999/2000.

This is despite a sustained downward pressure on domestic demand due to lower real incomes and dwindling household savings. Recently, the currency has stabilised at around Rupiah 6,500-7,000 to the US$. If conditions continue to improve, continuously renewed growth may be expected by 2000/2001 (a modest 3% growth rate was estimated by the World Bank).

The social effect of the financial crisis on Indonesia has been serious and World Bank estimates suggest that the impact has resulted in an increase in “absolute” levels of poverty from 10% in 1997 to 14-20% in 1998. The Social Monitoring and Early Response Unit (SMERU) estimates the decline in absolute poverty to have increased from 11% to 13.8% by 1999 (other estimates, including ILO, have produced figures of up to 48%).

With a contracting economy, labour demand has declined - with highly visible lay-offs in the construction and manufacturing sectors. In 1998, Bappenas estimated that around 6 million persons (+/-7% of total labour force) were laid-off, the greater part of which (1 million) came from the construction sector (25% of the construction labour force was laid-off). Conflicting estimates by SUSENAS for 1997 indicated a 9% decline in the construction sector, combined with declines of 13% in industry and 27% in the electricity sector. These impacts were absorbed into the agricultural sector - some 4.5 million have been re-absorbed into agriculture, equivalent to a 15% growth in the agricultural workforce.

During 1997 there was a large shift towards self-employment in both urban and rural areas, and a smaller shift towards unpaid family-based employment in rural areas. Real wages have declined and open unemployment has appeared. This increase in female and child employment acted as a coping mechanism to compensate for falling household incomes. Child employment has been observed to have increased and, although the impact on female employment is ambiguous, some 40% of those recorded as newly unemployed are female (the latter particularly due to the impact of declining textile sub-sector production). Unskilled men have suffered most from the construction industry decline.

However, with low personal savings and no effective social welfare system, people cannot afford to be unemployed for very long. The result has been an increase in under-employment (with falling real wages and purchasing power) and substantial increase in lower-paid agricultural employment.

The impact of the crisis on the labour market and on household incomes has not been even. The most striking impact has been in the urban areas and the rural parts of Java. However, there has also been an impact on those rural areas without significant cash crop earnings, such as South and East Kalimantan, and DI Aceh. Therefore, any job creation programme needs to have strong geographical targeting.

2. History of Labour Intensive Works and Labour Based Technology in Indonesia

Labour intensive works (or Padat karya in Indonesian language) have commonly been used in Indonesia (since at least the 1970’s) as a means of achieving national goals on employment

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3 Conflicts in estimates in part derive from “conventional” definitions of unemployment, which exclude those not “seeking work”. Estimates by Ifikhar Ahmed and Shafiq Dhanani (“Indonesia’s Recovery: Employment Optimism or Statistical Illusion?”: Occasional Discussion Paper Series No.2, ILO, Jakarta, October 1999) put the “true” levels of unemployment (at 12.1 and 14.5 million for 1997 and 1998) at over three times the statistical measure
creation, income creation and poverty alleviation and, where possible, reinforcing national
infrastructure goals. Over the years, however, the Government of Indonesia had gradually replaced
padat karya by other poverty alleviation strategies, until in 1994 all padat karya programmes were
discontinued. As a result of the economic crisis, padat karya was revived in 1997. The programme of
PK1 (Padat Karya 1) came on stream in December 1997 and lasted for a period of four months. It was
conceived as a crash programme targeted mainly to retrenched workers in construction and
manufacturing units situated in urban Java, which was perceived to have taken the major direct brunt
of the crisis.

The next phase of labour intensive or padat karya programmes, (abbreviated PK2), was initiated in
April 1998. PK2 was much larger in scope. Unlike PK1, which had the sole objective of providing
emergency income supplement through job creation, PK2 had the added objective of also creating
social capital. The target beneficiaries of PK2 sub-programmes varied from the “new” and the “old”
poor, to recently retrenched workers as well as other unemployed. The programme covered all
provinces. Some sub-programmes sought to target specific regions, some specific sectors, and some
specific population groups. Some were designed and implemented as top-down programmes, while
others, at least in principle, sought to involve community groups and/or NGOs. However, the sub-
programmes were mainly top-down, non-participatory and uncoordinated. Targeting and monitoring of
programmes was faulty and there have been many reports of significant financial “leakage”. Programmes executed under the World Bank-funded Social Safety Net Programme during 1998/99
thus met with limited success.

Most of the recent padat karya projects were conceived as part of the Social Safety Net programmes
induced by the crisis. However, only a small part was allocated towards PK, the rest going to
subsidised food, education and health. Official recognition of the problems of PK2 has resulted in
substantial cutbacks in the Padat Karya budget for the year 1999-2000, which is unfortunate, for the
fault lay not in the principle of padat karya strategy as such, but in the manner in which it was designed
and implemented.

The former Department of Public Works issued guidelines for the implementation of the 1999/2000
PK programme in Cipta Karya. The guidelines contain policies to maximise employment
absorption (employment driven), the employment of small contractors and the use of non-imported
materials. In the guidelines, every project must achieve a target level of employment absorption of
40% (20% of which must be female).

The guidelines have identified that there are needs for “renewed” programme approach. They
acknowledge that the previous programme suffered from a number of problems that inhibited the
effectiveness of the programme. These problems included: mismatching of instruments to
objectives; overlapping efforts and lack of co-ordination; weakness in targeting, including lack of
crisis responsive geographical targeting, poor project selection; implementation delays; fund
leakage; inappropriate design; budget allocation issues; lack of cost effectiveness and lack of
monitoring and evaluation of performance.

While the programme clearly identifies the importance of labour intensive/labour based type works,
the activities remain as a short-term unemployment relief and income-generating programme. The
programme is formulated “….. to provide open ended, short term, city wide and large-scale labour
intensive employment……”. It is assumed that the programme would be discontinued as the
economy recovers. The guidelines state that the programme is intended to provide employment,
particularly to unskilled workers, women headed households, laid off women workers (unskilled

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4 General Guidelines: Labour Intensive City-Wide Infrastructure and Services Program within the Framework of the Social
and poor women in particular), laid off workers caused by the economic crisis and small-scale contractors.

The previous labour-intensive programme, which is funded by the World Bank, is philosophically different from the current labour-based approaches in other countries. The labour-based approach, as defined in the ILO “Guide of Employment Infrastructure Programmes: Labour Policies and Practices” and the “Guide on Capacity Building in the Construction Sector” indicates that flexible and optimal use is made of labour as the predominant resource, while cost-effectiveness and quality aspects are ensured. It further differentiates the terms “labour-based”, “employment-intensive”, and “labour-intensive” in terms of an optimal (and efficient) and a maximum (and possibly inefficient) use of labour. In general, the latter two terms are used to represent projects where income-generation and job creation is the principal objective. This category includes, for example, disaster relief, or food-for-work projects that are temporary and where quality and productivity are usually low. Although the use of labour is maximised, these projects generally depend on “special” external funding and are not sustainable in the long term.

On the other hand, the contemporary labour-based approach emphasises the sustainability of labour-based methods by optimising the use of labour, and ensuring that employment-intensive programmes do not degenerate into “make-work” approaches where cost-effectiveness and quality aspects are ignored.

With the above description, one can see that the product quality and sustainability of the programme are two key characteristics. Rolling programmes for labour-based activities are, therefore, a necessity to ensure that the use of optimal labour, with a comparable quality of civil work, can be delivered. Current government programmes aim predominantly at infrastructure developments within infrastructure projects. The scope of labour-based approach can, however, be further extended to cover all development infrastructure, as well as to involve the private sector. In the Indonesian context, this would mean making the use of labour-based technology, a normal part of the way the Kimbangwil and local government approach the design and implementation of civil works projects.

3. The Needs for Mainstreaming Labour Based Programme: Results of 5 Case Studies

The long history of padat karya programmes in Indonesia indicates a clear government commitment to develop a new approach in public works by involving the community throughout the project cycle. While some of them were successful, many padat karya projects suffered from problems. These ranged from a lack of community participation to poor product quality, low quality engineering supervision or community communication to inadequate planning for future financing and maintenance, and thus low sustainability.

To investigate whether labour-based/labour intensive-type projects are still relevant and could play a useful in future poverty alleviation and employment creation programmes, a selection of case studies were undertaken of former padat karya projects. For the purpose of assessment, case studies were carried out at six locations. Two of the case studies reviewed public works: a road construction project in Sidorejo Village, Kabupaten Sleman and a World Bank/ILO rural road development project in Kabupaten Bandung, West Java Province. The remaining case studies reviewed community works: a road and footpath project in Kampong Ngaran, Yogyakarta Province, a tertiary irrigation project in Kabupaten Gunung Kidul, Yogyakarta Province, a slum area

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5 Authors: David Tajgman and Jan de Veen, ILO, 1998.
6 Authors: Peter Bentall, Andreas Beusch and Jan De Veen, ILO, 1999.
rehabilitation project (P3P) in Kabupaten Bandung, West Java, and a labour-based rural road project in Kabupaten Manggarai, Flores, and East Nusa Tenggara.

These case studies have provided valuable information on how padat karya programmes provided economic and social benefits to the community, as well as providing a foundation for the improvement of the future labour based programme. For example, the Swiss-financed labour-based rural road construction project\(^7\) in Kabupaten Manggarai, is an excellent example on how a participatory approach could help the community to fully understand the planning, design, implementation, monitoring, and evaluation process. The project also demonstrated that the quality and cost of the project is comparable with equipment-based road construction.

From an analysis of the case studies, a clear difference emerges between public and community works. Whilst with public works it is possible to “impose” solutions, this is not possible with works executed through local communities. Thus, with community works, it is recommended that there is a need to take account of the following factors in order to ensure improved programme design:

- the programme must gain public as well as political support before it is implemented;
- improvements must be made through better sub-project selection and design;
- improved community participation is necessary, requiring greater transparency and access to information which should foster a collective responsibility for project components, and promote ownership of the assets;
- further encouragement needs to be given to women, through institutionalising women’s groups, by training, and by promoting community campaigns - with open advertisements clearly stating that women can participate in programmes;
- the promotion of leadership skills as a key factor for motivating labour;
- the promotion of projects using appropriately trained community facilitators (social workers, planners and engineers) with good communication skills to ensure a better interface between government and the community;
- the private sector being further involved in community projects;
- the government process of decentralisation being supported through the development of appropriate contract documentation and payment procedures;
- more effective financial monitoring, particularly where the communities are making a capital contribution to schemes;
- improvements in the monitoring of quality should be further encouraged through the use of appropriate training in labour-based technology and “traditional” engineering aspects of civil works construction;
- for the labour-based approach to remain efficient and competitive with employment-based methods, labour needs to be engaged through fair and reasonable working conditions, and under labour-productivity and performance-norm agreements; and

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- Programme sustainability and long-term maintenance will depend on access to a constant flow of funds, either from government or the community – requiring that the project/asset ownership and financing are institutionalised.

It is clear from an assessment of former padat karya activities that the labour-based/labour intensive-type projects are still relevant and could play an important role in future public works programmes as a sustainable and mainstream component for many years ahead. They are relevant, not only because they could help unemployment problems currently faced by Indonesia, but can also provide, at the same or lower costs, a comparable quality of product to other technologies. At the same time, they provide an opportunity for more people to be directly involved with the development of the community.

4. Objectives of the Labour Based Programming

The project has an overall objective to provide optimal employment generation and poverty alleviation through the realisation of cost-effective, and well-managed, labour-based and labour-intensive construction programmes within the mainstream of the regular recurrent works programmes of central and local Government and the private sector.

The main immediate objectives of the project will be to develop appropriate institutional arrangements, effective management mechanisms and training approaches and programmes, in order to rapidly disseminate labour-based and labour-intensive technologies. Specifically, the project will:

- establish (mainline) a transparent national system for the adoption of labour-based technologies, targeted to meet economic, social and technical criteria;
- provide motivation for disseminating LBT, producing and disseminating best practice guidelines, specifications, contracts and other documentation;
- through training of trainers, facilitate appropriate training in labour-based technologies at all levels; and
- demonstrate, through practical examples, how to apply labour-based technology in both public and private sectors.

5. Employment Target of the Labour Based Programming

The project’s target is to create around 1.1 million additional unskilled jobs, by applying labour-based technology to every possible area of existing expenditure used to maintain, repair or create infrastructure. This will be achieved over a 5-year period (including the present year as a start-up period) within existing levels of construction expenditure. The projections are summarised below. The estimate is very conservative, and figures of double this magnitude are feasible, given conducive political, legal and institutional conditions.
Public sector full-time @ 200 days per annum (95% of total value)  913,000  
Public sector part-time @ 100 days per annum (5% of total value)  96,000  
Sub-Total, Public Sector  1,009,000  
Formal Private Sector (@ 60% of value of Public Sector)  76,000  
Other (informal sector and small-scale manufacturers)  30,000  
GRAND TOTAL (jobs created)  1,115,000  

Figure 1. Employment target for Labour Based Programme

Due to of data limitations, the method of estimating the incremental job targets can only be approximate. The method used was as follows:

- Estimates were made of daily unskilled (normally minimum) wages;
- Assumptions were made on the possible percentage build-up of labour constants based on practical and achievable targets;
- Budget projections were built-up from the existing Kimbangwil programme (padat karya and non-padat karya), and extended to other central and local government bodies, to which was applied the labour constants to allow an estimate to be made of the value of the labour component;
- Using the daily unskilled wages and assumptions on effective workdays, estimates were made of total workdays and of potential full and part-time jobs;
- From these basic numbers, the range of annual incremental jobs was defined. The calculation was based on either adjusted labour content, or unadjusted labour content, but with projected budget increases;
- An estimate was made of job targets, assuming that 95% of the jobs created in the public sector (Kimbangwil and non-Kimbangwil) are full-time and 5% are part-time; and
- A modest allowance was then added for the gradual inclusion of the private sector in the programme, and for the employment impact that could be achieved on the informal sector and small-scale construction materials manufacture.

6. Scope of the Labour Based Programming

The purpose of using labour-based-technology is not to “make work”, but to create good quality infrastructure that is needed and to provide the benefits of using such technology. Thus, the screening and targeting of labour-based projects needs to be a rational process, which balances social, economic and technical factors. There are three main questions relating to targeting, whether the project is needed, is in the right location, and is an appropriate project to apply labour-based techniques.

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8 Budgets were not projected to match pre-crisis levels.
9 Effective full-time job = annual minimum of 200 paid days; part-time = 100 paid days.
a. Project screening and selection criteria

There are a limited number of studies in Indonesia for screening labour-based projects, mostly relating to low-cost road construction. The most relevant study is that undertaken by ILO as part of Bina Marga’s World Bank-financed “Pilot Labour Intensive Road Project” (INS/92/01/IBR)\(^\text{10}\). This study (undertaken prior to the economic crisis) concluded that the choice of technology is conditioned both by the type of project (labour-based technology being most suitable for the rehabilitation and maintenance of unsealed roads) and the poverty level of the communities. The study developed a short list of screening criteria for identifying regencies (districts) that might form a geographically focused labour-based national rural road programme - primarily focused on the poorer Eastern Islands. The criteria are summarised in Table 1. Some caution is needed with this approach, particularly if the quality and accuracy of available background design data is questionable.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Indicators</th>
<th>Screening Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Adequate labour at competitive wage rates</td>
<td>Population density, Wage rates, Incomes</td>
<td>Population density greater than 20 persons per km(^2)</td>
</tr>
<tr>
<td>b) Possible unfavourable effects</td>
<td>Poverty indicators, Evidence of underemployment, Labour requirements in agriculture and other rural activities, including seasonal peaks</td>
<td>Either: A poverty indicator of greater than 30% (which is average for all regencies), or Income per head in the regency below 70% of national average (excluding oil revenues)</td>
</tr>
<tr>
<td>c) Beneficial effects:</td>
<td>Wage rates and poverty indicators, Evidence of underemployment, Current road condition</td>
<td>More than 50% of regency road length in fair/poor, poor or bad categories</td>
</tr>
<tr>
<td>d) Appropriate road standard</td>
<td>Current regency road condition, Traffic levels, Road densities</td>
<td>Either less than 1 km of road per 1,000 persons in “good” or “fair” condition, or Less than 1 km of road per 10 km(^2) in “good” or “fair” condition,</td>
</tr>
</tbody>
</table>

It would be possible during a further project phase to develop similar tables of indicators and screening criteria for other types of infrastructure, such as irrigation and urban works, based on the experience of the various pilot projects in Indonesia. Additional criteria that might be used include: (1) distinguishing the differences between public and community works; (2) infrastructure provision standards and condition classification; (3) willingness of the community to contribute to develop economic activities; (4) continuity with other development activities and compatibility with national and local development goals; (5) demonstrated implementation capacity; and (6) avoiding overlap with other similar activities.

These criteria might be applied using a decision tree approach (i.e. whether the project fulfils all or

most of the conditions) or a point scoring and ranking system. After the initial screening/targeting, a more detailed design method could be adopted using more refined criteria. For economic projects with a value over a specified minimum sum, a conventional discounted cost analysis (internal rate of return) should be undertaken.

Ultimately, to adopt a targeted approach, a range of detailed criteria will need to be carefully worked out on the basis of variables such as population density, poverty indices, unemployment incidence etc. This could be used to guide the allocation of funds across provinces and regencies. This supply-led allocation process will need to be supplemented with demand-led distribution of resources based on demand for funds from the lower levels. This assumes that communities are sufficiently empowered to carry out the micro-planning activities and that the appropriate overall planning system is in place. This emphasises the need for transparency, based on a much greater participation by the community in direct employment generation programmes than has been prevalent so far. Communities should be involved in local need assessments, implementation and monitoring of programmes. This will necessitate the process of decentralisation being supplemented with a simultaneous process of bottom-up institutional strengthening. Without this essential supplementary process, the programmes will be largely supply-determined, which could very well undermine the success of the entire strategy.

b. Choice of Technology

The main objective of the project should be to generate employment through the adoption of appropriate and cost-effective technologies. This will need to be based on an integrated and multi-disciplinary approach to the planning and design of infrastructure. Central to the technical orientation should be a strong focus on the use of local materials and “traditional” technologies and (for land development related activities) the use of biological treatments. The range of technical options is likely to be extensive and, in implementation, allowance needs to be made for a considerable range of choices to be available, based on the local physical and socio-economic conditions. Targets and cost estimates should be indicative only, and be adjusted based on implementation experience.

Although a reorientation towards labour-based methods is not technically complex, it does represent a considerable change in approach for field-level staff in comparison to ongoing projects. The approach may not be universally accepted and substantial efforts will need to be made to motivate supervising engineers and communities. Mechanisms such as award schemes and LBT accreditation for project engineers and participating communities should, therefore, be considered.

For community-based projects, the intended beneficiaries will need to be fully involved in project planning and implementation - the choice of technologies should not be largely driven by the implementing agencies. The close correlation often seen between project targets and achievements suggest that field operations are usually target driven and that there has been limited flexibility to respond to beneficiary aspirations. The most important issue to be resolved is how to achieve a satisfactory level of community participation and involvement in selecting technologies, in their execution, and in the longer-term management and sustainability of the assets.

11 The SDC-financed “Low Cost Road Construction In Indonesia”, which constructed low cost roads in the Manggairai District of Flores used this approach in selecting roads. Criteria used were:

- Zone of influence of road - maximum 30 points
- Isolation of community - maximum 15 points
- Demand for traffic services - maximum 10 points
- Synergy effect - maximum 5 points
- Presence of local initiatives - maximum 20 points
- Government implementation priorities - maximum 10 points
- Technical feasibility and construction costs - maximum 10 points
A list of appropriate construction sub-sectors and detailed menus of technologies and treatments that would be appropriate for labour-based methods has been developed for easier implementation of labour based programmes. These are categorised as being of either ‘medium-level labour content’ or ‘high-level labour content’, based on a labour/appropriate equipment mix situation with the materials costs excluded. However, these categories will depend largely on the type of design involved in the project.

The use of labour-based methods assumes the creation of additional (i.e. incremental) employment benefits. The possible range of such incremental benefits (by % of the value of works) that might be obtained using labour-based methods in other developing countries is shown in Table 2. This example has been taken from South Africa. There is an important note of caution that should be introduced here, which is that the benefits will only occur if the right combination of tools, equipment, materials and labour are used. Thus, under constraints of the seasonal use of labour (i.e. competition with on-farm employment) and climate, it may be necessary to use mechanisation at certain times in order to allow the fullest use of labour. If this approach is not used, the apparent “labour-based” method may reduce employment. It is also noted that the ILO does not recommend a prescription of “fixed” labour contents of works in a particular sector. Each project should be diagnosed using real local costs for all components and with an optimal utilisation of labour, equipment and tools.

Table 2: Comparison of Potential for Labour-Based and Intensive Technologies

<table>
<thead>
<tr>
<th>Construction sub-sector</th>
<th>Equipment-based (%)</th>
<th>Labour-based (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-cost housing</td>
<td>25 - 30%</td>
<td>30 - 40%</td>
</tr>
<tr>
<td>Social buildings</td>
<td>20 - 30%</td>
<td>25 - 35%</td>
</tr>
<tr>
<td>Water reticulation system</td>
<td>5 - 15%</td>
<td>25 - 35%</td>
</tr>
<tr>
<td>Surface water draining</td>
<td>5 - 15%</td>
<td>40 - 50%</td>
</tr>
<tr>
<td>Sanitation</td>
<td>5 - 15%</td>
<td>25 – 35%</td>
</tr>
<tr>
<td>Secondary roads</td>
<td>5 - 15%</td>
<td>30 – 70%</td>
</tr>
<tr>
<td>Dams</td>
<td>10 - 20%</td>
<td>50 – 70%</td>
</tr>
<tr>
<td>Railways</td>
<td>5 - 15%</td>
<td>20 – 30%</td>
</tr>
<tr>
<td>Electrification</td>
<td>10 - 15%</td>
<td>35 – 45%</td>
</tr>
<tr>
<td>Irrigation</td>
<td>15 - 25%</td>
<td>30 - 70%</td>
</tr>
<tr>
<td>Forestry *</td>
<td>25 - 35%</td>
<td>35 - 45%</td>
</tr>
</tbody>
</table>

Source: NPP. (1995) “The National Public Works Programme Guide”. Ministry of Public Works, Republic of South Africa. * Figures of up to 70% labour use in forestry activities are common in both India and Indonesia

7. Development of a Strategy to Mainstream Labour Based Programmes

There are basically three strategies to mainstream labour-based programmes in Indonesia. The first is to review and refine legal issues, secondly to expand an improved version of existing Labour-Based Technology and thirdly to conduct continuing research and training to foster technology expansion.
The strategy to review and refine relevant legal issues includes:

- obtain political endorsement for the programme objective and strategy to be implemented by Kimbangwil12, the State Ministry of Public Works, other Government Departments, local government and the private construction industry;
- forming a Ministerial Decree13 to ensure policy compliance and amend the law on Construction Service;
- progressively secure policy changes to support the strategy; and
- strengthen the National Technical Committee (Task Force) with a mandate to: promote L/B technology; evaluate policy outcomes; make recommendations for policy adjustments to promote and facilitate labour-based technology; and monitor compliance with policy recommendations.

In rapidly expanding an improved version of existing Labour-Based Technology, several measures need to taken as follows:

- award contracts based on price and demonstrated ability to optimise labour-based technology, local services and materials;
- introduce legal and procedural changes to contract documents and procedures to facilitate job creation and other social and economic goals;
- refine and mainstream the existing Kimbangwil labour-based technology programme and develop the participatory approach to gain public support, better targeting and more effective local-level planning;
- expand the Kimbangwil labour-based technology programme into the roads and water resources regular programmes - using settlement development as the vehicle;
- expand labour-based technology to the construction and maintenance programmes of the Department of Home Affairs and to other sections of Kimbangwil - building capacity with revised policies, procedures and contractual arrangements;
- support the private sector in adopting an efficient labour-based technology by providing information and proposing possible fiscal and other incentives;
- support the development of a stronger and more competitive contracting capacity by adapting tendering and procurement procedures, facilitating private sector access to credit, and in promoting good quality tools, equipment, spare parts and materials.

Continuing research and training programmes are necessary to ensure that technology expansion is taking place. The labour-based programme is dynamic in the sense that it should be developed according to the political, social and economical context of the region and country. This can be

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12 Please note that at the moment the public infrastructure is administered by the Department of Human Settlement and Regional Infrastructure, which is likely a result of a merger between the State Ministry of Public Works and the Department of Human Settlement and Regional Development (Kimbangwil).

13 The ILO has recently worked with the Government of the Philippines in the preparation of an Executive Order (EO94/99) now approved by President Estrada, and which establishes a policy and an institutional framework for the wider and improved use of labour-based equipment-supported technology in the infrastructure sectors in the Philippines.
achieved through:

- support to the Kimbangwil, as a “Centre for Excellence in LB Technology”, in assisting other government departments to adopt high quality and efficient labour-based technology;
- developing appropriate specifications to facilitate the use of labour-based technology;
- establishing model demonstration areas through the regular civil works programme, for “on the job” teaching - demonstrating the whole project cycle from project conception to work completion;
- encouraging research and overseas visits to further develop Kimbangwil as the Centre for Excellence in LB Technology and assist Kimbangwil staff in their capacity to apply the technology;
- linking universities\(^ {14}\) and Kimbangwil research centres to the model demonstration areas;
- defining the overall training programme over three years;
- using the ‘training of trainers’ system to establish a training capacity to train key stakeholders, including high level decision makers, government staff, contractors, workers’ and employers’ organisations, foremen, engineers, architects, supervisors, NGOs and local communities; and
- promoting the wider use of labour-based technology through the introduction of an improved decentralisation payment procedure, improved contract documentation and procurement systems, and the use of local materials, local services and resources in infrastructure construction and maintenance projects.

From the above assessment of the potential approaches to developing labour-based technology in Indonesia, it is possible to envisage that a new project is justifiable, particularly targeted at small-scale contractors and community development/women’s groups.

In line with national structural adjustment policies, including civil service reform, and in the context of new construction industry legislation, the project will assist in implementing institutional capacity building and training for promoting labour-based technologies in the construction sector. The main thrust for the project activities will be initially through the Kimbangwil, creating a “centre of excellence”, and rapidly expanding to the Department of Home Affairs in the early part of the project period.

The project will have four components, reflecting the immediate objectives, as follows:

A. **The setting-up of a Technology Audit Unit in the Kimbangwil**, with the mandate of providing an appropriate management information and monitoring system for the restructuring of infrastructure works to promote the maximum effective use of labour-based and labour-intensive technologies. The project will establish a central office, within the Kimbangwil Research and Development Agency, to provide essential logistical support, equipment and technical assistance for the restructuring and mainstreaming of the labour-based programmes. Overall monitoring and review of policies will be undertaken by the Planning Bureau in the Secretariat General’s office of the State Ministry of Public Works. The central project office will be serviced by a TA team, which will comprise an international Chief Technical Adviser and short-term specialists. It will effectively act as a

\(^ {14}\) The ILO has recently entered into an agreement with Gadjah Mada University whereby this University will moderate an Asia regional network of universities fostering curricula development and research into local level planning, labour-based technology and rural transport.
“Technology Audit Unit” within the Kimbangwil for the restructuring process, including designing and implementing planning and monitoring management systems on the basis of new technical activities. Essential technical tasks of the unit will be to:

- make a rational division of the works programme into clear categories: equipment-based or labour-based; public works or community-based works;
- undertake a detailed review of the need for restructuring and mainstreaming labour-based practice;
- develop detailed policies and mechanisms for their implementation;
- monitor application of relevant laws;
- undertake a technical and legal review (due diligence) to identify laws, directives, instructions and contract forms and procedures which may need amendment;
- assist in the preparation of amendments to laws and directives and contractual procedures;
- establish links with the construction industry organisations and service forum; and
- provide essential support to the project co-ordinating committee.

B. The production of best practice guidelines on labour-based technology and the promotion of technical innovations in the Kimbangwil and the Department of Home Affairs, within the context of a decentralised planning process and the maximum involvement of community organisations. The project will work with Kimbangwil, the Department of Home Affairs and the private sector in transferring appropriate labour-based technology to their respective programmes. It will involve a technology review, examining the impact of technology change on the whole project cycle - from the initial planning and screening, to the choice of individual proposals, through to implementation and operation.

The project will be involved with the promotion and choice of technical innovations, including reviewing and modifying current specifications, preparing contracts, reviewing quality control and supervision procedures, and arranging for the production of best practice guidelines on labour-based technology. Issues to be addressed are likely to include:

- the role of local-level planning in key communities, executed through local government BAPPEDA (Regional Development Agency) offices;
- forms of agreements/memorandums with communities and potential contributions to projects;
- review of construction industry institutional and training needs, including the contractor and consultant organisations (including supervisors co-operatives);
- review of labour standards and working hours;
- review of wages and payments, including methods of recruitment and wage setting (minimum versus economic wage) and productivity agreements;
- monitoring of attendance and payments, including remuneration in kind;
monitoring of the quality of labour-based work and minimum technical standards;

monitoring of project costs, especially comparative costs of LB versus EB for similar works;

monitoring of social security and insurance, occupational health and safety requirements.

The project will also review the need for amendments to contracts and conditions of engagement to accommodate Kimbangwil and local government labour-based programmes, and make recommendations for systems that could be introduced into the private sector to maximise labour-based works. This will cover the following areas:

- large and medium-scale contractors (Class A and B);
- small-scale contractors (Class C1 and C2);
- supervisors and mandors\(^\text{15}\);
- consultants and NGOs;
- communities; and
- force account works, including making recommendations for changes to how local government arranges these works.

The project will initially work with the technical design cells of the Kimbangwil (in the five Directorate Generals). If this approach is found to be successful, the project will as rapidly as possible commence work through the Home Ministry’s local government executed works programmes.

In the short-term, there will be a requirement for the project to link with the Kimbangwil Settlement Directorate’s current padat karya programme under the World Bank funded SSN Adjustment loan (“Labour Intensive City-wide Infrastructure and Services Program”).

In the long-term, the need will be to mainline the project over all the construction sub-sectors. Thus, in the latter phase (after the mid-term review), the project will investigate how to include community development activities, other public sector institutions (such as cable laying activities) and, ultimately, the private sector.

Research is often driven more by universities and donors than by official research bodies. This is not totally the case in Indonesia, and a great deal of useful research publications on labour-based technology and appropriate technology have already been prepared by the government research bodies\(^\text{16}\). However, there is a need to re-orienting the research to more clearly address project needs, and any future research activities should build on the extensive experience of pilot labour-based projects in Indonesia. As it is anticipated that research staff will also be involved in the preparation of good practice guides, technical training and project workshops. An allowance has been included in the project budget for (at this stage) undefined research activities.

\(^{15}\) Mandor/Bas borong or labour-only sub contractor is a very important element in the Indonesian construction industry since they manage day-to-day works of construction works

\(^{16}\) These include:
- Pusat Litbang Pengairan (Research Institute for Water Resource/Hydrology);
- Pusat Litbang Jalan (Research Institute for Highway Engineering);
- Pusat Litbang Permukiman (Research Institute for Human Settlements); and
- Institut Pertanian Bogor (soil conservation techniques, reforestation, etc.).
The provision of appropriate training and retraining, focusing on the training-of-trainers, including strengthening of appropriate training programmes and the provision of additional transport, equipment and other facilities. A preliminary overall analysis of training availability for labour-based works, including estimates of skills requirements, skills availability and the skills gap has been undertaken by the project. This also gives an overall projection of training needs for training/re-training/training-of-trainers in LB/LI skills, with an emphasis on technology choice and management training. The range of participants would need to include administrators, local planners, project managers, engineers, architects and technicians (public sector and consultants), contractors (large, medium and small), project supervisors and sub contractors (including co-operatives), local communities; community facilitators and NGOs; as well as unions and labour exchanges.

The emphasis for the project will be on the training-of-trainers. Technical training will concentrate on developing staff and beneficiary training programmes that focus on an integrated and multi-disciplinary approach to labour-based construction and covers the linkages and relationship between activities. The multi-disciplinary approach is essential to achieve the mixture of technical engineering and socio-economic factors, without which such programmes are certain to fail. However, the core focus of the technical training should be practical and field oriented, with the objective of improving the quality of field activities.

There is scope for training activities to provide a balance between learning by exposure through field visits, and classroom-type or distance learning. This will be particularly true for the training-of-trainers and for beneficiary training. There are now extensive examples of completed and well-executed labour-based works, which can provide suitable venues for group field visits.

Existing in-house and on-the-job training within the Kimbangwil is handled by the following institutions:

- Puslatjakons (training of consultants, contractors, mandors, etc.);
- Pusdiklat (training of Kimbangwil professional and managerial staff); and
- Pusdiktek (education of public works staff).

The project will support the strengthening of these training facilities to promote additional capacity/skills development, based on need analysis of both the public and private sectors. Particular emphasis will be placed on improving the training-of-trainers, targeted at those involved with training of technician-level staff and mandors employed in the private sector. It will also provide training to communities and support agencies participating in the development and implementation of labour-based activities.

The initial main focus of the component would be the provision of technical assistance for the design and implementation of training-of-trainers programmes and in-service training courses, using a variety of delivery methods, possibly based on the use of distance-learning techniques and web-site information. This would be implemented by running annual workshops for the training-of-trainers using at the facilities available at Kimbangwil regional training centres (Jakarta, Bandung, Yogyakarta, Medan, Surabaya and Ujung)

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17 For example, accessing the Kimbangwil technical information on the Internet
Under this component, specific project support will also go to:

- the provision of a labour-based technology library within the Kimbangwil and general educational equipment, including in-service field and sample equipment for training use;
- strengthening linkages between the universities, technical institutions, research bodies, and the Kimbangwil/Home Affairs/Bappenas programmes;
- curriculum development for local accessibility planning, “traditional“ indigenous engineering techniques, labour-based/intensive construction management and use of appropriate technology - for use in universities, technical colleges and Kimbangwil educational institutes; and
- developing and improving distance learning techniques, including linkage to the PU Net system at local level and to other web sites, the use of study tours and twinning arrangements for technology transfer of international best practice, and the development of appropriate publications, “comics”, videos, VCDs, etc.

D. The planning, design, execution and monitoring of labour-based demonstration programmes targeted at poorer communities. Demonstration programmes will include both large-scale public works, including investigating different procurement methods, as well as other poverty-reducing pilot projects implemented in conjunction with local communities and NGOs. The project will assist in the identification, planning and design of poverty reduction demonstration programmes, specifically targeted at job creation. These will be based around existing GOI programmes and will be used to demonstrate the technology transfer packages. Demonstration programmes will need to cover both major public sector programmes (such as road rehabilitation) as well as community-based infrastructure specifically targeted to assisting poorer communities (such as marketing and income generating activities). A major part of this component will be to establish and operate an effective monitoring and evaluation system. The project will establish a simple internal reporting system, operated by a local Management Information System (MIS) Adviser, to ensure that the outputs are delivered in a timely manner. However, the main monitoring and evaluation system will be based around the SITK (System Informasi Tenarga Kerja – Manpower Information System) and other State Ministry of Public Works and Kimbangwil monitoring systems. The project will support the further development of the SITK by providing a contract to national consultants for completing the system design and for adding additional analytical features. The main issues to monitor will include levels of employment generated, success of the targeting system, quality and cost effectiveness of the works.

The project will also work with selected local government authorities in establishing systems for selecting and prioritising labour-based works. This will take the form of providing TA advice on the application of participatory planning techniques at the community level. The project will provide support to the development of on going and new project proposals by local government containing a significant labour component. It is hoped, in this way, that significant demonstration/pilot areas on

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18 The appropriate approach could be to assist communities in the use of the Integrated Rural Accessibility Planning (IRAP) methodology, which has been developed by ILO and applied in the Philippines, Laos and Cambodia, and piloted in Indonesia by ITB.
the application of labour-based technology can be built-up, which can be linked with the project’s ongoing training and research activities.

8. Sustainability of Labour Based Programme

There is a clear need to develop an overall policy approach to the extension and delivery of labour-based technology in Indonesia. Apart from improving the entire enabling environment, a number of various policy options are available. These will be reviewed in the Indonesian context by the Task Force, in co-operation with the project staff, to see which combination might be tested and adopted in the short or medium term. The main options include:

- improvement of existing procurement practices, within the context of the present legal framework and existing (and possibly new) ministerial instructions;
- greater involvement of the existing contractor and consultant organisation in improving the targeted allocation of works - possibly within the context of a Construction Industry Forum Committee, to be convened under the new Construction Service Act;
- consider the establishment of an Employment Fund, targeted at small contractors, as recommended by the ILO Employment Strategy Mission (1999);
- improvements to the availability of information on LB works and access to micro-credit for small contractors (tools, mobilisation, etc.) and appropriate materials manufacturers (materials, working capital, technical assistance, etc.);
- establishment of employment exchanges in target areas (SSN padat karya programmes model for urban areas);
- improvement to the Department of Manpower’s labour market information system; and
- targeted public works and private sector procurement, using price and social targeting criteria (e.g. to those developed by the South Africa Government and UNCDF).

The project staff will maintain the internal reporting system (reporting on a quarterly basis). The project’s main monitoring and reporting system will include information on actual employment generation and technologies utilised and will utilise the SITK. The data base maintenance and operation of the system will be the responsibility of the State Ministry of Public Works Planning Bureau in the office of the Secretariat General, who will be supported by appropriate project inputs. A relationship will also be established with other monitoring and evaluation (M and E) systems monitoring the padat karya activities, such as the SSN programme, as well as the WB and USAID (Clean Urban) reporting systems.

There are three possible levels of risks: (i) at the project level; (ii) in the actual introduction and implementation of the labour-based technologies; and (iii) in overcoming legal and institutional constraints.

Project Level Risks arise when project design is over-ambitious, is top-down in its approach, and is unable to deliver the inputs included in the project document. Such risks are often inevitable with

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19 Three related systems are currently proposed, working through a “stakeholders forum”: (i) a Government Oversight Group to coordinate ministries; (ii) a control team (Tim Penganadali), involving government and civil society; and (iii) a formal independent monitoring team (civil society and NGO representatives). AusAID trust fund assistance is also proposed, to establish a monitoring unit using both quantitative analysis and field-based qualitative and participatory techniques.
institutional strengthening projects, particularly when they are cross-sectoral and involve a large number of institutions. Proposals for the various institutions are still at a preliminary stage and adjustments may need to be made in further developing the project activities. The continuous monitoring process and the inclusion of a mid-term review should allow the project design to be modified to match conditions as they evolve.

More serious risks are likely with the implementation of the project. The most fundamental risk is a possible lack of sustained political will to implement such projects, even though the State Ministry of Public Works and Kimbangwil have shown a firm commitment to the principle of using labour-based/intensive technology to date.

The main legal and institutional issue is the need for additions to the Law on Construction Service, which will permit improved procurement procedures to be used as an instrument of employment creation. To reduce this risk, a review of legal factors (legal due diligence) will be provided by the project at the start of the Implementation Phase.

As the project is primarily targeted to institutional strengthening and training, no direct negative environmental impact would be expected from the project’s implementation. Indeed, there are likely to be environmental gains due to the selection criteria and the way individual development projects are conceived. However, the project, in advising on the design of programmes using labour-based methods, will include provision for an assessment of social and environmental considerations, including ensuring:

- that an initial screening and examination of all potential components is undertaken to identify whether a full environmental impact assessment is required;
- the use of a community participation methodology, public awareness campaigns and social impact analysis in project design;
- that training programmes include an environmental monitoring and assessment component, with a target of up to 50 per cent female participation in the programmes;
- that gender awareness is incorporated in project planning - with the aim that 50 per cent of opportunities for new administrative, labour-based employment, and supervision posts will be available for female candidates\(^{20}\), and that women are not placed at any disadvantage in seeking such posts;
- that environmental monitoring and due diligence activities are included; and
- that appropriate prevention, management and mitigation measures are included in the project’s advisory notes, revised specifications and contract arrangements (e.g. shallow borrow pits with minimum impact for road construction, etc.)

In ensuring that these social and environmental considerations are integrated in the project design, full consultations will be held with the Central Environmental Impact Management Agency (Badan Penanggulangan Dampak Lingkungan - BAPEDAL).

It is very important to maintain the sustainability of the labour-based programme. Works at pilot project level always require a higher cost of investment, mainly allocated for tight supervision to ensure all processes conform with participatory planning principles, engineering quality standard are achieved, and funds are effectively used. Assessments of benefits and costs must be made in the long term, rather than in the short term, or in the case of a single project.

\(^{20}\) In conformity with ILO International Labour Standard (ILS).
Finally, sustainability of the program depends on a sustainable or constant flow of funds, either from government or from the community. Commitments from water user groups or roof tile businessmen are examples of community contributions to sustain labour-based programmes, and to maintain the quality of the work. Experience from visited projects shows that it is essential to provide seed money only to encourage revolving funds.

It is anticipated that labour-based technology will remain a permanent feature of the Government’s work programmes for some time to come. As the Indonesian economy recovers, and under-employment becomes less of an issue, it is likely that this interest might start to diminish. However, labour-based technology will still remain viable in circumstances where it is both technically, and economically, the most feasible solution.
Linking Local-Level Planning to Labour-Based Technology Works in the Philippines

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EXECUTIVE SUMMARY:

Past experiences with LB and labor-based/ equipment-supported (LB-ES) programs and projects have opened a wide opportunity for the practical adoption of LB-ES technology and the need for its further development, particularly in the island provinces and municipalities. The introduction of the Integrated Rural Accessibility Planning (IRAP) process in selecting infrastructure project areas for local government units (LGU) in the countryside has improved the viability and success of rural infrastructure projects.

The enactment of the Local Government Code in 1991 gave the LGUs major responsibilities for local governance including the alleviation of poverty and the improvement of the living conditions of rural communities by providing basic infrastructure projects. These projects, which are basically constructed using LB/ LB-ES technology include among others farm-to-market roads, irrigation systems, water supply systems (artesian wells, spring development, water impounding reservoirs, community taps), post-harvest drying facilities, school buildings and health centers.

IRAP’s technical assistance is delivered by developing national, regional and local experts, particularly at the Department of the Interior and Local Government, the National Economic and Development Authority and the State Colleges and Universities at the national level. In the LGUs, the targets are the Provincial Planning and Development Offices (PDO) at the regional level; and the City or Municipal PDOs at the local level. With the eventual institutionalization of an effective development planning using the IRAP procedure, the LGUs would be adequately prepared to plan and, through a recent government initiative, to implement the infrastructure projects by using LB/ LBES in order to generate gainful employment.

The latest policy of the Philippine Government on Labor-Based projects is contained in the Philippine Medium Term Development Plan (1998-2004), wherein it provides that “Labor-based technology in infrastructure activities, where feasible shall be promoted in support of employment generation efforts”. Executive Order 94, series of 1999, establishes the policy direction and institutional framework to implement the LB-ES infrastructure program. The ILO recommends the IRAP concept, strategy and procedure to be introduced in the various national and local infrastructure projects that EO 94 addresses, including the Department of Interior and Local Government (DILG) projects that are not presently covered under IRAP’s projects.

In addition, EO 94 has created a multi-agency Infrastructure Committee, whose functions include the formulation of a national LB-ES program and the provision of a framework to guide its implementation from the national down to the local levels. With this in place, it is envisaged that the institutionalization of the LB-ES units in the concerned infrastructure agencies will be forthcoming. Further, with the Infrastructure Committee being multi-agency and with corresponding powers to coordinate and monitor all activities, the usual problems encountered on bureaucratic linkages associated with past LB-ES programs can be properly and adequately addressed.

The paper presents the past experiences of the Philippine Government in the use of LB and LB-ES methods in the construction and maintenance of infrastructure projects; the various projects undertaken with technical and financial assistance from foreign institutions, the recent presidential directives and orders mandating the use of LB-ES technology in the generation of employment and the linkages of LB-ES technology to the IRAP identified projects on rural infrastructure. Case
studies are based on experiences of government infra-agencies in the implementation of LB-ES activities.

A. INTRODUCTION (Need for Employment-Intensive Programs):

A.1 High Population Growth, Poverty and Unemployment:

Worldwide, 370,000 children are born every day; half of them will be Asians and the majority of these newborn will be poor. In the Philippines 3 children are born every minute or 1.6 million more every year. This unabated growth in the population of the Country presents a great challenge to the sustainability of government programs. And unless more employment-intensive work methods are adopted as a regular part of government programs, the future social and political situations are not difficult to imagine.

Poverty in the Philippines is both rural and urban based and growing fast. In 1997, 44.4% of all rural households were considered to be living below the poverty line, (i.e. on less than1 US$ per day). This is an increase from the World Bank estimate of 27.5% in 1993. Complicating the many problems posed by poverty is the on-going civil unrest strife caused by anti-government factions in some rural areas. Past administrations and more aggressively the present one has pursued measures to solve the poverty problem by undertaking programs that will ease the burden of the less privileged, starting from healthcare and housing to food production and agrarian reform. However, many of these are seen essentially as only interim and temporary measures.

What is alarming is that the Philippines is facing growing unemployment and underemployment. According to the national Economic Development Authority (NEDA) the unemployment rate in the Philippines in 1998 was 10.13%, (3.13 million) and underemployment was at 21.8%. The majority of the unemployed is reported to be 18 to 24 years old and can be found in the urban areas, while most of the underemployed are residing in the rural areas.

A.2 The Need to Address Poverty Issues and Provide Longer Term Solutions:

More development-oriented programs are needed to alleviate poverty, particularly in the countryside, by way of sustained education and training and long-term gainful employment. LBES programs are powerful instruments for creating employment, thus alleviating poverty in areas where infrastructure works are urgently needed. Under the employment intensive programs (EIPs) of the Government, the use of LBES technology in the construction and maintenance of infrastructure projects has proven very effective.

The present government effort is to do away with the former short-term employment approach that was often introduced during crisis situations to provide palliative solutions. The main thrust of the present program involves a fundamental shift in the use of technology from equipment-based (EB) to labor-based/ equipment-supported (LBES) method in order to provide more gainful employment to the rural poor.

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B BACKGROUND AND CONTEXT OF LBES TECHNOLOGY IN THE PHILIPPINES

B.1 LBES Pilot Studies by the ILO:

The experimental phase of LBES projects in the Philippines began between 1971 and 1973. It started with the construction of a levee in Pampanga in 1971. The Labor-Based Equipment Supported (LBES) method was resorted to when the work area became inaccessible to heavy equipment due to heavy flooding in the province. Under advice from the International Labor Organization (ILO), restoration work was initiated using simple devices such as carabao scrapers and pull carts, while labor was provided using the “pakyaw” system. The Project was followed by the 5-kilometer-long Capas-Botolan Road in Tarlac on which extensive productivity measurements were taken.

Initial studies between 1973 to 1981 showed that LBM are suitable for Philippine conditions. However, no substantial development was carried for a number of years despite the passage of a Law that Public Works projects should be performed using Labor-Based Method (LBM) if the costs were no more than 10% above and involved no more than 50% of additional time compared to the best alternative Equipment-Based Method (EBM).

B.2 LBES Full Scale Projects

The following is a brief summary of the various road projects in the Philippines using LBES methods:

[i] Philippine Rural Infrastructure Projects (PRIP), 1981 to 1985:
LBES methods gained prominence in 1981 due to the foreign exchange crunch caused by falling commodity prices and a general decline in the economy that led to massive underemployment in the rural areas. Under PRIP, 55 kilometers of barangay roads were constructed using LBES methods between 1981 and 1985. The project was funded by the World Bank and implemented by the Department of Public Works and Highways (DPWH) with ILO assistance.

[ii] Rural Roads Project (RRP), 1985:
USAID sponsored the construction of 15 kilometers of pilot roads under RRP that was implemented in three provinces through DILG. ILO conducted a detailed study of the technical and socio-economic aspects of applied LB construction. The analysis revealed that LBES methods offer a technically and financially viable alternative to EB methods for smaller scale rural infrastructure projects.

[iii] Second Rural Roads Improvement Project (SRRIP), 1986:
SRRIP was a World Bank-funded project that started in 1986. The Land Settlement Roads component of SRRIP called for the construction of 280 km. of barangay roads using LBES techniques. These roads were located in three difficult areas marked by serious accessibility and peace and order problems. The project made good headway despite all the attendant problems. These works were the largest labor-based activities in the Philippines at that time. Upon completion the barangay roads were turned-over to the local councils.
The Central Visayas Regional Project (CVRP):
Another project that has significant LBES components, was the World Bank-financed CVRP which planned the construction of 240 km of trails using LBES techniques. Unfortunately, due to serious management problems and the lack of requisite technical support, very few trails were built.

Upland Access Project (UAP) 1984-1990:
Following the positive conclusions from the 1983 USAID-ILO studies, a number of full-scale demonstration projects were initiated including the UAP. Under the UAP at the DILG, about 300 km of minor roads and trails in fifteen pilot provinces were constructed using LBES methods. The Project is considered the most successfully completed LBES project so far in the Philippines.

Community Employment and Development Program (CEDP), 1986-1988:
In early 1986, the Government launched an ambitious emergency employment program called the CEDP with a supplemental budget of approximately 3.9 billion Pesos. This was the first national program involving LBES work. The objective of the program was to stimulate a much-needed economic recovery. It emphasized LBES projects in order to generate a greater number of jobs, apparently to alleviate poverty. It targeted one million part-time jobs in one and a half years. The CEDP had a total management funding allocation of 9.1 million Pesos and 3.9 billion Pesos for program implementation, of which nearly 60% was assigned to the DPWH. Infrastructure projects accounted for the bulk of the investments.

LBES programs were not however confined to the roads sector only. It included other important projects which eventually became national programs. Among them are:

1. ILO/ Government of Finland Implementation of Appropriate Technology in Philippines Forestry, 1982:
This project involved ILO technical assistance to the Philippines Bureau of Forestry development and resulted in technical specifications and training and a program which gainfully was able to use LBES to create more and improved job opportunities in the forestry sector.

