Report of Proceedings - 27 September - 1 October 1993

Harare, Zimbabwe

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INTRODUCTION

The seminar was held from 27 September to 1 October in Harare with a total of 80 participants from 18 countries. The participants consisted of ILO technical advisers, counterpart ministry staff and consultants engaged in labour-based roadworks. The meeting was hosted by the Zimbabwe Institute of Civil Engineers.

This seminar was the third in a series of reviews of current practice in labour-based technology, and was organized and conducted by the ILO ASIST[1] team, which is responsible for the promotion of this technology in Sub-Saharan Africa. The first seminar was held in Mbeya, Tanzania in 1990 with 21 participants from 6 countries. The second seminar took place in Mohales Hoek, Lesotho, in March 1992, with 36 participants from 14 countries[2].

The purpose of these seminars is to bring together labour-based practitioners from the region to discuss and exchange between the various country programmes, thereby improving the application and efficiency of labour-based methods in road construction and maintenance.

Four major topics related to labour-based road works were discussed during this seminar, namely appropriate tools and equipment, small-scale contractor development, the involvement of women and the Technical Enquiry Service of the ASIST project. A one-day field trip was organized to present the labour-based road construction and maintenance programme of Zimbabwe.

Tools and Equipment

Although labour-based methods emphasize an extensive use of labour rather than equipment, a significant part of the costs and attention of project staff is devoted to the use of equipment. Tools and equipment on labour-based projects constitute only 20-30% of the total costs on road construction and rehabilitation projects. Furthermore, appropriate and good quality equipment is essential for the achievement of high production rates and good rates and good quality work, as well as a proper working environment. The Technical Enquiry Service of ASIST tries to collect and disseminate available information and experience on this topic, which has proven to be an issue of high concern for project managers.

Small-scale Contractor Development

Traditionally, most labour-based road projects have been Government-executed work schemes. However, in recent years, the private domestic contracting industry has become more and more involved with this programme. This session presented the experience from labour-based road programmes where the roadworks have been successfully carried out by domestic small-scale contractors trained in the use of labour-based road construction and maintenance methods.

[1] ASIST, Advisory Support, Information Services and Training in Labour-based Technology, a regional programme funded by NORAD, SIDA AND SDC.

[2] Labour-based Technology, A Review of Current Practice, Volumes 1 and 2, 26 - 28 February 1990, Mbeya, Tanzania, ILO, Geneva.

Labour-based Technology, A Review of Current Practice, 2 - 6 March 1992, Mohales Hoek, Lesotho. These reports are available on request from ILO, Geneva.

The Technical Enquiry Service

The ILO has designed a programme, funded by donors, to provide advisory support, information and training (ASIST) to labour-based road construction and maintenance programmes in Sub-Saharan Africa, with the main objective of increasing the efficiency of the management of the programmes. One of the outputs to achieve this goal is to provide a service of information collection, research, collation and distribution on subjects related to this technology. A Technical Enquiry Service within ASIST has been established to provide these services.

During this session the participants were briefed on the current status of TES and the type of services which can now be provided. Finally, the participants were requested to prioritize their information and research requirements.

To date, the Technical Enquiry Service has acquired and catalogued 1580 publications relating to labour-based technology, which are kept in a computer database. This information is available upon request for labour-based practitioners in the region.

Following a recommendation from the Lesotho meeting, TES now produces a labour-based journal covering a specific topic in each issue. The journal covers information related to one specific topic in terms of ongoing research and development, available literature, recommended reading, key contact persons, presentation of project activities, etc. The first issue of the ASIST journal was completed in Ma 1993 and a second issue is expected in November this year. The topic for the next issue will be appropriate design and use of tools and equipment for labour-based roadworks.

Women and Labour-based Roadworks

Labour-based road programmes have always made an effort to promote the employment of women. This session provided a review of how the various programmes have achieved this objective and how it has been received in rural societies and by project management. Finally, it was also discussed how this issue can be secured when involving the private sector in the execution of the roadworks.

Site Visit

The participants had the opportunity to visit some of the activities of the labour-based road construction programme in Zimbabwe, during a one day visit to road sites in Mutoko District.

Plan of Action

During the last day of the seminar, the participants were organized in groups, each of which prepared a set of recommendations for future action in relation to the above topics. During the final plenary discussions at the end of the day, these recommendations were further discussed and prioritized for ASIST follow up.

II STRUCTURE OF THIS REPORT

This report follows the order of the sessions as they took place during the seminar. The comments and questions related to the papers presented are summarized in a separate chapter after the presentations under each session. These summaries also include the general findings of the plenary discussions which evolved after the various presentations. The findings of the discussion groups are presented as a separate chapter under Session 7.

Due to time constraints during the seminar, all papers were not presented in their full form. Nevertheless, this report presents the full versions of all the papers prepared for this event.

III ACKNOWLEDGEMENT

The ILO/ASIST secretariat to this seminar appreciated the crucial assistance they received from the project staff from the Zimbabwe labour-based programme in the organization and support of the 4-day event, as well as the Zimbabwe Institution of Engineers who hosted the seminar. Furthermore, we would like to thank the participants for their efforts in traveling and

contribution to this seminar, and their employers for allowing for their absence and travel costs.

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Handtools and Equipment - The Current Scene

By Collins Makoriwa, ILO National Professional, ASIST, Kenya

SYNOPSIS

This paper looks into the current state of affairs of hand tools and equipment employed in labour-based projects in sub-Saharan Africa. Special emphasis is given to the equipment used in Kenya, Botswana and Lesotho.

Possible steps are suggested to improve current problems. These solutions are general and may not apply to all places.

Hand tools

Preamble

Through the rest of this paper, the term tools will be used to refer to hand tools whilst the term equipment will refer to machinery and its peripheral attachments.

Hand tools are the crux of the issue in labour-based roadworks. They are the main items used by labour in the construction and maintenance of roads. It is possible to construct labour-based roads using labour and tools only, but it is not possible to construct these roads using labour and equipment without the use of tools.

General

In spite of hand tools being so crucial to labour-based road construction they have not been given the attention they deserve. Generally, the labour-based road construction industry is agreed upon the types of hand tools to be used for various operations. What is generally lacking is an appropriate quality standard for the hand tools employed and a specification of the dimensions ofthe various hand tools.

Several institutions have drawn up standards for hand tools (BSI, ILO etc.). These standards are generally not met by projects due to several reasons. The main ones are:

Lack of awareness of the impact of good tools on the labourers' output

- Incompetent purchasing officers
- Good tools are not available
- Legislation restricting importation of quality tools.

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Project Background

With financial assistance from DANIDA and SIDA, the Government of Zimbabwe, through the Department of State Roads of the Ministry of Transport, commenced in 1991 a road rehabilitation programme using labour-based methods and local resources. A first pilot site started in 1991 with technical assistance provided by a Danish consultancy firm, COWIconsult. Under this project, demonstration sites