2. ILO/ UNDP-Assisted Nationwide Application of Labor-Based Methods, 1987-1988:
This ILO multi-sector program which was initiated in April 1987 lasted for 18 months and was aimed at maximizing the utilization of LBES methods on multi-sector infrastructure projects as a means of alleviating severe unemployment problems. More specifically the immediate objectives of the Project were a) the establishment of an institutional framework, b) the conduct of a nationwide training on LBES methods and c) the formulation of systems and procedures and the setting-up of organizational structures in concerned government agencies for the application of LBES methods.

In order to achieve the above objectives, a Central Labor Based Advisory and Training Team (CLATT) composed of representatives from DPWH, DLG, National Irrigation Administration (NIA), Department Labor and Employment (DOLE), NMYC and NEDA was created to implement activities for the project. The major achievements that can be attributed to CLATT include:
[a] The production of training manuals on LBES methods for construction and maintenance;
[b] The direct training of 705 site supervisors from various agencies, including two courses for trainers;
[c] Assistance to DPWH and DLG in the conduct of echo training for some 340 participants;
[d] Finalization of detailed specifications for hand tools;
[e] Development of new units of tools for manufacturers;
[f] Development of proposals for the establishment of permanent labor-based units;
[g] Development of procedures for centralized tool procurement;
[h] Development of Bidding Documents for “Pakyaw” Contracts

CLATT also initiated the issuance of EO 336 which established Labor-Based Units (LBUs) in the various infrastructure agencies of the Government.

[3] Comprehensive Agrarian Reform Program (CARP), 1998: This program involved 2,100 short rural road projects covering 3,800 km in specially selected CARP areas nation-wide under the supervision of the DPWH.

[4] “Kabuhayan 2000”: In 1992 the Government adopted certain measures on multi-sector employment generation program in the countryside called “Kabuhayan (livelihood) 2000”. This aimed to generate two (2) million part-time jobs in three years and over-shadowed the intended processes and efforts of E.O. 336, so much so that even the NEDA InfraCom reporting requirements for all LBES units of infrastructure agencies were overlooked. The “Kabuhayan 2000” program involved the coordination of employment generating and rural development agencies of the government which included agencies involved in infrastructure maintenance and development.

The local component of the infrastructure development program targeted the construction and rehabilitation of 1,300 km. of rural access roads using the LBES Methodology, while the maintenance of 8,679 km. of provincial roads, 1,195 km. of city roads, 12,874 km. of municipal roads and 85,940 km of barangay roads were implemented using the length-person maintenance system. Also included in the program was the construction of 113 public market modules.

C. GOVERNMENT LBES STRATEGY

C.1 Current Policy and Institutional Framework for LBES Technology in the Philippines

C.1.1 Executive Order No. 94 (1999)

The present Government of the Philippines (GOP) has taken the policy decision to maximize the use of LBES methods in the construction and maintenance of infrastructure projects as a means of alleviating severe unemployment and under-employment, especially in the rural areas. This policy is contained in the Medium Term Philippine Development Plan (1998-2004). The policy provides that “Labor-based technology in infrastructure activities, where feasible shall be promoted in support of employment generation efforts”.

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In order to institutionalize this policy, Executive Order No. 94 was issued 12 April 1999, “Establishing the policy direction and institutional frame-work to implement the Labor-Based/Equipment-Supported (LBES) infrastructure program”. The EO’s purpose is to directly support the primary strategy of the poverty alleviation agenda of the Administration in eliminating obstacles that prevent the poor from becoming productive and competitive members of society. In line with this strategy the GOP shall promote technologies and approaches as instruments for the economic empowerment and job creation for the poor. EO 94 also recognized the labor displacing effects of the economic crisis and saw the need to further strengthen instruments for job-creation particularly LBES programs and projects.

The GOP believes that LBES methods can sustain and encourage the optimum use of labor while ensuring cost-effectiveness and quality standards when applied in appropriate infrastructure projects. Further the EO was also inspired by the premise that LBES methods will greatly reduce the construction industry’s reliance on imported equipment and machinery, thus contributing to the economic well being of a depressed economy. The EO declared that it is the policy of the GOP to utilized LBES methods in infrastructure programs and projects, including foreign funded projects. Whenever possible and feasible, it shall be chosen as the technology of “first choice”. It is noted that EO 94 also recognizes the fact that Labor-Based Units (LBUs) have been established in the various infrastructure agencies through EO 336, series of 1988.

EO 94 also created the LBES Infrastructure Program Committee (LBES-InfraCom) where the DPWH and the DOLE co-chair the Committee, with the DILG as a lead member together with 9 other national government agencies, four local government leagues and 5 representatives of the private sector.

C.2 GOP Priorities on LBES Works

C.2.1 DPWH Department Order NO. 183 (1999):

As a result of EO 94, DPWH issued Department Order No. 183 dated 09 September 1999 assigning additional functions to the DPWH CLB/ CARP Office and expanded the coverage of its program. The coverage included all LBES Infrastructure Program under EO 94, the Regular CARP and OECF-Assisted Agrarian Infrastructure Support Program (ARISP) of the Department of Agrarian Reform (DAR); the Farm to Market Road Program of the Department of Agriculture (DA) and the DPWH-Local Government Unit (LGU) Cost Sharing Program, among others.

C.2.2 DPWH Memo of 29 November 1999:

A Memorandum addressed to all regional directors, district engineers and concerned DPWH officials followed on 29 November 1999 directing all concerned officials to expedite the pre-construction activities of the Comprehensive Agrarian Reform Program (CARP) to the fullest extent feasible to ensure the early start of the project. All district offices concerned were instructed to implement the projects by “administration” using “labor intensive methods” or LBES methods of construction. District offices that have been verified to encounter problems, are allowed to undertake projects by contract after public bidding in accordance with the provisions of existing infrastructure rules and regulations. Situations which may justify contract award are: a) scarcity of construction materials due to lack of interest among suppliers to deliver them at remote places or
inaccessible sites; b) unavailability or shortage of construction workers especially during the harvest season; c) inadequate light construction equipment in the district office which is prevalent in mountainous or rolling terrain and other isolated areas.

For DPWH projects implemented thru direct contract, contractors are required to maximize the use of “labor-intensive construction techniques” and to employ workers coming from the barangays or adjacent ones where the projects are located. A significant number of district offices have however been authorized to undertake projects via contract.

C.2.3 DPWH Memo of 29 February 2000:

Pursuant to EO 94 and DO 183, DPWH Memorandum dated 29 February 2000 has directed the Administrative Manpower and Management Service (AMMS) to assist the DPWH CLB/ CARP Program Office in conducting training programs for concerned DPWH staff including representatives from member agencies of LBES InfraCom. Provided funding is available the ILO would be available to assist with this important training.

C.2.4 Implementing Rules and Regulations for LBES Projects:

In accordance with the functions of the LBES InfraCom, to prepare specific guidelines in the implementation of the Program, The Technical Working Group (TWG) has prepared a draft Implementing Rules and Regulations for the LBES approach revolving around the following policies and principles:

[1] The GOP is committed to strengthening the implementation of the LBES Method through the institutionalization of more focused policy direction and operational framework that will ensure the success of the state in alleviating unemployment and underemployment;

[2] The primary strategy of poverty alleviation agenda of the GOP is to devise measures that will enable the poor to become productive and competitive members of society;

[3] The GOP shall provide and promote appropriate environment-friendly technologies and approaches as instruments for economic empowerment and job creation for the poor and other target groups;

[4] The GOP shall require concerned departments and agencies to maximize the use of LBES technology, while ensuring cost-effectiveness and quality results in the implementation of infrastructure projects.

[5] The Program shall put a premium on the recruitment and placement of displaced workers in LBES projects and include training programs for sustained upgrading of skills and competencies of these workers.

[6] For projects where LBES Method is found appropriate, there must be a significant shift in favor of the LB component.
D. ILO ASSISTANCE TO LBES PROJECTS AND PROGRAMS

D.1 Previous ILO Technical Assistance to Philippine LBES Projects:

[1] The World Bank funded Philippine Rural Infrastructure Projects (PRIP) from 1981 to 1985 where the ILO assisted the DPWH in the construction of 55 kilometers of barangay roads in 55 provinces using LBESM.

[2] The USAID-sponsored Rural Roads Project (RRP) in 1985, where the ILO conducted detailed technical and socio-economic studies of LB construction for 15 kilometers of pilot roads implemented by the DILG in three provinces.


[4] The UNDP-Assisted Nationwide Application of LBM between 1987 and 1988 which was initiated by the ILO in April 1987 and lasted for 18 months. A Central Labor Based Advisory and Training Team (CLATT) was established to implement the attendant activities.

D.2 ILO’s Present Activities in Support of LBES Technology in the Philippines:

Since 1998 the ILO has been providing part-time technical assistance through its specialist regional program, ASIST-AP. This assistance has been responsible for assisting the GOP in the policy development that has lead to the EO 94 and the establishment of the LBES-Infracom. ASIST-AP has also been providing technical backstopping to the ILO/GOP Nationwide Integrated Rural Accessibility Planning (IRAP) project which is discussed under Section D.5. The limited funding resources available to the ILO means however that additional donor support is needed to provide the essential technical resources envisaged under this project proposal. The ILO has also been providing part-time development planning and development engineering advisory support since 1999 to the European Union-funded Central Cordillera Agriculture Development Project (CCADP) which involves extensive infrastructure works.

D.3 ILO’s Employment Intensive Investments Program (EIIP):

The ILO has a special branch (EMP/INVEST) in Geneva which is responsible for a global program of employment intensive investment programs and projects (EIIPs) promoting the use of LBES work methods. EIIPs, as promoted globally by the ILO, are powerful instruments for generating employment, through LBES investment and practices for infrastructure planning and development.

These programs have operated in more than 35 developing countries and recognize that the public infrastructure sector budgets usually account for more than 50% of national public investment programs. The employment impact of these programs is very much a factor of the particular technology used in the development and maintenance of those infrastructure sectors.
The EMP/INVEST Branch has two major regional programs of ASIST providing advisory support, information services and training within the EIIP. One is based in Africa and provides global information services and the other is based in the Asia-Pacific region.

D.4 Advisory Support Information Services and Training- Asia Pacific (ASIST-AP)

ASIST-AP is an Asian regional program to increase the use of cost-effective LBM under fair working conditions, while promoting employment and income generation primarily in the rural areas.

ASIST-AP provides a comprehensive policy, planning and technical advice service. It advises on project and program design, coordination, monitoring and review of both urban and rural LB programs and rural access and transport programs. ASIST-AP actively gathers, synthesizes, and disseminates relevant information on urban and rural LB technology and rural access and transport. It also provides a technical inquiry service to respond to specific requests for information. ASIST-AP maintains a database of contact persons and institutions involved in the promotion of and development of LB technology and rural access and transport. It also provides support to national training institutes and universities in the development of curricula, training programs and materials, as well as training techniques and methodology. The three priority countries are Philippines, Thailand and Indonesia.

D.5 The Integrated Rural Accessibility Planning (IRAP):

The IRAP Project is a joint undertaking involving the ILO, the Department of Interior and Local Government (DILG) and the Royal Government of the Netherlands. This nationwide Project is being implemented by the ILO with the DILG providing the counterpart support staff. The Dutch Government provides the funds for its implementation.

IRAP is a local level planning process that is based on the concept that “the lack of access of rural people to goods and services, is one of the fundamental constraints to their development”. Improvement of access to basic goods and services, therefore, is a major weapon in the war against poverty. For the rural population in the country, where 44% live below the poverty line, a major constraint that hinders improving their situation is their lack of access to essential goods and services. Households need to have access to facilities and services in order to fulfill their basic, social and economic needs and be able to live active social and productive lives.

Accessibility therefore is a major determinant of rural development. The success of the program designed to improve the living conditions of the rural poor will, to a large extent, depend on the degree of access that these people have to the facilities and goods available. IRAP’s starting point is access which also provides the basis for determining priorities for improvements and the most effective means of achieving them. The IRAP technique is being recommended by the ILO as a prerequisite to the inception of any community-based LB technology program in the Asia Pacific region.

D.5.1 The IRAP Procedure:

IRAP is a local level planning tool that is a simple, relatively inexpensive and easy-to-apply data gathering and analytical procedure. It focuses on access of rural households to basic goods,
services and facilities. At the project level, the procedures of IRAP is applied through the planning and development offices (PDOs) of the LGUs.

Capability-building activities involve “hands-on and on-site” training where LGU planners & technical staff engage in rapid appraisals of local “access” conditions. At the field level, the application of IRAP involves the following:

(a) data gathering (secondary & primary);
(b) data encoding (using IRAP Info System);
(c) computation of accessibility indicators;
(d) accessibility mapping;
(e) identification of sectoral problems;
(f) target setting;
(g) formulation of interventions;
(h) identification of sectoral projects;
(i) presentation to decision-makers (LCEs & LDCs);
(j) integration in LGUs Annual Investment Plan (AIPs) & Area Development Plan (ADP);
(k) preparation of project proposals;
(l) fund sourcing (internal/external);
(m) project implementation; and
(n) monitoring and evaluation;

D.5.2 Information Resulting from IRAP Procedure:

The application of the IRAP procedure will result in the generation of accessibility information relating to:

[1] Subsistence needs, such as- potable water, fuel-wood collection, domestic food production;
[2] Economic needs, such as- roads and transport systems, markets, agricultural inputs, post-harvest facilities, electricity;
[3] Social needs, such as- health services & facilities, education services & facilities.

Data generated through IRAP application are very useful and viable given the short duration needed for its collection.

D.5.3 Uses of IRAP Information

The uses of the generated accessibility information includes among others the following:

At Local Level:

[1] It provides a profile of the local accessibility condition as well as a ranking of sectoral concerns and geographical (area) targets.

[2] It helps LGUs identify and develop “access improvement interventions” leading to improved living condition of rural population.
[3] It provides LGUs a basis for projects and programs which will improve access as well as provide employment and livelihood opportunities for rural population thereby helping contributing to the improvement in the economic status of the households.

[4] IRAP assist LGUs in investment planning, particularly in identifying and prioritizing projects for integration in their Annual Investment Plans.

[5] Provinces are aided in targeting municipalities for specific sector projects as well as municipalities being assisted in the targeting of barangays.

The enactment of the Local Government Code in 1991 gave the LGUs major responsibilities for local governance including the improvement of the living conditions of families and reduction of poverty in rural communities.

At Regional and National Level:

[1] The accessibility information generated through IRAP would be significant inputs to government agencies, non-government organization, and the donor community in the planning and development of projects and programs aimed at the rural poor.

[2] The accessibility indicators would also be useful in the monitoring and evaluation of poverty reduction.

D.5.4 Access Improvement Interventions

The IRAP procedure looks into how households avail of basic goods and services by determining the amount of time spent to get to the facility. Accessibility Indicator is a function of Number of Household and Distance/Travel Time.

Access improvement interventions fall under two general types:

[1] bringing the people closer to goods, service and facility by enhancing their mobility through improvements of roads and transport Systems; and/or

[2] bringing the goods, service & facility closer to people through proper siting and location.

Access improvement interventions usually include the following projects:

[a] Water systems project (Level I and II: artesian wells, spring development, reservoir, establishment of community taps);
[b] Road improvement projects;
[c] post-harvest facilities, irrigation system;
[d] small infrastructure projects (school buildings, rural health units, markets)
D.5.5 IRAP I & II

D.5.5.1 Nature of IRAP I & II

IRAP (I & II) was a capacity-building project made possible through a grant from the Royal Government of Netherlands. It was implemented ILO in collaboration with the DILG through the Rural Transport Unit of the Bureau of Local Government Development in Phase I and the Local Government Academy in Phase II. IRAP I was implemented in 1993 and IRAP II from 1994-1995 with an extension phase from 1996-1999.

D.5.5.2 Project coverage of IRAP I & II

IRAP I was able to cover a total of 12 provinces for theoretical Inputs, 2 provinces for the Training on Mapping, and the same 12 provinces for its Application of IRAP. Six of these provinces were in Mindanao, four in the Visayas and two in Luzon. IRAP II covered 13 additional provinces making the total of IRAP-covered provinces 25. Eight of these provinces were in Mindanao, three in the Visayas and 3 in Luzon.

D.5.5.3 Approach & Strategy of IRAP I & II

IRAP I & II introduced in these provinces a simple, inexpensive and easy-to-apply data gathering and analytical procedure which considers access of rural households to basic services, facilities, and goods as a determinant of development needs. During IRAP I and II, the technical assistance delivery was mainly through the development of local experts in the Local Government Units (provinces and municipalities) and by conducting series of hands-on and on-site activities to identify and prioritize accessibility needs of the people.

D.5.5.4 Objective of IRAP I & II

To integrate into the planning practices of the LGUs a local level planning tool based on the integrated rural Accessibility Planning (IRAP) Procedure.

D.5.5.5 Accomplishments of IRAP I & II:

- Skills for IRAP Transferred to a total of 401 LGU planners and technical staff and 131 DILG technical personnel in IRAP I. Skills for IRAP transferred to a total of 841 LGU planners and technical staff and 257 DILG technical personnel in IRAP II.
- The IRAP planning procedure was applied in 25 provinces of the country.
- Policy and decision makers in the covered LGUs convinced of the usefulness of and need for IRAP.
- Effective projects and programmes aimed at access improvements implemented in covered LGUs particularly in Regions 6, 10, 11 and 13.
- Skills for training on IRAP transferred to trainors in Regional Universities particularly in Region X
- Partly installed capacity on IRAP in the Local Government academy particularly on the part of their contractual personnel.
- IRAP database established in LGA.
D.5.6 IRAP III

D.5.6.1 Nature of IRAP III:

IRAP III is a capacity-building project made possible through a grant from the Royal Government of Netherlands. It is implemented by the International Labour Organization (ILO) in collaboration with the department of Interior and Local Government (DILG). It will cover rural communities nationwide from 2000 to 2002 and will target major actors of local decision-making such as local planners and technical staff, Local Chief Executives (LCEs), members of the Sanggunian Bayan (local legislative council), and members of the Local Development Councils (LDCs).

D.5.6.2 Approach & Strategy of IRAP III

IRAP III will introduce nationwide a simple, inexpensive and easy-to-apply data gathering and analytical procedure which considers access of rural households to basic services, facilities, and goods as a determinant of development needs. The technical assistance delivery is through a) development of regional experts from DILG, National Economic & Development Authority, State Colleges & Universities and Provincial Planning and Development Offices, and b) development of local experts activities to identify and prioritize accessibility needs of the people.

D.5.6.3 Objective of IRAP III

The end goal is to contribute to the socio-economic development and poverty reduction efforts of the country through effective development planning capacity at local, regional, and national levels.

D.5.6.4 Expected Results from IRAP III

- enhancement of the IRAP procedure in terms of its responsiveness and appropriateness to particular local conditions.
- Promotion of the use of accessibility information in monitoring and evaluation of poverty reduction.
- Promotion of the IRAP technology as basis for regional and national development and investment plans.
- Institutionalization of the IRAP procedure as a planning tool in all levels of government: local, regional and national.

E. INSTITUTIONAL FRAMEWORK FOR THE LBES SUBSECTOR

E.1 The Labor-Based/ Equipment-Supported Infrastructure Program Committee (LBES-InfraCom)

The LBES Infrastructure Program Committee (LBES-InfraCom) was established under Executive Order No 94, series 1999. The Committee is tasked with undertaking the following functions and responsibilities, among others:
a). Formulate a national program on LBES to provide a framework that will guide the implementation of LBES methods and technology at the national and local levels, including the specific guidelines to implement the various components of the program;

b). Coordinate and monitor all program/activities related to the implementation of LBES projects;

c). Resolve policy and operational issues and problems which may arise relative to the implementation of the program, in close coordination with concerned agencies/entities;

d). Determine training and technical assistance requirements for both the public and private sector involvement in the program;

e). Submit quarterly reports to the President on the status of the implementation of the national program, including issues and attendant recommendations;

The LBES InfraCom members include:

Department of Public Works and Highways (DPWH) as Co-chair
Department Labor and Employment (DOLE) as Co-chair
National Anti-Poverty Commission (NAPC)
Department of Interior and Local Government (DILG)
Department of Transportation and Communications (DOTC)
Department of Energy (DOE)
Department of Education, Culture and Sport (DECS)
Department of Agriculture (DA)
Department of Agrarian Reform (DAR)
Department of Environment and Natural Resources (DENR)
Department of Finance (DOF)
Department of Budget and Management (DBM)
National Economic Development Authority (NEDA)
Housing and Urban Development Coordinator Council (HUDCC)
League of Provinces
League of Municipalities
League of Cities
League of Barangays
5 representatives each from the private sector representing contractors, employers, engineering consultants, academia and labor groups

The technical and administrative secretariat services needed to support the Committee will be provided jointly by the DPWH and the DOLE. The Committee shall determine the funds necessary for the Program’s initial implementation, including its sources. Succeeding funding requirements for the continued implementation of the Program will be included in the Government’s annual budget.
E.2 The Three Major Departments in the InfraCom:

E.2.1 Department of Public Works and Highways (DPWH)

The DPWH is designated as “The Government’s Engineering and Construction Arm” responsible for “the planning, design, construction and maintenance of Infrastructure facilities, especially highways and bridges, flood control, water systems and other public works in accordance with national development objectives. The DPWH shall exercise the following powers and functions:

[1] Provide technical services for the planning, design, construction, maintenance and operation of infrastructure facilities;

[2] Develop and implement effective codes, standards, and reasonable guidelines to ensure the safety of all public and private structures in the country and assure efficiency and proper quality in the construction of public works;

[3] Ascertain that all public works plans, designs and project implementation are consistent with current standards and guidelines;

[4] Identify, plan, secure funding for, program, design, construct, undertake pre-qualification, bidding and award of contracts of public works projects with the exception only of specialized projects undertaken by government corporate entities with established technical capability and as directed by the President of the Philippines or as provided by law;

[5] Provide supervision function for all public works construction and secure that actual construction is done in accordance with the approved government plans and specifications;

[6] Assist other agencies, including the local governments, in determining the most suitable entity to undertake the construction of public works projects;

[7] Maintain or caused to be maintained all highways, flood control, and other public works, throughout the country except those that are the responsibility of other agencies and as directed by the President of the Philippines or as provided by law;

[8] Provide an integrated planning for highways, flood control and water resources development system and other public works;

[9] Classify roads and highways into national, regional, provincial, city, municipality and barangay roads and highways, based on objective criteria it shall adopt; provide or authorize the conversion of roads and highways from one category to the other;

[10] Delegate to any agency, it determines to have the adequate technical capability, any of the foregoing powers and functions.
E.2.2 Department of Labor and Employment (DOLE)

The DOLE is the primary policy making department of the Philippine Government in the area of labor and employment. It provides the necessary programming, coordinating and administrative functions required of the agency and assumes the following responsibilities:

[a] The promotion of gainful employment opportunities and the optimization of the development and utilization of the country’s manpower resources;

[b] The Advancement of workers welfare by providing for just and humane working, condition and terms of employment;

[c] The maintenance of industrial peace by promoting harmonious, equitable, and stable employment relations that assure equal protection for the rights of all concerned parties;

In pursuit of the DOLE mandate, it perform the following functions:

[1] Enforce social and labor legislation to protect the working class and regulate the relations between the worker and his employer;

[2] Formulate and recommend policies plans and programs for manpower development, training, allocation, and utilization;

[3] Recommend legislation to enhance the material social and intellectual improvement of the national labor force;

[4] Protect and promote the interest of every citizen desiring to work locally or overseas by securing for him the most equitable terms and conditions of employment and by providing social and welfare services;

[5] Regulate the employment of aliens including the establishment of a registration or work permit system for such aliens, as provided by law;

[6] Formulate general guidelines concerning wage and income policy;

[7] Recommend necessary adjustments in wage structures with the view to developing a wage system that is consistent with national economic and social development plans;

[8] Provide for safe, decent, human and improved working conditions and environment for all workers particularly women and young workers;

[9] Maintain a harmonious equitable and stable labor relations system that is supportive of the national economic policies and programs;

[10] Uphold the right of workers and employers to organize and promote free collective bargaining as the foundation of the labor relations system;
[11] Provide and ensure the fair and expeditious settlement and disposition of labor and industrial disputes through collective bargaining, grievance machinery, conciliation, mediation, voluntary arbitration, compulsory arbitration as may be provided by law and other modes that may be voluntarily agreed upon by the parties concerned; and

[12] Perform such other functions as may be provided by law.

E.2.3 Department of the Interior and Local Government (DILG)

The DILG is the government agency mandated to supervise and develop all local government units (LGUs) in the country including the provincial, municipal and city government units. The Office of the Project Development Services (OPDS) is in charge of supervising the implementation of infrastructure projects handled by the various LGUs.

The OPDS was created under Executive Order 262 dated 25 July 1987 with the primary task of formulating innovative approaches and strategies designed to promote the technical capabilities of LGUs. This includes assistance in the development of program components for the implementation of tested and appropriate systems and processes at local level. The major role of the OPDS is to help train local officials in all facets of development with the end in view of equipping them with the necessary tools to plan, implement and maintain their own projects. In pursuit of such objective, the OPDS follow a developmental strategy of active and shared partnership among the national government, which it represents; the LGUs, which are conduits of development projects; and the citizenry, the ultimate project beneficiaries.

The OPDS is directly under the office of the DILG Secretary and is headed by a Project Director (PD). The PD is assisted by Project Managers who are responsible for the operations and management of the various project offices. The project management offices (PMOs) for “special projects” are classified into (a) “foreign-assisted” projects and (b) “nationally-funded” projects. These project offices help the LGUs strengthen their technical and administrative capabilities in the construction, improvement and maintenance of local roads, bridges, markets and school buildings and other related projects.

So far the OPDS has been getting foreign funds from several donors institutions and countries including, the United States Agency for International Development (USAID), the International Bank for Reconstruction and Development (IBRD), the Asian Development Bank (ADB), the United Nations World Food Program (UNWFP), the Australian Agency for International Development (AusAID), and others.

E.2.3.1 Infrastructure Projects Devolved to LGUs

Under the New Local Government Code, the basic infrastructure facilities that LGUs are responsible for constructing and maintaining include the following:

1) Farm produce collection and buying stations;
2) Hospitals, health and day-care centers;
3) roads and bridges;
4) water supply systems, artesian wells, spring development, rainwater collectors;
5) multi-purpose hall and pavements;
6] sports and cultural centers;
7] public libraries and reading centers;
8] public markets and slaughterhouses;
9] communal irrigation systems, small water impounding dams;
10] communal forests forest development projects;
11] municipal buildings, schools;
12] public parks and playgrounds;
13] fishing ports, seawalls, dikes;
14] drainage and sewerage systems and flood control;
15] traffic signals and road signs;
16] public cemeteries;
17] tourism facilities;
18] police and fire stations and jails;
19] Communication and transportation facilities.

E.2.3.2 Sources of Funds for LGU Projects:

In order to finance their infrastructure projects and basic facilities programs, the LGUs may consider the following sources:

[1] The 20% share of Internal Revenue Allotment (IRA) share LGUs for local development projects

[2] Share in the proceeds from the development & utilization of their national wealth,

[3] Loans, credits, and other forms of indebtedness of local government units;

[4] Deferred payment and other financial schemes


[6] Loans from funds secured by the National Government.

[7] Build Operate and Transfer Law as applied in Local Government Unit.

[8] Financing from the private sector for the construction, maintenance, operation and management of infrastructure projects.

F. PROBLEMS TO BE ADDRESSED; THE PRESENT SITUATION

With the GOP’s strong policy commitment to LBES methods especially through the issuance of EO 94, the main problem areas to be addressed are those relating to the realization of the goals of the EO. The challenges ahead related largely to the administrative, contractual and regulatory reforms needed and to the need to develop a larger and better public and private sector capacity to implement an expanded and improved program. The constraints associated with previous LBES programs are well known and well documented.
F.1 Past experiences with LBES program (summary of lessons learned)

In 1998, the ILO commissioned the Development Academy of the Philippines (DAP) to make a study on LBES Infrastructure Program in the Philippines. The DAP study consolidated all previous researches and reports and classified the problems and shortcomings encountered in the LBES Method as follows:

I. On Policy Administration

1. Lukewarm attitude towards labor-based technology (LB method is considered a retrogressive move);
2. Conditions imposed by foreign lending institutions limiting the number of projects to be implemented on force account (as provided in some loan agreements);
3. Non-acceptance/resistance by the recipient community (project beneficiaries would like to see the projects as soon as possible);
4. Organizational limitation for LBES project implementation (most infra agencies concerned do not have sufficient complement of trained LBES staff);
5. Imposition of BIR tax on “pakyaw” contracts (needs to be exempted from said taxes);
6. Civil service requirements on hiring of common laborers to submit plantilla/position (limits the hiring of project facilitators on force account);
7. Conflicting policies being issued by central office, e.g., whether on projects are on fast-track or LBES.

II. Administrative Support

1. Lack of support to LBES technology
2. Non-compliance to department order and policies particularly among district officers
3. Realignment of projects per request of local official, e.g., political interference
4. Project clustering is biased towards contracting/equipment-based especially at the level of district engineers
5. No permanent LBU position and staff/resources
6. Acquisition of right-of-way
7. Delay in the processing of papers
8. Weak coordination, particularly with financial and technical people, of support and client agencies
9. Delayed or non-submission of project listing; listing not prioritized
10. Lack of guidelines on realignment of project which causes delays in project implementation
11. No authority to procure support facilities for CARP activities
12. Non-compliance of client agency personnel with project identification & validation
13. Need for a more active dissemination and information campaign for labor-based technology
14. Weak management and field operation communications system due to low management support and lack of communication facilities
15. Insufficient service support for project verification and reporting.

III. Financial

1. No funds for personnel services and maintenance and operating expenses to maintain labor-based units in designated infrastructure departments/agencies due to the implementation of the new Local Government Code;
2. Delayed and insufficient release of cash/fund
3. No assurance of continuous funding
4. No maintenance funds
5. Lack of financial support to CARP support services component
6. Delayed cash support to DPWH program
7. Schedule of fund releases conflicts with the agricultural sector’s need for manpower
8. Reporting system delays budgetary/cash flow
9. Control of overhead and engineering funds are in the wrong office/staff causing occasional diversion from CARP operation to regular operation

IV. Technical

1. Lack of information on labor-based technology
2. Unrealistic work program
3. Existing standard specifications are not adaptable to Philippines and small scale manufacturers
4. Improper use of hand tools causing breakage and low productivity
5. Absence of experienced tool experts to undertake testing and evaluation of purchased hand tools
6. Transfer of LBES technology to private sector through regular contracts (relative to “pakyaw” labor only contract)
7. Effective monitoring and supervision
8. Unavailability of specification standards for LB projects
9. Non-issuance of approved design standards for LB projects
10. Inadequate selection criteria and guidelines
11. Absence of site validation
12. Frequent cases of realignment confuse project implementation

V. Human Resource-Related

1. Non-permanency of appointment and position
2. Need for more training; laborers are not familiar with technology
3. Lack of trained supervisors
4. Seasonal availability of manpower
5. Need for active interface with the academe & professional organizations
6. Need for a more active dissemination and information campaign for labor-based technology
7. Lack of trained LB engineers due to transfer, promotion, separation, etc.

VI. Political Interference

1. Prevalence of political intervention on project identification, prioritization, validation and acceptance
2. Prevalence of intervention or realignments
3. Prevalence of intervention on the use of equipment-based versus labor-based/ equipment-supported method

VII. Socio-Cultural

1. Lack of moral values, e.g., business ethics & labor practices
2. Peace and order problems in the project sites
3. Attitude towards hard work
4. Preference for traditional work and working time
5. Resentfulness to uncertainty
6. Accessibility of project to residence
7. Expectation of tangible benefits in addition to salary & wages from the project

VIII. Physical Environment

1. Effects of seasons and weather
2. Effect of topography or terrain
3. Effect of base material in project site

G. PROJECT STRATEGY AND IMPLEMENTATION ARRANGEMENTS

G.1 Project Strategy:

The project strategy will involve the strengthening of the technical arm of the LBES-Infracom in scoping and reshaping the various departmental projects and programs to be encompassed in the overall project. This will be achieved through technical assistance and training. IRAP procedures will be tapped for this purpose.

Important will be the setting up of a ‘technology screening’ or ‘technology audit’ system in the concerned government departments so as to channel an optimal amount of work into the LBES implementation stream and to leave alone those works which are better undertaken by EB methods.

Initial overall departmental programs for the attainment of the employment targets will then be set. The program will be clearly defined in terms of geographic location, size, scope and phase expansion and specifically recommend the allocation of technical and financial resources. The project will also aim to promote the optimal use of local materials and resources, appropriate technology and concepts, and assist in the establishment of effective monitoring systems and the promotion of fair working conditions for LBES workers.

An early training-needs assessment will be undertaken to facilitate a rapid strengthening of the central technical and managerial capacity of the concerned departments as well as the private sector. Training activities will be initiated at the earliest opportunity.

Appropriate technical cooperation linkages will be established with the Downstream project, funded separately by AusAID under its PAGF Program, involving the field operations of DILG and the LGUs. This will enable the consolidation of the LB Units established under EO 336 and assist in the implementation of the Medium Term LBES Infrastructure Program under the Downstream project. IRAP generated data will be very useful in these situations.

It will be essential that any new LBES programs be conceived along the mainstream programs of the technical department and not seen only as emergency, temporary-relief measures. The concerned line departments will be encouraged to comply with Executive Order No. 94. To realize the objectives of the Program in introducing fundamental change where it is feasible and
appropriate the new LBES program components will be implemented alongside certain equipment based operations

It is also important that the project cycle be taken into consideration starting with appropriate community or regional planning and full understanding of operational and maintenance issues. A clear distinction will be made between public works and community facilities and between productive and social infrastructure when it comes to project selection. Again, the IRAP concept will play a vital role in these activities.

G.2 Institutional Framework:

Institutional framework will be established at two distinct levels; i) policy and advisory ii) operational. Policy and advisory will be the responsibility of this Upstream project of the LBES InfraCom, developing implementing rules and guidelines by the Technical Working Group (TWG), supported advisory by the ILO Project Team. The downstream technical assistance project with DILG will be responsible for advising on operational matters at LGU level.

G.3 ILO Project Advisory Team (PAT)

The PAT will advise the LBES InfraCom and will be responsible for the following activities:

- Provide advisory support and training assistance including awareness training for government personnel, contractors and consultants on EIP’s and LBES technology; basic technical orientation and refresher training for technical personnel of the Government, the contractors, workers and consultants
- Assist develop the overall scope of the national works program through a ‘technical audit’ unit which will screen all government programs and categorise all works into four basic categories:
  - Equipment-based but with some work elements or activities undertaken by LB method;
  - Labor-based/ equipment-supported works which will be substantially expanded,
  - Purely Labor-based works (labor and hand tools only), and
  - Purely Equipment-based works which cannot be modified for technical and financial reasons.
- Assist the LBES-InfraCom to achieve the same quality standards of an EB work using LBES methods for the selected works with no substantial increase in project costs. Despite the limited scope of short-term labor-intensive programs, the ILO will be able to assist in recommending which kind of activities should be attempted, setting out basic works procedures and recommending reasonable levels of labor productivity and cost control.
- Assess training needs for the key stakeholders in this national LBES program from both the public and private sector as well as the communities and developing special LBES training programs which will be incorporated into the regular departmental training calendars with the ILO advisory team focussing on the development of training materials and the training of trainers.
- Establish an efficient national monitoring system for LBES Programs. Current monitoring systems are considered in need of considerable strengthening. A comprehensive and effective monitoring system will bring opportunities for improved quality, effective cost
control and proper accountability. With a well-established monitoring system, the basis of future studies and decisions need not be theoretical or borrowed from foreign experiences. EO 94 will make concerned government departments responsible for the implementation of projects and proper reporting.

- Promote fair working conditions for LBES workers involved in these expanded programs. In this regard the ILO has recently produced a comprehensive guide for employment-intensive programs which will be the basis of such promotion. This program will pay particular attention to regular consultation with the ILO’s three social partners (government, employers and workers) and encourage their active participation in the LBES-InfraCom.

- Support the existing and potential role of the private sector in project design, management and implementation of LBES projects. The ILO advisory team would endeavor to contribute technical support and training in LBES technology to this sector. In this respect, the ILO will provide guidelines on LBES contracting which will be made available through the LBES-InfraCom. The technical assistance would support and facilitate the development of new small and medium LBES contractors and the strengthening of existing ones.

G.4 The Linkage of the ILO to LBES-InfraCom

The ILO ASIST-AP project based in the ILO Regional Office in Bangkok will provide regular technical advice and management for this Project as part of the ILO country program for the Philippines under the ILO Manila Office. In addition the ILO multidisciplinary team (SEAPAT) in Manila will assist with advice in related specialist areas such as small and medium enterprises (SME) development, occupational health & safety and employer and worker organizations’ support.

G.5 LBES and LGUs’ Good Governance

Governance must be anchored on an institutional philosophy. In the case of local government units, where most LBES rural infrastructure projects will be dispensed, five major institutional elements of government differentiate them from the National Government. These are: local autonomy; public service; transparency; accountability; and information dissemination. In reality local government autonomy, transparency and accountability constitute a necessary context for the pursuit of public trust, which by nature is imperatively critical for effective governance. An LGU is much more than a dispenser of local services and a window for collecting taxes. Whatever the style of governance is applied, adherence to the above elements is crucial.

For LGUs, governance is the dynamics produced by the web of relationships that exist between public officials and the governed. At best, government is generally accepted by all citizens as a given reality. To most rural poor, however, government is a daily hope for survival. As LGUs try to cope with the demands of modernization and increase in population, the importance of governance has come to fore.

G.5.1 Major Events that Influenced the Need for Good Governance of LBES Projects:

The following developments in the past decades have brought about the importance of governance in LGUs to the point that it becomes a crucial factor for their credibility and survival as an institution for public service and as implementors and beneficiaries of rural infrastructures:
[1] The signing of Executive Order no. 336 (1988), establishing Labor-Based Units (LBU) in the infrastructure agencies of the government including the DILG thru the LGUs;

[2] The enactment of the Local Government Code in 1991 providing for the devolution of governance to LGUs, including basic infrastructure facilities which LGUs are responsible for constructing and maintaining;

[3] The signing of Executive order No. 94, series of 1999, establishing the policy direction and institutional framework to implement LBES Infrastructure program, where the LGUs are major players.

The LBES programs envisioned to be designed under the proposed technical assistant project will introduce better governance at the Upstream and Downstream level which would result in reforms needed in the construction procurement processes by giving more opportunities for LBES contracts vis-a-vis EB method of implementation.

G.6 Responsibility for Rural Infrastructure Development:

Responsibilities for rural infrastructure development in the Philippines primarily rest with the municipal governments, which are sometimes supported by national line agencies and special national programs. DILG being a member of the LBES InfraCom, will be receiving support under the AusAID Philippines-Australia Governance Facility (PAGF) to promote LBES technology at the LGU level as an alternative technology in infrastructure development. ILO will further support this program using regional resources (ASIST AP). This latter project is referred to as the DOWNSTREAM project. The link between the two projects is apparent. The UPSTREAM project will assist the InfraCom in promoting LBES technology, develop sectoral programs and training materials, guidelines and manuals and monitor the effectiveness of the project. While the DOWNSTREAM project help train trainers and the private sector in undertaking the construction and maintenance of infrastructure projects using LBES methods.

G.7 Mainstreaming of the LBES Program:

The main thrust of the present Philippine program is the mainstreaming of LBES technology in regular construction and maintenance works in both locally-funded and foreign-assisted projects. Although the bulk of the projects will come from the Department of Public Works and Highways (DPWH) being the engineering and construction arm of the Government, the Department of Interior and Local Government (DILG) will also play a major role in infrastructure development as most of the local facilities that were formerly handled by DPWH are now devolved to the LGUs since 1991.

These programs will be the main focus of technical support and training so that those responsible for these programs in both the private and public sectors are better equipped to be able to design, manage and maintain works using either LBES or equipment-based methods as is appropriate in a given situation. Data gathered using the IRAP procedure will be tapped for this purpose.
Due to the significant scope of both regular and special bank programs in the infrastructure programs the project would aim to give particular attention to demonstration sites or demonstration programs where the application of LBES methods can be refined and improved and where on-job training can be incorporated.

It is most important also to make the distinction here between Public Works programs of a national or regional character (where the ownership of the created assets is national) and Community Works where the ownership of the assets created and maintained is local.

The LBES-Infracom, created under Executive Order 94 and tasked to shape, implement and monitor the country’s LBES program, has already prepared an initial schedule of projects and employment targets for consideration in the overall program covered by the Directive. These include the DPWH component of roads and bridges, flood control and seawall works, water supply, school buildings and other structures; the NIA component of community irrigation projects; the school building projects under the Department of Education, Culture and Sports (DECS) program; the roads, flood control and water supply projects of the Department of Agrarian Reform (DAR) and THE watershed protection works of the Department of Environment and Natural Resources (DENR) as well as the comprehensive local government works of the Department of interior and Local Government (DILG).

Finally, in all these efforts, the ILO-IRAP local-level planning tool will play a substantial roll in the success of the LBES program in the Philippines.
Labour-Based Methods: A Tacit Knowledge Perspective
The Case of Egypt

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1. Introduction

It has been well proven over the past decades that employment is an essential ingredient in any poverty-focused development strategy. Whether we are dealing with unemployment or underemployment, both conditions pose serious social and economic burdens on society. With Egypt facing the unemployment problem, it is of great urgency that immediate and effective strategies are designed and implemented to abate poverty and unemployment.

In response to these challenges, labour-intensive methods based on tacit knowledge traits have been emphasized as an approach to improve the overall welfare of Egyptian rural societies. Labour-based projects envisage the economically efficient employment of as much labour as is technically feasible to produce the quality of product demanded by the specification and allowed by the funding available (1). Labour-based methods make maximum use of labour and minimum use of capital equipment and are ideal for low wage countries with abundant labour, as is the case in Egypt. Labour-based methods have also proven to be fully competitive with, and a cost-effective alternative to equipment-based methods, as long as workers are provided with adequate tools and good incentives.

Another key factor that enhances the use of labour-based methods is tacit knowledge. Tacit knowledge was apparently first identified by the physicist and chemist, Michael Polanyi (2). He defined tacit knowledge as the genetic, bodily, intuitive, mythical, archetypical and experiential knowledge the human beings have, even though it cannot be easily expressed by means of verbal concepts. Although Polanyi introduced his concept in the 1950’s, it has been regretfully neglected in studies of information and society until recently.

Before continuing, it is important that we clarify the difference between tacit knowledge and ordinary knowledge. Tacit knowledge can be viewed as the know-how or embodied knowledge existent within a person, while ordinary knowledge is seen as the know-what of theoretical knowledge. Lately, tacit knowledge has been proven an essential element in the knowledge base and central learning of structured groups.

Whilst reading this paper, it is important to bear in mind that these rationales are not simply hypotheses, but actual facts. We shall introduce two communities displaying deeply rooted tacit knowledge. These communities specialize in specific labour-based activities and have proven beyond a doubt to be quite successful.

When portraying the broad perspectives of labour-based methods and tacit knowledge, it is important to view their origins and analyze the reasons for success within the context of the overall social system of any country. Since labour-based methods are predominantly human-related interactions, this calls for the explanation of certain factors that pertain to its nature and characteristics, foremost, social capital.

Social capital may be defined as an informal, definite pattern that promotes the interaction and collaboration between two or more individuals (3). These criteria for mutual exchange in human relationships must not only exist, but be actualized in dealings with acquaintances, and must lead to cooperation in groups and teamwork. As a result, conventional traits such as trust, honesty, reliability in duties and responsibility must all arise. These criteria are portrayed in the case studies...
of two villages: El Rahawy and El Kobaysaut. These villages, which are the core of our subject matter, shall be discussed further on in the paper.

Once social capital has been established, this leads us to a further concept embodied in labour-based activities, known as the radius of trust. All groups that have acquired social capital, no doubt have a circle of people amongst whom cooperative norms are effective. This circle is their radius of trust. As more groups are formed, and more social capital is produced in society, their radii of trust correspondingly grow. The radius of trust can be thought of as a type of positive externality because it provides a continuous benefit to the group, irrespective of the joint actions that the group is initially trying to achieve.

A specific feature that has been identified in the cases of the two villages was that certain groups, particularly large ones, are characterized by internal hierarchies, a division of labour, status and functional distinctions. While the group may be united around some common interest, the degree to which individual members are capable of collective action on the basis of mutual trust depends on their relative position within the group.

As these selected villages underwent in-depth research, it was interesting to note that the groups were found to contain all the characteristics of tacit knowledge, social capital, radii of trust, internal hierarchy and, a form of small scale entrepreneurship. The entrepreneur plays a major role in the formation process of the activity at hand, as well as maintaining group stability. He/she is the individual who contemplates opportunities and risks, develops ideas, decides on the type of activity and the location, searches for means of implementation both technical and financial, then finally implements, operates and progresses. The inhabitants of the two villages surprisingly illustrated entrepreneurial qualities very similar to those found in individuals of urban societies. This brings us to another characteristic of tacit knowledge, being that this know-how or embodied knowledge is characteristic of the expert entrepreneur who acts, makes judgments and so forth without explicitly reflecting on the principles or rules involved.

This emphasizes the importance of encouraging and supporting these specialized villages as a means for the development of society and as a tool for reducing unemployment and poverty.

The purpose of this paper is to depict the essence of tacit knowledge, especially in the context of labour-based methods. Sections three and four present the reports completed on the case studies of two rural villages displaying tacit knowledge traits, followed by our conclusions and recommendations in section five.

2. Methodology

Within any given community, there exists a range of activities and services provided by and for the members of the society. These activities and services depend on various geographic, social, economic and cultural factors.

In Egypt, although the terrain is 96.5% desert, agrarian activities dominate the labour workforce of most villages surrounding the capital, Cairo. For the vast number of families, whose members constitute the main agricultural work force, agriculture is not merely an occupation or a source of income, but a way of life. This is particularly evident in traditional societies where farmers are closely attached to their land and its cultivation.
However, through our research, we have identified two communities that specialize in specific labour-based activities other than the traditional agricultural sector. The communities display high degrees of tacit knowledge within their societal structures. This study focuses on these communities and their development to serve as a basis for analysis. In order to fully understand the nature of labour-based techniques to our society, the core aspects of the study are viewed from the point of view of the entire country.

Figure (1) Profile of Labour Based Involvement in Major Economic Activities in Egyptian Villages
The complete structure of the Egyptian rural economy can be analyzed through its four main activities. As in Figure 1 (a) illustrates, most labour-based trends incline towards the agricultural sector of the economy. Apparently, this has been characteristic of most villages over the past years. However, through our research, we have discovered the occurrence of several villages, two of which we will discuss in depth later, that have literally transformed their activities from traditional agriculture to uniquely new fields of craftsmanship. This ninety-degree rotation is illustrated in Figure 1 (b). This transition has led us to ponder the reasons and intentions behind their movement, who were the entrepreneurs initiating this progression, how was social capital produced, was the radii of trust the cause or effect of the transformation, and what was the overall social, financial, and economic impact on the rest of the community, as well as surrounding villages. Other questions arose such as where did these villagers attain the tacit knowledge for their activities, on what basis did they choose the particular profession at hand, and did they receive any external aid?

In order for us to obtain clearer answers and understand the full picture, the two villages mentioned earlier; El Rahawy and El Kobaysaut, were visited and studied in great depth by two researchers. The researchers prepared an extensive data collection protocol for the inhabitants of the villages covering all historical, traditional, and economic aspects of the communities. With this knowledge, we present our observations with the objective of developing a better understanding of the essence of labour-based methods from a tacit knowledge perspective.

3. El Rahawy Village Case Study

El Rahawy village is located on the north outskirts of the suburb Giza, approximately 35km from Cairo. Neighboring villages include Kafr Higazy, Gizaya Bahary and Ezbat el Kashlana. The population of El Rahawy (as of 1996) was close to 12,000.

This humble village consists of one bank, known as Bank El Kariyah, the Rahawy post office, a youth club, a health institute, a school from the primary to elementary level, as well as an institute of religion also up to the elementary level, a telephone exchange facility, potable water sources, and a small village market.

El Rahawy village has distinguished itself amongst other villages by diversifying a portion of its activities from agriculture to manual well digging. Presently, well digging constitutes 40% of the village’s labour-based activities, followed by an equivalent 40% in agriculture, 15% in other activities such as brick manufacturing, and finally the remaining 5% unemployed.

El Rahawy commenced its well digging profession in 1925, when village workers were recruited to work as a part of well digging teams for their own community. Over the years, as their tacit knowledge and skills in well digging grew significantly, so did their labour work force. This is an impeccable example of the theory of the development of social capital. We may assume that as more groups and teams were formed, more social capital was produced within the society, and thus the radii of trust grew correspondingly. In 1964, a few workers in the village had improved their experience and acquired sufficient funding to present themselves as contractors for manual well digging, and so it has been up until the present day. The well-digging contractors represent a form of effective entrepreneurship established within the community. As expressed in the philosophy of tacit knowledge, the expert works without having a theory of his work; he simply performs skillfully without deliberation or focused attention. These experts or entrepreneurs were attracted
by a catalyst factor i.e., they already had the knowledge. Thus they developed their ideas, decided on the type of activity and location, established the financial and technical means for implementation, and finally they implemented. Although the contractors depend 50% on their own independent funding, El Rahawy has of one non-governmental organization, which provides investment and funding, along with some assistance from the Social Fund for Development.

The effect of culture and tradition within a community on the employment of its labour is clearly portrayed in the Rahawy case. It has been observed that over the past decades the knowledge, skills and experience required for successful well digging has been passed on through the traditional father to son heritage manner, along with learning by doing. Tacit knowledge can be acquired and transferred on a variety of levels: individual, group and inter-group basis (4).

The procedures for implementing the well digging projects follow a distinct routine. Firstly, in the event of a demand for a well, the contractors demand a down payment before the actual work begins. Once the terms for settlement have been agreed upon, the contractor selects available members of the community for his team (see annex 1, picture 2). This procedure reflects the strength and importance of the radii of trust that exists between the contractors and the workers. These teams usually consist of no more than 10 workers, with ages varying from 18 to 40 years. Some contractors do not own their own equipment, and thus must rent. The total cost of the equipment ranges from 20,000 to 30,000 L.E.

There are three inhabitants in the village who are liable for the leasing of the digging equipment (refer to annex 1, picture 1). Once the equipment has been acquired (in cases of non-ownership) and prepared, the contractor, along with his team travel to the site. Trucks are rented in cases when the location is far away. Following the completion of the well, the contractor returns with his team to collect the remaining payments. The cost to the contractor for digging an entire well depends on its size, width and location. However, most contractors charge on average 50 L.E / m. Labour wages range from 15 L.E to 20 L.E / day. Workers usually collect their pay on a weekly basis.

An interesting occurrence that was noticed was that approximately 5 years ago, the activities of well digging began to spread to surrounding villages, such as Kafr Higazy, Om Dinar and Oseem. Although these villages are not as skillful and proficient as El Rahawy, they are developing their skills to better themselves and broaden their work opportunities. Currently, Kafr Higazy and Om Dinar have 5 teams, and Oseem has 20. This perception, along with previously discussed observations indicates how tacit knowledge-based activities significantly enhance social capital, and how the existence of tacit knowledge within a community promotes the growth of the radii of trust. As indicated above, surrounding villages began acquiring the know-how entrusted it with others through the work, and so forth. It is quite important to note that although prosperous, not all workers are satisfied with the tasks of well-digging. This is for several reasons. Primarily, these workers work long arduous hours, under extreme weather conditions. All of their work is done with absolutely no protective coverings, and the equipment is used with their bare hands. Therefore, besides the fact the work is physically exhausting, these workers are constantly subject to injuries, which can be fatal. In the event of injury, the contractors have formed an informal, voluntary, joint mutual fund between themselves. The fund provides compensation to the wounded individual and his family until his recovery. In cases of injury to a worker, the team contractor is responsible for the worker’s financial welfare and the welfare of his family, until his recovery. These acts of responsibility represent again the degree of social capital and radii of trust that has developed in these rural villages.
4. El Kobaysaut Village Case Study

El Kobaysaut village is a small, meek village located at approximately 410km south of Cairo, and 40km north of the Sohag Governorate. Its population is approximately 10,000, with surrounding villages Kom El Asfar, El Dobayraut, El Tolayhhaout, and El Tahhta.

El Kobaysaut village was favored amidst other communities, as was El Rahawy, by extending their traditional agricultural activities to the completely new art of installing underground, potable water-pipe networks, sewerage systems as well as the infrastructure for telephone and electricity networks, again through labour-based techniques and using their own tacit knowledge. Please refer to annex 2. These activities involve 30% of the population, while 35% work in agricultural and the remaining 35% in other fields of employment.

The village launched its profession about 50 years ago, and since then, they have been looked upon as experts in their field. Contractors from cities afar prefer to send for them to do the work rather than recruit workers nearby. This accomplishment cannot go unnoticed. The knowledge, skill and experience required to maintain their position as the best emphasizes their success in the transfer of knowledge through inheritance as well as extensive training. It was discovered that those villagers that went to school would regularly dedicate their summer vacations to work with their family and fellow villagers to develop their competence. Most villagers continue to work in this profession, even after completing their graduate studies. This results in a remarkable trend where 35% of the village population is not only educated, but also active in this profession. All this again emphasizes the extent of tacit knowledge present within these villagers. As was presented in the Rahawy case, the villagers here gained their experience and skill from the traditional father to son manner. Although inhabitants of El Kobaysaut remain the pioneers of their profession, 10 to 15 years ago, neighboring villages had gradually begun to offer the same tasks as well. This expansion portrays the growth of the radii of trust within primarily the village of El Kobaysaut, and then expanding to Kom El Asfar, El Dobayraut, El Tolayhhaout, and El Tahhta.

An interesting factor that developed was the extensive degree of division of labour and status amongst the team members. In contrast to the case of El Rahawy, contractors do not play an active role in the actual hard labour of the work. In El Kobaysaut, they simply set the terms of agreement with the individuals in demand of potable water or sewerage networks, secure the down payment, and then begin paying daily installments to a sub-contractor and his team. Although team sizes vary from project to project, all teams must consist of a sub-contractor, technician, and several workers, with their ages varying from 18-50 years (see annex 2). The sub-contractor’s position is vitally critical as he is responsible for gathering team members, dividing the tasks among them, supervising their activities until the task at hand has been accomplished, and then finally compensating them with their wages. In brief, the characteristics and authority of a sub-contractor distinctly resemble those of an entrepreneur. Once the work has been successfully completed the contractor returns to collect the remaining payments due.

The average wage of the sub-contractor varies within the range of $60L.E$ to $80L.E$ per day, pending on the size of the project. Usually, the larger the project, the greater the compensation. Technicians receive an average of $25L.E$ per day, while workers take in roughly $15L.E$ per day. An interesting note that should be mentioned is that El Kobaysaut village differs from El Rahawy in the sense that here, villagers have a chance to promote their positions from a worker to a technician to a sub-contractor and so forth, while in El Rahawy, the workers remain workers and contractors for life.
All technicalities put aside, one specific observation that particularly impressed our research team while visiting the village site were the personal traits rooted in the villagers that were expressed through virtues such as patience, dedication, determination, willingness and sacrifices for their work. These characteristics again emphasize our theory of social capital and radii of trust that have developed in these societies and reflected through their inhabitants. Occasionally, workers may be required to spend anywhere from 2 weeks to 3 years or more away from home depending on the size of the projects at hand. While away from home the only accommodations they acquire may range from simple tents to pitiful apartments, where they may sleep 10 workers in one room, with no beds, sheets, or other comfort.

Another disheartening consideration is the safety factor. As was the case in El Rahawy, absolutely no safety precautions are taken by these workers (refer to annex 1, picture 3). All hard labour is done with their bare hands, with no protective gear over their bodies, no safety glasses, and no medical aid kits in cases of injury. Contrary to the situation in El Rahawy, El Kobaysaut villagers have no sources of informal personal insurance, nor do contractors provide financial aid to the wounded or his family. However, despite these terrible disadvantages, 90% of the workers in El Kobaysaut do not wish to change their profession, as opposed to some Rahawy villagers who claimed that they would.

Although the success of labour-based methods produced remarkable results in expanding the essence of radii of trust between the inhabitants of the village and their neighbours, the production of social capital within the community, and the extraordinary, independent acquirement of the extensive tacit knowledge required for the profession, it should be stated that it is our responsibility to further guide and assist these villages to attain higher achievements and spread their expertise, in order to support local development throughout rural Egypt.

5. Conclusion

To summarize our findings through the in-depth studies of the two selected villages, we believe their outstanding progress provides visual, concrete evidence as to the inevitable success resulting from the presence of tacit knowledge in labour based methods.

We had previously defined labour-based methods as the economically efficient employment of as much labour as possible to produce a high quality product at a reasonable cost. Tacit knowledge involves knowing how to obtain desired results, knowing what to do in order to obtain the results, and knowing when to do it. These two interdependent components when combined together have proven to be equally indispensable to the realization of development goals and improving rural societies. We strongly believe that tacit knowledge has been the main factor behind the success of these villages. It has been demonstrated that this form of knowledge is strongly implanted in the culture of the communities. Societal groups are important factors shaping the processes within which tacit knowledge is embedded (5).

Now, through our research, labour-based skills have been found to include continuous, cumulative and collective characteristics. These skills, being tacit, once acquired are routinely in use for life and serve the backbone of income-support therefore reducing the risk of skill deterioration due to lack of utilization. This characteristic thus defines “continuous”. The skills are perceived as “cumulative” because they serve as a base on which new skills may be built upon, and enhanced.
This leaves us with room for improvement to better develop these villages. Finally, through the effects of social capital production, and the growth of the radii of trust, the tasks completed are accomplished and transferred through a community organization, thus being “collective”.

Our recommendations as to the proper actions that should take place in order to ensure the widespread development of rural villages can be summarized in five basic steps.

(i) Firstly, to identify the villages with unique activities and study their social, historical, cultural and economic backgrounds in detail, as we had done with El Rahawy and El Kobaysaut. Identifying these rural villages and setting them as an ideal example will encourage other communities to follow the same paths.

(ii) Secondly, to recognize their achievements and promote their tacit knowledge tactics, labour-based methods, social capital and radii of trust, as well as their entrepreneurial concepts. Although these issues have been proven to already exist in the villages, there undoubtedly still exists opportunities for enhancement.

(iii) The third step would be to further develop their skills. This could be done, for example, by improving their production methods and techniques, thus augmenting their efficiency and quality. Another improvement could be the ever so important safety factor. As has been clearly observed in both El Rahawy and El Kobaysaut, the villages lack all necessary safety precautions. This is clearly illustrated in the annex 1, picture (3). Here, our role would be to provide them with the knowledge, as well as supply the tangible requirements to ensure a safer work environment and reduce the risks of death and injury on the job.

Both steps two and three, if implemented correctly should result in positive feedback, because they would provide motivation and incentives for the workers to learn more and work harder. Their spirits would be lightened and with safety assured, widespread involvement of other villagers should correspondingly increase.

(iv) This leads us to the fourth step of helping the transfer of tacit knowledge present in one village to other rural villages in need of development activities. This chain of action, once begun, should initiate a burst of activities thus stimulating stagnant villages making them active as well as prosperous.

(v) Last but not least, the final step on our part should be to continuously follow-up on these villages in order to remain up to date with new developments, problems or changes. Hence, providing the necessary support to ensure the continuous development of rural communities.
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DEVELOPMENT AND IMPLEMENTATION OF A
NATIONAL LABOUR BASED WORKS POLICY

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1. Background

Soon after independence (1990), the Government of the Republic of Namibia identified unemployment as one of the four key development challenges to the young economy. The Interim Development Plan and later the First National Development Plan, clearly spelt out strategies and goals to be pursued by Government in this regard. With the objective of meeting this need, the Ministry of Works, Transport and Communication started a pilot project to investigate the socio-economic and technical viability of labour-based road construction as a means of employment creation. Technical and financial support from the ILO and Sida was focused on development and improvement of standards, managerial processes and work methods, together with contracting capacity development for implementation of an acceptable labour-based road construction and maintenance programme. Encouraging results were achieved through the pilot project, which was completed in 1994.

Following the realization that there existed employment potential in a well-structured labour-based works programme, the Ministry commenced the implementation of an expanded labour-based road construction project in 1995. A further development was the Government’s interest in having the experience gained in labour-based road construction duplicated in as many sectors of the economy as possible. This led to the preparation of a draft policy on labour based works (lbw). The objective of the policy was two-fold. Firstly, it would form a basis for awareness creation within other sectors (both public and private) and demand that these sectors review their operations with a view to rendering them more employment-creation oriented. Secondly, the policy would ensure the creation of an environment that could promote development of well structured, widely accepted and applied, and correctly implemented employment creation programmes.

The Government therefore commissioned the Ministry of Works, Transport and Communication to proceed with the preparation of the policy on lbw. The policy document (The White Paper on Labour Based Works) was completed in 1998 after an extensive consultative process.

This paper discusses the policy development process and highlights the current position with regard to its implementation. It also makes certain proposals in general regarding the way forward in any attempt to expand lbw beyond the roads sub-sector.
2. Policy Development Process

Employment creation has been clearly identified in most developing countries as an important strategy for implementation as governments seek to fight poverty. Many initiatives stemming from this strategy have been tried and some have failed to have real impact due to lack of commitment, acceptance, understanding among stakeholders and due to disjointed approaches being employed. In particular, labour-based initiatives as a means of employment creation have been implemented in many developing countries. The success of many such programmes has been reported, but in almost all cases, these have been restricted primarily within the roads sub-sector. If the level of employment creation achieved and the magnitude of work done is a measure of success, then many countries can boast of having successfully implemented lbw. One must however assess the level of acceptance and ownership that has accompanied such programmes. In many instances, the central governments’ commitment is limited and implementation is subject to availability of donor support. There are two inherently weak institutional linkages that must be reinforced; acceptance and commitment.

It was with the above background in mind that the Department of Transport, in Ministry of Works, Transport and Communication in Namibia decided to spear-head a process aimed at addressing these two real and primary shortcomings. The implementation of labour-based road construction had successfully been investigated and expansion of the project was underway. In order to ensure maximum realization of the potential benefits of a wide application of the principles of lbw across as many sectors as possible, it was necessary to formulate an acceptable policy. A Cabinet memorandum was therefore prepared in September 1995 informing government of the progress made in the formal road related lbw programme and seeking a mandate to prepare a national policy. The Cabinet memorandum was presented by the Ministry with a clear statement that all that the Ministry was doing was to initiate what was in fact a national effort and that the results would finally have to be seen as having a national dimension.

Cabinet acceded to the preparation of a White Paper on lbw in November 1995, on condition that a comprehensive consultative process was carried out with all stakeholders. In addition, the following principles had to be upheld in the preparation of the policy:

a) Construction projects or manufacturing processes incorporating lbw should be technically and economically viable i.e. be of comparable quality and cost to more capital intensive projects or manufacturing processes.

b) In the benefit/cost evaluation of projects, allowances should be made for external or social benefits and price distortions not normally taken into account under a strictly business approach.

c) Labour Based Works should be introduced as far as possible, with a view to the creation of permanent jobs, although temporary job creation methods were not to be ruled out.
d) Labour Based Works should operate within the prevailing legislation and labour standards but may require the acceptance of special provisions with a view to making it a more attractive option.

Following this important decision, the Ministry of Works, Transport and Communication, nominated twenty-two members of what was referred to as the Draft White Paper Committee (DWPC). The committee comprised of Government bodies, organized labour, private sector and NGO’s. In order to assist the DWPC, the Department of Transport appointed a technical subcommittee of experts comprising diverse professionals including engineers, economists, a labour consultant and a policy analyst to drive the process. The role of the technical subcommittee was primarily to carry out the necessary study and to prepare the various working documents and material for discussions in workshops with the DWPC.

3. The Consultative Process

In accordance with the prescribed process by government, the Department of Transport embarked on comprehensive consultations involving all the perceived stakeholders. It was agreed that the best way to proceed with a nationwide consultation process was to produce a discussion document: the Green Paper on Labour Based Works. The document was drafted by the technical sub-committee and through workshops adopted by the DWP committee. The contents of the Green Paper were basically issues that required input by the stakeholders. These included inter alia the labour environment within which LBW could be implemented. The Green Paper reviewed the existing labour legislation and analysed its impact on the envisaged wide application of LBW. The other consideration was the issue of technology required to ensure acceptability of lbw. Training and source of funding were the other aspects considered in the discussion document. The DWPC identified the possible course of action in these respects, leaving adequate room for discussion with and proposals from stakeholders.

Upon the publication of the Green Paper, copies were disseminated to all the Regions in the country, to Government Ministries and Departments, to NGO’s to organized labour and to donor agencies.

Stakeholders were requested to forward their views after studying the Green Paper or to make contributions in workshops. Regional workshops were organized and participants invited from a wide spectrum of stakeholders. The workshops were conducted by the DWP technical subcommittee. Open and frank discussions were held, with the participants being given opportunity to state their concern and what they perceived as the weakness in the envisaged broad application of lbw. The outcome of these discussions were recorded verbatim and later collated to establish the salient issues.
On completion of the Regional workshops, a final workshop was held in Windhoek in which both the public and the DWP Committee discussed the concerns raised in the regions. The outcome of this workshop was incorporated in the Draft White Paper.

4. **The Green Paper On Labour Based Works**

The Green Paper on lbw was essentially a discussion document. It was intended to encourage all those with an interest in job creation to participate in preparing a national policy on lbw. The paper called on community leaders, trade unionists, business persons and Government officials at both central and local levels to be part of the subsequent consultations and discussions. The paper was in fact a condensed version of several working technical papers on the economy in general, the labour environment, the employment statistics and experiences gained in other countries. It provided the background to the Namibian economy, the Government budget and features of the labour market, which indicated the scale and form of economic challenges facing Namibia. A review of the potential role of lbw in addressing these economic challenges was given, noting that lbw in itself was not a universal remedy to unemployment. The statement was made however that, lbw could definitely make a significant contribution if properly applied.

The Green Paper introduced a range of possible strategies or interventions, each of which could have a part to play, both in the short and medium terms. The potential impact of the various strategies were reviewed, together with their possible role in supporting economic policy. This was to allow the possibility of prioritising and phasing such interventions. One important conclusion was that it would require a radical and sustained change in public and the private sector investment priorities and approaches in order to make a substantial impact on unemployment and poverty. The Green Paper also provided a set of guiding principles for the White Paper on Labour Based Works and drew the attention to some of the key issues which clearly demanded widespread public debate.

The guiding principles highlighted in the Green Paper were that:

(i) Lbw should be co-ordinated with national economic policies and vice versa. The lbw policy would be largely targeted at the unskilled, unemployed poor with a view to providing them with employment and income as well as empowering them through skills development.

(ii) Lbw programmes would be promoted in all sectors of the economy, involving both the private and the public sectors but with infrastructure creation in under-developed rural areas enjoying special priority.

(iii) Lbw projects would be designed as viable, sustainable economic projects, taking into account the external benefits which may, if necessary, be discounted by suitable incentives, subsidies, etc. as appropriate.
The conclusions drawn in the paper were inter alia that, the unemployment problem, which was in reality a poverty problem, was massive and pervasive, estimated at about 28% of the economically active part of the population. In the short run, even large scale reallocation of government spending was not likely to have a major impact on existing unemployment but could arrest its growth. The participation of all players in the economy was essential for success. The issues requiring debate included; whether to attend to unemployment backlog or merely aim to stop its growth; what mix of strategies to adopt; conditions of employment of labour; employment potential in the various sectors; the funding strategy; relevance for education and training; and the role of the communities in the implementation of the policy.

5. **The Draft White Paper On Labour Based Works**

The Draft White Paper was basically divided into three main parts. The first part formed the introduction and the environment in which the Policy was expected to operate. It reviewed the Namibian economy, the level of unemployment and the potential that lbw could have if widely adopted.

The second part of the draft policy dealt with the enabling environment necessary for successful implementation of lbw. The four important elements that the policy identified under this part were the necessary institutional support, training and skills development, utilisation of labour, the appropriateness of technology and the funding arrangements. The third and final part of the policy dealt with the delivery mechanisms through which lbw could be made to thrive in the Namibian economy. These include the force account operations, public sector procurement, private sector initiatives and community based initiatives. Policy statements were made on Government’s position on each of these elements.

The Draft White Paper was discussed at various stages in workshops before finally being adopted by the DWPC. The Draft was then submitted to Cabinet in September 1998 where it was approved. It was later tabled in parliament where it received overwhelming support. The main concern was whether in fact such a policy would be implemented soon and efficiently enough so that the latent benefits could be realized.

The Paper was finally launched publicly by the Minister of Works, Transport and Communication in December 1999. The White Paper on Labour Based Works now is a Government Policy which various institutions are in the process of either implementing or studying with a view to incorporating its recommendations as part of their operations. Interesting developments in the Ministry of Works, Transport and Communication include bitumenised labour-based road construction and labour based railway line construction in addition to the normal road works. Other agencies such as Telecom, Nampower, the Ministry of Regional and Local Government and Housing and the Ministry of Agriculture, Water and Rural Development, have also recently began to employ lbw methods in executing infrastructural projects such as trenching for water and sewer pipes, and bush
clearing. Some urban authorities have also diversified their operations to include manual street cleaning and street marking, work which was normally reserved for machine-based operations.

The obvious missing link however is the support mechanism to ensure coordination, monitoring and wider dissemination and awareness creation.

6. **Labour Based Works Forum**

A policy is as good as the results of its application. This was realized at the time of drafting the White Paper on Labour Based Works. In order to give the policy self dynamism, the first and foremost policy recommendation was the creation of an institutional support mechanism. This was to be realized through a National Labour Based Works Forum. The Labour Based Works Forum was to be formed out of the stakeholders as a body that would be the hub of all lbw activities without removing operational responsibility from the various implementation agencies.

In order for the Forum to have the necessary mandate to carry out its functions, it was deemed necessary to introduce an enabling legislation. A draft Bill on Labour Based Works was therefore prepared. The draft Bill essentially advocates the creation of small but potent Government parastatal that would promote and coordinate all lbw activities in the country. The draft Bill on Labour Based Works is currently under scrutiny by an inter-ministerial committee comprising of the Ministries responsible for Labour, Employment Creation and Transport together with representation from the National Planning Commission.

It is proposed that the Forum should have its executive functions performed by a small board of directors, consisting of competent persons with relevant expertise. The Board would be supported by a small secretariat. In addition to the Board and the Secretariat, a Labour Based Works Advisory Council is proposed. The Council should ideally be tripartite, comprising representatives from Government institutions, the private sector, non-governmental organisations, training institutions, local communities, organised labour and employers organisations. The purpose of the council will be to facilitate the deliberations on general issues pertaining to lbw technology, where the views of the interested parties may be heard. In addition, the council will provide an effective channel of communication for the dissemination of information about lbw policies.

The success of the Labour Based Works Policy will to a very large extent depend on the effectiveness of the Forum. The Forum’s core functions will relate to promotion of lbw technology, providing advice, facilitating training programmes and guidance in respect of its application, assessment of the potential for applying lbw technologies in any particular project, the undertaking of research in labour based technologies, the devising of incentives to enhance the application of such technologies in the private sector and the formulation of
measures to be applied in the public sector. Such an institution is bound to deal with special challenges and must therefore be manned by competent and well motivated individuals.

7. Challenges And Potentials

Labour Based Works as a means of alleviating unemployment has been practiced in many developing countries in the last three decades. The obvious benefits accruing to economies adopting the technology have been creation of infrastructure and provision of employment opportunities. The other indirect gains have included transfer of technology, retention of capital and boost to local economic activities.

The practice in most of these countries however has been to limit real labour-based initiatives to the roads sub-sector development while other sectors, at best, only implemented ad-hoc labour based initiatives. This has tended to ignore the fact that the principle of substitution of labour for capital without compromising economic efficiency and quality can in fact be applied in a rational manner to other activities as well. It is true that provision of infrastructure by its very nature, (being typically capital intensive) lends itself a good candidate in the advocated diversification. Besides roads provisioning therefore, canals and dams, trenching for piping and cables, landscaping, and rural community sanitation are good examples for consideration.

In addition to the provision of infrastructure, crop husbandry, production of construction materials, small scale mining, afforestation, nature conservation and light manufacturing should be considered. It is important to note however, that even within the roads sub-sector, the full potential of lbw has not necessarily been realized. There are instances where the lbw projects have been driven with external support and local commitment seem to have been linked to existence of such support. The absence of adequate resources including relevantly trained and experienced manpower seem to affect the programmes and projects.

Political support although generally provided, seem to be driven by a single sided view of the benefits; provision of employment to constitutes. The degree of “ownership” of the programmes and projects appear to reside only within the implementing agencies and only partially within the recipient communities. Acceptance of the technology seem also to be restricted to professionals trained in or associated with the implementation of the programmes and projects. Some technocrats are sceptical about standards and unit costs achievable through lbw. The private sector does not normally consider itself as a key player in promotion of initiatives such as lbw and have in many instances ignored the possible financial advantages that could be associated with such consideration. Except of course in the roads sub-sector, governments have rarely considered facilitating the private sector to become role players in employment creation through lbw.

Unemployment is a real challenge in developing countries and it continues to grow. For this reason, it must be understood and attended to like many similar known challenges including
health, education and human rights. In fact it could be argued that since poverty is a manifestation of the combined result of some or all of these challenges, each of the challenges must be accorded equal effort, publicity, resources and political attention. The rather ad-hoc approach to resolving unemployment in general needs to be thoroughly reviewed. Co-ordinated efforts and ownership of employment creation initiatives like lbw need to receive wider acceptance, get more entrenched into national programmes and should have as much and committed ownership as other development challenges. There is a need for national policy, coupled with a dedicated well mandated, multi-sectoral-based driving institution.

Although the Namibian efforts with regard to full implementation of a national labour based works policy are still to yield results, it is our conviction that the progress made to date is in the right direction and that the expected wide application of lbw, together with a mechanism to champion the process will manifest itself in real impact in the unemployment scene.

Countries grappling with the unemployment problem and wishing to adopt lbw initiatives are therefore encouraged to consider (i) wider application of lbw beyond the roads sub-sector (ii) entrenchment of the approach through a national policy, and (ii) creation of a well mandated, preferably statutory, national institution to provide the necessary support required for its success.
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Employment-Intensive Investment and Urban Poverty

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I. Urban unemployment and poverty

There are 1.2 billion people (one fifth of the world population) living on less than $1 a day (World Development Report 2000/2001). In Sub-Saharan Africa the proportion of the population living on less than $1 a day increased from 18.4 per cent in 1987 to 24.3 per cent in 1998, and the number of the poor people is still rising. Additionally, some 80 per cent of Low Human Development Countries - countries with high population growth rates, low income, low literacy and low life expectancy - are in Africa. Four of every 10 Africans live in conditions of absolute poverty, and the recent evidence suggests that the incidence of poverty on the continent is increasing.

The world is rapidly urbanizing. By 2015, the world will witness, for the first time in history, that more people in developing countries live in urban than in rural areas. Urban population growth in Africa is the fastest in the developing world. The annual growth rate of urban population increased from 4.6 per cent between 1950 and 1955 to 4.9 per cent between 1960 and 1965. It was estimated at 4.4 per cent during the period 1990 to 1995. Projections show that the growth rate will stay at level at between 3 and 4 per cent between now and 2025.

According to UNDP, (Human Development Report 1999), human poverty is also grim in many developing countries. In Africa over 60 million poor people have little choice but to live in squalid, unsafe environments where they face social and economic exclusion, with limited access to basic infrastructure and social services.

Globalization of the world economy and the liberalization of international trade are weakening the once predominate power of national governments to create and protect jobs. This has further put cities into difficult positions in certain economic sectors where jobs have been lost in favour of other regions and cities of the world. In many African countries, employment growth has been lower than that of the labour force, resulting in the growth of unemployment. Additionally, the deterioration of labour market conditions, and the limited capacity of the public sector to absorb labour force have pushed an increasing number of job seekers into the urban informal sector, where productivity and working conditions are poor.

The magnitude and rate of urbanization, high urban unemployment and the negative consequences of globalization pose an urban challenge, calling for the provision of adequate jobs, improved access of the poor to infrastructure and basic social services in developing countries. Furthermore, innovative policies and strategies need to be developed in order to meet the goals of social development for all, and to reduce the proportion of people living in extreme poverty by one half by the year 2015. This goal was reaffirmed at the World Summit for Social Development and Beyond held in Geneva in July 2000.

II. Employment-intensive investment policies

One alternative to address urban unemployment and poverty is employment-intensive infrastructure investment policies. These are seen as a powerful engine for both economic development and social progress. Labour-intensive methods are typically appropriate in developing countries, where wage rates are low for unskilled labour.

Many international and national development agencies have created jobs in social services and in the provision of other public infrastructure through labour-intensive technology in recent years. In
developing countries, and those with economics in transition, labour-intensive urban public works programmes, in particular infrastructure investment in access roads, environmental rehabilitation and regeneration schemes, have been proven to be effective in promoting employment and stimulating people-centred sustainable development.

Starting from the early 1990s, the ILO transferred its extensive experience in labour-intensive rural works programmes to the urban sector. The urban employment-intensive investment strategy addresses primarily unemployment and poor/little access of the poor to infrastructure and basic social services in urban informal settlements. The ILO experience shows that the upgrading of slums and settlements is always associated with high social and economic benefits.

The evaluation mission of the ILO-supported urban informal settlement upgrading project in Uganda noted that the employment opportunities provided the local poor with a supplementary income. Some of the workers used the capital to start or improve their small and micro-enterprises. Others invested either in education for their children or in housing improvements. This created a multiplier effect.

An ILO study in Tanzania also revealed that the upgraded infrastructure helped improve the working environment and productivity of the informal sector producers. They either used their houses as workplaces, or operated out of the poor unplanned urban settlements. The roads and footpath accessibility, proper drainage and sanitation all made a positive contribution to sustainable employment creation in these settlements.

III. Efforts at city level

There is an increasing trend that investment decisions are being made at local level in the process of decentralization. Therefore, city governments are encouraged to maximize the employment dimension in their public works programmes using the resources under their control.

As a technical input to Habitat II, the ILO adopted the Urban Employment Charter in December 1995 at the Tripartite International Symposium on the Future of Urban Employment. It states that unemployment is the primary cause of the urban poverty reflected in deteriorated living and working conditions, lack of access to basic infrastructure and social services, crime and violence, drug addiction, homelessness, street children, overcrowding, etc. The Charter fully recognizes the role of cities and encourages municipal and local governments to play a major part in social and economic development.

In order to successfully combat urban unemployment and poverty through labour-based infrastructure investment policies, the Charter calls for reforms in the following areas at local level:

1. Policy and regulatory environment

In many developing countries, the policy and regulatory framework is unfavourable to the poor population. It results in the poor, particularly the poor living in urban informal settlements, being marginalised from mainstream social and economic development, such as the benefits of public investment in basic infrastructure and social services.
The policy and regulatory framework should remove obstacles and disincentives to access for the poor. Pro-poor regulations should be reformulated with objectives to: abolish discrimination against labour-based technologies; ensure transparency in tendering and contracting public investments; eliminate inappropriate standards of provision that are not affordable; encourage the entry of new technologies and training; make subsidy policies more effective and better targeted; facilitate active involvement of the private sector; etc.

The policies and regulatory environment should be friendly towards the establishment and involvement of small and medium enterprises/contractors (SMEs), as they are recognized as being the engines of employment creation by use of labour-based technology in delivery of their goods and services. Regulations should ensure removal of the enormous obstacles faced by the SMEs such as restricted access to credit and markets, etc. This would encourage the participation of small and medium sized labour-based contractors in competition for work.

City governments are also able to change the way in which they contract out for labour-based goods and services, in order to maximize the impact of their investment on employment creation. For instance, a contractual system needs to be developed to ensure access of SMEs to large public infrastructure projects, by dividing the work into lots that can be undertaken by SMEs.

2. A city alliance

Building partnerships amongst employer and worker’s organizations, governments at all levels, the private sector, NGOs and community-based organizations (CBOs) is increasingly seen as an innovative and effective way to successfully tackle the growing urban challenges. A city alliance could ensure the avoidance of the risk that the poor may be excluded and marginalised in the development process. The introduction of private initiatives and more competition in the development and operation of urban infrastructure and services will contribute to improvements of efficiency and reliability in meeting the growing demands of the urban poor.

Within the new partnership, the role of government changes from that of an implementer and provider of infrastructure and social services to that of an enabler or a facilitator in combat of urban poverty and unemployment. This change in the role of governments will provide them with “new” responsibilities and actions that benefit poor people, including flexible interventions in land allocation and tenure and housing and financial markets, in addition to reorientation of the allocation of local resources in urban infrastructure investment programmes in informal settlements.

The ILO’s experience in Dar es Salaam demonstrated full participation of the local poor in upgrading their informal neighbourhood. Represented by a Community Development Committee (CDC), they were involved in the identification of their priority needs, planning, design, implementation and maintenance. This democratic mechanism was realized through community contracting arrangements, resulting in the generation of a sense of responsibility and ownership among the poor participants, which was reflected in the enhanced sustainability of the developed assets.

3. Secure land tenure

In addition to the lack of human and financial resources, city authorities and policy-makers in developing countries are reluctant to regularize the informal settlements and provide the required
basic infrastructure and services. They fear transforming what were regarded as temporary settlements into permanent urban communities. However, the overwhelming majority of these informal settlements are proven to be not temporary, but exist and expand in urban areas for decades.

The impacts of the above attitude towards urban informal settlements are grievous. Without secure tenure, poor people living in these settlements are deprived of their right to integrate into mainstream social and economic development. In addition, it hinders governance, distorts the price of land and services, and thus causes further poverty.

Secure land tenure is a pre-condition for any development programme/project in urban informal settlements. Without certainty provided by secure tenure, neither governments nor the private sector would like to make a penny investment in the upgrading of the settlements. A World Bank study in Guatemala indicates that the regularisation of land tenure resulted in a significant return on private investment in the settlements upgraded at a ratio of approximately US$7 of private investment for every US$1 of public upgrading funds.

There is therefore a need for a change of government policy in providing secure tenure to the poor in informal settlements. Practical approaches to security of land tenure could take different forms, including:

- maintaining the current system, i.e. protection from eviction or from eviction with no provision for re-housing;
- guaranteeing security of land tenure without legal regularization, i.e. an active commitment by the public authorities, and guaranteed negotiation with concerned population groups prior to any eviction;
- recognizing the legitimacy of new forms of conditional ownership, for instance a provision of legitimacy of land appropriation on the condition of positive land development by the inhabitants; and
- legalizing informal land delivery channels, which is a decisive step to legalizing the informal land market.

Other forms of secure land tenure that are applicable in informal settlements include collective and communal tenure. However, it is necessary to develop principles in relation to the sharing of access to a property on the basis of an agreement and/or on conditions of a long and common history and cultural identity of the local communities.

IV. Conclusion

Employment-intensive infrastructure investment and participation approaches have been proved as development strategies aimed at achieving poverty reduction through employment creation, and improved living and working conditions for urban informal sector producers. As city governments are confronted with increasing urban unemployment and poverty, and more extreme forms of unemployment and poverty such as crime, violence and drugs, etc., they are encouraged to apply
the above approaches/strategies to upgrade urban informal settlements. To meet this goal, some fundamental reforms are necessary at city level, from policy and regulatory framework to the institutional set up.
OVERVIEW OF SUSTAINABLE LUSAKA PROGRAMME

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ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
Background

The rapid urbanisation of Lusaka has overtaken all physical and other city planning actions. As a result, infrastructure initially planned for a much smaller population is proving less and less adequate. This is especially so in the provision of housing, potable water, sewerage and solid waste management.

The consistent decline in the national economy coupled with rapid urbanisation has resulted in a situation characterised by high levels of urban poverty.

For Lusaka, the local authority’s lack of capacity to enforce bylaws of city planning and development, coupled with high in-migration, has resulted in a large percentage of the city’s population residing in unplanned informal settlements.

As a result, Lusaka is facing serious environmental and health problems due to inadequate infrastructure and social services.

Deteriorating environmental conditions affect mainly the urban poor population thus directly contributing to the decline in their living conditions. Furthermore, environmental problems at this level represent a serious obstacle to new investments in economic development thus hindering any amelioration of the situation.

In order to contribute to an overall sustainable growth and development of Lusaka, the strategy for environmental planning and management has to make provision for positive contributions to poverty reduction and economic development.

For the moment the capacity of the local authority to cope with this challenge alone is insufficient in terms of both human and financial resources. There is therefore a need for effective partnerships to be established with other stakeholders.

OVERVIEW OF SUSTAINABLE LUSAKA PROGRAMME

Sustainable Lusaka Programme (SLP) forms part of the Global Sustainable Cities Programme initiated by United Nations Centre for Human Settlements (UNCHS - Habitat). It supports the long term environmentally sustainable growth and development of Lusaka, through the integration of environmental planning and management (EPM) at city level.

The focus of the Programme is on disadvantaged, unplanned settlements. It is designed to involve communities and all main stakeholders of Lusaka in the formulation and implementation of issue strategies and action plans resulting in prioritised utilisation of internal and external resources. A key aim is to institutionalise the Programme approach within Lusaka City Council (LCC) in order to facilitate the implementation of improvements in environmental infrastructure and related service provision.

Current Objectives
The development objective of SLP is to support measures aimed at poverty alleviation in communities of high poverty levels (mainly targeting peri-urban settlements) and to promote environmentally sustainable socio-economic development and growth in the short, medium and long term in Lusaka. This entails:

a) Providing opportunities for communities with high poverty levels to initiate activities for poverty alleviation through sustainable activities of environmental improvement

b) Helping to build sufficient capacity at community level to positively plan, implement and manage a sustainable environmental Programme with popular participation of the community.

c) Providing sufficient capacity at city level to plan and manage the environmental conditions and natural resource base of Lusaka, thereby reducing environmental hazards and enhancing development potential on a long term sustainable basis.

d) Contributing to poverty reduction and helping to realise the development potential of Lusaka by enabling the implementation of development activities at community level.

Community profiles and priority identification

Sustainable Lusaka Programme has funded four community profiles which were carried out by the LCC Research Unit. The profiles provide valuable information on the settlements and can be used as a basis on which to formulate development interventions; they include data on a range of areas, rank community priorities, and outline action plans. Now that participatory approaches to data collection have been integrated into LCC's work, the quality of data could be improved and made more relevant as follows;

(i) Greater desegregation:
- Gender (women/men); consider separate meetings for men, women, children
- Age (children, adults, older citizens)
- Head of household (man, woman, polygamy, widow, grandparent, or child-headed)
- Population of settlement (men, women, male/female children, older citizens, street children, orphans etc)

(ii) Shelter:
Indications of what proportion are in rented accommodation and their characteristics; what percentage are homeowners, what percentages are land owners

(iii) Land tenure/title deeds:
In whose name - male, female, or joint.

(iv) Water;
Percentage of people who cannot pay by the month and are using daily coupons, the perceptions of different income groups on water charges, and the length of time people queue for water.

**Drinking water supply systems**

The water exploitation and supply varies from one settlement to another and from one urban centre to another. These typically include unprotected shallow wells, boreholes and traditional or public standpipes.

In many peri-urban settlements, privately owned shallow hand dug wells are the most common source of water supply. The water quality may be poor, but for most residents, the wells provide a cost free and convenient source of water.

In Lusaka, there have been many approaches, methods or mechanisms that have emerged as examples of best practice in water supply service delivery in peri-urban areas. However, it is recognised that no single approach is perfect and applicable to all situations; some adaptations may be necessary when applying the approach in a different context.

Water vending, as a means of delivering water supply services to the peri-urban, is gaining wide acceptance in most settlements. Water vending is practised under various payment systems in most peri-urban areas. They include user cards, tokens and direct cash payment at a water point. User cards are issued to residents who subscribe to the scheme upon payment of a membership fee; thereafter the user makes a monthly payment, and is allowed to draw water only on presentation of the user card to the tap attendant.

The financial and economic situation prevailing in peri-urban areas makes it difficult to provide water and sanitation services based on purely economic considerations. Household income levels are very low and this affects their ability to pay.

The Lusaka Water and Sewerage Company (LWSC), on the other hand, has indicated that being a commercial utility, they would rather concentrate their efforts on providing services to 20 percent of the population of Lusaka (in the informal medium to high cost housing areas) from whom they derive 80 percent of their operational income.

**Ng’ombe Water Supply**

In Ng’ombe settlement there are different charges depending on who supplies the water. There are 11 taps, of which 6 are working, and four boreholes, of which three are functioning. The area has over 30,000 inhabitants. There are also 6 hand pumps (constructed by private organisations such as Human Settlements of Zambia (HUZA) and Rotary Club that are managed by the Resident Development Committee (RDC). The tap and boreholes are not evenly distributed in the area and the water pressure is often low.

Water supplied by LWSC through the RDC costs K3, 000 for month for which a family is allowed.
to collect 120 litres for day. LWSC has entered into a contract with the RDC whereby the RDC collects the water charges, pays the water and other costs and pays the bill to LWSC.

However, there seems to be regular misunderstandings about the metered charges between LWSC and the RDCs who at times do not pay their bills in full.

On the other hand, the Water Company enters into contracts with private vendors in the community. Their water bills are typically about K5,000 for month. The water charges for hand pumps are about K1,000 to K1,500 per month for 120 litres per day. The owners of shallow wells charge K1,500 per month for unlimited daily consumption.

Sustainable Lusaka Programme in conjunction with Lusaka City Council has provided one borehole in the new Ng'ombe with 6 standpipes serving 500 households. A water committee that has been trained by ILO will manage this facility on a commercial basis and will be responsible for paying electricity bills.

Solid waste collection

At the community level, solid waste has been identified through community consultations as one of the priority problems.

The main problems associated with solid waste at the community level is uncollected waste, and lack of dumping sites which are accessible to the communities. Collection and disposal of solid waste is still viewed as a local authority responsibility especially when the residents have been paying a service charge.

The ILO has developed training material to help community members set up micro-enterprises for solid waste management. Participants in the training have since organised themselves into groups to form community based solid waste entrepreneurs (CBSEs). A total of six such community-based organisations have been registered and have started implementing the solid waste collection in the three settlements.

Community Agreements

The relationship between LCC, RDC and CBOs were clarified in terms of the responsibilities of the different actors involved in solid waste management. A Community Contracting workshop and subsequent training by ILO/ASIST helped in clarifying these different roles and relationships.

Demonstration projects are being implemented by the communities in the settlements of Ng'ombe, Kamanga and Mandevu/Marrapodi. Currently, the Programme is supporting the introduction of community managed solid waste collection and water supply. The intention of such demonstration projects is to introduce sustainable and cost efficient systems of managing community infrastructure programmes. Lessons learnt from these processes are intended to be applied later through replication at city level. The Programme is also providing resources to support four other settlements in Lusaka whose projects were approved by Lusaka City Council.
The affected settlements are Linda (water supply), Bauleni (water supply), Kalingalinga (solid waste management) and Kamanga (housing materials)
LABOUR BASED EMPLOYMENT PRACTICES –
THE NEED FOR A PARADIGM SHIFT IN
PROCUREMENT POLICY

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Abstract

Construction industries in developing countries are composed of large numbers of small and medium contracting organisations (SMC) that have traditionally operated within either a local and/or a national boundary. Traditionally, most of these SMCs are engaged in construction of residential houses, industrial plants, highways, dams, utilities and refineries. To effectively execute construction projects, they need a reliable permanent labour force but they cannot provide workers with employment stability because of the lack of work continuity. SMCs in developing countries (specifically in Africa) are relatively small because they do not have sufficient capital. As a result, they are limited to types of projects they can bid for, and place greater reliance on casual labour. Although these organisations outnumber their larger counterparts, and the role they play in sustaining the larger ones is considerable, there is hardly any formal attention given to SMCs in policy formulation and procurement systems reform. Based on the author’s experience as a former full time member of the South African Task Team Secretariat on Construction Industry Development, this paper seeks to argue that SMCs in Africa have a great potential in embracing Employment –Intensive Construction Methods (EIM) and thus contributing to employment generation and alleviating poverty. Furthermore, the paper argues that in order for the SMCs to embrace EIM appropriately in a sustainable way, there is a need for governments in Africa to establish appropriate policies. Finally the paper recommends a number of steps, which should be taken in order to create an enabling environment for labour based employment practices in African countries.

Keywords: labour based employment practices, policy, procurement systems, small and medium contracting organisations.

1. Introduction

Construction industries in Africa comprise both building (residential and non-residential) and civil engineering sectors and play an indispensable role in their countries economies. They provide physical infrastructure, which is fundamental to African development and their activities affect the lives of all Africans. Construction contributes substantially to gross domestic fixed investment (GDFI). For example, in South Africa construction contributes about 35% to GDFI and current projections of future infrastructure requirements indicate that its contribution to GDFI could double within 5 to 10 years (Department of Public Works (DPW), 1999). It is on the basis of these arguments that construction industries in Africa need to be drivers of development.

Referring to the need for ‘new development paradigm’, Chambers (1994) argues that first/last biases – which are variously urban, industrial, capital-intensive, centralized, high technology, and planned top-down often leave poor people out or make weak for them, fall under what he refers to as ‘normal professionalism’. The preferences for technology under ‘normal professionalism’ are as indicated in Table 1 below.
Table 1.1: Preferences for technology

<table>
<thead>
<tr>
<th>Core or First</th>
<th>Peripheral or Last</th>
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<tbody>
<tr>
<td>large-scale</td>
<td>small-scale</td>
</tr>
<tr>
<td>capital-intensive</td>
<td>labour-intensive</td>
</tr>
<tr>
<td>inorganic</td>
<td>organic</td>
</tr>
<tr>
<td>market-linked</td>
<td>subsistence-linked</td>
</tr>
<tr>
<td>mechanical</td>
<td>human or animal-powered</td>
</tr>
<tr>
<td>developed in core</td>
<td>developed in periphery</td>
</tr>
<tr>
<td>‘high’ technology</td>
<td>‘low’ technology</td>
</tr>
</tbody>
</table>

Source: Chambers (1994)

In the African construction industries the ‘first’ list is preferred by most ‘normal professionals’ while the ‘last’ list is usually closer to the resources and needs of the unemployed and poorer rural people where SMCs operate. Although popular thinking seems to favour the SMCs definition to include licensed business entities only, the author uses an open definition of SMCs, which include both formal and informal contracting businesses (small and medium contractors).

There are many influences, which reproduce and reinforce normal professionalism’s bias against unemployed and the poor. There is a need to address these influences in order to embrace the new paradigm and the new professionalism.

The purpose of this paper is to argue that part of the solution to unemployment and poverty in Africa lies in embracing the new paradigm and the new professionalism. It argues that through Employment –Intensive Construction (EIM), SMCs in Africa have a great potential in contributing to employment generation, alleviating poverty, equalising income inequalities and capacity building in economically disadvantaged communities. Furthermore, the paper argues that in order for the SMCs to embrace EIM appropriately, governments in Africa should establish appropriate policies – policies that provide enabling frameworks within which construction industries could play more strategic roles in social development and economic growth. The paper further, addresses the need for best practice in construction procurement as a primary requirement for EIM sustainable success – the need to embrace contingent procurement strategies, which take on board all relevant factors, and lead to consistently predictable outcomes. Finally the paper recommends a number of steps, which should be taken in order to create an enabling environment for labour based employment practices in African countries.

2. Learning from Experience

According to McCutcheon (1990), the technical and economic feasibility of EIM in road construction methods was studied by the World Bank in the 1970s and 1980s. Referring to the conclusion of the first phase of the study, the International Bank of Reconstruction and Development (IBRD) report (IBRD, 1971), found that EIM were technically feasible for a wide range of construction activities and can generally produce the same quality of products as equipment intensive methods. Focussing on economic feasibility, the IBRD second phase of the report (IBRD, 1974) concluded that labour productivity could be improved very significantly by the introduction of certain organisational, management and mechanical improvements.

The International Labour Organisation (ILO) World Employment Programme (ILOWEP) initiatives, which included: a pilot project in Kenya in 1974; Kenya Rural Access Roads programme
– construction of tertiary access roads; the Kenya Minor Roads Programme in 1987 - construction of secondary roads; a Botswana pilot project which commenced in 1980 and extended in 1982 to the District Roads Improvement and Maintenance Programme; the Lesotho Labour Construction Unit (LCU) – constructing tertiary roads; and the Malawi District Road Improvement and Maintenance Programme which was initiated in 1979, are significant successful EIM programmes.

Beside the above prominent EIM projects, projects have been carried out in many other countries (McCutcheon, 1989 & 1995) in Asia (India, Thailand, Indonesia, Pakistan, Mainland China, etc.); in Africa (South Africa, Tanzania, Zambia, Uganda, Egypt, Ghana, etc.). Beside the application of EIM in road construction, some of these projects have been involving housing projects and EIM has been applied successfully.

Governments as part of their policies for rural development have usually initiated EIM projects in countries indicated above. According to McCutcheon (1999), objectives of these projects have included the creation of employment opportunities, the provision of infrastructure, and the fostering of agriculture.

Drawing upon experience and analysis of EIM programmes in Kenya and Botswana, McCutcheon (1989 & 1995) lists the following reasons for their success:

- programmes were long-term and national;
- sound intellectual assessment of the technical feasibility and economic efficiency of using employment-intensive methods;
- technical, institutional, organisational and social-economic aspects received concentrated attention during preliminary work, continued through pilot projects, embryonic training programmes, and subsequent national programmes;
- strong organisations were established with good management systems;
- training was extensive and good at what it set out to do;
- there was a long-term political support;
- there was a long-term financial commitment;
- on balance there was good co-ordination between the parties concerned; and these programmes were not short-term emergency relief projects.

The fact that the majority of EIM programmes described above, have been successful suggest that EIM initiatives have all the necessary requirements of best practice initiatives, both in road construction and other infrastructure projects, including mass housing projects. But even in those countries where excellent examples of EIM are there for every one to see, bureaucratic and political pressures have reinforced ‘first’ and prior biases.Public clients are subject to pressures, which are so prevalent and well known as to be commonplace. These, according to Chambers (1994), are:

- to produce a portfolio of projects quickly;
- to spend budgets, especially donor organisations funds, by deadlines;
- to include capital goods from donor countries as part of projects;
- to reduce staff numbers (as retrenching donor governments slim their aid agencies and host country bureaucracies are cut back in structural readjustment).

In international financing agencies or aid agencies, the above pressures favour fewer, larger projects with more ‘first’ characteristics (see Table 1.1 above), since these enable fewer programmes staff to spend more, to spend it faster, and to spend more of it in the donor countries. Normal
professionalism as described above is then reinforced and normal professionals rewarded. In short, the dynamics are anti EIM, where there are systemic forces, in the sequence of activities in the project process, and in the dynamics of international financial institutions and aid bureaucracy – which favour the ‘first’ and neglect the ‘last’.

The dominance of ‘core’ or ‘first’ preferences in technology as indicated in Table 1.1 above has influenced practices in African construction industries to an extent that long term projects implementing EIM initiatives successfully have remained primarily confined to specific programmes with very little change in established procurement policy and practice. This scenario has remained as a norm in most of the African countries, hence EIM could be described as an infant initiative when looking at the way in which construction industries in Africa operate. Focussing on the South African construction industry position on implementing EIM, McCutcheon (1999) argues:

“….the designs, specifications and documentation hardly exist; on the other, the industry does not have organisational structures, planning, procedures and supervisors to handle highly employment-intensive construction works.”

This South African construction industry scenario could be super-imposed on any construction industry in Africa and almost bring a direct fit. This situation of treating EIM initiatives under ‘last’ preferences need to be addressed. The way forward is to look at strategies, which will embrace EIM in a formal and permanent way. It is through formalising EIM practices that sustainable benefits will be realised.

3. Formalising EIM – the need for a paradigm shift in procurement policy

3.1 Broader policy issues

African governments need to formalize EIM. In every African country there is need to embrace EIM in a formal way through public policy. Public sector Construction Industry Policy should among other objectives focus on developing the capacity and role of the public service.

Public sector delivery should aim at accepting both ‘core’ and ‘peripheral’ preferences for technology on all projects such that there are no ‘core’ or ‘peripheral’ preferences for technology before considering internal and external clients requirements. In situations where there are high levels of unemployment, the Public-sector delivery should aim at maximising employment opportunities through EIM, and to empower communities through participation and training.

Learning from EIM programmes in a number of countries (Chambers, 1994; McCutcheon, 1989, 1995 & 1999) in Africa and Asia, it is important to understand that there are constraints associated with EIM in construction and community participation targeted to the unemployed. These constraints are listed in the South African Policy document (DPW, 1999), as:

- complete employment sustainability is not achievable, because construction is project based;
- beyond a specific threshold, EIM in construction becomes less cost-effective than plant-based construction;
community participation can be costly, leading to project and delivery delays and can limit the extent to which continuity of work and skills development can be scheduled;

- the substitution of plant intensity by EIM and the community-participation factors are not fully understood by public-and-private-sector professionals.

Based on the above fundamental constraints, policy on EIM in construction should be based on a number of principles, hence EIM programmes should be promoted in a manner that will:

- create quality assets;
- address the need for immediate unemployment alleviation and promote linkages to broader development initiatives;
- maximise local employment through the optimal use of EIM;
- develop sustainable capacity;
- reinforce industry growth and development;
- target women and youth;
- involve communities in decision making;
- maximise the use of local resources;
- achieve a balance between the need for a job creation and the need to deliver construction goods and services in a cost-effective manner;
- facilitate the transfer of sustainable technical, managerial and capacity-building skills to recipient communities; and
- shape the delivery process/procurement system.

Policy on EIM should be strengthened by key programme approaches, which should include: **EIM in construction and job creation; participation and empowerment; and monitoring and evaluation.**

### 3.1.1 EIM in construction and job creation:

The principles indicated above should be incorporated in the framework for EIM in construction projects. A number of government departments at all levels of the government should endorse the framework and should continue to develop it in conjunction with community and labour groups through an established (formal) programme [e.g. in South Africa, the Community-Based Public Works Programme (CBPWP)] and other relevant public sector programmes.

The sustainability of jobs created could be enhanced through several approaches and the formal programme should promote the following:

- improved co-ordination by line function departments, provinces and local authorities to develop more concentrated delivery programmes in an effort to overcome the constraints of construction project delivery;
- greater flexibility in the delivery of training so that post-project training can be accessed by project participants to consolidate their skills base and to enhance industry capacity; and
- linkage of project participants to all employment agencies.

### 3.1.2 participation and empowerment:

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Through a formal programme as indicated above, and in execution of its line function the Government Department/or Ministry responsible for EIM in construction should promote the principles, ethos and methodology of a people-centred delivery process throughout the public sector. In so doing the Government Department/or Ministry responsible for EIM in construction should be able to impact on the practice of the private sector.

Community participation and empowerment must be facilitated – and in this sense facilitation should become a central delivery component, which transforms the nature of project management. It is important that facilitators must achieve practical understanding of the project and of the respective roles of project participants. They should forge solidarity and enable the participants to perform their respective functions effectively during the often-difficult process of implementation.

It is thus essential that built environment professionals and public sector project managers should augment their project management skills by an understanding of facilitation. Through the delivery of the formal EIM in construction programme, the development of capacity should be facilitated by the national Government Department/or Ministry responsible for EIM in construction in cooperation with other lower level departments (i.e. provincial / or regional departments). This cooperation should be able to provide a sound basis for reinforcing the capacity of local authorities to assume greater responsibility for process related facilitation of projects, which fall within their jurisdiction.

In collaboration with tertiary institutions the Government Department/or Ministry responsible for EIM in construction should promote the incorporation of these project-management requirements into the curricula of the built-environment professions.

3.1.3 monitoring and evaluation:
A system of monitoring and evaluation within the scope of the formal EIM programme should be established to ensure effective promotion of job creation and community empowerment programmes. This will require input at a project level by both professionals and public-sector agencies.

The formal EIM in construction programme should always convene post-job reviews of selected public-sector projects to assess performance indicators on job-creation, training, targeting of local resources and capacity building in order to recommend modifications on future contracts.

3.2 Procurement policy issues

One of the two principal arguments of this paper rests on one fundamental aspect of the construction process that requires early and particular attention if project success in terms of EIM in construction is to be achieved. This involves the systematic approach to the selection of the most appropriate organisation for the design and construction of the project – herein referred to as the construction procurement system (CPS).

Reporting on an examination of past research and literature, Masterman (1992) refers to phrases such as ‘….. procurement method’, ‘procurement form’ and ‘procurement path’ that have been used by various authorities when referring to this concept.
According to Franks (1984), CPS is ‘the amalgam of activities undertaken by a client to obtain a facility (author’s emphasis)’. Masterman (1992) uses “organisational structure” instead of “the amalgam of activities” in his definition of a procurement system. The term construction procurement system (CPS) has therefore been adopted and used throughout this paper. This term is generally used in this paper based on Masterman’s (1992) definition, to describe:

“The organisational structure adopted by the client for the management of the design and construction of a construction project.”

The basic decision on the appropriate CPS to take should precede the preparation of the outline (project) brief, since it necessarily affects who shall assist with the design brief as well. The choice of an appropriate CPS must be determined by the nature of the construction project and the clients’ wishes over acceptance of risk. Such decisions are very difficult. There are a number of publications [Masterman, (1992); Hughes (1990&1992)], which give, detailed account of different CPSs, their risk distribution potential and merits and demerits of the same.

Once an appropriate CPS has been determined, the first stage of applying relevant principles of EIM in construction has been reached. You now have a system with its associated project management structure, which will be able to manage the whole spectrum of dynamics associated with determining which principles of EIM in construction should be applied and the extent of application in the project.

In a study carried out by Rwelamila (2000), characteristics of the majority of construction projects in the Southern Africa Development Community (SADC) construction industries do not conform to principal characteristics of Construction Procurement Systems (CPS). This strongly suggests that the Construction Procurement Systems are basically used as default systems. In other words, the procurement systems management structures and their respective contract arrangements are used merely because clients and project consultants do not seem to consider the issue of selecting appropriate procurement systems.

The extensive use of default Construction Procurement Systems in public sector construction projects, suggest that in the majority of projects, Project Managers do not have appropriate management structures to achieve construction EIM objectives. This further suggests that the gap between an appropriate Construction Procurement System and an inappropriate one (default procurement system) remains a hidden challenge to the Project Manager in trying to attain EIM objectives.

The gap between an appropriate Construction Procurement System and a default procurement system leads us to speculate with a strong argument, that any Project Manager’s efforts to achieve EIM objectives under this condition will automatically lead to more pressures. The possibilities of applying EIM principles are very remote indeed.

The fact that the Project Managers (PMs) do not have appropriate Construction Procurement System to facilitate the application of EIM principles appropriately, leads the Project Manager to ‘fire fighting’, suggests that the PM doesn’t have time at all to deal with the principles of EIM.

In the eyes of the Internal Clients, the project has no clear framework to embrace EIM objectives. Since the Project Manager doesn’t show any clear direction to determine which principles of EIM objectives to be applied, the ability of the Project Manager to deal with EIM principles is lost and
the forces of effective strategic implementation in the project are lost – there is zero principle of attaining EIM objectives.

The Project Manager’s inability to pull every project stakeholder together leads to a situation where the majority of ICs do not feel as a collective towards meeting EIM objectives. The project collective becomes a myth and hence interdependence is lost in the eyes of the Internal Clients, hence a blind focus to EIM objectives.

The Project Manager’s attitude of trying all aspects of manoeuvring to turn the default Construction Procurement System into a workable system – an impossible task, makes the Project Manager and his or her subordinates to become aggressive. This leads to a situation where work and work only becomes a measure of every Internal Client’s contribution. The project loses direction and the application of EIM principles remains dubious.

In short construction procurement policy is required in all African construction industries, which formalises the principal logistics of applying EIM. Furthermore, policy should establish a procurement framework, which allows EIM to be considered on merit. The policy on procurement should be based on the fact that construction clients require contingent procurement strategies, which take on board all relevant factors, and lead to consistently predictable outcomes.

It is important to note that procurement policy should embrace the project cycle environment, such that a procurement framework should discourage traditional tendering approaches, which primarily focus on two parameters of cost and schedule. The focus should be on all four parameters: quality, schedule, cost and utility and above these parameters, the need for tenderers to understand EIM practices. Any method of assessing tenders should have a clear focus in establishing tenderers’ capacity to embrace EIM practices. If the project requires EIM practices to be part of project implementation, EIM parameters should be identified and weighted accordingly when short-listing tenderers.

Formulation of procurement policy should aim at influencing private clients to embrace EIM, through public sector projects. Public sector clients should demonstrate their commitment by applying EIM best practices. It is through public sector projects implementation of EIM that private clients will be convinced about the viability of EIM. Furthermore, construction industry policy focus groups should involve all stakeholders (private and public sector stakeholders). Focus groups conveners should include both public and private sector personalities – public private sector partnerships should characterize policy formulation teams.

There are lessons to be learnt from the United Kingdom (UK) regarding private sector responses to public sector initiatives. Although the UK examples are not EIM practices based, they demonstrate that it is possible for the private sector to embrace public sector initiatives through effective management of construction procurement (Cox and Townsend, 1998). These examples which include The Rover Group – fit for purpose supply relationship; McDonalds UK Ltd – lead time reduction through standardisation and modularisation; BAA – the proactive re-engineering of construction supply chains; and Gazeley Properties – the impresario of construction supply chain management.

Positive discrimination in procurement – the SMC question: The policy should be able to promote SMCs via public sector procurement. Positive discrimination procurement should be aimed at involving SMCs fully into public sector projects, similar to Affirmative Procurement Policy (APP)
initiatives in South Africa, described elsewhere (Letchmiah, 1999). Positive discrimination of SMC should be aimed at embracing the following principles:

- any measures which are adopted to secure participation by the SMCs should not result in failure in the delivery of, or deterioration in the quality of the goods, services and works which are contracted for;
- only those SMCs which are in operation in a particular industry and are considered capable of successfully completing a given contract at the time when goods, services or works are requested, should be considered;
- businesses should compete for the award of contracts; and
- measures, which are adopted to secure participation by SMCs, should fall away once EIM best practices are universally accepted.

4. Conclusions and Recommendations

4.1 Conclusions

This paper has shown that in Africa the viability of the principles of EIM has been proven through the implementation of several programmes. In turn, the establishment of EIM programmes have not been supported by policies, which should create an enabling environment for formalizing EIM and establishment of a procurement framework, which promotes contingent procurement strategies, which take on board all relevant factors (including EIM), and lead to consistently predictable outcomes.

The extraordinarily use of construction procurement systems as ‘default systems’ in most construction projects in Africa shows that the African construction industries need a paradigm shift in choosing CPSs and selecting tenderers, and this shift need to be supported by appropriate procurement policy.

Under this culture of default CPSs, where preferences for technology are on ‘core’ or ‘first’, application of EIM depends on individual initiatives and very little on a planned path. The EIM principles remain on paper with very little commitment from project stakeholders. The organisational structure becomes another white elephant, and the person responsible for EIM principles is not taken seriously.

4.2 Recommendations

In order to formalize EIM and maximize employment opportunities, among other best practice initiatives, construction industries policies in Africa should be premised on long-term employment generation programmes and make sure that construction of much needed infrastructure is not treated as emergence relief.

Before establishing appropriate construction industries policies in Africa, the constraints associated with community participation through EIM in construction as described in Section 3.1; and principles of job creation and community-empowerment should be taken into consideration.
Establishing of appropriate construction industries policies, which will formalize EIM, should be supported by key programme approaches as discussed in Sections 3.1.1 – 3.1.3 above. These programme approaches will address the sustainability requirement of EIM.

The need for positive discrimination in procurement: Positive Discrimination Procurement Policy (PDPP) should be part of construction procurement policy (focus on embracing EIM best practices). The essential characteristics of a PDPP should be threefold:

- Use should be made of Targeted Procurement to achieve predetermined socio-economic objectives;
- Specific target groups should be identified and systematically targeted in accordance with national policy objectives; and
- Consistent and uniform definitions, strategies and monitoring and reporting mechanisms should be used to realise policy objectives.
5. References


SFD WASTEWATER PROJECTS

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Objective

This paper presents the experience of the Egyptian Social Fund for Development (SFD) in implementing wastewater projects in rural Egypt. It shows how the SFD was established, the role of its Public Works Program (PWP) and how the PWP utilizes labor based methods in the implementation of its funded wastewater projects.

The paper explores the use of labor based methods in the various components of a typical wastewater project, from the underground collection pipe network to the treatment plant. Although the paper does not intend to explore the detailed technical aspects of the different technologies used to treat wastewater, it does, nevertheless, point to the appropriate technologies that lend themselves to the use of such methods in their implementation.

Introduction

In the early nineties the Egyptian government chose to adopt a plan developed by the International Monetary Fund and the World Bank to shift the country towards a free market economy. Various steps were taken in order to set the stage for the Economic Reforms and Structural Adjustment Plan (ERSAP) to take place. One major concern was the impact that such a shift would have on poor communities. Thus, part of the plan was to form a social safety net to act as a mitigation measure for the negative effects of the ERSAP on poor people.

Social Funds, at that time, were a novelty. They had only been tried out in few countries, so there was no proven record of their successful effect on these economies. Social Funds are simply semi autonomous apparatuses established by the donor body in cooperation with governments in developing countries to help with the deployment of aid money according to donors’ regulations and guidelines. They typically employ local expertise in various related fields of development, hence, their personnel are more familiar with the local culture and needs of the people. Social Funds provide a transparent mechanism that allows donors to remotely monitor the impact of its investment through an elaborate means of reporting. Therefore, as part of the ERSAP, the Egyptian government established the Social Fund for Development to act as a social safety net during the implementation of ERSAP.

The Social Fund for Development

The SFD was established in 1991 by a presidential decree to form a semi autonomous organization under the auspices of the Cabinet of Ministers. The initial mandate of the SFD was temporary for a duration of four years (1992-1996), during which 18 different donors including the World Bank pledged a sum of $737 million dollars to combat poverty and unemployment. It took less than a year for the SFD to be formed and become operational. It consisted of five complementary programs, each dealing with a certain field of development. The programs were: Enterprise Development, Community Development, Public Works, Human Resources and Institutional Development. During its first phase, the SFD was able to contract all of its resources and produce results that convinced donors to investigate the possibility of its extension.
In 1996 the donor community decided to fund another four years (1997-2000) with a new pledge of $692 million dollars. This extension presented an opportunity for the SFD to alter its mandate and shift from its initial function as an emergency fund to a more sustainable local development organization. Currently the SFD is completing its second phase, and the experiences learned and successes accomplished so far have strengthened the case for its continued existence. This is why the SFD recently signed an agreement with the World Bank for another phase, based on which other bilateral agreements have followed with donors like KfW of Germany in addition to another batch of agreements presently being processed with other donors.

In a joint effort, the five different programs of the SFD function vertically and laterally in tandem to provide needed services to their respective beneficiaries. The Enterprise Development program is concerned with availing loans to small entrepreneurs starting their own businesses. During SFD’s second phase it flourished into an independent local credit organization currently functioning under the supervision of the SFD. The Community Development program is primarily concerned with providing community services to poor beneficiaries. Its services mainly are in the fields of health and education and act in a manner complementary to those offered by the Public Works Program. The latter is concerned with providing services in the areas of potable water, wastewater, roads, public buildings and the environment. Most of these services are offered to rural areas and poor pockets in urban cities. The Human Resource program is concerned with the privatization of the public sector and the extra labor force shed as a result of its restructuring. The Institutional Development program works with government institutions to offer services for the smooth functioning and operation of the other four SFD programs. This entails data collection as well as coordination with national and central government planning to avoid any unnecessary duplication of funding.

The Public Works Program

The PWP implements potable water projects such as underground pipe networks, artesian wells, elevated and ground water tanks. Wastewater projects are typically gravity lines networks, civil works for pump stations, forced mains and treatment plants. Public buildings projects are mainly schools, clinics, social and youth centers. Environmental projects are primarily related to irrigation and usually entail the covering, pitching and cleaning of canals. PWP funds such basic services in the fields of social and economic community infrastructure to raise the standard of living and upgrade the quality of life of the rural poor.

In order to maximize the generation of job opportunities, the PWP uses labor based methods to implement its projects. Labor based methods have been previously used in various regions in Africa, South America and Asia often in the implementation of roads and some potable water projects. Public buildings naturally lend themselves, due to the nature of the methods used in their construction, to the use of labor based methods. Irrigation and wastewater projects, however, are considered new fields for the utilization of labor based methods.

Problem Identification

The wastewater problem manifests itself in Egypt due to a variety of reasons that are to some extent particular to this country. Egypt is a country where about 90% of its population resides on
about 5% of its land. This creates extremely high densities in most of the urban settings and some of the rural villages. In rural areas underground tanks are widely used to dispose of households’ wastewater. The simplest underground tanks entail the construction of an underground chamber adjacent to the house. Variations of this simple design have also been used; some consist of two chambers (one for retaining solids and one for fluids), others with a high narrow pipe outlet where all the fluids are drained continuously through a network and disposed of while the solids remain. Other types deal with gray water (water from kitchens, sinks and shower tubs) separately from wastewater (water from toilets), and some use sand and rock filters. Underground seepage tanks relying on technologies that dispose of their water content into the surrounding soil are the ones responsible for much of the wastewater problem.

Seepage underground tanks are constructed with brick walls and a reinforced concrete ceiling with compacted dirt as flooring. A high inlet carries wastewater from the household’s water closets and kitchen into the underground tank. The compacted dirt flooring of the tank helps the fluids to percolate into the ground and the solids to remain in the tank. In some cases the walls’ brick joints are not fully mortared to allow for lateral seepage of fluids to the outside of the tank into the ground. This process goes on until the tank is filled with solids and is ready to be emptied. The owner of the household typically rents a dump truck to empty the tank into the nearest dump site. When this happens the tank is ready to receive more wastewater until it is full again and the whole process is repeated.

Until recently underground tanks functioned satisfactorily for rural areas that typically consumed low quantities of potable water and enjoyed dry soils that readily absorbed the tanks’ contents. Now the matter is quite different.

Recent Development

Although Egypt enjoys an arid climate and consequently a dry terrain, most of its population lives on arable land where the primary source of water, for human consumption and irrigation, is underground water and the river Nile water respectively. This has led to high population concentrations along the Nile valley and delta basin creating high densities in a limited strip of land with an already high water table.

Through the years the consumption of potable water in Egypt has been moderate to extremely low. Major cities enjoyed their proximity to water resources and built an infrastructure that allowed their inhabitants to reach almost international standards in potable water consumption. Many rural areas were not blessed with an elaborate infrastructure to achieve such levels of consumption, and so relied on public taps or even unpurified water for daily use. During the last two decades the government and donors have focused their efforts in resolving the problem of potable water scarcity in rural areas. Major potable water projects were implemented and great strides were made to bring potable water consumption to acceptable levels. Consumption was raised in most rural areas from 30-40 liters/capita/day to 100-150 liters/capita/day.

As a result, a new problem began to arise. Lower Egypt was the first region to suffer. Due to the increased discharge of wastewater from underground tanks; higher subsoil water levels and subsequently a much higher water table began to appear in inhabited areas. Subsoil water levels
were as high as a few centimeters below the surface of the ground. In some cases the situation was so severe that water was showing on households’ floors and needed to be emptied overnight. Slowly the problem began to reverberate on a national scale. Upper Egypt followed, and the need for an effective solution became urgent. Underground tanks were not effective anymore. They were continuously flooded by wastewater that could not seep into the ground because of the higher subsoil water levels. Hence, the tank needed to be emptied more frequently, as often as every week. This added an extra levy on poor inhabitants who have to pay for the expense of emptying their underground tanks. The problem was compounded because subsoil water mixed with wastewater underground and created a contaminated environment that acted as an excellent conductor to the underground potable water network. Any hairline crack in a potable water pipe was now subject to seepage of contaminated water into it, thus subjecting the inhabitants to great health hazards.

**SFD Role**

The government quickly realized the problem. It was simply the fact that more water is being pumped into the system without a suitable means to extract it. The government availed funds for the installation of adequate wastewater systems in larger cities. Rural areas and villages were left behind. The SFD as the primary financier of public works projects in rural Egypt had to deal with the problem while complying with its labor based guidelines. It was decided to implement a pilot project and analyze its outcome.

The governorate of Fayoum was the site of choice. Before designing the project, calculations were made and analyses conducted to simulate the results. The prime concern was the feasibility of using labor based methods during implementation and what rates of job creation could be attained. A typical comprehensive wastewater project consists of a gravity line network with manholes along its length to collect wastewater from households through house connections leading to a pump station. This will raise the wastewater from the elevation of the lowest pipe inlet at the end of the network to a level where it can be transferred under pressure through forced mains to the treatment plant. This would in turn biologically create the right environment for the wastewater to be treated.

**Labor Based Methods**

The idea of using labor based methods in the implementation of wastewater projects is rather alien to a lot of labor based practitioners. Wastewater projects are typically very complex and require highly qualified expertise for their design, construction and above all operation and maintenance. In the eyes of some this renders them unsuitable for developing countries in general and their rural areas in particular. Although the connotation of wastewater projects is generally urban, the aforementioned review shows how the wastewater problem is now hitting rural settings more than urban ones. Cities are equipped, prepared and have the funds to deal with the problem while rural areas are only now beginning to face it. This is bound to increase as a result of the urbanization of small villages.

Urban wastewater projects are usually expensive, compact and rely on intricate chemical reactions to treat their waste. This notion had to be reversed in order for it to function in a rural setting. The SFD started by examining its comprehensive wastewater pilot project in Fayoum to find out which
of its components could readily use labor based methods in their construction. These components were simply the laying out of underground pipes for gravity lines and the forced mains. Even in pump stations the civil works are rather labor intensive. The analysis concluded that the limits to the use of labor based methods only lie in the treatment plant and the technology used for its functioning.

Gravity line network pipes come in a variety of diameters according to the length of the network and where it is constructed. The optimum diameter must allow for a continuous flow of wastewater inside the pipe taking into consideration the function of the pipe’s slope. Since it is a gravity line network the recommended slope must be always maintained along the entire network. This necessitates going into much lower depths to maintain such slopes especially in long networks. Therefore, the topography along the network path has to be carefully studied prior to design. These trench depths, typically in villages, need to be achieved in very narrow alleys in between adobe houses. Wooden shutters are often used to support the sides of the trench where the pipes are being laid and to maintain the integrity of the soil. The installation of gravity line networks readily lends itself to the use of labor, simply because in villages mechanical equipment can hardly maneuver in narrow alleys. Besides, the deep digging and shuttering require extensive use of labor. As a ratio of labor content to capital investment; gravity line networks offer a high ratio that is acceptable to SFD standards. This is why more gravity line network components have later been independently funded by SFD.

Pump stations require a building in which to be installed. The mechanical equipment and electrical fittings offer a low ratio of labor content to capital investment. Therefore, SFD only funds the civil works of this component which is the construction of the building housing the pump and the inlets and outlets of the pipes in addition to the mechanical and electrical works and connections. The equipment required is typically financed by the beneficiaries as their local contribution to the project. This condition is normally stated in the framework agreement signed between the SFD and the Sponsoring Agency representing the project’s targeted beneficiaries.

Forced mains also need to be buried underground with the assistance of skilled labor to ensure proper installation and reliable connections. The ratio of labor content to capital investment of this particular component relies on the cost of the forced mains as a function to their diameter and length. Often the ratio is compensated for when similar ratios are taken into account for the gravity line and treatment plant.

**Treatment Plant Technology**

The treatment plant is the largest component of a comprehensive wastewater project. It represents about 30% to 40% of its construction cost. SFD investigated a variety of technologies to settle on the one that is most appropriate and most suitable to the conditions in rural Egypt. Construction was taken into consideration, while local operation and maintenance expertise and cost also had a bearing on the selection process. After consulting with specialized firms and authorities, SFD concluded that the choice is essentially between two technologies; namely, oxidation ditches and stabilization ponds.

Both technologies rely on the use of biological treatment rather than a chemical one. And for that, they both require vast areas of land for processing their waste. With both technologies it takes more
space and time to accomplish what could be easily done in a compact unit using chemical reactions and mechanical equipment.

A typical treatment plant is an open site with a small kiosk for storing simple cleaning equipment and accommodating a couple of maintenance personnel, and a series of artificial ponds for treatment. Wastewater typically enters the treatment plant through an inlet that directs it to the ponds/ditches (ground basins) that act as phases in the treatment process. Each basin with its size and location provides a step in a sequential biological reaction. Wastewater remains in each basin for a predetermined time and then flows to the next one until it is completely treated. The biological reaction occurring in each basin relies on the active bacteria present in that basin and the time wastewater is retained in it.

Fortunately enough, both oxidation ditches and stabilization pond technologies readily utilize labor based methods in their implementation, simply because of the nature of their design. They both require large artificial ponds to be dug in the ground. The floor of each basin needs to be laid with stones to reduce uplift due to underground water pressure. The flooring is then leveled horizontally and the sides trimmed to a slope with sand. Usually synthetic lining is laid to prevent leakage. Finally the flooring is sealed with an ordinary concrete slab and the sides with mortared stone pitching. The construction of such a basin can use large numbers of laborers during its construction. Most of the laborers used are unskilled. The major work component is digging, leveling and pitching. Some of the labor force need to be skilled to lay stones and mix and lay concrete.

Oxidation ditches and stabilization ponds are technologies that rely on natural processes for treatment, and so are environmentally friendly. They are efficient because they are based on self activated processes, and less costly than conventional methods due to the fact that they use low technology in construction and operation and maintenance. They involve a very small or no foreign exchange investment. Their most prevalent disadvantage is that they use more land than conventional methods. Stabilization ponds use even more land than oxidation ditches. This is why it is recommended to use stabilization ponds in upper Egypt where land is abundant and most villages lay along the Nile valley with desert backgrounds that can be easily utilized for treatment. Oxidation ditches are recommended for Lower Egypt because of the scarcity of land there. Compared to stabilization ponds they are more compact. Finally it is worth mentioning that the effluent produced by both technologies can be made suitable for certain agriculture purposes.

Conclusion

From this we conclude that labor based methods can readily be used in the implementation of various components of a wastewater project such as the gravity line networks, forced main pipes and pump stations’ civil works. A number of projects funded by the SFD are only gravity lines networks connecting to existing treatment plants. This makes these projects particularly labor intensive. After a comprehensive wastewater project is funded in a village, and due to economies of scale, the treatment plant included in that project allows for a capacity that is typically larger than the discharge of that particular village. Hence, future projects in the adjacent villages are generally gravity line networks and forced mains and pump stations discharging into the same treatment plant.
As for treatment plants, they could be labor based provided that the right technologies are used. The technologies should take into consideration the cost of construction, the foreign exchange rate and the limited expertise of local maintenance and operation staff in developing countries. The outcome of SFD’s research and the results of its wastewater pilot project in Fayoum in 1993 prove that oxidation ditches and stabilization ponds are the two appropriate technologies that take the aforementioned parameters into account and thus are most suitable for the use of villages in developing countries.

Resources

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TRANSPORT AND SUSTAINABLE RURAL LIVELIHOODS IN ZAMBIA: A CASE STUDY

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Objectives of the case study

In a recent participatory cross-sectional study of rural communities in the Northern and Copperbelt Provinces of Zambia undertaken in March 2000, some livelihood analysis revealed that transport constraints, and their impact on rural livelihoods and service provision are of a high priority for the rural poor. Indeed transport emerged as a serious concern in all six study districts, particularly with regard to the impact of poor accessibility and mobility on food security, agricultural marketing and ability to pay for health and education. This case study intends to review the interactions of transport on livelihood assets in the Zambian context, and the way in which transport based livelihood strategies can reduce the vulnerability context and improve livelihood outcomes.

1. INTRODUCTION

It is now widely accepted that travel and transport constraints cannot be solved by roads alone. Transport constraints on rural livelihoods are not simply a result of poor road condition, but are a culmination of inadequate infrastructure, poor public transport provision, and exorbitant tariffs imposed by private transporters whose services are infrequent, and further impede the ability of the rural poor to generate a sustainable livelihood.

In addition, the poor state of the roads combined with inadequate transport services has an adverse impact on access to the already costly rural health centres and basic schools. A poor transport network is shown to compound the subsistence burden in Sub-Saharan Africa. Rural farmers are unable to transport their agricultural outputs for sale at the market without a considerable capital outlay with which to purchase an intermediate mode of transport, such as a bicycle, or animal cart. Subsequently, it becomes necessary for farmers to sell or barter produce at a much-reduced price to traders, or pay excessive transport fees in order to generate any surplus capital with which to pay for health care, and education.

This case study is based on research undertaken for the DFID funded ‘Policy Toolkit for Increased Rural Mobility’, an on-going project drawing on empirical case studies of Sub-Saharan Africa where transport constraints impact heavily on rural livelihoods, and where external factors, in particular institutional interventions, have intensified the livelihood constraints faced by the rural poor. The project aims to produce a ‘Toolkit’ manual which will identify transport constraints which typically affect remote communities, and will contain an assessment of baseline requirements for improvement of infrastructure, transport services, location of extension services and village level transport. It will also address policy issues for improved rural accessibility, and will recommend appropriate interventions for improved mobility, which will be reflected in the enhancement of livelihood assets and strategies.

2. BACKGROUND

The livelihoods of the rural poor in Zambia have been adversely affected by externalities in recent years. In an attempt to pursue the agricultural sector as the ‘main engine of growth’, since 1991 the structural adjustment programme has succeeded only in marginalising non-commercial agricultural producers (World Bank, 1994). The newly decentralised market structures have led to the elimination of subsidies for agricultural inputs thus increasing the vulnerability of small-scale farmers who no longer have access to fertiliser, seed and pesticides, which are vital for maize production. Subsequently, the rural poor have resorted to growing more traditional crops which do
not require these inputs, including sorghum and finger millet, despite the fact they reach a lower price at market.

This process of liberalisation has affected subsistence and emergent farmers in all nine Provinces, but has proved most damaging in areas that are extremely remote and lack efficient livelihood strategies with which to alleviate vulnerability in the event of shocks and stresses.

Northern Province (the largest Province at 147,826 sq km) is one such region of Zambia where 86% (1,027,000) of the provincial population live in rural areas (Central Statistical Office, 1998). The condition of the Trunk, Main and District roads are far from adequate, and the feeder roads are extremely dilapidated, and frequently impassable throughout the wet season. The principle economic activity in Northern Province is the farming of maize, millet, beans, cassava, and sweet potatoes, as well as fishing in Districts adjacent to the Lakes of Bangweulu, Lake Mweru-Wantipa and Lake Tanganyika.

In contrast, the Copperbelt Province (31,328 sq km), so called because of its copper mining activities, is the focus for Zambia’s economy and foreign exchange earnings. Yet, despite having a population nearly double that of Northern Province (of which only 17% live in rural areas), and being located only 321km from Lusaka along key trunk road networks and railway lines, there remain a considerable proportion of rural dwellers stuck in the poverty cycle because of impediments to their mobility brought about by poor infrastructure and transport service provision.

3. LIVELIHOOD ASSETS IN THE STUDY AREA

The livelihoods approach is based on understanding people’s strengths (assets or capital endowments) and how these can be used to achieve positive livelihood outcomes. The five capital assets are as follows:

1) Natural capital – natural resource stocks available to people
2) Social capital – social resources including membership of groups, family and social networks
3) Human capital – skills, knowledge, health and ability of labour
4) Physical capital – basic infrastructure such as roads and water supplies
5) Financial capital – financial resources such as savings and access to credit

A further discussion of these livelihood asset categories is made in more detail in Section 6.

3.1 Natural Capital

Northern Province is divided into five agro-ecological zones, where grassland predominates (50%), savanna (33%) and forest (12%) with a very small proportion used for cultivation. Rainfall is high, ranging from 1100 to 1400mm with the wet season falling between October and March. Rural population density is only 5.8/km². The chitemene (slash and burn agriculture) farming system was found to be most widely practised in the study area.

The Copperbelt Province is characterised by its large copper and cobalt reserves, as well as commercial forestry. Small-scale farmers produce a combination of traditional crops such as cassava, finger millet and beans, as well as maize, though chitemene is not traditionally practised in the Province. Soil fertility varies, though Mpongwe and Masaiti Districts enjoy greater productivity, which has encouraged the resettlement of ex-miners into the newly transformed ‘agro-belt’ under
the Rural Enterprise and Agri-services Promotion Programme (REAP). Horticulture is also more widely practised in the Copperbelt where demand is strong. Animal husbandry is a dwindling activity in both Provinces, principally due to the prevalence of corridor disease, which has considerably reduced the number of cattle.

3.2 Physical Capital

Transport infrastructure appears to be a significant concern for villagers surveyed in Northern and Copperbelt Provinces. The lack of access to social services, markets and agricultural inputs was shown to affect the sustainability of livelihoods and to reduce the life chances of the rural poor. Impassability in the rainy season affects incomes as traders cease to come and buy produce. The majority of travel is by foot, though bicycles are used widely and are loaned to neighbouring villagers at a small fee. Few scotch carts and other IMT’s were observed, especially in Northern Province where corridor disease has killed large numbers of cattle, aside from the fact that traditionally the Bemba, and other ethnic groups in these areas are not cattle keeping.

Small increases in vehicle frequency, shorter travel times, and improved access to markets and social services, may have resulted from feeder road rehabilitation, especially in highly productive agricultural Districts of the Copperbelt, but use of feeder roads still remains extremely low. Attributing and ascertaining feeder road impact in remote areas such as these is difficult given the relatively low levels of economic activity, large distances and low densities of populations. Indeed, feeder road improvements alone (i.e. without complementary development activities) will not necessarily bring new traders to remote areas or greatly increase economic activity.

The lack of communication networks in general was cited as a barrier to livelihood enhancement, particularly with regard to the network of agricultural extension, designed to facilitate the transfer of information on market price, provision of credit and inputs, technology and training. In all six Districts under survey, positions of agricultural extension remained unfilled, and where ‘camp officers’ were posted, few had access to anything more than a bicycle to disseminate information from the Ministry of Agriculture, Foods and Fisheries to upwards of 100 households. The capacity of Zambia’s field services has diminished in recent years, a situation which has intensified due to the poor road condition and insufficient government funding.

3.3 Human Capital

The participatory surveys revealed that both Copperbelt and Northern Provinces were subject to grossly inadequate rural health care and education services. The Director of Health in Masaiti District, Copperbelt, made specific reference to insufficient funds, shortage of drugs, shortage and poor distribution of staff relative to population and physical barriers. Indeed, personnel at the rural health centres (RHC’s) visited, replicated their concerns over their inability to reach patients at the village level and for medicine kits and vaccines to reach the RHC’s.

Emergency health care access was also highlighted in many of the focus group discussions and consistently emerged as a priority concern for villagers. In emergency situations, villagers would often transport the patient on an improvised stretcher (‘machila’) laid across a bicycle, to the nearest RHC. Inevitably, a culmination of poor physical access to medical staff and drugs, leads to the propagation of high mortality rates in rural areas.
Education also emerged as a priority concern, especially for young families. Distance to schools and an absence of secondary schools is felt to be more acute in rural areas. Teachers identified absenteeism as a priority concern, both by children who are unable to reach school because of the walking distance, and by teachers who lack the incentive to relocate deep in the bush where transport services are non-existent.

3.4 Financial Capital

Access to agricultural credit is extremely limited now that government has withdrawn support. Late delivery of fertilisers where they are available is widely recognised as a problem causing farmers to default on their loans because poor yields result from less than optimum use of input. Where farmers’ co-operatives do exist, they are still required to provide their own means of transport on collection of farm inputs from the Food Reserve Agency. The high transport fees consequently consume much of the surplus capital generated from the high agricultural yields.

Zambia is currently subject to a number of credit schemes such as the social recovery project, designed to support infrastructure improvements at the community level; and the IMT project run by the Technical Development Advisory Unit (University of Zambia), which aims to provide credit to emergent farmers for the purchase of IMT’s, with a particular focus on animal draught. In Zambia at least, credit schemes are characterised by failure because of problems with repayment, although with rigorous assessment processes and the implementation of group collateral it is hoped that future credit schemes will prove fruitful. Unfortunately, the nature of these schemes has lead to the further marginalisation of the absolute poor, including peasant farmers, who are unable to provide any collateral, as well as those who are not located in areas of high agricultural productivity.

3.5 Social Capital

Social networks, community groups, and relationships of trust were identified in all of the study areas. Village groups or assemblies were particularly active, as were village health neighbourhoods and other social groups (those of particular maturity were found in Mapanda Village in Luwingu District, Northern Province, and Chalabesa in Mpika District, Northern Province). These groups would meet to discuss development issues within the community, and serve to promote the frequency of health outreach programmes and extension visits. Religious activities were also shown to reinforce community relationships and help to build up a resistance against shocks and stresses.

4. LIVELIHOOD CONSTRAINTS

The Participatory Rural Appraisal (PRA) techniques employed in the three Districts under survey in Northern Province (Mpika, Mungwi and Luwingu) indicated that the key livelihood constraint faced by rural communities is food insecurity. This is exacerbated by a number of factors, such as financial and physical access to fertilisers, (thus proliferating use of ‘chitemene’ or ‘slash and burn’ farming system), and absence of an efficient marketing network, intensified by the inferior road condition. Furthermore, the size of landholding for small-scale farmers is constrained by low labour inputs, with cultivation being undertaken by individual households, and periodic problems of rainfall during the winter months despite receiving 1100-1400mm of rain per year.
During a PRA activity, undertaken to establish the prioritisation of major concerns, it was revealed that villages amongst the Chalabesa community (located 103km from the District Capital Mpika), were suffering from extreme vulnerability, principally because the appointed fertiliser agents were unable to operate in the area, as it takes an average of two hours by motor vehicle to travel along the poor access road which is 32km long. Likewise, the infrequency of private transporters is shown to contribute to the lack of local marketing initiatives, because farmers are unable to transport their produce to the market in distant Mpika. Consequently, traders who travel to Chalabesa impose unfair trading terms, leading to an increase in bartering, which inhibits the generation of surplus capital required for payment of consumer goods, school fees, and health centre admission fees.

Basic access to markets emerged as the principal livelihood constraint cited by rural communities in the Copperbelt. The surveys revealed that Mpongwe and Masaiti Districts were better able to obtain farm inputs required for surplus production of maize by forming farmers’ co-operatives with which to secure collateral for the acquisition of fertiliser. These Districts have also benefited from donor funded rural development programmes, which have boosted the financial and institutional capacity of the District Councils enabling them to initiate localised feeder road improvements with graders borrowed from the Provincial Roads Engineer. The Small-holder Development Programme (SDP) funded by the European Union (EU) is one such project. It funded the rehabilitation of six roads in Mpongwe District and two roads in Masaiti District.

The less fertile District of Lufwanyama, Copperbelt, received no EU funding from the SDP and has since remained the poorest and most inaccessible District in the entire Province. Deemed a politically insignificant and less agriculturally productive area, the Lufwanyama District Council has virtually no capabilities to undertake even the most essential maintenance, even to the Kitwe-Kasempa main road. The only market towns of any consequence are Kalilushi and Kitwe, the latter being a distance of 60km from the study area of Mukutuma. This journey, undertaken by local teachers and farmers usually involves a three-hour walk to the nearest junction, followed by a K4,000 single fare to Kitwe.

Transport problems in Lufwanyama District were shown to be more characteristic of those experienced in Northern Province, especially the problem of food security. This is particularly so during times of shock, as in 1999 when heavy rains led to a poor harvest, causing children to be taken out of school in order to carry out piecework in exchange for the staple ‘millie meal’. In addition, the soils in Lufwanyama are especially poor, and in the absence of farmers co-operatives for the acquisition of fertiliser, villagers have a tendency to move further into the bush, with the effect of diminishing the availability and quality of natural resources, and removing children from their schooling because of the journey distance.

5. LIVELIHOOD STRATEGIES

The field study revealed that the rural poor in both Northern and Copperbelt Provinces have very little scope to adopt transport-based strategies with which to markedly improve their livelihood potential. There is clearly a strong demand for transport interventions with which to undertake marketing activities and access basic services, be they efficiently managed, and moderately priced transport services, or non-motorised intermediate modes.

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1 Current exchange rate is approximately £1 = 4300 kwacha.
Currently, the only transport providers who directly impact on rural livelihoods are informal transporters and rural householders who own ox-carts and (more commonly) bicycles. More opportunities for ‘catching lifts’ to the market were observed in the Copperbelt, particularly in Ibenga, a town bordering Masaiti and Mpongwe districts where a combination of pickup trucks, tractor-trailers and scotch carts provide frequent services to outlying areas. A typical small-scale farmer was found to own an ox-cart and seven cattle, which is hired out for K500 per kilometre or K500 per 50kg box of vegetables. He was able to generate additional income by hiring out his oxen for ploughing, at K100,000 per hectare of land.

In the remote villages themselves, it is not uncommon to find people leasing out their bicycles for a moderate fee, enabling people to make considerable time savings by transporting their goods to the market themselves, rather than waiting for a lift, which may take up to two days. This was particularly true of rural community teachers who were required to make frequent trips to collect their salaries, and to sell produce, which they had received in payment for school fees.

Another strategy identified to overcome the absence of an effective transport mechanism, is the formation of farmers co-operatives, for which the benefits are three fold. The Food Reserve Agency (FRA) will only provide agricultural inputs to farmer’s cooperatives, to ensure post-harvest repayment. Cooperatives enable individual farmers to provide sufficient collateral, as well as a down payment for the fertiliser, by which they can increase agricultural productivity and further sustain their livelihood income. The collective hire of a vehicle (motorised or non-motorised) acts to reduce transport costs for the collection of fertiliser, without which it would be virtually impossible to obtain sufficient quantities, because the FRA do not have the capacity to deliver inputs direct to the farms.

Additional livelihood strategies observed at the village level focused principally on marketing and income generation. Bartering, for example, is undertaken in the Copperbelt, and predominantly in Northern Province. It was shown to be an important trading mechanism, which was usually undertaken with equity, although some villagers complained of being undercut by traders. Other strategies included charcoal production for sale at the roadside and market, and beer brewing by women, for sale within the village. The more affluent households in possession of a hammer mill (of which there were relatively few), charged neighbouring households for its use in grinding maize into millie meal, thus alleviating the time burden of women.

6. SUSTAINABLE LIVELIHOOD ANALYSIS

This section will attempt to apply results of the survey data in Zambia to the Sustainable Livelihoods Framework, as propounded by DFID (see Figure 1 below). By examining key components of the framework in the context of the Northern and Copperbelt Provinces, it allows us to interpret the main factors that affect people’s livelihoods and to compare them between Provinces. Livelihood analysis should not be used to recommend where transport investment should be prioritised in one region of a country over another. Rather, it draws on participatory discussions with the rural poor, and highlights where components that influence livelihoods are weak and require further investigation and perhaps investment.
The framework is a flexible tool and can be used to summarise the components that influence livelihoods from different sectors such as transport, water and sanitation, health, education, marketing etc. It can be used to summarise the livelihood processes of individual households, villages, districts etc, to reflect the livelihoods status of a given population in an urban or rural setting. Furthermore it can identify particular problem areas that hinder livelihood improvements, and therefore foster recommendations that aim to strengthen the assets of the poor.

6.1 Northern and Copperbelt Provinces compared

The following analysis compares the assets of Northern and Copperbelt Provinces in Zambia and ways in which the rural poor in each region overcome transport constraints that weaken their livelihood potential.

6.1.1 Capital Assets

Livelihood assets indicate the capital stocks of particular stakeholders, which strengthen their ability to achieve positive livelihood outcomes. Each asset can represent multiple benefits, and by strategically substituting or diversifying the asset stocks can further strengthen asset endowments to improve the sustainability of livelihood outcomes. Through the application of livelihood analysis data onto the asset pentagon (see Figure 2 below), declining capital assets can be identified and possible interventions to reinforce existing assets explored. The further away from the central point of the pentagon an asset plot lies, the greater the influence on livelihood outcomes. Ideally, each plot on the pentagon will show increasing access to all assets.
The asset pentagons in figure 2 have been drawn subjectively and require substantial quantitative evidence to support their assertions. However, they clearly indicate the difference in capital stocks available to the rural poor in Northern and Copperbelt Provinces as discussed in the main body of the report and summarised below:

**Human Assets:**

- Human capital available to the rural poor living along rural feeder roads is equivalent in Northern and Copperbelt Provinces.
- Catchment area of RHC’s typically extends beyond 30km and 3,000 people (minimum population required for a health post or clinic). Fees vary between clinics but method of payment duplicated across Provinces. Problems of physical and financial access to basic health care similar in Northern and Copperbelt.
- Access constraints to primary schools also duplicated between provinces. Distance to school being a priority concern. Principle mode of transport to school is on foot or bicycle. Fee payments in cash or kind for both Provinces.
- Copperbelt's asset base is marginally stronger due to proportion of economic activity. Hence, greater scope for formal employment in commercial centres where the copper mining industry predominates and the service sector is growing. There are a greater number of secondary schools available to pupils in each district of Former Ndola Rural. The Copperbelt houses one of only two universities in the country, giving rise to local enterprise.

**Natural Assets:**

- Natural assets vary between survey provinces. Northern Province has an area of 147,826 square km and a population of 855,177 (1998 figures courtesy of Care International). Population density is extremely low, therefore land resources are abundant. Chitimene (slash and burn) farming widely practised by Bemba ethnic group, hence natural resources for livelihoods gradually diminishing. Scattering of population makes it increasingly hard to
justify and prioritise road investment or to relocate services where the greatest number of people will benefit. Livestock available for animal draught has decreased because of disease, yet the Bemba people do not traditionally keep oxen or donkeys.

- Inhabitants of Chilubi and Luwingu districts benefit from the fish stocks found at Lake Bangweulu, as do people in Kaputa and Mbulungu who can utilise resources at Lake Mweru Wantipa and Lake Tanganyika respectively (water and wetlands cover about 5% of the area).

- The Copperbelt has an area of 31,328 square km and a population of 1,427,545 (1998 figures), hence, greater population pressure. Yet it benefits from a more compact road network, which penetrates all rural districts giving rise to rural-urban linkages. Farmland in Mpongwe District is especially fertile.

- The use of animals for transport is a culturally accepted practise amongst the Lamba ethnic group (Copperbelt Province), yet corridor disease (a disease of the central nervous system) has severely diminished cattle stocks, as in Northern Province.

- The Copperbelt contains no lakes, and the river networks have no potential for natural transport systems.

Financial Assets:

- Councils in both provinces prioritise investment where agricultural productivity is high, resulting in further isolation and marginalisation of least productive districts, as is the case in Lufwanyama District, Copperbelt.

- The surveys did not reveal any regular inflows of money into rural areas in the form of pensions or remittances, although there is certainly more scope for both forms of income in the Copperbelt where a greater proportion of family members are formally employed in the towns or where former miners now undertake farming activities in rural areas.

- Access to credit remains unachievable by the absolute poor in Northern and Copperbelt Provinces because they typically have no means of collateral, and are therefore unable to repay loans to invest in transport modes or small-scale enterprise. Emergent farmers in the Copperbelt, however, benefit more from the presence of donor-funded programmes, which include credit schemes such as the Social Recovery Project and IMT project (run by the Technical Development Advisory Unit).

Physical Assets:

- The pentagon in figure 2 indicates that the greatest difference in capital asset stocks between the Provinces under survey is physical assets. Due largely to it’s sheer size and lack of funding by the road fund under the Road Sector Investment Programme (ROADSIP), the Northern Province has a grossly inefficient feeder road network whose impact on the rural poor is manifold. Vehicle stocks diminish because the road condition causes irreparable damage to vehicles, leaving fewer transport services to serve rural feeder roads with extortionate fares.

- A similar pattern emerges in the Copperbelt where transport services become inaccessible to the extreme poor and transport terminals and storage facilities become obsolete. Yet, there has been a recent spate of funding for the rehabilitation of eight feeder roads in the Copperbelt (140km of road funded by the European Union in 1997) which has markedly improved access to basic health and education services and markets for the rural poor, hence increasing the potential to improve their human and financial assets.
Road investment is more sporadic in the less productive Northern Province, and any significant investment tends to be spread thinly between a number of roads.

Scotch carts are more commonly used in the Copperbelt for goods transit and farming.

Social Assets:

- Social capital assets are replicated in both Provinces where community networks and stakeholder groups are apparent in most communities. Women’s groups, farmers cooperatives, and village committees etc act to disseminate information and lobby local government officials and NGO’s for funding, materials with which to undertake construction and maintenance of infrastructure and to provide support in a crisis.
- Indeed, evidence of community self-help road maintenance indicates high social capital. The questionnaire surveys indicated that 72% of respondents in the Copperbelt and 74% in Northern Province are willing to provide voluntary labour for road improvements with the help of an engineer.
- Relationships of trust at a local level are strong in both provinces where social interactions are as important to livelihood outcomes and life chances as more tangible assets. Beer parties, funerals and extended family relations in general all contribute to the well-being of the rural poor, and more formal social groups such as the Parent-Teacher Association (PTA) who ensure that village services are run effectively (for example by collecting primary school fees and delivering to the education authority).

The participatory surveys combined with quantitative data revealed that the greatest asset available to the rural poor in Northern Province is social, and the least prominent asset is physical whereby the infrastructure networks and vehicle stocks are dilapidated, inefficient and in some communities non-existent. In the Copperbelt, social assets are also deemed strongest, indicating their importance as an informal ‘safety net’ during periods of intense insecurity. When communities draw on urban-based relatives during crises, these tend to be from larger cities in the province (Ndola or Kitwe) or the capital Lusaka. However, if the cause of vulnerability is such that it encompasses a wide localised area such as drought, social assets might become obsolete if relatives are also located in the affected area.

The weakest asset amongst the rural poor in the province is financial although this trend is likely to change with an increasing number of credit institutions. However, the appropriateness of such schemes for the extreme poor has yet to be fully determined, and may in fact foster future generations of indebtedness, which will undermine the value of existing assets.

6.1.2 Policies, institutions and processes

Policies, institutions and processes operate at all levels, from the household to national politics and international aid and therefore affect the rural poor in Northern and Copperbelt Provinces equally. The enabling environment of rural producers has disappeared with structural adjustment in the 1980s, the impacts of which are extensive. Livelihood capabilities have been thwarted by the public sector reform programme, which has seen the removal of subsidies on production and consumption, cost sharing in the provision of health and education, and removal of public transport services.

Private sector investment in all sectors is not yet sufficient to fulfil demands of the rural poor in relieving the effects of poverty. Emergent farmers can benefit from private fertiliser and seed manufacturers such as Omnia, yet small-scale farmers have neither the capital or transport means
required to access inputs from private producers. Likewise, private transport services are operated on an informal basis and are therefore infrequent, unreliable and costly, and typically do not operate on tertiary feeder roads where the risk of damage to transporter vehicles is high, and the economic returns low. Improvements to transport infrastructure have, in recent years been sub-contracted to private contractors such as Akapesi General Contractors and Kafula General Supplies and Contractors (Luwingu) who commonly use labour intensive techniques to undertake rehabilitation and maintenance where the local councils have no capacity to do so.

Clearly, the structures and processes that affect rural livelihoods have transformed considerably over the last two decades. Donor agencies and NGO’s have injected capital investment into sectors where government institutions have failed. Yet, this has fostered dependency by local communities and the Government of the Republic of Zambia alike who continue to live in a culture of indebtedness.

Increasingly however, donor funded programmes are promoting community empowerment so as to remove local power relations and enable communities to take responsibility for their own development. The principle objective of the proposed LEEP (Livelihoods Enhancement Through Empowerment and Participation) project was to help poor people to enhance their livelihoods in Northern Province, yet was withdrawn before it even started because of concerns over capital investment and its potential for success. Donor funded programmes of community empowerment have been beset with problems in the Copperbelt also, the Small-holder Development Programme (SDP) being a case in point, where alleged corruption and change of project management after seven years of success caused funding to be withdrawn.

Zambia is blighted with weak institutional resources, and although aid programmes support poverty reduction, they too prioritise investment in areas of high productivity and profitability. Hence, rural funding is concentrated in the Copperbelt, which has a high population density and is natural resource rich compared with Northern Province, which is sparse, unproductive and has negligible local government influence.
6.1.3 Vulnerability and livelihood strategies

The table below summarises measures of vulnerability in both survey provinces and strategies used to counteract risk and adversity:

<table>
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<tr>
<th>Province</th>
<th>Vulnerability Indicators</th>
<th>Livelihood Strategies</th>
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| Northern And Copperbelt| *Food insecurity especially in wet season due to withdrawal of subsidised fertiliser inputs.  
*Malnutrition caused by consumption of monocrops.  
*Road impassability due to seasonal rains leading to high morbidity & mortality because inaccessible RHC’s  
*Population growth and lack of resources (health, education, food, transport services etc) to cope with demand.  
*Demographic changes – spread of STD’s and AIDS leading to decline of economically active adult population.  
*Livestock diseases leading to loss of income, loss of potential transport mode (animal draught).  | *Bartering for clothes, shoes & household commodities at the village, in the absence of transport means to access markets.  
*Diversification of production & return to traditional food crops (cassava and millet).  
*When rural transport services cease during the wet season, villagers walk or cycle to essential amenities (using a ‘machila’ stretcher for medical emergencies).  
*Community groups collectively hire vehicles to obtain agricultural inputs/take produce to market thus sharing costs.  
*Motorised trips used for multiple activities eg. Taking maize/millet to the grinding mill and then mealie meal to market for sale to save time and money.  
*In the absence of a cash income, health clinic and school fees are paid in kind (food crops).  
*When harvests are poor, households diversify their source of income with eg. Beer brewing and knitting for sale/exchange.  
*Contraception – for smaller families and disease prevention.                                                                                                                                                                          |
| Northern               | *Land use conflict between national parks and farmland hence limiting production potential (average land holding 0.5 to 2 hectares).                                                                                                                                                                                                                       | *Small-scale farmers migrate into the bush & practise ‘chitemene’ to propagate fertile soils.                                                                                                                                                                |
| Copperbelt             | *Infrequent delivery of drugs to RHC’s because of road condition leads to the misuse of anti-biotics at RHC’s affecting immunity of vulnerable groups including young, elderly & infirm.                                                                                                                                                                         | *Remittances received from urban relatives.  
*Rural households able to utilise larger, more competitive markets in Kitwe, Ndola, Lusaka because of shorter distances and travel costs.                                                                                                               |

7. RECOMMENDATIONS FOR IMPROVED LIVELIHOOD OUTCOMES

7.1.1 Improved Accessibility

Recommended transport interventions for improving sustainable livelihoods in rural Zambia should include research and development into, and increased supply of IMT’s, for which the demand is clearly evident. The propagation of a ‘critical mass’ would serve to reduce transporter and hire costs, and would foster the provision of spare parts manufacturers and maintenance necessary for sustained utilisation, and would promote local enterprise in areas where small scale farming is obsolete. IMT’s would be of particular service to extension and outreach workers in the delivery of health care and agricultural inputs.

The TDAU’s IMT project is currently in its inception stage, drawing on pilot studies to establish the appropriateness of different IMT modes and capability of the rural poor to manage credit for their
purchase. It is hoped that the project will create awareness as to the benefits of IMT’s for intra and inter-village travel, and foster greater demand for IMT innovations, in particular animal draft technology, which is culturally obsolete in much of the country. It is critical however, that alongside IMT promotion, on-farm training programmes are initiated to incorporate animal husbandry, animal health, harnessing and ox/donkey training. The demise of animal draft power through cattle disease in Zambia was principally a result of poor care. Effective training and veterinary care will help prolong the working life of the animals and improve their efficiency both as a means of long distance transport and in improving agricultural productivity.

The government funded Palabana animal draft power development programme has proved effective in promoting ox-powered transport and more recently donkey power, and issues a bi-annual newsletter for agrarians and extension workers providing advice and information on prices indicators for equipment, spares and veterinary drugs. Yet, the Palabana Farm Power and Mechanisation Centre is grossly under-funded and requires substantial capital investment.

The participatory surveys undertaken in Northern and Copperbelt Provinces highlighted the need to supplement rural transport services with IMT’s. Bicycles are virtually the only mode of IMT that are consistently used throughout rural Zambia, predominantly to travel between the village and main road from where motorised travel is undertaken to the market. Informal transport services are unlikely to fulfil all the travel requirements of the rural poor because of the nature of the feeder road infrastructure, remoteness of rural inhabitation and cost of supply. Yet, the PRA respondents indicated the impact of bicycle use on time, quality of merchandise in transit and health. Hence, IMT provision would fill an important gap in the market. The relaxation of legislation on informal transport services would also help in increasing the number of private transporters on the road thus creating a competitive market, which would reduce the cost of motorised fares for rural households.

In addition, the field surveys undertaken in Zambia indicated the problems associated with feeder road investment where the road network is vast. In ‘Roads are not Enough’, Dawson and Barwell (1993) investigate the option of non-transport interventions to increase accessibility by reducing the need for travel by rural people. They suggest that trip time can be reduced and accessibility increased, by reducing the distance that people have to travel to reach facilities. The location of facilities including agricultural input supply centres, crop marketing facilities, water and firewood sources, grinding mills, schools and health clinics would impact positively on rural livelihood outcomes because of savings in time, capital expenditure and energy. A non-transport approach requires further investigation to explore fully the investment and method of prioritisation required for a given population.

### 7.1.2 Improved institutional capacity

It is recommended that the Sustainable Livelihoods Framework be used as a tool to establish problem sectors and focus interventions and investment where it will reap the most economic and social benefits. It is critical however, that rural communities are thoroughly consulted to identify their priority concerns and requirements before expending capital where it is least effective. A non-transport approach for example would require an examination of local services, and to establish the priority concerns of the community to account for need. A combination of stakeholder consultation, local empowerment and community participation would be required to justify any investment in services, as it is required for any significant road investment.
The Integrated Roads Project (IRP) currently being undertaken in Tanzania exemplifies the potential successes of transport interventions combined with non-transport interventions whilst reducing the risk of dependency through community participation and empowerment.

The Village Travel and Transport Programme (VTTP) as part of the IRP, being carried out in the Morogoro region of Tanzania, has applied direct transport interventions including rural transport infrastructure improvements and provision of appropriate IMT’s, and non-transport interventions onto rural communities. The key objective is to empower both the community and supporting institutions through empowerment education and action research. Although presently a pilot study, the VTTP in Morogoro signifies what can be achieved using a grass roots approach and ensuring that the poorest and most vulnerable in society are consulted effectively.

### 7.1.3 Social Recovery Project

The Social Recovery Project (SRP) is a community-based programme funded by the World Bank. The road component within SRP is the Community Transport Infrastructure (CTI) and is a sub-component of the Community Accessibility Component of the Road Sector Investment Programme (ROADSIP) in Zambia. The project became effective in 1991 and will be replaced by ZAMSIF (Zambian Social Investment Fund) in 2000, which will complement other poverty reduction programmes.

The aim of the CTI is to improve rural accessibility by bringing more of the road network under regular maintenance. Community roads are, by broad definition, those roads that do not fall under the jurisdiction of any road authority. These roads do not receive any budgetary allocations from the government. As more community roads are brought under regular maintenance, transport possibilities will increase therefore relieving vulnerable groups, including women, the problem of being ‘transporters’ of goods on their heads and backs.

The SRP is implemented with communities themselves identifying their needs and applying projects on a cost sharing basis with the community contributing at least 25% of the total project cost and SRP providing the remainder. Selection considerations for SRP funding include:

- The road should lead somewhere (another village, existing passable feeder roads, basic services – health clinics, schools, an area of economic activity etc)
- The road should reduce travel time
- The road should improve public transport possibilities
- Technical requirements should be simple, in design and supervision
- Mode of execution of works will be labour based
- There should be evidence of sustainability by way of maintenance committee or existing maintained structure

Communities are required to apply for funding with the help of local councillors, and a field appraisal to establish the priorities of all community members before work commences.

The SRP has been one of the most successful donor funded projects in Zambia, and promotes ownership of community roads, as well as improving the physical assets of the rural poor and improving their livelihood chances, whilst contributing to poverty reduction. Whilst the roads themselves cannot solve the travel and transport constraints of the rural poor, by empowering the
community to help themselves and actively rehabilitating existing infrastructure, it is hoped that these programmes will proliferate other interventions including transport services and IMT innovations.

Clearly, rural transport planning should be implemented using a package of measures that incorporate the condition of road and track networks, and efficient means of transport for the very remote poor including low cost services and IMTs, without undermining their existing assets. There is a need to communicate the priority requirements of rural communities to transport decision and policy makers, thus avoiding the wastage of donor funding and ensuring that appropriate interventions meet the needs of the poor rather than serve to exacerbate their isolation.

Key References


Egypt’s Social Fund for Development (S.F.D)  
Labour Based Contractor Training Programme  

"UNIQUE FEATURES"  

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LIST OF ABBREVIATIONS

CBM  Carl Bro Management
DAG  Development Assistance Group
Danida  Danish International Development Agency
DKK  Danish Kroner
ILO  International Labour Organisation
I.A.  Implementation Agencies
LBE  Labour Based Engineering
LB  Labour Based
LE  Egyptian pounds
MDRM  Multi Donor Review Mission
NGO  Non Governmental Organisation
PIP  Project Implementation Plan
PIU  Project Implementation Unit
PWP  Public Works Programme
SFD  Social Fund for Development
TASFD  Technical Assistance to SFD
USD  U.S. Dollar
1.0 BACKGROUND

1.1 Programme Agreement.

Egypt is one of 18 programme co-operation countries for Danish development assistance. Until 1996, however, most of Denmark’s assistance to Egypt was concentrated on health, water & sanitation, the environment, energy, agro-related industries and development of small enterprises.

With the intention to expand its assistance and financial support to SFD (Social Fund for Development), Danida arranged two short missions to Egypt in 1996 to jointly identify a possible extended scope of activities to be supported by Danida, both in technical assistance and through direct investments.

As a result, a Draft Project Implementation Plan (P.I.P.) and a Draft Project proposal were produced in November 1996. One of the main objectives of these documents was to improve the unemployment situation in the country by introducing a systematic, carefully monitored training programme in Labour Based technology. This programme would later be tailor-made for Egyptian conditions in various public works disciplines and concentrate on training and employment of aspiring small-scale contractors.

In December 1996 a Project Agreement was signed between the Government of Denmark and the Arab Republic of Egypt. The framework of this agreement was to support SFD’s second phase (1997-2000), with a budget of DKK (Danish kroner) 80 million. This amount represents Danida’s total project budget, which includes both financial and technical assistance to a combined Community and Public Works Development programme.

The overall development objective of this agreement is to make a contribution to sustained poverty alleviation in Egypt.

Within this framework, however, the labour based contractor training programme will not only provide technical and practical training during a series of short courses, but will also contribute to the objectives of poverty alleviation by creating employment for aspiring young entrepreneurs and contractors, as well as employ a large number of labourers and support staff, and, as a result provide a wide range of new or improved infrastructure services to the regions.

While Danida’s support concentrates primarily on the poorer governorates of Upper Egypt1, SFD decided to expand the geographical range of the training programme to 19 governorates2, spanning from Aswan in the south to Alexandria in the north, with an ultimate goal to develop a core of 150 small-scale contractors in labour based technology.

1 Primarily the Southern governorates of Aswan and Qena

2 Egypt is built up of 26 governorates. These are semi-autonomous entities, each with a Presidentially elected governor, reporting to the Prime Minister. The three types of governorates are: 17 Rural, 5 Desert and 4 Urban (Cairo, Giza, Port Said and Alexandria). Each governorate is broken down into 5-15 marakez, which in turn comprise 5-6 Village Councils. The Village Councils are built up both by mother villages and satellite villages. The SFD is represented through regional offices in all 26 governorates.
The first set of Danida funded projects identified by the PWP team were, however, not directly included in the contractor training programme. SFDs Public Works Programme has been engaged in environment-improving projects of canal cleaning and/or encasing for several years. During the initial short-term TA missions to SFD in 1997, therefore, in addition to preparing the framework of a national LB training programme, a range of environmental oriented projects in Upper Egypt were also identified. These projects were selected jointly by the regions and SFD and proposed as future projects through SFD/PWP. The main scope of work would involve cleaning and encasing polluted irrigation canals in concrete, backfilling and improvements to the area, and would delegate future maintenance duties of the canal culverts to the respective regional municipalities.

In 1997, Danida approved USD 2.0million equivalent towards a range of environmentally sensitive canal projects in Aswan and Qena. The budget was part of Danida’s total programme donation of DKK 80.0 million, and was the first project to be implemented after TASFDs assignment to SFD and mobilisation in Egypt.

The initial number of projects in Aswan and Qena was 17, later extended to 22. From 1998, all 22 projects were tendered and awarded to regional contractors already short-listed with SFD. All of these projects have now been successfully completed and were handed over by September 2000.

1.2 TASFD

The foundation for the scope and role of TASFD (Technical Assistance to SFD) was laid out in the 1996 Project Agreement to support SFD’s Second Phase through the year 2000.

To implement such services, Danida floated tenders to a number of short listed consultants in 1997. Both the Contract Agreement between CBM (Carl Bro Management) and Danida, (TASFD), and a separate agreement between Danida and SFD were signed in December 1997. The services of I.T. Transport Ltd./UK were retained through a sub-consultancy with CBM to manage the contractor training component of the programme.

Danida’s technical and financial assistance to SFD through the TASFD represents a viable means of assisting SFD in achieving its stated objectives and expected outputs. Hence, TASFD’s overall development objective coincides with that of SFD; i.e. “to make a contribution to sustained poverty alleviation in Egypt”. Within this framework, two immediate objectives of the project are defined as:

1) to contribute to employment creation through improved social services and improved physical infrastructure, which particularly are benefiting poorer segments of the population in Upper Egypt

2) to increase the capacity of SFD to serve as a vehicle for long-term poverty alleviation.

Based on the Project Agreement and Danida’s Terms of Reference for the project, TASFD is following the scope of services as outlined in the Implementation Plan, to achieve the project objectives through three components:
• **HRD Component**, through an HRD Unit working with SFDs Community Development Programme (CDP), stationed in Cairo, Aswan and Qena.

• **NGO Component**, through an NGO Unit working with SFDs CDP, stationed in Cairo, Aswan and Qena.

• **LBE Component**, through an LBE Unit of two civil engineers working with SFDs Public Works Programme (PWP), stationed in Cairo.

1.3 Training Development

The scope and outline of the new Labour Based training programme which SFDs PWP (Public Works Programme) has implemented since 1998, was progressively developed by various experts in this field, primarily building on the following:

- projects and systems already in progress under SFD/PWP since 1992

- relevant training and reference material designed and used under ILO managed LB projects (primarily in sub-Sahara Africa and Asia)

- scope, approach, curricula and programme design developed from the 1996 Project Implementation Plan, and subsequent reports and recommendations from three TA consultancy & project planning missions in 1997

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Results

- 150 Contractors trained in labour based engineering techniques and business management
- 17 environmental projects (canals)
- Joint PWP/CDP projects

TASFD

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**ILO/ASIST 8th Regional Seminar for Labour Based Practitioners**

**October 2000**

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various inputs from national and international consultants, prior to, and after, the project tender and award of the Technical Assistance contract (TASFD) to Carl Bro Management in December 1997.

By mid-October 2000, i.e. with less than 7 months remaining of the present active training phase, it is now clear that the above goals will easily be surpassed, not only to reach the core target of 150 new small scale LB contractors, but also by including more than 100 of SFD’s existing contractors who have completed a tailor-made, parallel orientation/training programme, together with more than 50 regional NGOs representing the 19 governorates.

The contractor training programme itself is clearly becoming a success story for SFD and the governorates, but also an international eye opener, which should become more apparent during the 8th ASIST conference.

Within the programme’s first two years (October 1998 – October 2000), construction projects have been awarded to trainees and established contractors in four of the project’s total of six groups. The total value of the contracts is in excess of LE45million (USD12.9million\(^3\)). Considering that Danida’s overall programme budget is about LE33million (USD9.7million) for all of TASFD’s 3-year activities, of which SFD/PWP’s gross training budget for LB contractors is only USD1.7million equivalent, the \(\frac{3}{4}\) mark result of the contractor training programme shows good prospects for a continuation, as well as a justification for expansion.

The key to the success and reasons for the present momentum of SFD’s new Labour Based contractor programme can be summarised in the following four corner stones of basic training:

- Need
- Teamwork
- Expertise
- Funds

1) **The need**\(^4\) is clearly reflected in the national interest, and the large number of highly academically qualified applicants to the programme (refer Section 2.2), the low drop out rate (less than 4%), and the goodwill and manner by which the “old timers” of the established groups of SFD’s regional contractors welcome the new candidates to their trade.

2) **The teamwork** spans nationally through 75% of Egypt’s governorates, reaching across the private and public sectors, with SFD as the central control of a well defined programme, assisted by national and international advisers along the way, and by experienced implementers through close monitoring.

3) **The expertise** of the programme is founded on the broad international knowledge of labour based contracting and training, which SFD/PWP largely acquired through TASFD and its associates. This expertise was augmented by short-term missions of international experts at optimum periods of the training, and participation in international conferences and workshops.

\(^3\) 1USD = LE 3.5  
\(^4\) also refer “The Demand for Labour Based Contractors”/TASFD March 2000
by SFD/PWP staff and the national training consultants during 1997, 98 and 99. A major plus in the programme was SFD’s decision to use a responsible local training consultant.

4) The adequate and timely availability of funds from SFD’s sources is naturally a critical source of success to a programme as complex and widely implemented as this. The long experience by SFD prior to the initiation of the Danida funded LB programme proved to be vital for a smooth running programme.

2.0 UNIQUE FEATURES

2.1 National Coverage

SFD/PWP’s main objective is to provide basic services for the poor, and in doing so create job opportunities for the unemployed.

Based on the results of a survey commissioned by SFD to map and categorise the poor and unemployed all over Egypt, PWP laid down an action plan to prioritise targeted governorates and districts for development and channelling of funds to their designated beneficiaries. Governorates in Upper Egypt, followed by rural areas in Lower Egypt, and then deprived districts in urban settings respectively, constitute PWP’s three phased action plan for proper funnelling of grant funds.

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5 Refer PWP Programme Manual, p.8
The widespread presence of SFD’s activities and services throughout rural Egypt allowed PWP to reach its targeted communities and actually improve their quality of life. PWP’s projects increased in scope and demand since start-up in 1992. PWP is currently funding labour-based social, economic and productive infrastructure projects in most of the country’s governorates. These projects include potable water, wastewater, roads, environmental projects and public buildings.

While TASFDs HRD and NGO programmes are confined to Upper Egypt, SFD/PWP made it clear from the outset that the design and coverage of the structured LB training programme should aim at reaching the maximum number of governorates already part of PWP’s infrastructure projects. Secondly, the programme should not be limited to only the more conventional field of rural, gravel roads, but during its first phase also include important disciplines such as potable water, roads and environmental projects (improvement of irrigation canals).
During the pre-project phase, therefore, PWP decided to expand the geographical coverage of the LB portion of TASFDs portfolio to cover 19 governorates, representing more than 80% of the nation’s population, and spanning from the most southern town of Aswan to Alexandria and Port Said in the north. Realising that this set up deviates from the norm of most other programmes, which often are confined to 1 – 2 training centres, the total training programme was divided into three batches of 6 groups located at 6 different training venues as follows:

<table>
<thead>
<tr>
<th>Batch No</th>
<th>National distribution of training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group No.</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

2.2 Selection and recruiting of candidates

The format of the training programme was drafted during the initial planning phase of the project and built on concepts and procedures from a range of other international projects. A major reference was also SFD’s 6 year’s experience of funding, implementing and managing a wide range of labour intensive projects throughout Egypt.

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6 Refer LCU’s central training facility in Lesotho, Botswana’s training at RTC and FTU, Zambia’s training centres, Kisii Centre in Kenya, etc.
Most other LB programmes in Egypt mainly concentrate on road projects and are implemented through a ministry (Ministry of Works, Roads Department, etc.). They benefit from an already existing cadre of experienced labourers and foremen from established force account projects. SFD's programme does not enjoy this luxury.

During the initial planning periods of the programme, it was agreed to encourage the training of candidates with fewer academic skills, but with a wider practical experience in construction. The groups of trainees were selected to be as homogenous as possible, both academically and with similar practical experience. The initial expectation was that few women would apply for the course, but most such initial assumptions were proven wrong as the applications and testing of candidates progressed.

**TYPICAL 7 WEEK RECRUITING SCHEDULE**

<table>
<thead>
<tr>
<th>Activity</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th># Trainees (Total for all groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1567</td>
</tr>
<tr>
<td>Application Period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1567</td>
</tr>
<tr>
<td>Initial Screening</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>969</td>
</tr>
<tr>
<td>Written Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▼</td>
<td>969</td>
</tr>
<tr>
<td>Review &amp; Select</td>
<td></td>
<td></td>
<td></td>
<td>▼</td>
<td></td>
<td></td>
<td></td>
<td>497</td>
</tr>
<tr>
<td>Interview</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▼</td>
<td></td>
<td>497</td>
</tr>
<tr>
<td>Final Selection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▼</td>
<td>165</td>
</tr>
<tr>
<td>Start Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▼</td>
<td>158</td>
</tr>
</tbody>
</table>

The majority of the applicants had university degrees in commerce, tourism or engineering, or technical school graduates. Approximately 7% of the original applicants were women.

Compared to other training programmes, the total advertising and recruiting period was extremely fast track. The contract between SFD and the national training consultant was awarded in the last week of August 1998 and the training course of the first group had already started by mid-October. The initial outline of the training material and final work plan were drafted in parallel to the 7 week recruiting period for the first batch.

The recruitment and selection of the three batches of trainees from the selected 19 governorates (6 groups), as shown above, followed a standard sequence and involved a panel represented by the training consultant (Chemonics Egypt), TASFD and SFD/PWP. The procedure was as follows:

1) Advertisement in local press; 3½ weeks
2) Registration and collection of application forms from Regional PIU Offices, SFD offices and from Training Consultant’s Cairo office; 3 weeks (overlap with 1)
3) Review, screen and select of applicants for (2 stage) written tests; 1½ weeks (overlap with 1 & 2)
4) 1 day written test, review results and select short list of candidates for oral interview by panel; 1 week.
5) Interview; 1 day per group.
6) Final selection and invite to course; 4-5 days
7) Start course (Introduction session); 3-4 days after approval and invitation.

The three main qualifications for applying were, that the candidates should be between 25 and 35 years of age, with a minimum high school degree, that all male applicants should have completed their military service and that the candidates should apply for a course to be conducted in his/her governorate.

While the interest in the course was much higher than expected (10 times the estimated final number of applicants), the drop out rate of approximately 38% from those who collected application forms to the candidates who were selected to take the written tests (a two step test in common knowledge and technical subjects) was not unexpected.

A further cut by more than 50% after the written tests still left 474 men and 23 women from 19 governorates for the panel interview with each candidate. Following the selection of 165 candidates for the course, 158 agreed to start and, as of October 2000, there are still 154 dedicated contractors in the programme, relatively evenly distributed between the six groups.

2.3 Training phases & Methodology

SFD’s Public Works Programme is considered the lead local institution that pioneered the concept of labour-based construction in Egypt. SFD has done this initially through the enforcement of its guidelines and subsequently through beneficiaries believing in the positive experiences gained by such enforcement. Because PWP has the intention to institutionalize the LB concept within Egypt and the region, it strives to replicate its experience by creating and supporting local expertise in that field. This is why it opted for sharing the training responsibilities between international experts and a national training firm, although this firm’s original experience in labour based technology was slim.

Initially, it was proposed to design a two batch training course of two equal back-to-back modules of 10 months each, broken down in four theory sessions and four practical sessions, the last of which should be a 3 month, independently executed contract. This was not found to be feasible, and an alternate work plan was agreed upon between PWP, TASFD and the Training Consultant (Chemonics Egypt).

- Firstly, the large groups of contractors already registered with SFD in all 26 governorates could feel threatened by competition from the new groups of emerging contractors, clearly with the support of SFD. Hence, a programme that introduced a better integration between the new groups and the existing contractors was developed.
- Secondly, it was decided to start the programme with a smaller (pilot) group of trainees in governorates close to Cairo, rather than in Upper Egypt. The training of Group 1/Batch 1 was conducted in Menoufya and Qalubya governorates north of Cairo, with initially 23 trainees, followed by larger groups in Upper Egypt, the Delta region and the northern governorates.
- Thirdly, it was decided to introduce a typical 37-week module for three batches (of six groups total), which would overlap during the last 2-3 month periods of practical subcontracts, in order to reduce the overall project period.

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7 Refer page 32, PWP Programme Manual
The standard 37 week module was broken down into the following 8 phases:

<table>
<thead>
<tr>
<th>Training Phase</th>
<th>Activity</th>
<th>Duration (Weeks)</th>
<th>Main Training &amp; Reference Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orientation and Initial Theory</td>
<td>2</td>
<td>Introduction, Business Management, Practicing Entrepreneurship, Pricing &amp; Bidding</td>
</tr>
<tr>
<td>3</td>
<td>Apprenticeship</td>
<td>8</td>
<td>Contract Documents and Site Management Manual</td>
</tr>
<tr>
<td>4</td>
<td>Tender Period for Subcontract</td>
<td>4</td>
<td>Tender &amp; Contract Documents</td>
</tr>
<tr>
<td>5</td>
<td>Tender Review &amp; Award</td>
<td>-</td>
<td>- ditto -</td>
</tr>
<tr>
<td>6</td>
<td>Final theory Sessions</td>
<td>-</td>
<td>Misc. lecture material and material from Phases 1, 2, 3 &amp; 4</td>
</tr>
<tr>
<td>7</td>
<td>Subcontracting Period (Ph 5,6,7): 16</td>
<td></td>
<td>Contract and all reference material</td>
</tr>
<tr>
<td>8</td>
<td>Wrap Up and Graduation</td>
<td>1</td>
<td>N/A</td>
</tr>
</tbody>
</table>

During the two weeks of work shadowing, the trainees are assigned to reputable SFD contractors in each of the three main disciplines of the programme. After completion of phase 2, the trainees choose which contracting field to pursue, providing there is sufficient demand for such work in the respective governorate.

Phase 3 (Apprenticeship period) is also a practical period, performed in close co-operation with an established SFD contractor as a practical mentor. The training consultant is responsible for close supervision and interim theory sessions by short-term trainers through the Resident Engineer. Regular assistance is provided by TASFD and the PWP.

Thus, after the first 16 weeks of theory and coached field sessions, the trainees move to phases 4 and 5, which prepare them for tendering and award of a practical subcontract. Phases 4 and 5 last for 2-3 months. The funds for the projects are transferred by SFD to the Project Implementation Units, and the trainees sign a contract with the main SFD contractor, as a result of the tender.

The core management responsibilities and co-ordination of the programme was directed form the Cairo Headquarter with daily contact with the TASFD LB team. The central training team consists of a Project Supervisor with a Quality Assurance Panel, a Project Manager and a Project Coordinator with a Production Unit. In turn, each of the three training batches has a Batch Manager with an appointed Resident Engineer for each of the six groups.

During the initial phase of the programme, a one-week introductory workshop was held with input from two international LB experts. During each of the Apprenticeship periods, SFD approved further inputs from an international LB consultant for a 2 week mission for theory and field

8 refer Work Plan (Chemonics Sept 98)
training. In May 1999, a three day Stakeholders Workshop was arranged by TASFD, headed by an international expert in LB contracting and training.

After completion of the subcontract, each trainee receives from the project a full set of hand tools as per a pre-agreed list. By that time the trainee has obtained (or is in the process of obtaining) membership of the Contractors Union and has completed a 37 week intensive course in practical and theoretical aspects of labour based contracting. Following this, the trainee can proceed to tender as a short-listed sub-contractor or a main contractor, either on SFD-sponsored projects or in the open market.

2.4 Training Material and Language

The PWP team and TASFD’s LB Technical Advisers agreed early in the programme to follow a common format for the design of the training material in the Handbook and Workbook. The format was based on some of the ILO’s training modules; e.g. the “Improve Your Construction Business” (IYCB) manuals and the "Road Maintenance and Regravelling” (ROMAR) manuals. Material from various other training programmes was also consulted. The pure theory sessions were split from the practical exercises, which created good interaction with the trainees and gave them a broader understanding of each subject. SFD has signed a contract agreement with ILO’s Publication Department in Geneva to issue Arabic versions of the six IYCB books and of the field manual: "Building Roads by Hand", to use as training and general reference material in the programme.

Another challenging aspect of SFDs training programme is not only the need to have all training material in Arabic, but also to deliver lectures in Arabic. This is required for all work with the trainees, and during the seminars with the established contractors. This requirement caused some initial delays in the lecturing by international consultants. During the course of the programme,
however, the system was improved to provide a better routine of direct translation, both in the classrooms and on site.

More importantly, the national training consultant (Chemonics Egypt) developed a set of new modular training materials, tailor-made to Egyptian conditions and contracts. This material became the core training and lecturing material in the programme, not only for the construction disciplines of potable water, roads and irrigation canals, but also for the comprehensive manuals in management and financing.

The training material is being used in all three batches of the programme, and will be published in its final Arabic version to the public by SFD by the end of the project. The Manuals in Business Management and Practicing Entrepreneurship have also gained attraction outside the programme and outside Egypt.

The following eight training packages, which follow the Handbook and Workbook model, are introduced at the respective phases of the programme in Arabic, (refer Section 2.3):

1) PROGRAMME INTRODUCTION
   - Construction Industry
   - Construction projects
   - Contracting Sector Legislation
   - Public Works Sector
   - Implementing and Maintaining L.B. Projects
   - Reviewing Geometric Terminology and Measures.
   - Introduction to Labour Based Road Projects
   - Introduction to Labour Based Environmental projects
   - Introduction to Labour Based Water Projects

2) PRACTICING ENTREPRENEURSHIP
   - Entrepreneur Era
   - Characteristics of Entrepreneur and Factors of his Success
   - Tendency Towards Entrepreneurship Thinking
   - Strategic Planning for the Contracting Company
   - Young Contractor……Effective Leader
   - Young Contractor……Risk Undertaker
   - Decision Making skills in Contracting Industry
   - Effective Use of Time

3) PRICING AND BIDDING
   - Contractual Procedures Under Law No. 89 of 1998
   - Obtaining Specifications, Conditions of Contract and visiting site
   - Study of Tender Document and Tender Analysis
   - Evaluation of Direct Cost
   - Evaluation of Total Cost
   - Tender Submission
• Contract Award and Contracting
• Taking over Site and Project Implementation
• Initial and Final Handing over of Project
• Outline of Accounting for Small Scale Contracts

4) LABOUR BASED ROADS PROJECTS
• Public Works Projects
• Fundamentals of Road Construction
• Project Work Items
• Materials, Tools and Equipment
• Tender Documents
• Procedures of Contract Implementation
• Earthwork; (Supply and Place)
• Pipes/Culverts; (Supply and Place)
• Stone Pitching
• Base course and Sub Base; (Supply and Place)
• Surface Layer; (Supply and Place)
• Quality Control
• Tender and Cost Calculations
• Initial Handing Over
• Methods of Repair and Maintenance
• Safety and First Aid

5) LABOUR BASED ENVIRONMENTAL PROJECTS
• The Irrigation System in Egypt
• SFD Environmental Projects
• Canal Lining
• Canal Covering
• Work Items
• Materials, Tools and Equipment
• Labour and Performance Rates
• Tender Documents
• Work Performance
• Canal Lining
• Construction of Box Culverts
• Quality Control and Quality Assurance
• Tender Preparation for Labour Based Projects
• Initial Handing over and Accounting
• Canal Cleaning
6) LABOUR BASED WATER PROJECTS

- Introduction
- Water Supply
- Labour Based Construction
- Bidding for Labour Based Water Supply Projects
- Site Preparation
- Well Construction
- Excavation and Bedding
- Visual Inspection and Installation of Pipework
- Water Network Accessories
- House Connections
- Crossing of Canals, Drains and Roads
- Post Installation Inspection
- Water Tanks
- Safety Procedures
- Invoicing, Preliminary and Final Hand Over
- Labour Performance and Rates

7) SITE MANAGEMENT

- Introduction
- Philosophy of Site Productivity
- Labour Productivity in Construction
- Site Preparation
- Planning and Monitoring of a Project
- Preparation of Barcharts
- Preparation of Detailed Schedules
- Outline of Monitoring
- Monitoring of Project Time
- Quality Control
- Managing of Contracts
- Overall Site Planning

8) BUSINESS MANAGEMENT

- Financial reports
- Financial Analysis
- Budget Planning
- Cash Flow
- Bank Facilities
- Insurances
- Social Insurance
- Taxes in Construction
- Work Planning
- Administrative Communication
- Variations in Work Orders
Claims and Settling of Disputes
Negotiations.

This locally produced, comprehensive training package is considered as pioneer reference material not only for labour based projects, but is already widely requested for various other business enterprises and entrepreneurial programmes, even outside Egypt.

During the planning and pilot phase of the programme, (i.e. prior to award of the training contract to the national consultants in 1998), modules from Lesotho, Botswana and Zambia were used as reference models by the project design team. Likewise, various training materials from Asian projects were used to build a conceptual structure and syllabus of the SFD training programme. The draft outline was amended and expanded upon during the initial phases of the training, which physically started with the first batch of 23 trainees in Northern Egypt in October 1998.

2.5 Project Disciplines and Training Cost

The PWP aims to implement the following main categories of projects under its infrastructure and municipal services:

- **Social:**
  Potable Water projects
  Repair flood damages
  Schools & Health clinics

- **Economic:**
  Roads
  Pond fillings and landscaping

- **Productive:**
  Environmental projects; Covering & cleaning irrigation canals

The original outline of the LB training programme from 1996/97 suggested a limited number of subjects, a simple modular training programme, and use of only a few established training centres. This scope was found to be too limited, if the programme was to reach a large cross-section of the rural areas, and achieve a larger impact of training and employment.

PWP also decided that the LB programme during this phase should cover most of the above categories of projects (e.g. roads, water and environmental projects), and not be limited to roads.

SFD/PWP also requested draft training-materials for building and wastewater to be produced during this period, for a possible implementation at a later phase.

SFD/PWP decided, from their experience, to expand the project coverage beyond the geographical areas of Danida’s typical interventions (i.e. Upper Egypt), and include a total of 19 of the country’s 26 governorates. The training was delivered in 6 different groups split geographically as follows (refer Section2.1): 4 groups representing 11 governorates in the northern regions, the Nile Delta and the Cairo/Giza areas, and the remaining 2 groups representing 8 governorates in Upper and the more Central/Minya regions. In this way, more than 75% of the country’s populated areas would
benefit from the training programme. There would be 6 sets of training centres, all represented by a local full time resident engineer.

SFD also insisted that the LB training programme should be managed in a way that would promote the input of local consultants and transfer knowledge in labour-based technology to national companies and individuals.

PWP therefore departed from the more traditional format of employing an international Project Manager/CTA (Chief Technical Adviser) in an administrative position, supplemented by a range of inputs by short-term consultants. This ”older” format was considered to be a potential bottleneck, by keeping the macro-expertise outside SFD, and possibly outside Egypt, after the contractor training was completed.

As such, it was decided to maintain the management, advisory and monitoring duties to international LB experts through a Danida appointed consultancy, working closely with SFD/PWP on a daily basis, and accommodated on PWPs premises. In addition, it was also decided to award the training programme to national companies, who would work hand in hand with the international experts, SFD/PWP, PIU regional offices, the trainees, contractors, etc. until completion of the training. Transferring of LB knowledge would therefore be fulfilled, and a broader group of team players and responsible parties would gain increased experience, from the period of joint planning, through training and implementing a variety of types and number of contracts.

The consultancies for producing training material and planning & implementing the training programme were awarded by SFD in August 1998 to an approved combined budget amount of LE5.33million (USD1.6million). In addition to training of contractors and implementing more than 150 labour based main and sub-contracts during the two year period from October 1998, (all in roads, potable water or irrigation canal covering), a total of 22 environmental projects in Upper Egypt have also been completed. The approved budget for these environmentally oriented projects was USD2.0million (equivalent), funded by Danida. This brings the total contribution to the Public Works Programme funded by Danida, including the Contractor Training close to USD3.6million equivalent.

The basic training contract with the national consultant to the amount of LE4.14 million will result in the training of 154 new LB contractors and run separate orientation programmes for 100 established contractors. This training follows a 37 week module for three batches.

From the above, a training cost per person per day can be estimated to a surprisingly low amount of less than USD8.5, including the cost of tool kits for all graduated trainees. The total projected cost of main and subcontracts (training and post training) is expected to reach beyond LE50million (USD14.7million) by completion of Batch 3, while, in comparison, the entire Danida donation to the TASFD project is DKK80million (USD10million). The training programme can clearly claim value for money.

\[9 \text{ LE } 4.14 \text{ million/3.5x254x185(days) x 3 (batches)=USD 8.39}\]
In comparison to the World Bank funded LB training programme to LCU in Lesotho from 1993 to 1995, with its overall training and programme budget of USD1.2million, which resulted in 24 LB contractors trained over 2 years, SFDs programme proves to be competitive.

Also, compared to the Labour Based Rural Roads Rehabilitation and Maintenance Programme\textsuperscript{10} in Zimbabwe, with an estimated number of 277 trained personnel of 7 various categories (and 25\% drop out rate) over 3 years, SFDs programme should inspire replication/or expansion.

2.6 Project Cycle and National Co-ordination

SFD’s PWP Programme Manual outlines two sets of objectives in their planning and implementation of projects:

Firstly, \textit{Short and Medium Term Objectives}: These are executing community based infrastructure projects, primarily in rural areas, which absorb part of available labour force during implementation, operation and maintenance of such projects.

Secondly, \textit{Long Term Objectives}: Ensure the Public Works programme’s sustainability by upgrading the capabilities of beneficiaries, establishing an efficient management and monitoring system of integrated public works projects through labour based methods, and through the creation of a cadre of new entrepreneur contractors.

SFD’s construction projects are implemented under PWP in all 26 governorates in Egypt. The standard PWP project cycle which is followed, is broken down in three phases: a) Regional Identification and recommendation, b) Central Assessment and Pre-Approval and c) Final Approval and Implementation. This procedure is seen as being elaborate from a normal labour based contract point of view. As a result, the actual contract awards and project start up of a number of the LB subcontracts were achieved later than originally expected. As a result, the national training consultant’s contract was extended by 5 months through April 2001.

One disputed clause in the conditions of a standard SFD Labour Based contract implemented before the training programme started in 1998, was a requirement that the wages paid to labourers employed on a project would account for a minimum 25\% of the contract cost. The LB advisers to SFD and PWP jointly decided to approach the labour issue from a more common, and a more fundamental definition of a Labour Based Programme. The simplest of the frequently quoted definitions, which has been used by TASFD, is: ”A project/or part of a project is considered to be Labour Based when the prime mover of the project is the labour force.” The training programme was therefore designed to concentrate more on efficient planning and optimum productivity, which on occasion could result in the labour contribution to vary even below the 25\%, in spite of the original SFD/PWP requirement.

The large number of established contractors in all the governorates, for whom the first groups of trainees were assigned as subcontractors during the final phase of practical training, found the main strengths of the programme to be the new graduates’ ability to properly plan their work programme,

\textsuperscript{10} Page 84 Danida Feasibility Report of June 1996
both with respect to cash flow, project time and optimum utilisation of work forces through the allocating of tasks, and awareness of quality control.

**PWP TYPICAL PROJECT CYCLE**

- **BENEFICIARIES**
  - POPULAR COUNCIL
  - TECHNICAL DEPARTMENTS

- **REGIONAL ASSESSMENT**

- **SFD/PWP & Consultants:**
  - Technical
  - Financial
  - Environmental
  - Priority ranking
  - Social Impact

- **SFD IN-HOUSE ASSESSMENT AND PRE-APPROVAL**

- **APPROVAL AND TRANSFER OF FUNDS**

- **IMPLEMENTATION PHASE**

- **P.I.U. MANAGERS’ TECHNICAL & ECONOMICAL FRAMEWORK AGREEMENTS**

- **IMPLEMENTATION AGENCIES**

- **REGIONAL CONTRACTORS**
3.0 THE FUTURE

By the end of April 2001, SFDs present Labour Based Contractor training programme will be completed and should have exceeded its objectives. The trained contractors will represent 19 of the country’s governorates, and be members of the Contractors Union. All graduates will be registered on SFDs short list of contractors, and qualified for small and medium sized projects in roads, water or irrigation canal works.

At the National Conference for Social Development in Cairo on September 17\textsuperscript{11}, it was stated that Egypt’s development agenda emphasises the importance of education, and the need to develop the educational system to correspond to the actual needs of the society. It was further announced that the objective of this policy is to produce a new generation of qualified personnel who can manage a whole range of jobs and professions in order to curb unemployment and fill the gaps in the development process. Another sign of potential job opportunities is the Cabinet’s declaration that the estimated amount for investment in potable water and wastewater projects during the next four years is LE 16.0 billion, which is estimated to cover 213 of Egypt’s cities and marakez.

During the first two-year period of SFD’s training programme, increasing interest and respect for the programme has developed on a national and international scale.

- From January 23, to February 10, 2000 an eight-member Multi Donor Review Mission (MDRM) undertook a comprehensive review of SFD on behalf of the Development Assistance Group (DAG) comprising the SFD donors. The review mission’s report was very positive about SFDs Community Development Programme and the Public Works Programme in their accomplishments to deliver much needed service to the poor. It was suggested that the donors should provide additional grants to the programmes.

- The report also praised PWP in playing an innovative role within the Egyptian context of service delivery; e.g. “in nurturing the concept of Labour Intensive public works execution and by launching capacity building of small contractors.”

- In July 2000, Danida arranged a 5-day mission to review TASFD’s work. The Mission Report was very positive and suggested an extension of the present team through December 2001, plus recommending a next (3\textsuperscript{rd}) phase of the programme.

- Another encouraging sign of programme recognition is that ILO and SFD recently agreed to co-sponsor an expert in LB technology to prepare a Project Proposal for a possible continuation and replication of the present LB programme.

\textsuperscript{11} The Egyptian Gazette, September 18
Several of the trainees from the programme are forming, or becoming members of, NGOs in their regions, through which they tender for projects, either as a group or individually. This trend is very encouraging and is spreading to several governorates.

In June 2000, the TASFD LB group completed a document called: "Training Programme for Small Scale Labour Based Contractors; Future Tracks".

The above document has been circulated to SFD and to Danida for reference and is a review of the added scope, which TASFD is recommending for the period after 2001. From now on, Egypt should not have to rely on Kisii, Lusaka, Nairobi, Gaborone or Eastern centres for LB training. Egypt will provide an alternative centre, with SFDs new background as a valid source of information and learning, both for the Middle East, North Africa and beyond.

The "Future Tracks" document refers to work completed through SFD, but also concentrates on a more "global", long term need for L.B. programmes in Egypt based on the team’s experiences over the last 2-3 years. The "Future Tracks" report summarises the long-term proposal in two scopes: 1) Institutional Issues and 2) Operational Issues.

The results of SFD’s Labour Based training programme speak for themselves. There is both a need and growing understanding for continued LB contracting in Egypt. After the 8th ASIST conference in Cairo, it is hoped that an increased international interaction will develop, which will give an opportunity for further expansion and improvement of LB technology, and thereby contribute both to employment creation, and towards poverty alleviation in deprived areas.
Operational Issues

SFDs Labour Based Contractor Programme
“Future Tracks”

- New Trainees
- Site Supervisors
- Refreshing Training Programme
- Wastewater Module
- Building Module
- Model Site
- LB Specifications
- Data Bank
- Variations & Negotiations
- Introduction to Academia
SFDs Labour Based Contractor Programme
“Future Tracks “

Institutional Issues

Contractor Union

NGOs Role

Tendering Procedures

Awareness Campaign

Operation & Maintenance Programme
Translated Reference Material Used in SFDs L.B. Training Programme 6 Manuals: I.Y.C.B.
16 Tailor Made Manuals Used in SFDs L.B. Training Programme

Orientation Period
Phase I
• Introduction
• Business Management
• Practicing Entrepreneurship
• Pricing & Bidding

Work Shadowing Period
Phase II
• Roads
• Environment
• Potable water

Apprenticeship Period
Phase III
• Site Management
## SFD L.B. Training and Employment records

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<tr>
<th>Group</th>
<th>Governorates</th>
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### Status of Contractors Union Registration

**17 Sept., 2000**

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**Instructors:**
- MR Mahmud Rashad
- MS Maheeb Said
- MK Mahmoud Khaled
- MM Mohab Mattar
- MA Mahmoud A. Salam
- SH Saad Hassan
- RA Ragab A. Moneim
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Mainstreaming Labour Based Programming in Indonesia

Danang Parikesit
Lecturer at Civil Engineering Dept. Faculty of Engineering,
Gadjah Mada University Indonesia

Paper presented at:
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
Introduction

Based on the ILO project proposal for the wider and improved use of labour-based technology in infrastructure programmes in Indonesia, this paper describes the three-year programme of technical support and training. The programme is oriented to achieving policy and technical management reforms across the entire infrastructure sector. The technical assistance will focus on assisting the State Ministry of Public Works and the Department of Settlement and Regional Development (Kimbangwil)\(^1\) to develop their capacity as the national technical focal point for labour-based technology. The programme will be extended outside the Kimbangwil where appropriate, in particular to the Department of Home Affairs (Local Government) and eventually to the private sector. The Kimbangwil will also chair a National Technical Committee (Task Force) on the national Labour-Based Technology programme. The committee will comprise representatives from the public and private sector, as well as research and academic institutions.

The technical assistance will be based on refinements of existing practices, and will: assess the existing and proposed regular civil works programmes for their suitability for either labour-based and equipment-based technology; undertake a basic review of policy and programmes; develop an affirmative, impartial and fair procurement process to refine existing procedures; ensure that public works are targeted for meeting poverty alleviation objectives, good governance, infrastructure needs and unemployment; facilitate the amendment of legal constraints, and; devise packaged contractual systems (using labour-based and equipment-assisted methods) that will allow the contracting process to follow the basic principles of good governance. This may involve utilising fair conditions of work, including, where appropriate, the unbundling of contracts for smaller contractors and providing incentives.

The objective of the project is to attain optimal employment generation and poverty alleviation through the realisation of cost-effective, and well-managed, labour-based and labour-intensive construction programmes, within the mainstream of regular recurrent works programmes of central and local government and the private sector.

The main immediate objectives of the project will thus be to develop appropriate institutional arrangements, effective management mechanisms and training systems, in order to rapidly disseminate and bring into effect labour-based and labour-intensive technologies.

The paper then discusses in more detail the project’s four main components: (i) Strengthened Labour Based Programmes (ii) Technology Innovations for Labour-Based Programmes (iii) Strengthened Training and (iv) Poverty Reduction Demonstration Programmes.

1. Macroeconomic and Employment Context in Indonesia’s Development

Indonesia has been amongst the hardest hit in the current Asian economic crisis. Based on World Bank and IMF estimates\(^2\), the short-term economic prospects are not encouraging. The Gross Domestic Product (GDP) was estimated to have declined by 15.6% in the 1998/99 financial year. The construction sector suffered the most (a 40% decline), financial services declined by 27% and the trade, hotel and restaurant sector declined by 21%. Only the agriculture and mining sectors have

\(^1\) Please note that from September 2000, public infrastructure is administered by the Department of Human Settlement and Regional Infrastructure, which is likely a result of a merger between the State Ministry of Public Works and the Department of Human Settlement and Regional Development (Kimbangwil).

not been severely affected, although non-oil export earnings fell by 8.8%, notwithstanding severe depreciation of the Rupiah. In the face of ongoing financial sector problems, corporate dislocation and lower international commodity prices, positive economic growth is not expected for 1999/2000.

This is despite a sustained downward pressure on domestic demand due to lower real incomes and dwindling household savings. Recently, the currency has stabilised at around Rupiah 6,500-7,000 to the US$. If conditions continue to improve, continuously renewed growth may be expected by 2000/2001 (a modest 3% growth rate was estimated by the World Bank).

The social effect of the financial crisis on Indonesia has been serious and World Bank estimates suggest that the impact has resulted in an increase in “absolute” levels of poverty from 10% in 1997 to 14-20% in 1998. The Social Monitoring and Early Response Unit (SMERU) estimates the decline in absolute poverty to have increased from 11% to 13.8% by 1999 (other estimates, including ILO, have produced figures of up to 48%).

With a contracting economy, labour demand has declined - with highly visible lay-offs in the construction and manufacturing sectors. In 1998, Bappenas estimated that around 6 million persons (+/-7% of total labour force) were laid-off, the greater part of which (1 million) came from the construction sector (25% of the construction labour force was laid-off). Conflicting estimates by SUSENAS for 1997 indicated a 9% decline in the construction sector, combined with declines of 13% in industry and 27% in the electricity sector. These impacts were absorbed into the agricultural sector - some 4.5 million have been re-absorbed into agriculture, equivalent to a 15% growth in the agricultural workforce.

During 1997 there was a large shift towards self-employment in both urban and rural areas, and a smaller shift towards unpaid family-based employment in rural areas. Real wages have declined and open unemployment has appeared. This increase in female and child employment acted as a coping mechanism to compensate for falling household incomes. Child employment has been observed to have increased and, although the impact on female employment is ambiguous, some 40% of those recorded as newly unemployed are female (the latter particularly due to the impact of declining textile sub-sector production). Unskilled men have suffered most from the construction industry decline.

However, with low personal savings and no effective social welfare system, people cannot afford to be unemployed for very long. The result has been an increase in under-employment (with falling real wages and purchasing power) and substantial increase in lower-paid agricultural employment.

The impact of the crisis on the labour market and on household incomes has not been even. The most striking impact has been in the urban areas and the rural parts of Java. However, there has also been an impact on those rural areas without significant cash crop earnings, such as South and East Kalimantan, and DI Aceh. Therefore, any job creation programme needs to have strong geographical targeting.

2. History of Labour Intensive Works and Labour Based Technology in Indonesia

Labour intensive works (or Padat karya in Indonesian language) have commonly been used in Indonesia (since at least the 1970’s) as a means of achieving national goals on employment

Conflicts in estimates in part derive from “conventional” definitions of unemployment, which exclude those not “seeking work”. Estimates by Ifikhar Ahmed and Shafiq Dhanani (“Indonesia’s Recovery: Employment Optimism or Statistical Illusion?”. Occasional Discussion Paper Series No.2, ILO, Jakarta, October 1999) put the “true” levels of unemployment (at 12.1 and 14.5 million for 1997 and 1998) at over three times the statistical measure.
creation, income creation and poverty alleviation and, where possible, reinforcing national infrastructure goals. Over the years, however, the Government of Indonesia had gradually replaced padat karya by other poverty alleviation strategies, until in 1994 all padat karya programmes were discontinued. As a result of the economic crisis, padat karya was revived in 1997. The programme of PK1 (Padat Karya 1) came on stream in December 1997 and lasted for a period of four months. It was conceived as a crash programme targeted mainly to retrenched workers in construction and manufacturing units situated in urban Java, which was perceived to have taken the major direct brunt of the crisis.

The next phase of labour intensive or padat karya programmes, (abbreviated PK2), was initiated in April 1998. PK2 was much larger in scope. Unlike PK1, which had the sole objective of providing emergency income supplement through job creation, PK2 had the added objective of also creating social capital. The target beneficiaries of PK2 sub-programmes varied from the “new” and the “old” poor, to recently retrenched workers as well as other unemployed. The programme covered all provinces. Some sub-programmes sought to target specific regions, some specific sectors, and some specific population groups. Some were designed and implemented as top-down programmes, while others, at least in principle, sought to involve community groups and/or NGOs. However, the sub-programmes were mainly top-down, non-participatory and uncoordinated. Targeting and monitoring of programmes was faulty and there have been many reports of significant financial “leakage”. Programmes executed under the World Bank-funded Social Safety Net Programme during 1998/99 thus met with limited success.

Most of the recent padat karya projects were conceived as part of the Social Safety Net programmes induced by the crisis. However, only a small part was allocated towards PK, the rest going to subsidised food, education and health. Official recognition of the problems of PK2 has resulted in substantial cutbacks in the Padat Karya budget for the year 1999-2000, which is unfortunate, for the fault lay not in the principle of padat karya strategy as such, but in the manner in which it was designed and implemented.

The former Department of Public Works issued guidelines for the implementation of the 1999/2000 PK programme in Cipta Karya. The guidelines contain policies to maximise employment absorption (employment driven), the employment of small contractors and the use of non-imported materials. In the guidelines, every project must achieve a target level of employment absorption of 40% (20% of which must be female).

The guidelines have identified that there are needs for “renewed” programme approach. They acknowledge that the previous programme suffered from a number of problems that inhibited the effectiveness of the programme. These problems included: mismatching of instruments to objectives; overlapping efforts and lack of co-ordination; weakness in targeting, including lack of crisis responsive geographical targeting, poor project selection; implementation delays; fund leakage; inappropriate design; budget allocation issues; lack of cost effectiveness and lack of monitoring and evaluation of performance.

While the programme clearly identifies the importance of labour intensive/labour based type works, the activities remain as a short-term unemployment relief and income-generating programme. The programme is formulated “….. to provide open ended, short term, city wide and large-scale labour intensive employment……”. It is assumed that the programme would be discontinued as the economy recovers. The guidelines state that the programme is intended to provide employment, particularly to unskilled workers, women headed households, laid off women workers (unskilled

and poor women in particular), laid off workers caused by the economic crisis and small-scale contractors.

The previous labour-intensive programme, which is funded by the World Bank, is philosophically different from the current labour-based approaches in other countries. The labour-based approach, as defined in the ILO “Guide of Employment Infrastructure Programmes: Labour Policies and Practices” and the “Guide on Capacity Building in the Construction Sector” indicates that flexible and optimal use is made of labour as the predominant resource, while cost-effectiveness and quality aspects are ensured. It further differentiates the terms “labour-based”, “employment-intensive”, and “labour-intensive” in terms of an optimal (and efficient) and a maximum (and possibly inefficient) use of labour. In general, the latter two terms are used to represent projects where income-generation and job creation is the principal objective. This category includes, for example, disaster relief, or food-for-work projects that are temporary and where quality and productivity are usually low. Although the use of labour is maximised, these projects generally depend on “special” external funding and are not sustainable in the long term.

On the other hand, the contemporary labour-based approach emphasises the sustainability of labour-based methods by optimising the use of labour, and ensuring that employment-intensive programmes do not degenerate into “make-work” approaches where cost-effectiveness and quality aspects are ignored.

With the above description, one can see that the product quality and sustainability of the programme are two key characteristics. Rolling programmes for labour-based activities are, therefore, a necessity to ensure that the use of optimal labour, with a comparable quality of civil work, can be delivered. Current government programmes aim predominantly at infrastructure developments within infrastructure projects. The scope of labour-based approach can, however, be further extended to cover all development infrastructure, as well as to involve the private sector. In the Indonesian context, this would mean making the use of labour-based technology, a normal part of the way the Kimbangwil and local government approach the design and implementation of civil works projects.

3. The Needs for Mainstreaming Labour Based Programme: Results of 5 Case Studies

The long history of padat karya programmes in Indonesia indicates a clear government commitment to develop a new approach in public works by involving the community throughout the project cycle. While some of them were successful, many padat karya projects suffered from problems. These ranged from a lack of community participation to poor product quality, low quality engineering supervision or community communication to inadequate planning for future financing and maintenance, and thus low sustainability.

To investigate whether labour-based/labour intensive-type projects are still relevant and could play a useful in future poverty alleviation and employment creation programmes, a selection of case studies were undertaken of former padat karya projects. For the purpose of assessment, case studies were carried out at six locations. Two of the case studies reviewed public works: a road construction project in Sidorejo Village, Kabupaten Sleman and a World Bank/ILO rural road development project in Kabupaten Bandung, West Java Province. The remaining case studies reviewed community works: a road and footpath project in Kampong Ngaran, Yogyakarta Province, a tertiary irrigation project in Kabupaten Gunung Kidul, Yogyakarta Province, a slum area

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5 Authors: David Tajgman and Jan de Veen, ILO, 1998.
6 Authors: Peter Bentall, Andreas Beusch and Jan De Veen, ILO, 1999.
These case studies have provided valuable information on how padat karya programmes provided economic and social benefits to the community, as well as providing a foundation for the improvement of the future labour based programme. For example, the Swiss-financed labour-based rural road construction project7 in Kabupaten Manggarai, is an excellent example on how a participatory approach could help the community to fully understand the planning, design, implementation, monitoring, and evaluation process. The project also demonstrated that the quality and cost of the project is comparable with equipment-based road construction.

From an analysis of the case studies, a clear difference emerges between public and community works. Whilst with public works it is possible to “impose” solutions, this is not possible with works executed through local communities. Thus, with community works, it is recommended that there is a need to take account of the following factors in order to ensure improved programme design:

- the programme must gain public as well as political support before it is implemented;
- improvements must be made through better sub-project selection and design;
- improved community participation is necessary, requiring greater transparency and access to information which should foster a collective responsibility for project components, and promote ownership of the assets;
- further encouragement needs to be given to women, through institutionalising women’s groups, by training, and by promoting community campaigns - with open advertisements clearly stating that women can participate in programmes;
- the promotion of leadership skills as a key factor for motivating labour;
- the promotion of projects using appropriately trained community facilitators (social workers, planners and engineers) with good communication skills to ensure a better interface between government and the community;
- the private sector being further involved in community projects;
- the government process of decentralisation being supported through the development of appropriate contract documentation and payment procedures;
- more effective financial monitoring, particularly where the communities are making a capital contribution to schemes;
- improvements in the monitoring of quality should be further encouraged through the use of appropriate training in labour-based technology and “traditional” engineering aspects of civil works construction;
- for the labour-based approach to remain efficient and competitive with employment-based methods, labour needs to be engaged through fair and reasonable working conditions, and under labour-productivity and performance-norm agreements; and

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• programme sustainability and long-term maintenance will depend on access to a constant flow of funds, either from government or the community – requiring that the project/asset ownership and financing are institutionalised.

It is clear from an assessment of former padat karya activities that the labour-based/labour intensive-type projects are still relevant and could play an important role in future public works programmes as a sustainable and mainstream component for many years ahead. They are relevant, not only because they could help unemployment problems currently faced by Indonesia, but can also provide, at the same or lower costs, a comparable quality of product to other technologies. At the same time, they provide an opportunity for more people to be directly involved with the development of the community.

4. Objectives of the Labour Based Programming

The project has an overall objective to provide optimal employment generation and poverty alleviation through the realisation of cost-effective, and well-managed, labour-based and labour-intensive construction programmes within the mainstream of the regular recurrent works programmes of central and local Government and the private sector.

The main immediate objectives of the project will be to develop appropriate institutional arrangements, effective management mechanisms and training approaches and programmes, in order to rapidly disseminate labour-based and labour-intensive technologies. Specifically, the project will:

• establish (mainline) a transparent national system for the adoption of labour-based technologies, targeted to meet economic, social and technical criteria;
• provide motivation for disseminating LBT, producing and disseminating best practice guidelines, specifications, contracts and other documentation;
• through training of trainers, facilitate appropriate training in labour-based technologies at all levels; and
• demonstrate, through practical examples, how to apply labour-based technology in both public and private sectors.

5. Employment Target of the Labour Based Programming

The project’s target is to create around 1.1 million additional unskilled jobs, by applying labour-based technology to every possible area of existing expenditure used to maintain, repair or create infrastructure. This will be achieved over a 5-year period (including the present year as a start-up period) within existing levels of construction expenditure. The projections are summarised below. The estimate is very conservative, and figures of double this magnitude are feasible, given conducive political, legal and institutional conditions.
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public sector full-time @ 200 days per annum (95% of total value)</td>
<td>913,000</td>
</tr>
<tr>
<td>Public sector part-time @ 100 days per annum (5% of total value)</td>
<td>96,000</td>
</tr>
<tr>
<td>Sub-Total, Public Sector</td>
<td>1,009,000</td>
</tr>
<tr>
<td>Formal Private Sector (@ 60% of value of Public Sector)</td>
<td>76,000</td>
</tr>
<tr>
<td>Other (informal sector and small-scale manufacturers)</td>
<td>30,000</td>
</tr>
<tr>
<td>GRAND TOTAL (jobs created)</td>
<td>1,115,000</td>
</tr>
</tbody>
</table>

**Figure 1. Employment target for Labour Based Programme**

Due to data limitations, the method of estimating the incremental job targets can only be approximate. The method used was as follows:

- Estimates were made of daily unskilled (normally minimum) wages;
- Assumptions were made on the possible percentage build-up of labour constants based on practical and achievable targets;
- Budget projections were built-up from the existing Kimbangwil programme\(^8\) (padat karya and non-padat karya), and extended to other central and local government bodies, to which was applied the labour constants to allow an estimate to be made of the value of the labour component;
- Using the daily unskilled wages and assumptions on effective workdays\(^9\), estimates were made of total workdays and of potential full and part-time jobs;
- From these basic numbers, the range of annual incremental jobs was defined. The calculation was based on either adjusted labour content, or unadjusted labour content, but with projected budget increases;
- An estimate was made of job targets, assuming that 95% of the jobs created in the public sector (Kimbangwil and non-Kimbangwil) are full-time and 5% are part-time; and
- A modest allowance was then added for the gradual inclusion of the private sector in the programme, and for the employment impact that could be achieved on the informal sector and small-scale construction materials manufacture.

6. **Scope of the Labour Based Programming**

The purpose of using labour-based-technology is not to “make work”, but to create good quality infrastructure that is needed and to provide the benefits of using such technology. Thus, the screening and targeting of labour-based projects needs to be a rational process, which balances social, economic and technical factors. There are three main questions relating to targeting, whether the project is needed, is in the right location, and is an appropriate project to apply labour-based techniques.

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\(^8\) Budgets were not projected to match pre-crisis levels.

\(^9\) Effective full-time job = annual minimum of 200 paid days; part-time = 100 paid days.
a. Project screening and selection criteria

There are a limited number of studies in Indonesia for screening labour-based projects, mostly relating to low-cost road construction. The most relevant study is that undertaken by ILO as part of Bina Marga’s World Bank-financed “Pilot Labour Intensive Road Project” (INS/92/01/IBR). This study (undertaken prior to the economic crisis) concluded that the choice of technology is conditioned both by the type of project (labour-based technology being most suitable for the rehabilitation and maintenance of unsealed roads) and the poverty level of the communities. The study developed a short list of screening criteria for identifying regencies (districts) that might form a geographically focused labour-based national rural road programme - primarily focused on the poorer Eastern Islands. The criteria are summarised in Table 1. Some caution is needed with this approach, particularly if the quality and accuracy of available background design data is questionable.

Table 1: Indicators and Criteria for Labour-Based Kabupaten Roads

<table>
<thead>
<tr>
<th>Condition</th>
<th>Indicators</th>
<th>Screening Criteria</th>
</tr>
</thead>
</table>
| a) Adequate labour at competitive wage rates | • Population density  
• Wage rates  
• Incomes | Population density greater than 20 persons per km² |
| b) Possible unfavourable effects | • Poverty indicators  
• Evidence of underemployment  
• Labour requirements in agriculture and other rural activities, including seasonal peaks | • Either: A poverty indicator of greater than 30% (which is average for all regencies), or  
• Income per head in the regency below 70% of national average (excluding oil revenues) |
| c) Beneficial effects:  
• Income and employment generation  
• Improved roads | • Wage rates and poverty indicators  
• Evidence of underemployment  
• Current road condition | More than 50% of regency road length in fair/poor, poor or bad categories |
| d) Appropriate road standard  
• To current standards  
• To revised standards | • Current regency road condition  
• Traffic levels  
• Road densities | • Either less than 1 km of road per 1,000 persons in “good” or “fair” condition, or  
• Less than 1 km of road per 10 km² in “good” or “fair” condition, |

It would be possible during a further project phase to develop similar tables of indicators and screening criteria for other types of infrastructure, such as irrigation and urban works, based on the experience of the various pilot projects in Indonesia. Additional criteria that might be used include: (1) distinguishing the differences between public and community works; (2) infrastructure provision standards and condition classification; (3) willingness of the community to contribute to develop economic activities; (4) continuity with other development activities and compatibility with national and local development goals; (5) demonstrated implementation capacity; and (6) avoiding overlap with other similar activities.

These criteria might be applied using a decision tree approach (i.e. whether the project fulfils all or

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most of the conditions) or a point scoring and ranking system\textsuperscript{11}. After the initial screening/targeting, a more detailed design method could be adopted using more refined criteria. For economic projects with a value over a specified minimum sum, a conventional discounted cost analysis (internal rate of return) should be undertaken.

Ultimately, to adopt a targeted approach, a range of detailed criteria will need to be carefully worked out on the basis of variables such as population density, poverty indices, unemployment incidence etc. This could be used to guide the allocation of funds across provinces and regencies. This supply-led allocation process will need to be supplemented with demand-led distribution of resources based on demand for funds from the lower levels. This presumes that communities are sufficiently empowered to carry out the micro-planning activities and that the appropriate overall planning system is in place. This emphasises the need for transparency, based on a much greater participation by the community in direct employment generation programmes than has been prevalent so far. Communities should be involved in local need assessments, implementation and monitoring of programmes. This will necessitate the process of decentralisation being supplemented with a simultaneous process of bottom-up institutional strengthening. Without this essential supplementary process, the programmes will be largely supply-determined, which could very well undermine the success of the entire strategy.

\textit{b. Choice of Technology}

The main objective of the project should be to generate employment through the adoption of appropriate and cost-effective technologies. This will need to be based on an integrated and multi-disciplinary approach to the planning and design of infrastructure. Central to the technical orientation should be a strong focus on the use of local materials and “traditional” technologies and (for land development related activities) the use of biological treatments. The range of technical options is likely to be extensive and, in implementation, allowance needs to be made for a considerable range of choices to be available, based on the local physical and socio-economic conditions. Targets and cost estimates should be indicative only, and be adjusted based on implementation experience.

Although a reorientation towards labour-based methods is not technically complex, it does represent a considerable change in approach for field-level staff in comparison to ongoing projects. The approach may not be universally accepted and substantial efforts will need to be made to motivate supervising engineers and communities. Mechanisms such as award schemes and LBT accreditation for project engineers and participating communities should, therefore, be considered.

For community-based projects, the intended beneficiaries will need to be fully involved in project planning and implementation - the choice of technologies should not be largely driven by the implementing agencies. The close correlation often seen between project targets and achievements suggest that field operations are usually target driven and that there has been limited flexibility to respond to beneficiary aspirations. The most important issue to be resolved is how to achieve a satisfactory level of community participation and involvement in selecting technologies, in their execution, and in the longer-term management and sustainability of the assets.

\textsuperscript{11} The SDC-financed “Low Cost Road Construction In Indonesia”, which constructed low cost roads in the Manggairai District of Flores used this approach in selecting roads. Criteria used were:

- Zone of influence of road - maximum 30 points
- Isolation of community - maximum 15 points
- Demand for traffic services - maximum 10 points
- Synergy effect - maximum 5 points
- Presence of local initiatives - maximum 20 points
- Government implementation priorities - maximum 10 points
- Technical feasibility and construction costs - maximum 10 points
A list of appropriate construction sub-sectors and detailed menus of technologies and treatments that would be appropriate for labour-based methods has been developed for easier implementation of labour based programmes. These are categorised as being of either ‘medium-level labour content’ or ‘high-level labour content’, based on a labour/appropriate equipment mix situation with the materials costs excluded. However, these categories will depend largely on the type of design involved in the project.

The use of labour-based methods assumes the creation of additional (i.e. incremental) employment benefits. The possible range of such incremental benefits (by % of the value of works) that might be obtained using labour-based methods in other developing countries is shown in Table 2. This example has been taken from South Africa. There is an important note of caution that should be introduced here, which is that the benefits will only occur if the right combination of tools, equipment, materials and labour are used. Thus, under constraints of the seasonal use of labour (i.e. competition with on-farm employment) and climate, it may be necessary to use mechanisation at certain times in order to allow the fullest use of labour. If this approach is not used, the apparent “labour-based” method may reduce employment. It is also noted that the ILO does not recommend a prescription of “fixed” labour contents of works in a particular sector. Each project should be diagnosed using real local costs for all components and with an optimal utilisation of labour, equipment and tools.

Table 2: Comparison of Potential for Labour-Based and Intensive Technologies

<table>
<thead>
<tr>
<th>Construction sub-sector</th>
<th>Equipment-based (%)</th>
<th>Labour-based (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-cost housing</td>
<td>25 - 30%</td>
<td>30 - 40%</td>
</tr>
<tr>
<td>Social buildings</td>
<td>20 - 30%</td>
<td>25 - 35%</td>
</tr>
<tr>
<td>Water reticulation system</td>
<td>5 - 15%</td>
<td>25 - 35%</td>
</tr>
<tr>
<td>Surface water draining</td>
<td>5 - 15%</td>
<td>40 - 50%</td>
</tr>
<tr>
<td>Sanitation</td>
<td>5 - 15%</td>
<td>25 – 35%</td>
</tr>
<tr>
<td>Secondary roads</td>
<td>5 - 15%</td>
<td>30 – 70%</td>
</tr>
<tr>
<td>Dams</td>
<td>10 - 20%</td>
<td>50 – 70%</td>
</tr>
<tr>
<td>Railways</td>
<td>5 - 15%</td>
<td>20 – 30%</td>
</tr>
<tr>
<td>Electrification</td>
<td>10 - 15%</td>
<td>35 – 45%</td>
</tr>
<tr>
<td>Irrigation</td>
<td>15 - 25%</td>
<td>30 - 70%</td>
</tr>
<tr>
<td>Forestry *</td>
<td>25 - 35%</td>
<td>35 - 45%</td>
</tr>
</tbody>
</table>

Source: NPP. (1995) “The National Public Works Programme Guide”. Ministry of Public Works, Republic of South Africa. * Figures of up to 70% labour use in forestry activities are common in both India and Indonesia

7. Development of a Strategy to Mainstream Labour Based Programmes

There are basically three strategies to mainstream labour-based programmes in Indonesia. The first is to review and refine legal issues, secondly to expand an improved version of existing Labour-Based Technology and thirdly to conduct continuing research and training to foster technology expansion.
The strategy to review and refine relevant legal issues includes:

- obtain political endorsement for the programme objective and strategy to be implemented by Kimbangwil\textsuperscript{12}, the State Ministry of Public Works, other Government Departments, local government and the private construction industry;
- forming a Ministerial Decree\textsuperscript{13} to ensure policy compliance and amend the law on Construction Service;
- progressively secure policy changes to support the strategy; and
- strengthen the National Technical Committee (Task Force) with a mandate to: promote L/B technology; evaluate policy outcomes; make recommendations for policy adjustments to promote and facilitate labour-based technology; and monitor compliance with policy recommendations.

In rapidly expanding an improved version of existing Labour-Based Technology, several measures need to taken as follows:

- award contracts based on price and demonstrated ability to optimise labour-based technology, local services and materials;
- introduce legal and procedural changes to contract documents and procedures to facilitate job creation and other social and economic goals;
- refine and mainstream the existing Kimbangwil labour-based technology programme and develop the participatory approach to gain public support, better targeting and more effective local-level planning;
- expand the Kimbangwil labour-based technology programme into the roads and water resources regular programmes - using settlement development as the vehicle;
- expand labour-based technology to the construction and maintenance programmes of the Department of Home Affairs and to other sections of Kimbangwil - building capacity with revised policies, procedures and contractual arrangements;
- support the private sector in adopting an efficient labour-based technology by providing information and proposing possible fiscal and other incentives;
- support the development of a stronger and more competitive contracting capacity by adapting tendering and procurement procedures, facilitating private sector access to credit, and in promoting good quality tools, equipment, spare parts and materials.

Continuing research and training programmes are necessary to ensure that technology expansion is taking place. The labour-based programme is dynamic in the sense that it should be developed according to the political, social and economical context of the region and country. This can be

\textsuperscript{12} Please note that at the moment the public infrastructure is administered by the Department of Human Settlement and Regional Infrastructure, which is likely a result of a merger between the State Ministry of Public Works and the Department of Human Settlement and Regional Development (Kimbangwil).

\textsuperscript{13} The ILO has recently worked with the Government of the Philippines in the preparation of an Executive Order (EO94/99) now approved by President Estrada, and which establishes a policy and an institutional framework for the wider and improved use of labour-based equipment-supported technology in the infrastructure sectors in the Philippines.
achieved through:

- support to the Kimbangwil, as a “Centre for Excellence in LB Technology”, in assisting other government departments to adopt high quality and efficient labour-based technology;
- developing appropriate specifications to facilitate the use of labour-based technology;
- establishing model demonstration areas through the regular civil works programme, for “on the job” teaching - demonstrating the whole project cycle from project conception to work completion;
- encouraging research and overseas visits to further develop Kimbangwil as the Centre for Excellence in LB Technology and assist Kimbangwil staff in their capacity to apply the technology;
- linking universities\(^\text{14}\) and Kimbangwil research centres to the model demonstration areas;
- defining the overall training programme over three years;
- using the ‘training of trainers’ system to establish a training capacity to train key stakeholders, including high level decision makers, government staff, contractors, workers’ and employers’ organisations, foremen, engineers, architects, supervisors, NGOs and local communities; and
- promoting the wider use of labour-based technology through the introduction of an improved decentralisation payment procedure, improved contract documentation and procurement systems, and the use of local materials, local services and resources in infrastructure construction and maintenance projects.

From the above assessment of the potential approaches to developing labour-based technology in Indonesia, it is possible to envisage that a new project is justifiable, particularly targeted at small-scale contractors and community development/women’s groups.

In line with national structural adjustment policies, including civil service reform, and in the context of new construction industry legislation, the project will assist in implementing institutional capacity building and training for promoting labour-based technologies in the construction sector. The main thrust for the project activities will be initially through the Kimbangwil, creating a “centre of excellence”, and rapidly expanding to the Department of Home Affairs in the early part of the project period.

The project will have four components, reflecting the immediate objectives, as follows:

A. **The setting-up of a Technology Audit Unit in the Kimbangwil**, with the mandate of providing an appropriate management information and monitoring system for the restructuring of infrastructure works to promote the maximum effective use of labour-based and labour-intensive technologies. The project will establish a central office, within the Kimbangwil Research and Development Agency, to provide essential logistical support, equipment and technical assistance for the restructuring and mainstreaming of the labour-based programmes. Overall monitoring and review of policies will be undertaken by the Planning Bureau in the Secretariat General’s office of the State Ministry of Public Works. The central project office will be serviced by a TA team, which will comprise an international Chief Technical Adviser and short-term specialists. It will effectively act as a

\(^{14}\) The ILO has recently entered into an agreement with Gadjah Mada University whereby this University will moderate an Asia regional network of universities fostering curricula development and research into local level planning, labour-based technology and rural transport.
“Technology Audit Unit” within the Kimbangwil for the restructuring process, including designing and implementing planning and monitoring management systems on the basis of new technical activities. Essential technical tasks of the unit will be to:

- make a rational division of the works programme into clear categories: equipment-based or labour-based; public works or community-based works;
- undertake a detailed review of the need for restructuring and mainstreaming labour-based practice;
- develop detailed policies and mechanisms for their implementation;
- monitor application of relevant laws;
- undertake a technical and legal review (due diligence) to identify laws, directives, instructions and contract forms and procedures which may need amendment;
- assist in the preparation of amendments to laws and directives and contractual procedures;
- establish links with the construction industry organisations and service forum; and
- provide essential support to the project co-ordinating committee.

B. The production of best practice guidelines on labour-based technology and the promotion of technical innovations in the Kimbangwil and the Department of Home Affairs, within the context of a decentralised planning process and the maximum involvement of community organisations. The project will work with Kimbangwil, the Department of Home Affairs and the private sector in transferring appropriate labour-based technology to their respective programmes. It will involve a technology review, examining the impact of technology change on the whole project cycle - from the initial planning and screening, to the choice of individual proposals, through to implementation and operation.

The project will be involved with the promotion and choice of technical innovations, including reviewing and modifying current specifications, preparing contracts, reviewing quality control and supervision procedures, and arranging for the production of best practice guidelines on labour-based technology. Issues to be addressed are likely to include:

- the role of local-level planning in key communities, executed through local government BAPPEDA (Regional Development Agency) offices;
- forms of agreements/memorandums with communities and potential contributions to projects;
- review of construction industry institutional and training needs, including the contractor and consultant organisations (including supervisors co-operatives);
- review of labour standards and working hours;
- review of wages and payments, including methods of recruitment and wage setting (minimum versus economic wage) and productivity agreements;
- monitoring of attendance and payments, including remuneration in kind;
monitoring of the quality of labour-based work and minimum technical standards;

- monitoring of project costs, especially comparative costs of LB versus EB for similar works;

- monitoring of social security and insurance, occupational health and safety requirements.

The project will also review the need for amendments to contracts and conditions of engagement to accommodate Kimbangwil and local government labour-based programmes, and make recommendations for systems that could be introduced into the private sector to maximise labour-based works. This will cover the following areas:

- large and medium-scale contractors (Class A and B);
- small-scale contractors (Class C1 and C2);
- supervisors and mandors\(^{15}\);
- consultants and NGOs;
- communities; and
- force account works, including making recommendations for changes to how local government arranges these works.

The project will initially work with the technical design cells of the Kimbangwil (in the five Directorate Generals). If this approach is found to be successful, the project will as rapidly as possible commence work through the Home Ministry’s local government executed works programmes.

In the short-term, there will be a requirement for the project to link with the Kimbangwil Settlement Directorate’s current padat karya programme under the World Bank funded SSN Adjustment loan (“Labour Intensive City-wide Infrastructure and Services Program”).

In the long-term, the need will be to mainline the project over all the construction sub-sectors. Thus, in the latter phase (after the mid-term review), the project will investigate how to include community development activities, other public sector institutions (such as cable laying activities) and, ultimately, the private sector.

Research is often driven more by universities and donors than by official research bodies. This is not totally the case in Indonesia, and a great deal of useful research publications on labour-based technology and appropriate technology have already been prepared by the government research bodies\(^{16}\). However, there is a need to re-orienting the research to more clearly address project needs, and any future research activities should build on the extensive experience of pilot labour-based projects in Indonesia. As it is anticipated that research staff will also be involved in the preparation of good practice guides, technical training and project workshops. An allowance has been included in the project budget for (at this stage) undefined research activities.

\(^{15}\) Mandor/Bas borong or labour-only sub contractor is a very important element in the Indonesian construction industry since they manage day-to-day works of construction works

\(^{16}\) These include:
- Pusat Litbang Pengairan (Research Institute for Water Resource/Hydrology);
- Pusat Litbang Jalan (Research Institute for Highway Engineering);
- Pusat Litbang Permukiman (Research Institute for Human Settlements); and
- Institut Pertanian Bogor (soil conservation techniques, reforestation, etc.).
C. **The provision of appropriate training and retraining, focusing on the training-of-trainers**, including strengthening of appropriate training programmes and the provision of additional transport, equipment and other facilities. A preliminary overall analysis of training availability for labour-based works, including estimates of skills requirements, skills availability and the skills gap has been undertaken by the project. This also gives an overall projection of training needs for training/re-training/training-of-trainers in LB/LI skills, with an emphasis on technology choice and management training. The range of participants would need to include administrators, local planners, project managers, engineers, architects and technicians (public sector and consultants), contractors (large, medium and small), project supervisors and sub contractors (including co-operatives), local communities; community facilitators and NGOs; as well as unions and labour exchanges.

The emphasis for the project will be on the training-of-trainers. Technical training will concentrate on developing staff and beneficiary training programmes that focus on an integrated and multi-disciplinary approach to labour-based construction and covers the linkages and relationship between activities. The multi-disciplinary approach is essential to achieve the mixture of technical engineering and socio-economic factors, without which such programmes are certain to fail. However, the core focus of the technical training should be practical and field oriented, with the objective of improving the quality of field activities.

There is scope for training activities to provide a balance between learning by exposure through field visits, and classroom-type or distance learning. This will be particularly true for the training-of-trainers and for beneficiary training. There are now extensive examples of completed and well-executed labour-based works, which can provide suitable venues for group field visits.

Existing in-house and on-the-job training within the Kimbangwil is handled by the following institutions:

- Puslatjakons (training of consultants, contractors, mandors, etc.);
- Pusdiklat (training of Kimbangwil professional and managerial staff); and
- Pusdiktek (education of public works staff).

The project will support the strengthening of these training facilities to promote additional capacity/skills development, based on a need analysis of both the public and private sectors. Particular emphasis will be placed on improving the training-of-trainers, targeted at those involved with training of technician-level staff and mandors employed in the private sector. It will also provide training to communities and support agencies participating in the development and implementation of labour-based activities.

The initial main focus of the component would be the provision of technical assistance for the design and implementation of training-of-trainers programmes and in-service training courses, using a variety of delivery methods, possibly based on the use of distance-learning techniques and web-site information. This would be implemented by running annual workshops for the training-of-trainers using at the facilities available at Kimbangwil regional training centres (Jakarta, Bandung, Yogyakarta, Medan, Surabaya and Ujung

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17 For example, accessing the Kimbangwil technical information on the Internet
Pandang).

Under this component, specific project support will also go to:

- the provision of a labour-based technology library within the Kimbangwil and general educational equipment, including in-service field and sample equipment for training use;
- strengthening linkages between the universities, technical institutions, research bodies, and the Kimbangwil/Home Affairs/Bappenas programmes;
- curriculum development for local accessibility planning, “traditional” indigenous engineering techniques, labour-based/intensive construction management and use of appropriate technology - for use in universities, technical colleges and Kimbangwil educational institutes; and
- developing and improving distance learning techniques, including linkage to the PU Net system at local level and to other websites, the use of study tours and twinning arrangements for technology transfer of international best practice, and the development of appropriate publications, “comics”, videos, VCDs, etc.

D. The planning, design, execution and monitoring of labour-based demonstration programmes targeted at poorer communities. Demonstration programmes will include both large-scale public works, including investigating different procurement methods, as well as other poverty-reducing pilot projects implemented in conjunction with local communities and NGOs. The project will assist in the identification, planning and design of poverty reduction demonstration programmes, specifically targeted at job creation. These will be based around existing GOI programmes and will be used to demonstrate the technology transfer packages. Demonstration programmes will need to cover both major public sector programmes (such as road rehabilitation) as well as community-based infrastructure specifically targeted to assisting poorer communities (such as marketing and income generating activities). A major part of this component will be to establish and operate an effective monitoring and evaluation system. The project will establish a simple internal reporting system, operated by a local Management Information System (MIS) Adviser, to ensure that the outputs are delivered in a timely manner. However, the main monitoring and evaluation system will be based around the SITK (System Informasi Tenaga Kerja – Manpower Information System) and other State Ministry of Public Works and Kimbangwil monitoring systems. The project will support the further development of the SITK by providing a contract to national consultants for completing the system design and for adding additional analytical features. The main issues to monitor will include levels of employment generated, success of the targeting system, quality and cost effectiveness of the works.

The project will also work with selected local government authorities in establishing systems for selecting and prioritising labour-based works. This will take the form of providing TA advice on the application of participatory planning techniques at the community level. The project will provide support to the development of ongoing and new project proposals by local government containing a significant labour component. It is hoped, in this way, that significant demonstration/pilot areas on

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18 The appropriate approach could be to assist communities in the use of the Integrated Rural Accessibility Planning (IRAP) methodology, which has been developed by ILO and applied in the Philippines, Laos and Cambodia, and piloted in Indonesia by ITB.
the application of labour-based technology can be built-up, which can be linked with the project’s ongoing training and research activities.

8. Sustainability of Labour Based Programme

There is a clear need to develop an overall policy approach to the extension and delivery of labour-based technology in Indonesia. Apart from improving the entire enabling environment, a number of various policy options are available. These will be reviewed in the Indonesian context by the Task Force, in co-operation with the project staff, to see which combination might be tested and adopted in the short or medium term. The main options include:

- improvement of existing procurement practices, within the context of the present legal framework and existing (and possibly new) ministerial instructions;
- greater involvement of the existing contractor and consultant organisation in improving the targeted allocation of works - possibly within the context of a Construction Industry Forum Committee, to be convened under the new Construction Service Act;
- consider the establishment of an Employment Fund, targeted at small contractors, as recommended by the ILO Employment Strategy Mission (1999);
- improvements to the availability of information on LB works and access to micro-credit for small contractors (tools, mobilisation, etc.) and appropriate materials manufacturers (materials, working capital, technical assistance, etc.);
- establishment of employment exchanges in target areas (SSN padat karya programmes model for urban areas);
- improvement to the Department of Manpower’s labour market information system; and
- targeted public works and private sector procurement, using price and social targeting criteria (e.g. to those developed by the South Africa Government and UNCDF).

The project staff will maintain the internal reporting system (reporting on a quarterly basis). The project’s main monitoring and reporting system will include information on actual employment generation and technologies utilised and will utilise the SITK. The data base maintenance and operation of the system will be the responsibility of the State Ministry of Public Works Planning Bureau in the office of the Secretariat General, who will be supported by appropriate project inputs. A relationship will also be established with other monitoring and evaluation (M and E) systems monitoring the padat karya activities, such as the SSN programme, as well as the WB and USAID (Clean Urban) reporting systems.²⁹

There are three possible levels of risks: (i) at the project level; (ii) in the actual introduction and implementation of the labour-based technologies; and (iii) in overcoming legal and institutional constraints.

Project Level Risks arise when project design is over-ambitious, is top-down in its approach, and is unable to deliver the inputs included in the project document. Such risks are often inevitable with

²⁹ Three related systems are currently proposed, working through a “stakeholders forum”: (i) a Government Oversight Group to coordinate ministries; (ii) a control team (Tim Pengandali), involving government and civil society; and (iii) a formal independent monitoring team (civil society and NGO representatives). AusAID trust fund assistance is also proposed, to establish a monitoring unit using both quantitative analysis and field-based qualitative and participatory techniques.
institutional strengthening projects, particularly when they are cross-sectoral and involve a large number of institutions. Proposals for the various institutions are still at a preliminary stage and adjustments may need to be made in further developing the project activities. The continuous monitoring process and the inclusion of a mid-term review should allow the project design to be modified to match conditions as they evolve.

More serious risks are likely with the implementation of the project. The most fundamental risk is a possible lack of sustained political will to implement such projects, even though the State Ministry of Public Works and Kimbangwil have shown a firm commitment to the principle of using labour-based/intensive technology to date.

The main legal and institutional issue is the need for additions to the Law on Construction Service, which will permit improved procurement procedures to be used as an instrument of employment creation. To reduce this risk, a review of legal factors (legal due diligence) will be provided by the project at the start of the Implementation Phase.

As the project is primarily targeted to institutional strengthening and training, no direct negative environmental impact would be expected from the project’s implementation. Indeed, there are likely to be environmental gains due to the selection criteria and the way individual development projects are conceived. However, the project, in advising on the design of programmes using labour-based methods, will include provision for an assessment of social and environmental considerations, including ensuring:

- that an initial screening and examination of all potential components is undertaken to identify whether a full environmental impact assessment is required;
- the use of a community participation methodology, public awareness campaigns and social impact analysis in project design;
- that training programmes include an environmental monitoring and assessment component, with a target of up to 50 per cent female participation in the programmes;
- that gender awareness is incorporated in project planning - with the aim that 50 per cent of opportunities for new administrative, labour-based employment, and supervision posts will be available for female candidates20, and that women are not placed at any disadvantage in seeking such posts;
- that environmental monitoring and due diligence activities are included; and
- that appropriate prevention, management and mitigation measures are included in the project’s advisory notes, revised specifications and contract arrangements (e.g. shallow borrow pits with minimum impact for road construction, etc.)

In ensuring that these social and environmental considerations are integrated in the project design, full consultations will be held with the Central Environmental Impact Management Agency (Badan Penanggulangan Dampak Lingkungan - BAPEDAL).

It is very important to maintain the sustainability of the labour-based programme. Works at pilot project level always require a higher cost of investment, mainly allocated for tight supervision to ensure all processes conform with participatory planning principles, engineering quality standard are achieved, and funds are effectively used. Assessments of benefits and costs must be made in the long term, rather than in the short term, or in the case of a single project.

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20 In conformity with ILO International Labour Standard (ILS).
Finally, sustainability of the program depends on a sustainable or constant flow of funds, either from government or from the community. Commitments from water user groups or roof tile businessmen are examples of community contributions to sustain labour-based programmes, and to maintain the quality of the work. Experience from visited projects shows that it is essential to provide seed money only to encourage revolving funds.

It is anticipated that labour-based technology will remain a permanent feature of the Government’s work programmes for some time to come. As the Indonesian economy recovers, and under-employment becomes less of an issue, it is likely that this interest might start to diminish. However, labour-based technology will still remain viable in circumstances where it is both technically, and economically, the most feasible solution.
THE USE OF IMPROVED MANAGEMENT AND TESTING PROCEDURES IN LABOUR-BASED CONSTRUCTION

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and
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Abstract
In recent years there has been a significant increase in the amount of infrastructure development which is being undertaken using private sector contractors who are required to use employment-intensive construction methods. The emergence of new contractors who utilise increased numbers of labourers in substitution for capital equipment has led to a focus on the procurement, testing and acceptance process relating to such construction.

The paper will deal with some techniques which have been introduced both in South Africa and in Egypt (on projects being funded by the Social Fund for Development). The methods proposed have been incorporated in “conventional construction” by the private sector, and by others, for a considerable length of time. However, their introduction and utilisation in the new class of contracts which are now available to entrepreneurs, is seen as a distinct advantage relating chiefly to the systems of estimation, tendering award, testing and control of contracts.

1. Introduction

Over the past thirty years labour-based construction has been planned and implemented by the public sector. Many projects and programmes have resulted in the generation of employment and the construction and maintenance of useful assets. Road programmes such as those in Kenya, Botswana and Lesotho are outstanding examples as to what may be achieved using a labour-based approach. However, in general, construction has not been undertaken by conventional contractors and under these circumstances, the monitoring and evaluation could not include an assessment of their profitability. It is not denied that cost control and adherence to budgets were, and remain, key factors, but, in the end, private sector contractors were not involved in the major programmes. On the one hand the incentive to make money was absent, on the other, the public sector was not able to take advantage of an entrepreneurial approach.

Since the 1980’s there has been increasing interest at policy making level of the greater role that might be played by the private sector in the provision of infrastructure. In some countries this has been accompanied by strategies to generate employment and contribute to the alleviation of poverty. Small companies were also seen to generate more employment than bigger ones and the use of employment-intensive methods would enable companies to overcome a major barrier to entry: the lack of capital.

Over the past ten to fifteen years in Ghana, Lesotho and South Africa, and more recently in Egypt there has been a growing emphasis on small contractor development. As an adjustment to small contractor development, where invariably capital for the acquisition of plant is absent, the use of labour-based methods has also received growing attention. In turn, the emergence of new contractors who utilise greater number of labourers in substitution for capital equipment has led to a focus on the procurement, testing and acceptance processes related to such construction. The National Public Works Programme in the Republic of South Africa and the Social Fund for Development’s Labour Based Egyptian Programme for Small Contractor Training in Egypt are two examples of government (public sector) sponsored interventions to create an entrepreneurial environment in which private sector contractors can operate in the provision of infrastructure. In some instances the emphasis has moved strongly towards the contractor aspect i.e. entrepreneurial development. However, at the root of these initiatives is the undeniable fact that contractors without capital can best enter the contracting environment using labour-based methods.
Within the conventional private sector contracting industry there has been an understandable scepticism towards labour-based contracting. Partly because labour-based contracting is different from conventional equipment-based contracting: designs, specifications and systems are not in place and change increases exposure to risk. Partly because of widespread perceptions that

(i) It is impossible to budget property (and therefore tender) for labour-based methods.
(ii) The product will take too long to construct
(iii) It will be of inferior quality.
(iv) Labour is more difficult to manage (especially in the context of uncertainty regarding productivities).

Extensive experience using proper labour-based methods challenges these prejudices. However they persist. To address these prejudices it is necessary to align labour-based contracting procedures with those familiar to, and therefore understood in, the conventional contracting arena. Adaptations of long-standing methods and approaches to contract assessment and budgeting, tendering, contractor selection and control have been developed. These provide a familiar basis for decision making which aim to provide increased accuracies in budgeting; reproducibility of analysis and reporting; and quality of product.

This paper deals with some techniques which have been introduced both in South Africa and on Social Fund for Development projects in Egypt. As indicated above, the methods have been incorporated in conventional construction by the private contractor, and by others, for a considerable length of time. However, their introduction and utilisation in the new class of contracts which are now available to entrepreneurs, is seen as a distinct advantage relating chiefly to the systems of estimation, tendering award, testing and control of contracts.

Four areas will be described and discussed. First - within the context of improving estimates for tender (and later implementation) - team balancing - a technique described by the same authors for the 1999 ILO Conference (Croswell and McCutcheon 1999) - is expanded upon, with special emphasis upon the Egyptian environment related to SFD projects. The second technique dealt with is the structure of the contracting environment which could optimise the opportunities available to emerging contractors using labour intensive methods. This includes decision rules relating to the selection of tenderers, the tender process, appraisal of submitted tenders and the monitoring of performance.

The third area covered is that in the field of road layer work testing. Although the use of Dynamic Cone Penetrometers (DCP) has been widely used and forms an integral part of the testing process both during construction and for acceptance in many areas, its application in Egypt has been limited. The paper deals with the physical characteristics of the DCP, its use and, in particular, its application to the pre-design evaluation of road formation construction phase contractor testing and the post construction phase acceptance testing of granular material in road layer works. The use of the DCP for comparative testing in the appraisal of trench compaction is also covered. Suggestions are made for an adaptation of acceptance criteria to take cognisance of testing methods, particularly as they apply to road layer works and trench backfill compaction. The introduction of a simple inexpensive testing method which is available to every contractor is advocated. A fourth area: monitoring will be touched upon in section 5.

2. Team Balancing


2.1 Individual Tasks and Team Balancing

The setting of appropriate individual tasks has been a cornerstone of modern labour-intensive construction. In relation to this work team balancing has been another critical factor:

For example:

<table>
<thead>
<tr>
<th>Task</th>
<th>Individual Task Production</th>
<th>Balanced Production</th>
<th>Number of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation</td>
<td>3 m³</td>
<td>12 m³</td>
<td>4</td>
</tr>
<tr>
<td>Load</td>
<td>6 m³</td>
<td>12 m³</td>
<td>2</td>
</tr>
<tr>
<td>Spread</td>
<td>12 m³</td>
<td>12 m³</td>
<td>1</td>
</tr>
</tbody>
</table>

BALANCED TEAM SIZE FOR THESE ACTIVITIES: 7

There are two limitations to reliance upon individual tasks. First, it has to be possible to demarcate the work to be done by each worker. Second, even for low-cost, low-volume rural road construction, where it has been possible to demarcate individual tasks, it has only been possible to set out the tasks for about 60% of the work. In effect, the pace of all the work has been maintained by those employed on an individual task rate.

2.2 Group Tasks

Individual tasks are particularly suited to instances where geometrical shapes can be measured and set out. For many civil engineering operations this is possible but the actual time of setting out might exceed the task itself. For such work it would be preferable to be able to set a group task and provide guidance as to the balancing required within the group. Little (1993) provided a method for estimating a group task. The complex operation was broken into its distinct constituent activities. Average productivities were used for each constituent activity and then combined using a straightforward formula to obtain a group task. Miyandeniya (1999) extended this work to calculate group size and balance in order to meet specified time deadlines.

2.3 Team Balancing

A suggested definition of team balancing is as follows: The optimisation of resources applied to any task taking cognisance of parallel and subsequent tasks and the need to keep the entire work force optimally employed. Team balancing schedules have application in all phases of the contract cycle and are useful to the designer/engineer, the client/employer and the contractor. Details of the use of team balancing schedules have been dealt with elsewhere (Croswell and McCutcheon, 1999) and the rationale behind the approach and the application, in practical terms only, will be dealt with here.

One of the greatest impediments to the acceptance of labour-based contracting is the perception that it is impossible to estimate the cost of the works accurately. Attempts at providing budgets have, in the past, often been no better than guesses with very little scientific, reproducible calculation being done. The reasons for this are manifold. However, the chief one is that too little analysis of the work make-up of particular operations is undertaken at the time of the preliminary design and
estimation. There is little conception of how much work can be done using labour-based techniques and often the requirement that labour-based techniques be used is applied to operations for which they are not suited.

If a sound, experienced practitioner is involved in a decision regarding what works can be undertaken using labour-based construction, then it remains for a proper analysis of those works to be done to ensure that they are constructed in the most economical way possible. Too often a decision is made to create employment through a particular contract without due consideration of its suitability for the large scale use of human labour. This is not a problem which is dealt with here, but it is obvious that it is pointless to do a rigorous analysis of operations which experience has shown are not amenable to a labour-based approach. Once an agreement has been reached that a particular project, or components thereof, are to be constructed by labour-based methods then it is up to the designer/specifier to ensure that there is a clear understanding of the work breakdown and of the labour input required.

As a brief example, it has been found in practice that the volume of material which can be excavated within a given period, is approximately equal to half of that which can be backfilled into the same space in the same period. This would lead to an empirical decision to have twice as many workers excavating as backfilling a given length of trench. Should this not be the case then either those designated to backfill the trench will not have work to do (because the excavators cannot produce open trench fast enough) or a trench will be left open for longer than is desirable if backfilling does not keep abreast of excavations. This concept can be extended into all operations related to each other to ensure that the size of the team is correct for the series of operations identified in the work breakdown. This simple tool optimises the size of the team and therefore the cost of labour.

If the person tasked with creating a budget uses this analysis, based on his experience, he will be able to create a budget approximating to reality. An added advantage is that a reproducible trail relating to the make-up of the budget is left behind and can be examined critically at a later stage, either for comparisons or to provide input for future contract budgeting.

It must be stressed that at the design stage estimating can only be undertaken by people experienced in both the ability of workers to perform particular tasks and the capacity of equipment which will be required. A good example is a general lack of understanding as to the capacity of a normal wheel barrow and the capacity of an individual to move such a wheel barrow when it is full of earth. Unrealistic expectations of productivity may well give a false sense of a lower budget. However such mistakes must invariably lead to the increase in costs and or delay in completion of the project.

From a tenderer’s point of view the advantages are similar. If he follows a rigorous analysis of the input required and the labour component which should optimise his operation, he will not only understand the quantum of the contract, but is more likely to accurately price the tender. It has been found that, after an initial period of careful education and mentoring, the discipline enforced by completing task balancing schedules, provides a far greater understanding of what contracting is all about and becomes an invaluable tool to tenderers. It is possible for contractors to return to team balancing schedules once a contract is underway to verify their initial assumptions or to make adjustments necessitated by actual experience.
If adequate requirements in reporting provisions are included in a contract then the information used by a tenderer to win a contract, or used by a contractor to analyse his ongoing performance, can provide a useful data base for other similar projects in a particular area.

Certain programmes which seek to provide training for small contractors, such as the SFD Programme in Egypt, provide the opportunity for a particular contractor to refer back to his earlier assumptions and analysis of contracts. Having reference to team balancing schedules, the contractor is undoubtedly empowered to provide an improvement of his performance, both practically and financially, during his cycle of training.

3. Tender Environment

Whereas in the past many projects were undertaken on a “force account” basis, when the private sector is involved the implication is that competitive tendering will be applied.

When the private sector gets involved two issues need to be addressed. The first is who should be allowed to tender and the second, what is the basis of the adjudication of the tender. For transparency these issues must be decided in advance and must be publicised.

Tenderers:

The selection of prospective contractors who will be invited to tender for a particular project or for a series of projects in terms of a programme, is influenced by a range of factors which include:

1. Purpose of contract, for example to encourage emerging contractors.
2. Targeted group, for instance previously unemployed, women or rural communities.
3. Financial objective of the funder, for example minimisation of cost or maximisation of opportunities for employment and/or contractor development.

The decision rules regarding the selection of tenderers are therefore vital and are directly linked to the tender process which undoubtedly would be influenced by the targeted tenderers. Tenderers may be involved in the process either by public notice, allowing opportunity to all comers, by prior selection based on the decision rules relating to identification of tenderers or by negotiation. For any of these decision rules to be applied requires a knowledge of the environment. This environment includes not only potential players, but a thorough understanding of the price and costs associated with various alternatives and a clear understanding of the market and the relevant competition which could be involved.

It is superficially attractive to target particular contractors and to provide them with a growth path which includes a cycle of contracts which they can perform over a period of time with increasingly less support and mentoring from outsiders (Croswell and McCutcheon, 2000). In this case however, the primary selection of these fortunate people becomes even more important and a thorough investigation into their potential for success is essential. Contractors are entrepreneurial and are not risk averse. Everything possible should be done, by way of psychometric testing if necessary, to assess the quality of trainee entering a growth cycle. The example of the SFD
Labour-Based Programme for Small Contractor Training is good one and it is apparent that the success rate of trainees from within that programme is significantly better than would have been expected from a random selection.

**Tender Adjudication:**

Tender adjudication rules are invariably set by some authority within the procurement agency, for instance the Tender Board. Obviously these rules need to be recognised, however it has been shown in practice that where emerging contractors are involved the application of rules such as selection of the lowest tenderer is inadvisable. Very often low tenders arise as a result of a lack of understanding, as do high tenders, and the requirement that a low tenderer be appointed without cognisance of the potential problem arising from his inability to perform, because of mistakes made in tendering, should not be overlooked. What is important is that whatever decision rules are going to be applied must be made public. These rules may include the exclusion of lower tenderers or tenderers whose prices deviate statistically from the mean, average or median of all prices offered.

One process which proved to be successful, and completely acceptable, during the development phase of a programme was that which was applied on the infrastructure contract at Ilinge in the Eastern Province region in the Republic of South Africa. Here it was agreed that individual tenders would be awarded to the tenderer whose price was nearest that reached by consensus during a meeting of all tenderers led by the Engineer. The Engineer had a very clear picture as to what a “correct price” was, but was able to accept argument, informed by local knowledge and experience, to influence the eventual acceptable price. As the tenderers became more sophisticated a more “normal” tendering process was adhered to, however the entire experience within the targeted tendering community was very beneficial to all. Experience elsewhere has indicated that an acceptable decision rule regarding the award of tenders, is that only tenders which are within a declared percentage of the Engineer’s estimate be considered. In the case in question 15% was used, but there is a good case for a maximum variance of 10% below the Engineer’s estimate. The percentage represents approximately the expected profits (“mark up”) in the average contract.

4. **Dynamic Cone Penetrometer**

During the training and monitoring work carried out in Egypt it became increasingly clear that a relatively simple, portable, method of testing compaction was required. The dynamic cone penetrometer (DCP) seemed particularly appropriate. The DCP may also be used for evaluating the hardness of “in situ” material and therefore may also be used for estimation of reasonable tasks for excavation.

The use of penetrometers is well known in civil engineering. At its simplest a penetrometer penetrates the subsoil and gives the operator some indication, related to the resistance to penetration, of the stiffness of the underlying material. There is a wide range of types and applications, including those known as dutch cone and spoon penetrometers, the latter being able to retrieve samples. A constant feature is some form of falling mass (of known and constant characteristics) and a rod connecting the impulse provider to the exploratory point. Some form of measuring device is maintained at the surface and the entire apparatus is then operated by hand, or by simple mechanical means, depending on the mass of the falling weight.
One form of the penetrometer is the dynamic cone penetrometer (DCP) as developed for and applied to road sub-grade exploration. The refinement and development of such a penetrometer has been reported upon since 1975 by Klein and others (references in Annexure A). A correlation was developed between the penetration rate and the California Bearing Ratio (CBR) of the materials being penetrated. While these results were not absolute, they give a clear indication of strength and certainly provide comparative results.

The form of the penetrometer used is as illustrated in diagram A and the method of operation is attached as Annexure A. The fact that the penetrometer can be used to rapidly determine indicative characteristics of underlying soil horizon has application, with great benefit, in varying circumstances and in particular, in labour-based contracts involving excavation.

4.1 Pre-design evaluation

The convenience and rapidity of the testing cycle can be applied to evaluate the subsoil conditions, either for excavation classifications or bearing capacity determination. Testing can, in the first instance, be comparative, but once full testing of similar horizons is undertaken, values can be assigned to various penetration rates (see diagram B). This is valuable information when deciding on layer design or indeed suitability of underlying layers for any bearing requirement (for example house foundations or footings). Because the CBR is widely used a correlation between penetration rates of granular material and CBR has been derived and is a useful design tool.

In the case of excavation preliminary exploration can be followed up and expanded by the use of a DCP. Comparative penetration rates along the length of a trench for instance can allow an expansion of the conclusions drawn from other, limited, testing methods. Testing is both inexpensive and rapid and as a result far greater exploration is possible within a given time and budget. This leads to more accurate classification of materials, more reasoned design decisions regarding layer works and, in the extreme, to a decision to avoid certain areas entirely. As an example in part of the SFD programme in Egypt, the use of the DCP was demonstrated on the road contract at El Fayoum. Upgrading and rehabilitation of an existing gravel road was being undertaken and it was possible to quickly demonstrate the strength of the existing road formation relative to the surrounding soil. This testing supported the contention that the existing, historical, road formation was a very valuable asset which had to be maintained and that deviation from the existing relatively stable layers would lead to problems associated with poor sub-grade conditions. The operation of the DCP is so simple that within a matter of hours a wide range of trainees were both able to operate the DCP and to interpret the results of their trial.

4.2 Contractor Road Testing

Small (emerging) contractors often do not have testing facilities for density. They have neither laboratories for sand displacement nor atomic density meters. In addition, in many instances, they do not have the knowledge or experience to apply conventional testing methods. A DCP can be a useful alternative. While it may be argued that comparative testing is inadequate, it is a valuable tool in the hands of a contractor to access progress and as a decision basis for presentation of compacted layers for testing and acceptance by the
Engineer. The simplicity of the operation, and the “immediate” nature of the results, is a great advantage, particularly when compared, for instance, with sand displacement testing for which results may take in excess of 24 hours (and require specialised facilities which may not be readily available). The simple fact that results are delayed can have detrimental consequences to all involved. By the judicious use of tests in which penetration of the DCP can be compared to densities obtained by other methods (sand displacement or atomic), valuable information can be conveniently available to a contractor.

Under controlled conditions, where a full range of comparative results for the types of materials in question are available, the use of the DCP for acceptance testing can also be justified. What is important is that the use of the DCP must be specified in the contract, and the conditions under which the results of the DCP will be accepted, must be clearly stated. The use of the DCP also requires some level of training for the contractor or his operator. In addition a change in paradigm as far as the accepting authorities are concerned is required.

4.3 Contractor Trench Testing

One area which is often neglected is that of checking the compaction of trench backfilling. Acceptance testing is invariably ignored, chiefly because of the complexity of the testing methods and the impracticality of testing in sufficient positions to truly verify adherence to specifications. Traditional specifications invariably call for certain densities, normally specified in terms of percentage of AASHTO or some similar requirement. No cognisance is taken of the density of the surrounding soil and often there is a definite variation between the in situ and newly compacted soil. Experience has shown that where trench compaction exceeds that of surrounding soil a “cut off” is created which may be undesirable. Alternatively, if compaction within the trench is less than the surrounding soil then a “flow path” is created, often with unforeseen consequences. A far more pragmatic solution would be to compact the trench to the density of the surrounding ground. To achieve this comparative testing is essential. Testing of this nature can very conveniently be achieved by the use of a DCP. Frequent, simple and convenient testing along and adjacent to the trench is indicated as a solution.

4.4 Excavation

Task Setting: When labour-based methods are employed setting of tasks provides one of the biggest challenges to supervisors. Where variable materials are encountered there is a constant debate, or possibly argument, with the workers as to the equity of setting a fixed quantity of work (for instance cubic metres of excavation) without reference to the relative hardness of the material to be excavated. If a team leader or supervisor is equipped with a DCP he is able to carry out testing, effectively in every task set, to provide reassurance to himself that the task is equitable and to provide proof to the worker that he is not being prejudiced. Experience has shown that the use of a DCP simplifies the decision process and eliminates the majority of potential conflicts. It is not necessary that the results are absolute, but mainly that the relative hardness (or softness) of the material to be excavated can be demonstrated quickly.
5. Monitoring

Experienced Engineers or other supervisory staff will either have set down rules or be experienced enough to know when a particular contractor is performing adequately. In a developing environment, such as that proposed for emerging contractors, normal rules may not be applicable. There are, however, some guidelines that can be offered, based on experience, relating to the evaluation of a contractor’s performance and to the prediction of his likelihood of success. Normal key performance indicators can also be applied, however in the writers’ experience one of the clearest indications of the performance of a contractor is the amount of “management time” the Engineer is asked to provide on a day to day basis.

No attempt should be made to discourage a contractor seeking advice and mentoring. However, experience on a large water reticulation contract (over 200km of pipeline), which was undertaken entirely using labour-based methods and emerging contractors, the amount of time that management “booked” to particular contracts was directly correlated to their prospect of success. The contractors who failed were those who, for whatever reason, required more support and advice. Fortunately, this indicator allowed sufficient notice of the difficulty being experienced by contractors for more effort to be applied to them and, pleasingly, only one contractor out of a group of forty one actually failed.

A recent publication *Performance Monitoring of Micro Contracts* (Sohail and Cotton, 2000) provides a detailed set of guidelines for performance monitoring and performance indicators related to the procurement of urban infrastructure.

6. Conclusion

The wider use of small contractors, in the private sector, engaged in labour-based construction requires some adaptation on the part of designer/specifiers and funders. It is certainly not proposed that standards are compromised, however the acceptance of amended approaches and testing procedures can greatly facilitate the accuracy of budgets and acceptance of the finished product without unduly compromising existing, which are sometimes difficult to follow given the small scale of operation, and its relative isolation from adequate testing facilities (and the possibly lower level of technical sophistication of the Contractor). Methods need to be introduced to assist all involved in gaining a better understanding of what is involved in labour-based construction and the cost thereof. Any assistance that can be given, particularly to trainee contractors must be of advantage in a national programme. Where more direct, cheaper and simpler testing procedures are possible, then the necessary adaptation to standard specifications must be justified if there is no prejudice to the accepting authority or funder. The use of a dynamic cone penetrometer for testing of density is strongly advocated, because of its simplicity and low cost. The changes in paradigm which are required are really not significant, but can lead to the facilitation of the entrance of small contractors who are likely to enter the market and create enhanced employment opportunities.

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DCP Bibliography is part of Annexure A

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Annex A: Method ST6

MEASUREMENT OF THE IN SITU STRENGTH OF SOILS BY THE DYNAMIC CONE PENETROMETER (DCP)

1. SCOPE
This method describes the determination of the rate of penetration of the Dynamic Cone Penetrometer (DCP) into a natural or compacted material by virtue of the built-in sliding hammer. The penetration rate is inversely proportional to the resistance of the ground to the penetration of the cone of the DCP and may be related, inter alia, to the in situ CBR or soil density (see 5.1).

2. APPARATUS
1. Dynamic Cone Penetrometer as illustrated in Figure ST6/1 with the appropriate spanners, spare cones, rods, etc. (See 5.2).
2. A pick or hand auger.
3. A spade.
4. A measuring tape, 2m long.
5. Traffic cones, warning signs and flags as required.

3. METHOD
Assemble the DCP as shown in Figure ST6/1 ensuring that the parts are fitting properly and that the hammer can slide freely. Place the tip of the cone on the site to be tested (see 5.2). Hold the DCP vertically and by means of a hammer knock the cone into the surface up to the zero mark, which is the parallel-sided shoulder portion (=3mm wide) just above the cone-shaped tip.

Attach the measuring rod to the DCP and zero the sliding scale.

While holding the DCP vertically, lift the hammer as far as it can go and allow it to fall freely and strike the anvil, driving the cone into the ground surface.

The penetration can be read off after each blow of the hammer or after as many blows as are practical or required for the purpose of the test (see 5.3). Record the penetration (to the nearest 1mm) and the number of blows on form ST6/1 or a similar form (see 5.4).

On completion of the test, the DCP is extracted by ramming the hammer against the upper stop - usually after the measuring scale has been detached to prevent damage (see 5.5).

The strength of layers deeper than the reach of the DCP can be measured by removing some or all of the overlying material with a pick and spade or using a hand auger. At the start of the test the depth below the original datum level of the material to be tested is measured, using a trace measure and recorded.
4. **CALCULATIONS**

4.1 The DCP penetration depths in mm are plotted against the number of blows on Form ST6/1 and a penetration curve is drawn, the angle of which is the penetration rate, known as the “DCP number” (DN) in mm/blow. A consistent slope angle thus indicates a consistent DN for that particular zone.

4.2 *In situ* shear strength (CBR)

From the curve, the DN (in mm/blow) at different zones or the mean over a chosen depth may be calculated to obtain the *in situ* shear strength of the particular zone. The DN of a specific zone is obtained by dividing the zone thickness by the number of hammer blows to penetrate that zone.

From Table 1 the equivalent *in situ* CBR value of that zone can be obtained.

### TABLE 1

<table>
<thead>
<tr>
<th>DCP number (mm/BLOW)</th>
<th>IN SITU CBR</th>
<th>DCP number (mm/BLOW)</th>
<th>IN SITU CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>110</td>
<td>17</td>
<td>12</td>
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<td>4</td>
<td>75</td>
<td>18</td>
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</tr>
<tr>
<td>16</td>
<td>13</td>
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</tr>
</tbody>
</table>

5. **NOTES**

5.1 The DCP may be used to assess the density of a fairly uniform material by relating density to penetration rate (DN) on the same material. In this way under-compacted or “soft spots” can be identified even though the DCP does not measure density directly.

A field DCP measurement results in a field or *in situ* CBR and will normally not correlate with the laboratory or soaked CBR of the same material. The test is thus intended to evaluate the *in situ* strength of a material under prevailing conditions.

If a number of DCP penetrations have to be compared with one another (or with target values), or when the mean values for a section of road have to be estimated, the DN values may be recorded on the DCP layer-strength diagram as illustrated in Form ST6/2.
5.2 The cone must be replaced when its diameter has been reduced by 5 per cent or it has been visibly damaged.

5.3 Reading after each blow are recommended for thin layers, say up to 150mm thick, but readings after every fifth blow are usually sufficient. The regularity of readings also depends on the rate of penetration. Readings should be taken more often with very soft material than with resistant material.

5.4 The results may be plotted on the work sheet as the readings are taken, to get an immediate indication of the penetration rate for each layer.

5.5 If necessary, samples of the material can be taken after the DCP test using a hand auger, or a pick and shovel for harder material.
THE DYNAMIC CONE PENETROMETER

NOT TO SCALE

FIGURE ST6/1
REFERENCES


Reinforced concrete with bamboo and nylon rope

Manoel Noronha
&
Michael Madanha

Paper presented at:
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
As its name suggests, the NGO World Vision has a presence on every continent – at present we are active in 103 countries worldwide. The main target of our organization is the eradication of absolute poverty, hunger, and injustice, working together with the most vulnerable members of society. We often work in countries in a state of emergency, distributing food to the worst affected areas.

Our work in Mozambique started in the 1990s, during the civil war. After the peace agreement, which thanks to the Lord was accepted and complied with by all members of society, Mozambique, and World Vision started a new era, with new challenges. In particular, the emergency projects evolved into development projects. Development projects seek to improve living conditions for all the population, but always with special attention to the most vulnerable. On this basis, and with the objective of expanding existing market conditions and creating new markets in areas with high population densities and good potential for agricultural production, we launched a labour-intensive road construction project in 1977.

One of the principal aims of the project is to develop local contractors. To this end, we constructed a residential training centre with capacity for up to 50 students. Theoretical training is given in the centre, and practical training under field conditions nearby. We aim to teach the contractors not only how to construct and maintain roads, culverts and bridges, but also how to run a business and manage its assets.

It was at this centre, for reasons described later, and also with the idea of teaching the contractors the basics of concrete technology and strength of materials, that we started the study presented here.

The equipment used for the tests is quite simple, but very accurate and reliable. Anyone with some familiarity with the strength of materials, reading this paper, will easily understand how it works, and the results presented as tables and graphs of load versus deformation.

We are aware that the results presented here are not yet sufficient for us to suggest that slabs reinforced with bamboo strips or pre-tensioned cords should be used in permanent structures. However, after analysing the results obtained in the tests, we do see indications of good performance from these materials, which encourages us to continue with the trials already started, and to think of carrying out more, as seems necessary.

Our main objective in presenting this research is to try to stimulate the curiosity of the readers and participants in the seminar with the idea that steel might not be the only way to reinforce concrete. We would be grateful if the participants would share their ideas and experiences with us.
1. HISTORICAL

1.1. The idea to undertake a small investigation of concrete planks reinforced with bamboo and rope mesh came from the fact that on some occasions, it is not possible to find the traditional steel reinforcing on the local market.

1.2. We are not trying any magic or miracle, but simply verifying the possibility of using materials easily found in local markets or in nature, and possibly presenting savings to users.

1.3. We constructed all of the planks in the conditions found on the field and not those found in the laboratory.

1.4. The comments presented in this paper and described during our presentation are considered as the first part of the studies. The number of strength tests carried out does not seem sufficient. Some tests that haven’t been carried out are of extreme importance, and are required to make some definite conclusions. An example is the durability of the bamboo inside the concrete. We intend to continue with the studies, and the results and the conclusions that we obtain will be sent to ILO immediately. The ILO will forward the results to all interested parties.

2. INITIATING TESTS

2.1. Initially we tried to establish some characteristics of the material we intended to work with. Tests were carried out to test the strength of the nylon and bamboo rope.

2.1.1. THE STRENGTH OF THE NYLON ROPE

- We started the test by hanging two drums with the nylon rope, which has a diameter of 1.5cm. The drums were previously weighed then slowly filled with water. We reached a load of 420kg without the rope snapping.
- Since the rope resisted the load presented by two drums filled with water, we arranged a bigger tank and re-tested. The tank was filled until it reached a load of 1,210kg without snapping.
- The tests stopped there, because we thought the test’s value was more than expected and sufficient.

2.1.2. BAMBOO STRENGTH

- The bamboo was cut into strips of 2.5cm width. The surface area of contact (with the concrete) was approximately 6cm (counting the edges of the strip) for each centimetre of length of the strip.
- For the bond test of the bamboo in the concrete we used a concrete block 30cm long made with 8mm steel reinforcing. The concrete mix used was the same as the mix...
for the planks: coarse river sand, 2.5 cm hand-crushed stone aggregate (440 kg/m³) and a water/cement ratio of approximately 0.52.

- Some strips of bamboo were tested in the natural state, while others were scraped with a knife on the smooth side.
- For the strength test of the bamboo, the strips were placed 30 cm into the blocks of concrete.
- For the bond tests of the bamboo to the concrete, both the strips of smooth and scraped bamboo were placed 30 cm, 10 cm and 5 cm into the concrete.

2.2. THE CONSTRUCTION OF PLANKS FOR TESTING

2.2.1. GENERAL OBSERVATION

- The planks were made of concrete in two sizes: some of 60 cm x 120 cm x 12 cm and others 30 cm x 200 cm x 15 cm.
- All of the planks were made of the same concrete mix: 1 sack of cement, 80 l of stone (2.5 cm), 60 l of coarse sand with approximately 5% of moisture content and 22 l of water.

2.2.2 PLANKS MADE WITH STEEL REINFORCING

- The planks of 60 cm x 120 cm were made with a steel mesh comprising 5 bars of 12 mm diameter longitudinally, tied laterally with 8 mm bars.
- The planks of 30 cm x 200 cm were made with a mesh comprising 4 bars of 12 mm diameter longitudinally, tied laterally with 8 mm bars.

2.2.3 PLANKS MADE WITH BAMBOO MESH

- The planks of 60 cm x 120 cm each included one or two layers of bamboo mesh comprising 10 longitudinal strips.
- The planks of 30 cm x 200 cm each included one or two layers of bamboo mesh comprising 5 longitudinal strips.
- Two samples of each planks were made, one with smooth bamboo and the other with scraped bamboo.

2.2.4 PLANKS MADE WITH NYLON MESH

- Planks of both 60 cm x 120 cm and 30 cm x 200 cm were made with nylon mesh reinforcement, used in its normal form and either put loosely in the mould or stretched manually. We observed that it was not possible to verify in the field the actual tension obtained when trying to stretch the ropes with manual resources.
- The planks of 60 cm x 120 cm included 8 ropes laid longitudinally, while the planks of 30 cm x 200 cm included 5 ropes.

3. STRENGTH TESTS OF THE PLANKS

3.1. THE LOAD AND MEASURING EQUIPMENT
3.1.1. LOAD BOX

- For the load box comprised a wooden box filled with concrete with a total weight of 9 tonnes.

3.1.2. EQUIPMENT USED

- For the loading of the decks we used a set of equipment including hydraulic jacks with a pump and manometer. Before starting the tests, the equipment was checked in the concrete and soils laboratory of DEP (Department of Roads and Bridges) in the Zambezia province.

3.1.3. MEASUREMENT OF DEFLECTION

- For the measurement of deflection, we used a device with an accuracy of 0.01mm.
- Readings were taken at all stages of loading, thus enabling us to verify the residual deflection after unloading.

3.1.4. THE LOADING

- The loading was applied in increments of 500kg per stage.
- The loading initially started with a load of 2,500kg. It was not possible to measure the small initial readings of the loading because the gauge on the jack did not provide this level of accuracy.

3.2. CONSIDERATION USED FOR THE TESTS

- The loading was applied in stages according to the description given.
- Before applying further load, it was verified that the deflection due to the previous had stabilised.
- We considered that the deflection had stabilised when the difference between successive readings was less than 5% of the deflection measured immediately after the load was applied.
- The position of the loading on the planks represented the worst loading case in practise (i.e. in the middle).
- It was intended that the loading applied to the beams should be 1.5 times the plank’s working load.

3.3. LIMIT DEFORMATION

- We considered that the maximum acceptable deflection for the 120cm long planks was 24mm. This was obtained from the calculation L/300 or 120/500 = 0.24cm
- For the 200cm long planks, we considered the maximum acceptable deformation to be 6.6mm. This was obtained from the calculation L/500 or 200/300=0.66cm. Beyond this limit the planks started to show too many cracks of significant size.

4. FIRST RESULTS ANALYSIS

4.1. For the 120cm planks reinforced with the natural and scraped bamboo mesh, the deflections were below the limit. Although the maximum deflections were acceptable, the residual deflection after unloading must be analysed more carefully.
4.2. All tests on the 200cm decks reinforced with bamboo presented unsatisfactory results in the maximum deflection and also in the residual deflection.
4.3. Although the nylon rope demonstrated good performance in the bonding and strength tests, it did not improve the strength of the concrete planks. When we look at the load/deflection tables we see that in every test the planks failed at approximately the same loading without cracks or deformation first appearing. We conclude that the pre-tension we applied to the rope was not sufficient. The concrete worked alone and broke when the bending forces exceeded the strength of the concrete. The rope started to work after the plank had broken. The nylon worked like a type of “fibre reinforcement” which is not what we required.

5. CONCLUSIONS

- The initial conclusions of the study, although very interesting, are still few and therefore should be studied more, much more.
- We need to discuss the conclusions with other people that have some experience in this subject. This would help to suggest new ideas for our tests. Therefore we are presenting the matter to you who read this paper and all the participants of the seminar.
NEW CHALLENGES IN DEVELOPMENT:
A CASE STUDY IN SEKHUKUNELAND,
SOUTH AFRICA

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Paper presented at:

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INTRODUCTION

Employment-intensive construction techniques have long been used to construct and maintain low-cost, low-volume rural roads in sub-Saharan Africa. The technology has been thoroughly proved by years of practice. This makes it even more disappointing that in South Africa the technology itself is generally rejected. In the few instances that it has been attempted, the success rate has been low. Studies have identified the various reasons for failure - mainly lack of knowledge about the principles of employment intensive methods, on which the successes elsewhere have been based. However, the fact that to date, there has been no successful long-term employment-intensive rural road construction programme in South Africa, has reinforced the prejudice that there are factors peculiar to South Africa which mean that large-scale programmes can no longer be sensibly proposed. Research and experience in Sekhukhuneland suggest that, if the basic principles are applied, employment-intensive methods can be used and there is potential for long-term large-scale work.

Although long-term low-cost rural road programmes have not been established, considerable progress has been made in research and development in relation to the use of employment-intensive methods in the provision of high-standard high-cost roads. Besides roads there have also been developments related to the provision of other high-standard infrastructure. The provision of infrastructure for a settlement of 17000 people (with close geographic links to a further 33000) is directly related to the focus of the conference. Difficulties in expanding such small-scale endeavours have important implications for the expansion in the use of employment-intensive methods in the urban context.

Rural areas in South Africa were neglected by the previous government and have not received their fair share of attention by the present government. The outstanding feature of some of the rural areas is the almost total absence of employment and the lack of infrastructure. One of the particularly impoverished areas is Sekhukhuneland. The Northern Province has recently recognised Sekhukhuneland as an impoverished area requiring urgent assistance.

The Research Centre for Employment Creation in Construction, based in the School of Civil and Environmental Engineering of the University of the Witwatersrand, has been studying the engineering services and infrastructure of the region for several years. The Centre led a short construction programme in Mohlaletse in 1999. All work was done using local labour and materials. In the context of the Conference, we believe that this study shows real potential. Long term planning for the area includes stormwater drainage structures, some road construction, a small dam, water treatment works, reservoirs and water reticulation. Due to the prevalence of rock outcrops, stone is available in quantity, has been used for stormwater drainage structures and will be used for most of the structures planned.

Challenges in rural settlements in Sekhukhuneland that will have to be solved in order to ensure successful investment in infrastructure are:

- Community participation and ongoing communication
- Agreed and fair methods of selection of workers from a flood of applicants
- Lack of town planning
- Lack of established standards for affordable amenities
- Politicisation of developmental issues
Lack of sustainable funding on a programme basis, in contrast to stop-start funding for particular projects
Lack of established training schools teaching labour-intensive construction skills

This paper endeavours to show how some of the challenges were dealt with in a particular settlement in Sekhukhuneland.

Local background

The capital of Sekhukhuneland is Mohlaletse, a village of about 17,000 people, situated in the Northern Province of the Republic of South Africa. It is also the seat of tribal government, being the headquarters of the Paramount Chief of the Pedi people, Kgosi Kgolo K K Sekhukhune. Mohlaletse is a typical rural settlement with a low density of housing and fairly extensive cultivation and vegetable gardening adjacent to the houses.

Mohlaletse has the basic amenities, albeit at a very basic level. The provincial road running through the village is bitumen surfaced up to the village and continues towards Apel (a regional centre) as a gravel road. A tributary of the Mohlaletse River cut the gravel road during 1998 and repairs lasted a few months. The next big rain in February 1999, destroyed the crossing and traffic has been using a long and rough deviation ever since.

The Mohlaletse River splits the village in two portions, with the older portion to the east and the newer portion to the west. They are joined by a narrow, single-track bridge at the far northern end of the village. There is a well-used drift in the middle of the village, used extensively by pedestrian and wheeled traffic. Unfortunately, when the river is in flood, only the bridge can be used.

Eskom supplies electrical power to the village, but the quality of supply is poor. It is not known whether the problem is due to illegal connections, as is the case in many townships in South Africa, or due to inadequate design.

Irrigation and potable water was originally supplied from a dam (built in 1962) on the main tributary to the Mohlaletse River. Due to poor agricultural practices and extensive soil erosion in the catchment, the dam filled with sand and silt over a short period. The earth wall was breached by a storm in about 1995. Calculations have shown that the concrete spillway is undersized. The soil held back by the dam wall is presently being farmed.

Water supplies come from boreholes spread throughout the village. Most are equipped with hand pumps. Several private boreholes are equipped with electric pumps, generally coupled to an overhead tank to supply some pressure head and storage capacity. One large borehole sited beside the "dam" is equipped with a diesel driven pump, which delivers water to two concrete reservoirs of total capacity perhaps 200 cubic metres. The reservoirs supply a piped reticulation of 63 and 50 mm diameter, which supply standpipes over a distance of two or three kilometres. A similar system is in use in the western portion of the village. Money to buy diesel fuel is generally in short supply, so many people use the river as their primary source of water. By digging a hole in the sandy bed of the river, water can easily be reached even at times when the river is not flowing.
Most of the boreholes deliver brackish water, while some others deliver water that is more palatable. The quality of the borehole water supplies was tested and did not comply with normally accepted water quality standards. Water treatment is clearly required.

Sanitation throughout the village is by pit latrines, with a few private septic tank systems. The pit latrines are generally poor makeshift structures with very few VIP (ventilated improved pit) latrines. The effect of the pit latrines and the septic tanks on ground water supplies is unknown and needs investigation. The problem is not seen to be particularly urgent (in the authors’ personal opinions) as the area is arid and the pollution plume from each installation is probably limited in extent.

The main village road from the bridge in the north to the middle of the village was gravelled and culverted several years ago. Maintenance has been by provincial grader only, smoothing out the corrugations and wash-aways several times per year. The drainage has been neglected, with the result that several of the culverts were blocked and the side drains silted up. Extensive erosion has removed much of the gravel surfacing. Other tracks in the village have been graded at various times. Several dongas (deep erosion channels) have formed, cutting through the village to the river.

Other facilities in Mohlaletse are a large unfinished Community Hall, a Post Office with limited facilities, many privately owned shops, restaurants and bars, and several diverse businesses.

**Mohlaletse Road drainage Project**

In September and October 1998 the authors and a team of fourth year civil engineering students from the University of the Witwatersrand, visited Mohlaletse in order to gather information for a design project. Several designs resulted: roads, stormwater drainage, a submersible drift across the Mohlaletse River and a sand dam to provide irrigation water supplies. Each design was the subject of a report, drawings, quantity estimates, a cost estimate and rudimentary contract documentation.

From the student designs, the Research Centre for Employment Creation in Construction chose standards for the main roads and principal drainage structures and compiled cost estimates for the construction of roads and drains for the village. These were reduced to practical budgets within the R250 000 allocated by the Donaldson Trust. During discussions in January 1999, it was decided in principle that the roads to be built or upgraded should be done in three phases:

- first phase should construct drainage systems that would protect the roads (and indirectly the village)
- second phase should build the roads as engineered earth roads, but to such standards of width and alignment to allow later upgrading;
- third phase would comprise upgrading and surfacing of the roads (when further funding became available).

The first two phases were to include the main village road from the bridge in the north to the middle of the village and from there to the Community Hall.
Other roads in the village were to be considered later, when additional funding and expertise were available. Cost estimates were done for several of these roads, but the totals were far beyond the practicable limits of present and foreseeable funding.

In April 1999, the Research Centre started a construction project under the leadership of Hubert van Zandvoort, a student of the “Technische Hoogeschool, Enschede” the Netherlands, who needed practical work experience. The work undertaken was to be the start of phase 1: construction of several drainage structures. The project took place over a period of four months, ending in July 1999. Funding was provided by the Donaldson Trust. The Research Centre was responsible for the design, training and management aspects. All work was labour-intensive, using local materials. The infrastructure that was built over a two-kilometre road length included:

- 2 large drifts
- 1 arch culvert
- upgrading of 3 culverts
- 3 small drifts
- relaying portions of the water pipe network alongside the road

During the duration of the project, the workforce was increased to 89 workers. This included six team leaders, ten stone masons and ten assistant masons, one clerk and the balance made up of labourers. The work commenced with basic training by the site supervisor of six team leaders, who were chosen from the community by the road committee. Masons and their assistants were chosen on the grounds of the skills they could demonstrate. The labourers were selected on a lottery basis. At the start of the project, the team leaders had only a few labourers to supervise. This number was slowly increased until acceptable team sizes were established.

All haulage of rock, sand and water was carried out using local donkey carts.

The total project cost was R235 000 and can be broken up as follows:

- Wages: R130 000
- Materials and tools: R32 000. Part of this amount will be saved on future projects, as the tools are now available in the community.
- Safety equipment: R4 000
- General dealer (local building supplier in the village): R28 000
- Rent (student staying in the village): R4 200
- Transport cost (travel between Wits and Mohlaletse): R30 000

The percentage of money remaining within the community was 69%.

The works in Mohlaletse were visited by two officers from the Royal Military Academy, Netherlands, Lieutenants E Netten and P van Schaijk, who were compiling research for a report on labour-intensive construction in military peacekeeping operations.

**Problems encountered**

Labour productivity was low, despite most of the work being done on a task basis. Problems encountered were largely due to inexperience of both the Supervisor and the team leaders. Setting
the size of the task depends on the site conditions, tools available, expertise of the team leader and the strength and skill of the labourer. The ground conditions changed rapidly in some areas, requiring the tasks already set to be reassessed, usually downwards, because the ground was harder at depth. Fully trained team leaders would have been able to cope with these varying conditions, but at Mohlaletse, every problem needed the exclusive attention of the Supervisor.

Quality of workmanship was often poor at the start of the work, but improved greatly once the team understood clearly what was required and how they could achieve it. The people employed were very willing and generally full of jokes and fun.

Some labour problems were experienced but were adequately solved by the Supervisor. It never became necessary to involve either the "head office" or the Donaldson Trust in these disputes.

Lack of sufficient training was clearly the underlying cause of many of the problems encountered. The Kisii Training Centre in Kenya gives a concentrated three-month course to Road Builders, whereupon they work under close supervision for another three months, followed by six months work under guidance, before they are even considered competent. The Research Centre was not able to provide this level of training at that time.

Communication proved to be a problem. Even within the village itself, communication was poor. For example, when a side road had to be closed or moved for some technical reason, the Supervisor called the Road Committee to the site to discuss the matter. The matter would be talked over and eventually agreed, but the decision was then not carried over to the local people affected by the change. The constructors would then be harangued by the locals, who were in ignorance of the consultation that had taken place. Clearly, the locals had to be involved in the decision for change. This is one of the essential differences between construction of roads in rural areas and inside a settlement.

Telephonic communications were always problematical. Only a few telephone lines enter the village and it was not always possible to depend on a third party for the recording and passing on of messages. Cell phones do not work in the village, as the nearest repeater is in Jane Furse (some 50 km away). This meant that the Supervisor had to drive several kilometres out of the village in order to use his cell-phone. The organisation in Johannesburg was not set up to give rapid answers to site problems, as the people were involved in academic pursuits and not constantly available. For future projects, this aspect must receive urgent attention.

Continuity of funding would have enabled much more work to have been tackled and completed.

**Solutions**

Much thought went towards finding answers to the principal problems. The first was training. Further training towards "Road Builder" standard of some of the present team leaders would enable future work to be undertaken more successfully. Possibilities for training are:

- Transport team leaders to Wits University and hold classes there: advantages: infrastructure exists, lecturers are available, transport and time related costs are low; disadvantages are that theory must be combined with practice and space to do practicals is non-existent, accommodation costs are high, the course has not been registered and will not be recognised.
- Use facilities of the Civil Engineering Industry Training Scheme (CEITS): advantages are that our lecturers will not be needed (saving preparation time), existing courses can be used and they are registered and recognised by the construction industry; disadvantages are that the courses are largely unsuitable (note however that we have no recent course lists), costly (at least R1000 per person per course, excluding accommodation costs).
- Send the candidates to other schools eg Botswana, Lesotho or even to Kisii in Kenya. Advantages are the high standard of teaching, excellent courses, good practical experience given during the courses; disadvantages are high costs, language barrier, courses not recognised in South Africa.
- Set up a training school at Mohlaletse. The cost of putting up a suitable building in Mohlaletse is high; however, use of an existing building may be possible. Advantages are that the training can be tailored precisely to local requirements; practical aspects can be undertaken just outside the "school", accommodation and transportation costs for the trainees are nil as they will live at home. Disadvantages are that transport and time related costs for lecturers are high and suitable accommodation will have to be found in or close to the village; courses must be registered to receive recognition.

Registration of the courses is essential and must be done in any case. This is not an obstacle, although it will take time.

Communication systems will have to be established both within the site at Mohlaletse and within the Research Centre at Wits University. The lack of telephones and the difficulty of establishing contact with specific people may be overcome by instituting regular call times, aided by scrupulous message recording and follow up.

Funding (more specifically the shortage of funds) can be overcome by finding suitable donors or partners. Anglo American Platinum (Amplats) has offered some limited funds for the year 2000, with the possibility of increasing funding if the project proceeds satisfactorily. Other donors or partners will have to be approached, amongst them the provincial authorities.

**Future: Mohlaletse**

The Donaldson Trust has allocated funds for the development of engineering services for the period 1999 to 2002. For this work to be carried out successfully, risk and liability of the sponsors will have to be limited, which can probably best be done by the creation of an intermediary "non-profit" company. The intention is, therefore, to establish a Section 21 Company (not for gain) that will act as the "contractor" to undertake the training, consulting, construction and maintenance required for the project. The "contractor" will enter into contracts and will arrange the necessary insurance to reduce the exposure to risk.

Studies have identified work still required at Mohlaletse to include:

**Drainage:**

- Drainage of the roads from the Mohlaletse River bridge to the Community Hall
- Drainage through the "old village"
- Erosion protection downstream of recently built culverts
- Bridge over stormwater channel at entrance to primary school
Roadworks:
- Construction of the road from the bridge to the Community Hall
- Construction of a drift across the Mohlaletse River
- Other roadworks

Waterworks:
- Repair of hand pumps on boreholes
- Construction of stone masonry dam upstream, with piping to a new filtration and water treatment plant
- Piping from the filtration plant to new reservoirs
- New stone masonry reservoirs
- Piping to connect all the reservoirs (new and old) to reticulation

Solid waste removal
- Construction of waste disposal area including fencing and gates
- Waste collection works
- Setting up the institutional framework

Sanitation:
- Repairs and conversion of existing latrines to VIPs
- Construction of new VIPs

Irrigation:
- Study of irrigation needs and design and construction of affordable solutions

Transportation needs study:
- Household based transportation needs study
- Planning of development around the findings of the study

Firewood lots:
- Study of firewood needs
- Planning and support of private initiatives for growing firewood

The drainage that was constructed over a length of about two kilometres of roadway, funded by the Donaldson Trust, ensured that access was kept open during the recent heavy rains and flooding experienced in the Northern Province. It is planned to complete the drainage and to rehabilitate the road over its full length of 5 km from the bridge over the Mohlaletse River to the Community Hall. The design approach used for the road drainage was to utilise existing culverts for the "minor drains" and to build new structures to add hydraulic capacity to satisfy the 50 year return flood for the "major drains". Most of the new structures are low-level drifts, designed to flow 200 mm deep in a 50 year storm event. This approach results in a robust drainage system that can be easily
maintained and repaired. This strategy will be used throughout the drainage works. Environmentally sound designs are essential, as soil erosion is a major problem in the whole of Sekhukuneland.

**Future: greater Sekhukuneland**

It is hoped to expand the work into Sekhukuneland with the help of funding and support from Amplats and other sponsors. Some funding has already been promised. Gravel roads are planned for Atok Mine (managed by Amplats) and the surrounding villages. Gravel will have to be sourced and transported to the construction sites. At Mohlaletse in 1999, donkey carts were very successfully used for transportation of rock and water. Should sufficient carts be locally available and the haul distances are favourable, donkey cart haulage will again be used. Roadway compaction will be done by mechanical vibrating rollers and local operators will be trained to safely operate and maintain these machines. All other construction activities will be done by hand.

Similar work is envisaged for the surrounding villages. No preliminary surveys have been done, as we do not wish to raise hopes in vain. When sufficient funding is assured, then the village councils will be approached to ascertain their own prioritised infrastructure needs.

Future developments in the provision of infrastructure using employment-intensive construction methods will be recorded, evaluated and reported.
BIBLIOGRAPHY


SOIL STABILIZATION FOR ROAD PAVEMENTS USING IONIC SOIL STABILIZERS

A State of the Art Review

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Paper presented at:

ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
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Abstract

Throughout the world, road construction, upgrading and maintenance costs are continually increasing thereby placing a serious burden on road authorities with limited financial resources. This situation is particularly serious in developing countries.

Access to suitable gravel sources also continues to be problematic in terms of availability, cost and the environment. Increasing population and agricultural pressures make it more and more difficult and expensive to acquire land for material extraction. As a result, gravel sources are becoming more remote with subsequent high haulage costs. The economic requirements of transporters for heavier vehicle loads causes further damage to and added maintenance costs of existing road networks, many of which are already in poor condition. Rehabilitation of gravel pits is generally neglected resulting in environmental degradation.

This Paper reviews current knowledge relating to the stabilization of in-situ materials using Ionic Soil Stabilizers or Sulphonated Petroleum Products (SPPs) in a process that makes locally available soils stronger, more durable and therefore suitable for road foundation layers and low traffic volume wearing courses.

The process has the potential for significantly reducing the costs of road construction, upgrading and maintenance in particular circumstances. The process also results in a significant reduction in the demand for aggregates through the substitution of stabilized in-situ materials for conventional gravelling.

The process involves the thorough mixing of in-situ soils together with sufficient water (to which is added a controlled quantity of an SPP agent) in order to achieve optimum moisture content and so ensure the required chemical reaction with the treated soils. This, followed by compaction and curing, ensures the achievement of the soils full strength. The process is not dissimilar to conventional lime and cement soil stabilization.

Such a process or technology that reduces the demand for high quality aggregates and offers the potential for reducing costs of road works must therefore be worth very serious attention by both government road authorities and private sector consulting and contracting firms.

This Paper provides a current 'state-of-the-art' review on the theory of SPPs for treatment of in-situ soils, the chemical, physical and environmental factors affecting strength of materials so treated, suitable specifications and material testing requirements to determine soil suitability for SPP treatment, permitted use of stabilized materials in road works, appropriate working methods and quality control, and environmental considerations related to their use.

This ‘state-of-the-art’ review is, and continues to be, supported through direct experience of the author in the implementation of a number of field trials in Africa and Asia, whereby sections of road have been constructed, rehabilitated and maintained using SPP technology. Following SPP treatment, the sections were monitored to measure performance both in treated and untreated situations.

Implementation and subsequent monitoring of these trial sections has significantly contributed to current knowledge regarding the determination of soil analysis requirements to ascertain soil suitability,
the most appropriate working methods, labour and equipment requirements and construction, rehabilitation and maintenance costs and benefits.

1. Introduction

Soil stabilization as defined by Philip Sherwood is

“the alteration of the properties of an existing soil to meet specified engineering requirements ………. for use in the various layers of road pavements”.

The soil properties that require alteration by stabilization include:
- strength to increase stability and bearing capacity,
- volume stability to control swelling/shrinkage caused by changes in moisture content,
- durability to increase resistance to erosion either from weather or traffic and
- reduction in permeability to reduce the ability of water to enter and pass through the soil.

Sherwood also details the properties of ideal stabilizing agents as those being able to stabilize a wide range of soils, have a permanent stabilizing effect, be readily available in the market place at relatively low cost and in large quantities, present no serious storage or transport problems and be non-toxic.

Historically, soil stabilization using chemical stabilizers was initiated during World War II in an effort to find substances that, when used in small quantities, would cause an immediate improvement in the bearing capacity of local soils and so facilitate rapid construction of airfields often located in remote areas.

Since the early 1950’s, a number of chemical stabilization agents have emerged on world markets most of which have been described in NAASRA (1986). However as G J Giummarra clearly states, “Not all these materials have been fully evaluated and their performances assessed”.

The principles of chemical soil stabilization have, therefore, been well known for the past 50 years with the trend being to the development and use of formulations based upon sulphonated oils or SPPs. However, use of SPPs continues to be restricted to somewhat limited applications including rural airfields, minor roads and hard standing areas for vehicle and equipment parking.

In June 1996, The Nation newspaper, based in Nairobi, Kenya, published an article entitled “Company to sell road chemical” which claimed that its use “cuts the cost of making a road by 50%”.

One must therefore ask why has a product, which appears to offer such potential for reducing the costs of road works, not become part of conventional civil engineering practise? Why are there so few engineering standards, specifications, codes of practise, etc., available regarding its use?

The answer to these questions is simple. Road building technology relies very much on past experiences by its practitioners. Conventional road design has long been established and is based on material testing techniques, which provide a reasonable degree of reliability in forecasting how materials will behave under certain conditions including traffic. Such testing techniques and subsequent methods of material use have developed concurrently with the expanded use of lime, cement and more
recently bitumen stabilizers together with the specialised equipment required for their efficient and effective handling.

Soil testing, as well as being a relatively new science, is at best inexact. Engineers acknowledge that material testing often culminates in widely divergent results due to a plethora of reasons; poor sampling techniques, use of testing equipment meeting varying standards and condition, variations with implementation of the testing methods, interpretation of results, human idiosyncrasies and so on.

Add to this the little that is generally understood of the characteristics of the (geologically) very recently formed soils found in tropical countries; refer Dr R S Millard\(^3\).

Until recently, few specific soil-testing techniques have been developed for chemical stabilizers including the range of SPPs found on the world market today. Engineers confidence in there being a reliable means for predicting behaviour when using SPPs in an infinite variety of soil types is, therefore, extremely limited and the technology remains dormant.

In summary, because of the current lack of well-researched technical information, SPPs have failed to become an accepted component of the road designers/builders arsenal of tools and have failed to achieve the credibility that they, under specific circumstances, appear to most definitely deserve. There is now, however, sufficient experience available that indicates a need for more scientific study regarding the use of SPPs for road works. In the Republic of South Africa, SPPs have been widely and successfully used for the past twenty years. Savings of up to 35% were found to be possible when using SPPs during district road construction and rehabilitation in Indonesia. More recently in Tanzania, use of SPPs resulted in savings of up to 25% during rural road rehabilitation and periodic maintenance operations. All this experience demonstrates that, in certain specific in-situ material situations, SPPs are indeed most successful.

2 Theory of Chemical Stabilization using SPPs

Naturally occurring soils, especially those with a significant clay content, readily absorb water. The absorption is reflected by swelling of the soil, which in turn results in a reduction in mechanical strength. When soil is compacted the absorbed water content is reduced, but the soil continues to have the potential to reabsorb water when water is reapplied either artificially or naturally during rain.

Sulphonated Petroleum Products or SPPs, when mixed with a specific range of soil types, alter the nature of the soils such that they permanently retain their maximum dry strength under all weather conditions.

To fully appreciate how SPPs function, it is necessary to understand how soils absorb water. Soils are composed of a large variety of components both inorganic and organic. Both have the ability to absorb water although the affinity of the soil for water is determined by its chemical composition. Examples include most clays, which have a high absorption potential, and sands having much lower potential. This varying affinity is determined by the surface charge or ionic nature of the individual soil particles. When this surface charge is altered, so is the ability for the soil to absorb water; refer P Paige-Green and H Bennett\(^4\).
SPPs are a blend of highly ionic reagents designed to be complimentary to the clay components of the soil matrix. These reagents participate in an ion exchange with the charged soil particles when water is present. Under the influence of compaction, during which the absorbed water is removed, SPP reagents adhere strongly to the clay soil particles. Thus they change the nature of the surface charge in such a way as to not only prevent the reabsorption of water but also create a stronger matrix.

In other words SPPs, when thoroughly mixed with a soil having some clay content, have an electrochemical reaction with the soil particles that enable the soil, once fully compacted, to permanently resist the reabsorption of water. The resulting increase in mechanical strength and, therefore, bearing capacity of the treated soil improves its capacity to carry traffic during all weather conditions.

This permanent increase in mechanical strength also means the achievement of increased durability, volume stability and reduction in permeability; achievement of all four basic requirements for successful soil stabilization, refer Sherwood\(^1\).

2.1 Chemical Composition of SPPs

SPPs are essentially a composition of three ingredients including Alkyibenzenessulfonatte (ABS), Phosphoric and Sulfuric acids all of which are 100% organic and derived from combined sulphur and buffered acids that are further combined as bisulphates. During the manufacturing process, wetting agents or detergents are produced which have the effect of reducing the surface tension of the absorbed water in the soil, and so assist with the dispersal of the agent throughout the soil matrix.

These same wetting agents also assist the soil particles to more easily slide past each other thus facilitating compaction with the result of high compaction densities with reduced compactive effort.

2.2 Physical Appearance, Transport and Storage of SPPs

SPPs, in their concentrated form, appear similar to industrial detergents; a heavy somewhat viscous liquid, which varies in colour depending on the colouring agent used by the manufacturer. They have, however, high toxicity and acidity and require careful handling. In their diluted state, SPPs are entirely safe; refer Section 10.

The packaging of SPPs usually takes the form of plastic lined 210 litre industrial strength metal drums appropriately labelled to warn those handling to be cautious. As one drum (210 litres) is generally sufficient for the stabilization of about one kilometre of road, decanting is generally required. This is best done by hand pumping of the concentrate into locally available 25 litre industrial quality black plastic drums which come fitted with a bung insert and screwed cap to prevent leakage. These plastic drums can be easily and safely handled, transported and stored.

In all cases, it is strongly recommended that, for reasons of personal safety, people responsible for decanting and handling SPPs be provided with overalls, gloves and safety goggles.

As the 210 litre drums are robust transport is not a problem. Single drums, usually strapped four at a time to wooden pallets, can be safely transported as deck cargo on ships. Single loose drums are safe to
transport in trucks and pick-up type vehicles. Where large quantities are required, drums can be safely stored and transported in containers with the optimum number being 40 (i.e. ten pallets each of four drums).

Storage also presents no problems. For short-term storage, drums can simply be left in the open or, preferably, under temporary cover. Heat from sunlight during open storage has absolutely no negative effects regarding either the volatility of the agent or its chemical characteristics. Long-term storage is best undertaken by stacking the drums on wooden blocks, in an upright position and out of direct sunlight.

3. Chemical Factors Affecting Strength of Stabilized Materials

The combination of physical, chemical and biological actions causes the breakdown of rocks on the earth’s surface to produce soils. The parent rock usually defines the composition of soils, with temperature and rainfall being the major causes of soil differences.

The chemical composition of soils can be very complex because, in their solid state, they contain inorganic components derived from the parent rocks combined with organic components resulting from vegetation decay. In their liquid state, soils contain dissolved salts as well as water.

However, as discussed at length by Millard, tropical soil formation processes are still very active, and lack the stability that comes with geological maturity. This activity means that soil characteristics continue to change, both as a result of handling during road work operations, and over time when exposed to prevailing conditions of weather and traffic.

The chemical composition of soils when treated and their subsequent chemical alteration resulting from exposure to weather and traffic has, therefore, a pronounced effect on the ease and success of stabilization, particularly when using chemical stabilizers. Further changes over time in a soil’s chemical composition may also affect the performance of road pavements formed using in-situ materials treated with SPPs.

At present little is known or understood of these processes and their short and long-term effects.

As already mentioned in Section 2 above, SPPs are a blend of highly ionic reagents, which participate in an ion exchange with the charged soil particles when water is present. Wim van Steenderen describes this ion exchange stabilization process as being similar to the action of lime on the clay fraction of a soil. Lime exchanges stable calcium ions for the more reactive sodium and hydrogen ions on the clay particle surface, with the result being a modified clay, less susceptible to the influence of water. The use of SPPs has a similar effect on soils with a clay content.

Dr Paige-Green and Bennett measured the cation exchange capacity (CEC) of soils to identify their potential for reaction with various ionic stabilization agents. They demonstrated that 2:1 clay minerals have the highest capacity for cation exchange, but went on to caution that capacity alone was not enough, and that cations must be capable of being exchanged during the stabilization process. At present, cation exchange capacity is difficult to measure due to variations in the pH of the soil and its organic content. However, a specific soil test has been developed in the Republic of South Africa to measure (CEC); refer Section 6.
The time taken for ionic stabilizers to react with soils is also a subject of some controversy; refer Steenderen\(^5\) and Paige-Green and Bennett\(^4\). Normally one would believe that ion exchange is very rapid, assuming proper implementation during the mixing of soils with water and SPPs. However, manufactures of these agents often claim that it can take up to two months for full reaction and subsequent attainment of maximum dry strength.

To compensate for this present dilemma, a period of curing treated areas for a minimum of five days, depending on prevailing weather conditions, is recommended; refer Section 8.

4. Physical Factors Affecting Strength of Stabilized Materials

The main factors affecting the strength of stabilized soils are:
- The chemical composition of the soil (Section 3).
- The physical composition of the soil and how it effects;
  - moisture content,
  - ISS agent content,
  - ease of mixing soil with ISS agent,
  - compaction and
  - curing.
- The external environment (Section 5)

4.1 Required Moisture Content

The presence of adequate quantities of clean and salt free water within the stabilized soil matrix is essential for efficient ion exchange with the clay fraction of the soil, and to enable its effective compaction.

Conventional civil engineering practise requires that the moisture content chosen for best results is the Optimum Moisture Content (OMC) corresponding to the maximum dry density for achievement of best compaction; refer Sherwood\(^1\).

The results of field trials undertaken to date supported by technical literature available regarding implementation of road works utilising SPPs\(^6\) indicate that, for best results, the moisture content of the treated soils must be at or above OMC at the time of mixing.

However, as was found to be the case during trials in Indonesia, where heavy rains often disrupted work, that moisture content in excess of OMC was not detrimental to the final pavement performance. It was necessary to simply delay final shaping and compaction until such time as the moisture content of the treated soil layer had reduced naturally through exposure to prevailing weather conditions.

The Indonesian Trials did demonstrate that treatment of soils with moisture contents below OMC failed to achieve their full performance potential.
Two very important results were proven during the trials in Indonesia and have since been confirmed by recent trials in Tanzania.

**Firstly**, the moisture content of soils treated with SPPs must be at or above OMC at the time of treatment for the full achievement of strength, durability, volume stability and limited permeability.

**Secondly**, excess moisture above OMC was not deleterious and that final shaping and compaction could be delayed until such time as the treated pavement layer was at or near OMC.

In other words, SPPs had not the time limitations experienced when using cement and lime stabilizers; refer Sherwood\(^1\).

### 4.2 Application Rates for SPPs

Manufacture’s recommended application rates for SPPs vary enormously; from between 0.03 litres per square metre for treating a 15 cm layer depth and 0.08 litres per square metre for treating a 20 cm layer depth.

To highlight this situation, the following comparison of recommended application rates is made using typical technical data provided by two SPP manufacturers\(^7,8\); one based in the Republic of South Africa producing *ISS – 2000*, and the other a distributor of *Terra Firma ISS* manufactured in Australia.

The South African manufacturer\(^7\) recommends a constant 0.03 litres of *ISS - 2000* per square metre for all (suitable) soil conditions to treat a layer of 15 cm depth.

The *Terra Firma ISS* distributor\(^8\) provides, as part of its technical literature, the following Table defining the application rate required to treat a 20 cm deep layer based on two indicators of soil suitability; plasticity index (PI) and percentage of sampled material passing the 75 micron sieve (PSD).

#### TABLE 1 - SPP APPLICATION RATES FOR 20cm TREATED LAYER DEPTH

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<th>Recommended Application Rate - Litre/Square Metre for 20 cm Layer Depth</th>
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One must question how one manufacturer can justify recommending a ‘universal’ application rate when it is logical to assume that soils, which vary so greatly, are very likely to require varying degrees of treatment.

This, of course, raises the issue of ‘overdosing’ soils treated with SPPs, which in turn increases (unnecessarily) the costs of road works. Overdosing has been shown to achieve no added benefit. In fact, Steenderen⁵ argues that many suppliers’ recommendations of application rates are too high, and that lower doses would achieve equally good results. He goes on to argue that overdosing can cause excessive lubrication of the soil particles, and result in reduced strength after compaction.

Steenderen⁵ proposes the use of the simple California Bearing Ratio (CBR) test method (Section 6) whereby soil samples taken from the proposed road alignment are tested using a range of dosage rates, commencing with the manufacture’s recommendation, and reducing the dosage by stages down to 50% of the recommendation. Based on these test results, decisions could then be made regarding:

- the soil’s suitability for stabilization,
- the dosage or application rate that gives the best CBR result for the required field density and
- the forecasted CBR results from which a pavement design suitable to the prevailing conditions can be adopted.

Experience from trials undertaken to date confirm Steenderen’s arguments. Soil testing requirements to determine the suitability of soils for treatment with SPPs, optimal application rate, cation exchange capacity (CEC) and predictions of CBR are detailed in Section 6.

During all trials undertaken in Indonesia, the manufacture’s recommended dosage or application rates for the SPP used were generally adopted.

Trials in Tanzania have, however, experimented with application rates well below those recommended with the achievement of excellent results.

The Tanzania Trials have also confirmed that the SPP application rate selected should be based on the results of four laboratory tests; Particle Size Distribution (PSD), Plasticity Index (PI), the CBR and CEC of soil samples taken at regular intervals along the road alignment (refer Section 6).

4.3 Ease of Mixing SPPs with In-Situ Soils

In practise, a measured quantity of SPP is added to a known quantity of water and sprayed on a measured area to ensure the correct amount of water and SPP are added to that area, in order to achieve, simultaneously, the required additional water to achieve OMC and the SPP application rate.
Trials undertaken to date have included purely labour intensive operations where water and SPPs have been applied using 20 litre capacity watering cans. Other trials have included equipment intensive operations using 3,000 to 8,000 litre capacity self-propelled water bowsers. In both cases, the results were successful, the only requirements being the careful measurement of the area to be treated together with accurate calculations to determine the additional water and application rate.

Thorough mixing, either by labour or equipment, to achieve a uniform homogeneous mix of soil, water and SPP, for the full width and depth of the treated pavement layer is essential for success.

Trials have demonstrated that it requires three hours to complete mixing operations (adding water and SPP together with mixing) for a section of road pavement layer 50 metres in length, 5.50 metres wide and a treated loose depth of 20 cm using labour intensive methods. Equipment intensive methods using a grader with rear-mounted rippers could undertake the same quantity of work in one hour.

4.4 Compaction of Materials Treated with SPPs

Sherwood\(^1\) explains that the strength requirements for stabilized soils generally assume that a high degree of compaction will be achieved. He also highlights the fact that it is more economic to achieve high strength through better compaction rather than attempt to, for example, increase the stabilizer content.

It has been proven that increasing the SPP application rate will not achieve higher strength, but will only result in a waste of agent and, therefore, money. There is also the possibility that overdosing will cause a reduction in strength, or at least a strength below that which could be achieved if the correct dosage was used.

Steenderen\(^5\) reminds us that the detergents produced in the SPPs during the manufacturing process act as an aid to reducing the surface tension of the adsorbed water and provide lubrication of the soil particles. This allows them to slide past each other more easily during compaction, the result being lower compaction energies required to achieve the high compaction densities required.

Trial experience has demonstrated that the ideal compaction equipment necessary for developing high strength and durability of SPP treated soils is a self-propelled smooth metal wheeled twin-drum roller of between three and eight tons dead weight, with a fully functioning vibratory action on both drums.

It is the vibratory action that is of most importance. As in the case of using a vibrating poker for increasing the density and strength of concrete, the vibratory action of the smooth metal wheels forces the absorbed water out of the treated layer and to its surface, resulting in a dense and perpetually impermeable layer.

On completion of rolling to the required number of passes, the compacted treated area can be immediately opened to traffic, with barriers and signs erected to control speed during the ‘curing’ period.

4.5 Curing of Materials Treated with SPPs
As discussed in Section 3, there is some controversy as to how quickly SPP reagents react ionically with the soil particles. Paige-Green\textsuperscript{4} supported by Steenderen\textsuperscript{5} argues that the ionisation is almost immediate, whereas some manufactures claim it can take up to two months for full reaction to occur.

A compromise solution has been trialed which appears to be very effective. This involves a process of curing the treated area by applying light watering during daylight hours to maintain a damp treated layer surface for a minimum period of five days.

5. Affects of External Environment on Strength/Durability of Materials Stabilized using SPPs

The external environment contributes to a number of factors affecting the strength of stabilized materials. The most important include temperature, rainfall (and therefore moisture content), and to some extent traffic levels.

5.1 Temperature Affects

The relationships between temperature and strength for cement and lime stabilized materials are well documented; refer Sherwood\textsuperscript{1}. However, for soils stabilized with SPPs, similar data is not currently available, and remains an outstanding area for research.

5.2 Moisture Content Affects

As described in Section 2, SPPs, when mixed with a specific range of soil types, alter the nature of the soils such that they permanently retain their maximum dry strength under all weather conditions.

This situation applies to the treated layer, but water will continue to migrate into and out of the sub-grade material immediately below and to the sides of the treated layer. If this migration of water is permitted, the bearing strength or CBR of the sub-grade material may be reduced. Under heavy traffic loading, this situation can lead to the development of high shear stresses and subsequent cracking of the treated layer.

The answer to this problem is simply the provision of an adequate and well-maintained drainage system that allows water to be quickly and safely discharged from all areas adjacent to the road alignment.

5.3 Traffic Affects

Over time there is a significant increase in compaction density. However, whether this is due to a continued reaction of the SPPs with the soil, or due simply to the passage of traffic (or both) is unclear. What is important is that strength does in fact increase over time together with durability.

6. Specifications/Soil Testing Requirements to Assess Suitability of SPP Stabilized Materials
The most obvious source of soils for treatment using SPPs are the in-situ materials found along the road alignment. However, these soils may vary enormously and present particular problems for the road engineer. As a result, soil testing to determine suitability of the in-situ materials for SPP stabilization is essential.

6.1 Soils Considered Suitable for Treatment using SPPs

Conventional material surveys for engineering purposes relies on three basic tests; Particle Size Distribution, Liquid Limit Test and the Plastic Limit Test.

An engineering classification of soils based on these mechanical tests was first developed by Casagrande, who classified soils into 21 groups, each with its own unique engineering properties. The American Association of State Highway and Transport Officials (AASHTO) simplified the Casagrande list into seven major groups A1 to A7 with a further subdivision of groups A1, A2 and A7. Experience has shown that use of the AASHTO soil classification system is adequate and easily related to the results of preliminary tests (Section 6.2) for determining soil suitability for SPP treatment.

SPP manufacturers that provide technical data regarding soil suitability for their respective products generally use the AASHTO soils classification system as a basic reference.

Based on trials undertaken to date and using the AASHTO soil classification system as a reference, SPPs have been found very successful in the Groups A-2-4, A-2-5, A-2-6 and A-2-7.

Using data from both Indonesia, and Tanzania where trials were undertaken in areas with high clay content soils containing residual gravels, SPPs were found to work well in Groups A-6 and A-7.

Groups A-4 and A-5, which include silty soils, have as yet to be trialed using SPPs, but most manufactures do claim success in these soil types. This is a further area where more research is required.

It is, therefore, most important to recognise that results using SPPs vary. Where SPP treatment is considered a possible option, soil testing must always be undertaken prior to implementation of works to prove, or otherwise, if success is possible.

6.2 Soil Testing Requirements & Specifications

The Specifications for each required soil test follow. A number of Specifications are quoted including British Standards (BS), American Society for Testing Materials (ASTM), the American Association of State Highway and Transport Officials (AASHTO) and Australian Standards (AS).

- **Sampling** - BS 1924, Part 1
- **Particle Size Distribution** - BS 1377, Part 1
  - ASTM D422.63
  - AASHTO T11 & T27
6.2.1 Sampling - BS 1924, Part 1

Sampling must be undertaken throughout and within the entire longitudinal alignment of the road where works are to include the use of SPPs. Such sampling must include at least five samples of each predominating soil type. Where the soil type is consistent throughout the alignment, samples should be taken at intervals of 500 linear metres.

6.2.2 Particle Size Distribution - BS 1377, Part 1

In this test, the most important indicator of soil suitability for treatment using SPPs is the percentage of a sample passing the 75 micrometre sieve. The BS test method, which requires wet sieving or washing the soil through sieves, is preferred as it gives more reproducible results and a more accurate representation of the soils likely engineering characteristics.

Trial results indicate that for SPPs to be successful, the soil test results for Particle Size Distribution (PSD) should be in the range 5 to 75%.

6.2.3 Plasticity Tests - BS 1377, Part 2

Again the British Standard is preferred. Here a sample passing the 425 micrometre sieve is used for both the Liquid Limit and Plastic Limit tests and final determination of the Plasticity Index for the soil.

For best results using SPPs, the Plasticity Index (PI) of the soil should be in the range of 6 - 50%
At this stage in the soil-testing regime, the potential for reaction of the tested soils with SPPs can be assessed by reference to Table 1 above. If both the PSD and PI test results fall within the permitted ranges, then further testing should continue as detailed below.

If, however, either one or both of these test results fall outside the permitted ranges, then consideration for using SPPs should be discontinued and other work methods adopted.

### 6.2.4 Field Density & Moisture Content - BS 1377, Part 9

The most common and preferred method for determination of Field Density and Moisture Content is the Sand Replacement Method. Although somewhat tedious and time consuming, the results obtained therefrom have been found reliable when using SPP technology for soil stabilization.

This test is undertaken prior to implementation of works to assist with soil classification and the determination of the Optimum Moisture Content (OMC) of the soil(s); essential information allowing calculation of the additional water required to achieve OMC during SPP treatment operations.

### 6.2.5 California Bearing Ratio (CBR) - BS 1377, Parts 4 & 9

CBR testing must be undertaken for each soil type located within the road alignment, as the results therefrom will influence many aspects including the final pavement design selected, the most efficient dosage rates for the SPP used, and the level of compaction required to achieve satisfactory results.

For new construction and rehabilitation works, minimum CBR values are required for each pavement layer to ensure subsequent pavement layers will be fully supported.

Where treatment of in-situ materials using SPPs is considered either for improving the sub-grade strength or for using treated sub-grade materials as a substitute for conventional sub-base or base-course aggregates, accurate determination of the CBR is essential.

For maintenance operations, particularly periodic works concerned with possible use of SPP treated in-situ materials as a pavement substitute for conventional gravel surfacing, CBR test results will determine if the SPP treated material will be strong enough to support anticipated traffic levels.

CBR testing is also essential for determination of the most effective and economic SPP dosage or application rate for the soil(s) treated, taking account of the field density required.

CBR testing on each of the soil types found within the road alignment should be repeated for a range of SPP dosage rates, commencing with that recommended by the SPP manufacturer, followed by reductions to about 50% of the recommendation. The optimum dosage or application rate being that which gives the best average CBR result for the field density required.

### 6.2.6 Cation Exchange Capacity (CEC) - DoT Research Report RR 93/286, Appendix A
The Methylene Blue Adsorption test was developed by E Cokca and A Birand\textsuperscript{10} to measure the cation exchange capacities (CEC) of clays. It is a simple and quick test and provides an accurate indication of the soils suitability for SPP treatment, together with the most economic application rate for the SPP used.

6.2.7 Determination of SPP Application Rate

Once the Particle Size Distribution and Plasticity Tests have been completed with confidence of results for each of the soil types identified, the appropriate SPP application rate(s) can be determined from Table 1.

Following this, results from CBR and CEC testing must be carefully analysed to determine the SPP dosage or application rate for the field density required.

Taking account of the research and field works undertaken by Steenderen\textsuperscript{5}, who commented that SPP manufactures often exaggerate the application rate for SPPs and that overdosing poses a threat to the attainment of compaction to the field density required, careful comparison should be made between the application rate indicated in Table 1 and the specific dosage rate providing the best average CBR/CEC results.

Where no significant differences occur, the application rate(s) indicated in Table 1 should be adopted.

Where significant differences are found between the application rate(s) indicated in Table 1 and those resulting from the best average CBR and CEC results, priority should always be given to the dosage or application rate(s) resulting from CBR/CEC testing.

6.2.8 Field Moisture Content - BS 1377, Part 2

Field Moisture Content to determine the natural moisture content (NMC) of the soils to be treated using SPPs must always be undertaken during implementation of works. This test is absolutely essential in order to confirm the additional water requirements for achievement of OMC. The test must be implemented immediately prior to mixing operations; refer Section 8 below.

6.3 Testing Requirements during Implementation of Road Works

The main test required during implementation of road works is the determination of Field Moisture Content; refer Section 6.2.8 above. This testing is required on a daily basis to confirm the required additional water necessary for achievement of OMC for the soils to be treated using SPPs.

6.4 Post Implementation Testing Requirements
The most important tests are Field Density (Section 6.2.4 above) and CBR (Section 6.2.5 above) undertaken 48 hours after completion to determine the degree of compaction density achieved and to define any corrective measures that may be required.

7. Use of Stabilized Materials in Road Pavement Layers

The objectives of using SPPs for road construction, rehabilitation and periodic maintenance works include:

- achievement of high strength, density and stability of in-situ materials thereby reducing the need for scarce and expensive pavement materials, and
- less recurrent and reduced frequency of periodic maintenance operations.

In other words, using SPP treated in-situ materials as a pavement substitute during rehabilitation, and again during periodic maintenance operations (i.e. ‘retreating’ with SPPs rather than ‘re-gravelling’).

8. Working Methods and Quality Control

Implementation techniques including both labour-based and equipment intensive operations are fully detailed in trial reports produced to date, and further reinforced by the data now available from the Department of Transport in the Republic of South Africa.

The activities that require most careful attention and supervision during implementation of road works using SPP technology include:

- thorough scarification of the sub-grade or existing pavement to a minimum depth of 20 cm,
- complete restoration of the road profile to its original cross-section including side drains,
- careful calculation of the additional water required for OMC and the quantity of SPP necessary to achieve the design application rate,
- watering combined with mixing to thoroughly pulverise and mix the soil with SPP and water,
- shaping of the treated layer to a minimum 7% camber prior to compaction,
- compaction using a vibratory twin-drum smooth wheel roller for the required number of passes necessary to achieve the design compaction density and
- curing the treated area for a minimum period of three to five days depending on weather.

Quality control measures include:

- adequate testing of the soils to ensure suitability and determine OMC, CEC and appropriate SPP application rate,
- testing to determine the natural moisture content prior to adding water, SPP and mixing,
- ensuring that treatment is undertaken to the full required depth,
- careful checking that the correct quantity of SPP is added to the water and the correct amount of water (and SPP) are applied to a measured area to ensure achievement of OMC,
- ensuring that mixing continues until a uniform homogenous layer,
- shaping to the required minimum camber,
• ensure rolling with a vibratory roller for the minimum number of passes necessary to achieve the required compaction density,
• checking that the drainage system is fully functional and
• ensure curing is undertaken for the minimum required period after treatment.

9. Costs/Benefits

Trials\textsuperscript{12,13} in Tanzania concentrated on road rehabilitation and periodic maintenance operations including reshaping to restore the road profile to its original design and re-treating (with SPPs) to provide an all-weather pavement wearing surface; reference the Ministry of Works Standard Specifications\textsuperscript{15}.

During 1997, unit rates quoted by contractors in Arusha and Kilimanjaro Regions for reshaping and re-gravelling averaged Tsh1.0 million per kilometre and Tsh10,000 per cubic metre (in place) respectively. In other words, reshaping followed by 15 cm gravel surfacing cost approximately Tsh8.5 million per kilometre.

During the same period, data obtained from Trials\textsuperscript{12,13} in both regions indicated average unit rates for reshaping of Tsh3.6 million per kilometre and treating with SPPs (including costs of the SPP agent, its mixing to a 20 cm depth and curing) of Tsh3.7 million per kilometre. The total cost was Tsh7.3 million per kilometre.

The direct cost savings were about Tsh1.2 million or US$2,000 per kilometre.

The indirect cost savings included a reduced demand for aggregate, its conservation for more important uses, and reduced road maintenance resulting from a decrease in heavy gravel haulage traffic loading.

Increased durability of the wearing surface resulted in fewer recurrent and periodic maintenance operations over the life of the road, further reducing maintenance costs in the long term.

10. Environmental Considerations using SPPs

Dr Kevin R O’Halloran\textsuperscript{16} undertook a comprehensive study in Australia during 1993 of the effects of SPPs on the environment. His conclusions were that ‘... in the diluted form the environmental toxicity of (SPP) formulations when used as a soil stabilizer… appear to be minimal… due to the low toxicity… and low mobility in a soil environment.’

The only visible indicator of SPP use is that vegetation growth on treated areas is inhibited, not by any residual toxicity of the SPP, but due to the reduced moisture content of the treated soils; an effect that is beneficial in terms of reduced routine maintenance related to grass cutting and vegetation control.

11. Conclusions and Recommendations
For developing countries, the adoption of SPP technology for road construction, rehabilitation and periodic maintenance operations offers a possibility for substantial cost savings both in the immediate and long-term.

Reduced demand for aggregates enables conservation of a valuable and scarce resource together with limiting heavy gravel haulage traffic, particularly on minor roads, resulting in less frequent recurrent and periodic maintenance.

SPP technology is simple, suitable for labour-based operations, and requires only limited equipment for implementation.
List of References

3. Dr R. S. Millard, Road Building in the Tropics, TRL, 1993, pages 1-312
9. Casagrande, The Extended Casagrande Soil Classification System,
Using Labour-Based Methods
In Water Projects In
Rural Egypt

Mostafa S. Noury
Labour Based Engineering Officer
Carl Bro Management

Paper presented at:
ILO/ASIST 8th Regional Seminar for Labour Based Practitioners
October 2000
Cairo, Egypt
I. EGYPT PROFILE:

The Arab Republic of Egypt has a total land area of 1,001,450 million square kilometers, of which only 5% is cultivated and inhabited. Apart from the arable land bordering the Nile River, which flows through the country from Sudan northward to the Mediterranean Sea, and the fan-shaped plain created by its delta, Egypt largely consists of uninhabited desert. Strategically located on the north-eastern tip of Africa, linking Europe, the Middle East and Africa, it borders with Sudan to the south, the Mediterranean to the north, Libya to the west and Palestine, Israel and the Red Sea to the east. It occupies the only land bridge between Africa and Asia and controls the Suez Canal, which provides the shortest sea route between the Indian Ocean and the Mediterranean.

With an estimated population, as of January 2000, of 65 million inhabitants, with 1.9 million citizens living abroad, Egypt is the most populous country in the Middle East. Along with providing a large consumer market for regional and international companies, this sizeable body of people forms an ample labour source with labour costs being competitive with those of India and many Asian countries. Although companies in the private sector usually pay four times the minimum level, wages remain low by developing country standards.

At the local government level, Egypt is divided into 26 semi-autonomous governorates, which are headed by governors appointed by the president.

II. BACKGROUND:

The Social Fund for Development (SFD) is now in its second phase of successful implementation. Phase I was from January 1992 to December 1996. Phase II followed and will end in December 2000. It is now anticipated by SFD that there will be phase III commencing on 1 January 2003. In between there will be a bridging period.

The mission of SFD is to:

- Facilitate the implementation of the Government of Egypt’s economic reform programme.
- Mitigate the adverse effects of structural adjustment on low-income population groups.
- Strengthen Egypt’s institutional capacity (governmental and non-governmental) to develop new social programmes and upgrade existing ones.
- Seek additional international and local financial resources and secure technical assistance.

The Danida funded Technical Assistance to the Social Fund for Development (TASFD) is working with the Community Development Programme (CDP) and the Public Works Programmes (PWP). The TASFD project has three components: Human Resource Development (HRD); Non-Governmental Organizations (NGOs), mainly with CDP and SFD Aswan and Qena regional offices; and Labour Based Engineering (LBE) with PWP on a national scale. This component covers 19 governorates out of 26. The immediate objectives of TASFD are:

- “To increase the capacity of the SFD to serve as a vehicle for longer-term sustainable poverty alleviation”
“To contribute to employment creation, improved social services and improved physical infrastructure, particularly benefiting poorer segments of population in parts of Egypt”

LBE group has, so far, to a very large degree achieved the objectives of the project in close collaboration with SFD/PWP.

III. Subcontracts and the Stakeholders:

To appreciate the size of the small-scale contractors training programme, the stakeholders and the prime movers must be identified. To provide the trainees with 150 subcontracts in 19 governorates has not been as easy as it may appear. The main stakeholders in the project are:

1. Danida, as the donor of the fund.
2. SFD/PWP as the implementers of the programme.
3. SFD’s 19 regional offices and staff.
4. SFD Project Implementation Units (PIUs), which are directly responsible for the projects in the governorates.
5. The Intermediary Agencies, the road, water and environment departments in the governorates who provide direct supervision of the infrastructure projects in the governorates and approving the activities on the sites.
6. The Established Contractors, who agreed to work with the trainees as subcontractors in the training programme.
7. The Contractors Union, who have implemented procedures to accept the emerging contractors in their seventh category as small-scale contractors.
8. Non Governmental Organizations, who are involved in linking the emerging contractors to the civil service arena in the country.
9. The Training Consultant, with representatives in all the 19 governorates and responsible for day-to-day follow up.
10. The trainees themselves. 150 trainees (and almost 150 problems).

Coordination between these parties has not been easy. The SFD/PWP General Director and his high calibre staff have had full control on the project from day one. The ratio of the size of this project to the size of other projects done by PWP is less 0.5%. However, PWP staff are spending more than 60% of their daily working hours in managing the training aspects of the project, which has hundreds of participants.

The initial objective was to complete the subcontract phase to allow the trainees to start their first job. This involved a lot of arrangements and contacts in all of the governorates. The structure of the SFD is the same in each of the 19 governorates, but the intermediary agencies vary from one place to the other.
Following the training phase, subcontracts have started in all of the governorates, and are being implemented successfully. The following graph indicates the percentage of the subcontracts compared to main contracts.

![Graph showing the percentage of subcontracts versus main contracts.](image)

Figure No. (1): The Percentage of the Subcontracts Versus the Main Contracts
IV. LBE Activities; Status before and at the End of Project:

It was felt that a comparison between the status before the project and at the end of the project status should be prepared. Many activities have been completed with a very positive impact.

<table>
<thead>
<tr>
<th>NO.</th>
<th>Activities</th>
<th>Status before the project</th>
<th>End of project status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>The Selection Process of the Trainees.</em>   (Advertisement, classification, tests, correction, classification, interview, etc.)</td>
<td>NONE</td>
<td>Documented system.</td>
</tr>
<tr>
<td>2</td>
<td><em>Training Material.</em> (The tailor-made and translated manuals)</td>
<td>NONE</td>
<td>30 Training manuals for the first time in the Arabic language.</td>
</tr>
<tr>
<td>3</td>
<td><em>The Crash Programme.</em> The relation between the project and the established contractors before, during and after the training in every group of the three batches.</td>
<td>NONE</td>
<td>More than 100 established contractors have been trained.</td>
</tr>
<tr>
<td>4</td>
<td><em>The Funds of the Subcontracts.</em> The role of SFD/PWP in setting aside the needed funds for the 150 subcontracts in 19 governorates.</td>
<td>None of this kind of training</td>
<td>Total of approx. $5 million.</td>
</tr>
<tr>
<td>5</td>
<td><em>The International Experts.</em> Involvement of international experts in the training of all groups. They participated in lectures, reporting, technology transfer and capacity building to the local training consultant. TOT session at the beginning of the project.</td>
<td>NONE</td>
<td>Six missions during the last two years.</td>
</tr>
<tr>
<td>6</td>
<td><em>Technical Instrument.</em> Fundamentals of the use of Dynamic Cone Penetrometer (DCP). How to use it to calculate the CBR, possibility of local manufacture.</td>
<td>NONE</td>
<td>Used during training and was locally manufactured.</td>
</tr>
<tr>
<td>7</td>
<td><em>International Exposure.</em> Two trips by the training consultant to ASIST conference in May 1999 and roadworks workshop in Jan 2000. Intensive contacts with ILO.</td>
<td>NONE</td>
<td>More info about the SFD unique approach.</td>
</tr>
<tr>
<td>8</td>
<td><em>Training Cadres.</em></td>
<td>NONE</td>
<td>Core of trainers of the training consultant and from TASFD.</td>
</tr>
<tr>
<td>9</td>
<td><em>Conferences.</em> Two conferences in Cairo. Preparation for the next ASIST conference</td>
<td>General conferences</td>
<td>More awareness of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>The Gender. New experience in the field of contracting business.</td>
<td>NONE</td>
<td>Eight women for the first time involved as contractors.</td>
</tr>
<tr>
<td>11</td>
<td>Sharing Experience. Trainees from B1 G1 shared their experience with the trainees of B2 G2. Some of the established contractors of Aswan were invited to attend lectures of the international expert mission.</td>
<td>NONE</td>
<td>Contacts between trainees and established contractors.</td>
</tr>
<tr>
<td>12</td>
<td>Job Sheets. Full explanation to the trainees of the benefits of using job sheets as a main step in implementing Labour Based contracts.</td>
<td>NONE</td>
<td>Documented system.</td>
</tr>
<tr>
<td>13</td>
<td>Team Balancing. The use of team balancing was successfully presented to the trainees. It provides a means of calculating the exact manpower needed which leads to cost and time frames.</td>
<td>NONE</td>
<td>Documented system.</td>
</tr>
<tr>
<td>14</td>
<td>Continuous Technical Assistance. B1 G1 have a chance to receive continuous technical assistance after graduation. CE gave the emerging contractors help in their new contract preparation.</td>
<td>NONE</td>
<td>More than years of TA to B 1 G 1.</td>
</tr>
<tr>
<td>15</td>
<td>Tools. Set of tools to be distributed to the trainees after graduation. Total cost is LE 1,850.</td>
<td>NONE</td>
<td>List of tools chosen by every trainee.</td>
</tr>
<tr>
<td>16</td>
<td>Contractors Union. The project is registering all the trainees at the Contractors Union.</td>
<td>NONE</td>
<td>150 small-scale contractors registered.</td>
</tr>
<tr>
<td>17</td>
<td>Documentation.</td>
<td>None for such kind of training</td>
<td>Full package</td>
</tr>
<tr>
<td>18</td>
<td>Training Centers. Value added to the training centers used during the training phases.</td>
<td>Existing, not used</td>
<td>Six venues were used.</td>
</tr>
<tr>
<td>19</td>
<td>The Role of PIU managers. Orientation to the details of LB Engineering techniques.</td>
<td>Competent</td>
<td>An evaluation study will be undertaken to evaluate the performance of the PIU managers.</td>
</tr>
<tr>
<td>20</td>
<td>Kind of Projects.</td>
<td>Three: roads, water and environment</td>
<td>Another 2 sectors to be added in the</td>
</tr>
</tbody>
</table>
V. Water Projects and Tests as major component of PWP Projects:

The LBE training programme trainees were entitled to implement subcontracts under the names of established contractors in their governorates. They are divided into the following three sectors: Water, Roads and Environmental projects.

The SFD/PWP has allotted a budget to implement the infrastructure projects in different governorates according the needs of the beneficiaries in the villages included in the project. PWP also took major steps to ensure the priorities of these projects and to make sure that every part of the Republic receives its share of infrastructure development. The total fund for the contracts among the established contractors and the trainees as subcontractors reached LE 30.7 million ($ 8.8 million). The following graph shows the distribution of projects between water, roads and environmental.

![LBE Subcontracts Classification Summary](image)

Figure No. (2): The percentage of the water project funds versus roads and environment projects.

The trainees in the water project sector were comprehensively trained, amongst other items, on:

1) how to complete task sheets,
2) how to store pipe materials and install pipe networks according to the standard specifications and how to use labour base methods, and finally
3) how to conduct the testing of water pipe networks on site.

The following figure is an example of the task sheets:
<table>
<thead>
<tr>
<th>Training Activity</th>
<th>Filling of trenches for water pipes/Individual exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material and Tools</td>
<td>Shovel, rake, hand rammer, pickaxe (to loosen settled excavation material) and wheelbarrow if necessary.</td>
</tr>
<tr>
<td>Tasks</td>
<td>1. Pack approved material and carefully compact,</td>
</tr>
<tr>
<td></td>
<td>2. Backfill excavated material in layers not exceeding 10 cm and compact using hand rammer,</td>
</tr>
<tr>
<td></td>
<td>3. Fill the trench to the top and clean the work site.</td>
</tr>
<tr>
<td>Time</td>
<td>1/3 of normal task rate</td>
</tr>
</tbody>
</table>

Figure No. (3): Example of exercise task sheet

The following figures illustrate the correct method of storing UPVC pipes and how to install the pipe networks.
NORTH (WEST) — SOUTH (WEST)

**TYPICAL SERVICE CORRIDORS**

**Suggested cover requirements**

Figure No. (4) : The typical service corridors and the cross-section of the trench with the suggested cover requirements
A. STACK WITH SPIGOTS ON ONE END

B. STACK WITH ALTERNATING SPIGOTS & SOCKETS

SECTION A-A

Exhibit No. (5): The technically sound approach for storing UPVC pipes
The following chart illustrates requirements for testing water pipe lines, which is the most important activity in the water projects. The procedure is already well known by the trainees. The importance of this activity is that it proves that the work on site has been properly completed. The inspector or the supervisor approves sections of the pipe network as completed works and authorizes payment to the small-scale contractor. The following chart indicates the steps required to test pipework.

Exhibit No. (6) : Steps of testing water pipeline on the site

Steps of testing water pipe line on the site
Finally, the following table indicates the workmanship rates for water projects.

<table>
<thead>
<tr>
<th>NO</th>
<th>Description</th>
<th>Gang Needed</th>
<th>Tools Needed</th>
<th>Daily Task Rate</th>
<th>Daily Wage Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Earthworks/Digging in ordinary soil</td>
<td>Laborers/Gang leader</td>
<td>Spade/Shovel/Pickaxe/Hoe/Bucket</td>
<td>M3/day 5</td>
<td>LE 12-15</td>
</tr>
<tr>
<td>2</td>
<td>Earthworks/Digging in rocks</td>
<td>Laborers/Gang leader</td>
<td>Sledge Hammer/Pickaxe/Shovel/Bucket</td>
<td>0.25 to 1.75</td>
<td>15-20</td>
</tr>
<tr>
<td>3</td>
<td>Simple Dewatering</td>
<td>2 laborers</td>
<td>Bucket/rope</td>
<td>2</td>
<td>12-15</td>
</tr>
<tr>
<td>4</td>
<td>Installation of UPVC pipes Diameter 110 mm</td>
<td>1 plumber/2 laborers</td>
<td>Open Wrench set/Ring Spanner/Brush/crowbar</td>
<td>400</td>
<td>20-25</td>
</tr>
<tr>
<td>5</td>
<td>Installation of UPVC pipes Diameter 160mm</td>
<td>1 Plumber/2 laborers</td>
<td>Open Wrench set/Ring Spanner/Brush/Crowbar</td>
<td>300</td>
<td>20-25</td>
</tr>
<tr>
<td>6</td>
<td>Installation of UPVC pipes Diameter 200 mm</td>
<td>1 Plumber/3 laborers</td>
<td>Open Wrench set/Ring Spanner/Brush/crowbar</td>
<td>250</td>
<td>25-30</td>
</tr>
<tr>
<td>7</td>
<td>Installation of UPVC pipes Diameter 250 mm</td>
<td>2 Plumbers/4 laborers</td>
<td>Open Wrench set/Ring Spanner/Pipe-assembly Clamp/Crowbar</td>
<td>100</td>
<td>25-30</td>
</tr>
</tbody>
</table>

Exhibit No. (7) : Workmanship Rates for Water Projects

VI. Tools of Water Projects:

- In this section of the paper, the tools will not be discussed in general. The main issue here is how the SFD made full use of the tools issue to protect the trainees after graduation. To assist the new emerging contractors to start their future contracts, SFD/PWP decided to provide the trainees with appropriate tools that fit their respective sector of infrastructure specialization. The tools were provided for free. With the help of TASFD and the Training Consultant, three lists of tools were prepared for the trainees to indicate their preferences. The budget allocated to each trainee was LE 1,850 (US$ 530). The following figures illustrate the list of tools for water projects with unit prices, and the minimum proposed quantity of each item as assistance to the trainees for their selection.
<table>
<thead>
<tr>
<th>Selection</th>
<th>Description</th>
<th>No. Prop.</th>
<th>Qt</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Spade</td>
<td>7.50</td>
<td>5</td>
<td>37.50</td>
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<tr>
<td>2</td>
<td>Shovel</td>
<td>7.00</td>
<td>5</td>
<td>35.00</td>
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<td>3</td>
<td>Pickaxe</td>
<td>10.00</td>
<td>5</td>
<td>50.00</td>
<td></td>
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<tr>
<td>4</td>
<td>Bucket</td>
<td>3.00</td>
<td>5</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hoe</td>
<td>7.00</td>
<td>3</td>
<td>21.00</td>
<td></td>
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<tr>
<td>6</td>
<td>Sledge-hammer</td>
<td>65.00</td>
<td>1</td>
<td>65.00</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Narrow-head (tapered) and flattened chisel set</td>
<td>45.00</td>
<td>1</td>
<td>45.00</td>
<td></td>
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<tr>
<td>8</td>
<td>Wheel Barrow</td>
<td>90.00</td>
<td>1</td>
<td>90.00</td>
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<tr>
<td>9</td>
<td>Water Bucket</td>
<td>4.50</td>
<td>5</td>
<td>22.50</td>
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<td>10</td>
<td>Hammer</td>
<td>15.00</td>
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<td>15.00</td>
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<tr>
<td>11</td>
<td>Wooden-hand hammer</td>
<td>12.00</td>
<td>1</td>
<td>12.00</td>
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<tr>
<td>12</td>
<td>Open wrench set</td>
<td>58.00</td>
<td>1</td>
<td>58.00</td>
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<tr>
<td>13</td>
<td>Ring spanner (toothed spanner)</td>
<td>105.00</td>
<td>1</td>
<td>105.00</td>
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<tr>
<td>14</td>
<td>Stillson (pipe) wrench</td>
<td>385.00</td>
<td>1</td>
<td>385.00</td>
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<tr>
<td>15</td>
<td>Adjustable open and spanner</td>
<td>12.00</td>
<td>2</td>
<td>24.00</td>
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<tr>
<td>16</td>
<td>Water Level</td>
<td>15.00</td>
<td>2</td>
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<td>17</td>
<td>Crowbar</td>
<td>30.00</td>
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<td>30.00</td>
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<td>18</td>
<td>Pipe-assembly clamp (fixture)</td>
<td>120.00</td>
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<td>120.00</td>
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<td>19</td>
<td>Steel brush</td>
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<td>2</td>
<td>6.00</td>
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<td>20</td>
<td>Pipe cutter</td>
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<td>1</td>
<td>35.00</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Hack Saw</td>
<td>5.00</td>
<td>1</td>
<td>5.00</td>
<td></td>
</tr>
</tbody>
</table>

No. (8) : List of Proposed Tools for Water Project
Pipe Installation Tools and Equipment

- Adjustable open end spanner
- Stillson (pipe) wrench (16,18,24,32 mm)
- Screw lathe 0.5-2.0 inch
- Open wrench set
- Narrow – head (Tapered) and Flatened
- Ring spanner (toothed spanner)
- Brush
- Pipe – assembly clamp
- Dewatering centrifugal diesel pump

Set of Equipment for water Projects
Shovel, Dewatering, and Backfilling Tools

Hoe
Bucket
Spade
Wheelbarrow

Pickaxe

Set of Tools and Equipment for Water Projects
Exhibit No. (9) : Set of Tools for Water Projects
One of the innovative aspects of the training project was the introduction of the Dynamic Cone Penetrometer (DCP) to the construction field in Egypt. It was introduced with the assistance of one of the International Experts from South Africa, Mr. James Croswell, to be used during the practical sessions in the field. The DCP is a tool used for soils exploration and testing over a very wide range of applications. The DCP specifically referred to here is a lightweight; relatively robust and easily used tool based on a falling mass of 8kg, and a penetration tool 22mm in diameter.

VII. The Contractors Union:

The “Egyptian Federation for Construction and Building Contractors” has achieved several objectives since it was founded 1992, according to decree number 104 for the year 1992. The Federation has already registered 15,000 contractors in 7 categories. The categories varies according to: the capital, years of experience, technical staff, financial statements, administrative and legal staff, completed projects during the last 5 years, equipment, etc. According to the regulations, only the registered contractors can apply for tenders and implement construction contracts. The emerging contractors will be registered in the seventh category of the Federation as small-scale contractors.

One of the measures taken by the SFD during the training phase is to register the trainees as emerging contractors at the Federation, and to pay the fees for registration from the project fund as a prerequisite for graduation. Currently about 66% of the trainees are registered, while the rest are still in the subcontract phase.

The objectives of the Federation are:

1. Looking after the common interests of the contractors.
2. Regulating the modus operandi of the profession.
3. Set the controls and traditions of practicing the profession.
4. Help to solve disputes among the Federation members as well as between non-members and members.
5. Help fulfill the State’s master plan in the field of construction.
**Dynamic cone penetrometer (DCP)**

1. Release hammer to under side of upper stop
2. Release hammer
3. Repeat 2 to 4 whilst counting blows until initial scale reading changes by 100 mm

**The correct use of the DCP**

Exhibit No. (10): Dynamic Cone Penetrometer and the Correct Use
VIII. Demand for LBE Contractors:

Ministry of Housing, Infrastructure and New Communities
National Organization for Potable Water and Sanitary Drainage (NOPWASD)

According to the state policy and the President’s instructions to provide Potable Water to the deprived villages, the Ministry of Housing, Infrastructure and New Communities through National Organization for Potable Water and Sanitary Drainage invite:

The experienced companies specialized in executing potable water pipe networks and water treatment plants that are willing to implement similar projects in the villages of the Republic.

Every one should present their credentials and resumes to be qualified to implement these projects to 240 villages according to the ministry’s applications not later than August 26, 2000.

Published in Al-Ahram newspaper August 17, 2000

The invitation of the Ministry of Housing, Infrastructure and New Communities to the experienced companies specializing in executing potable water and treatment plants is shown above. The ministry has a plan to implement water projects in 240 villages in Egypt. The date of the advertisement is August 17, 2000. The emerging contractors have an opportunity to participate in this important project in their respective fields, as main contractors or as subcontractors. The trainees will be in the contracting arena as soon as they have graduated.

When SFD/PWP started discussing the idea of implementing a training programme for small-scale contractors in 1996, it was not a shot in the dark. PWP were able at that time to anticipate the requirements of the infrastructure industry in Egypt in the near future. Small-scale contractors are currently a requirement of the market, and will be needed in the future. The specialized training that the programme provided the emerging contractors with gave them the means to compete on the same level as established contractors.
The above notice is an announcement of the implementation of wastewater projects in 50 villages in Kafr El-Sheikh governorate, which is located in the Delta area. It is expected that the emerging contractors will have an opportunity to participate in some of these contracts.

Also, the government has declared that the estimated amount for investment in potable water and wastewater projects during the next four years is LE 16.0 billion (US$ 4.6 bill). The programme is planned to cover 213 of the Republic’s cities and districts. Also villages will be included in this expansion of infrastructure development. Each governorate is currently preparing a survey of new projects.

SFD/PWP is in compliance with the policy of the Government of Egypt’s ambitious plans for infrastructure expansion and the provision of services. The introduction of 150 emergent contractors to share the implementation of these infrastructure projects at this time, to provide the whole country with potable water and wastewater systems, shows clear foresight by SFD/PWP.

It is apparent that the contracting arena can absorb more than the current number of trained emerging contractors, provided that they are as well trained as those that have already graduated from the project.
REFERENCES:

2. James Croswell, Field visit report to Egypt, 1999.
3. Andreas Beusch, Field visit report to Egypt 1999.
5. Readings Pertinent to the Contracting Industry, Dr. Eng. Ismail Osman, Chairman & CEO, the Arab Contractors “Osman Ahmed Osman”.
6. Reading on Leadership, Dr. Eng. Ismail Osman, Chairman & CEO, the Arab Contractors “Osman Ahmed Osman”.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIST</td>
<td>Advisory Support Information Services and Training</td>
</tr>
<tr>
<td>CBM</td>
<td>Carl Bro Management</td>
</tr>
<tr>
<td>Danida</td>
<td>Danish International Development Assistance</td>
</tr>
<tr>
<td>EC</td>
<td>Emerging Contractors</td>
</tr>
<tr>
<td>IE</td>
<td>Intermediary Agency</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>LBE</td>
<td>Labour Based Engineering</td>
</tr>
<tr>
<td>LE</td>
<td>Egyptian Pound</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>PIU</td>
<td>Project Implementation Unit</td>
</tr>
<tr>
<td>PWP</td>
<td>Public Works Programme</td>
</tr>
<tr>
<td>RO</td>
<td>Regional Office</td>
</tr>
<tr>
<td>SFD</td>
<td>Social Fund for Development</td>
</tr>
<tr>
<td>TASFD</td>
<td>Technical Assistance to Social Fund for Development</td>
</tr>
<tr>
<td>USD</td>
<td>US Dollars</td>
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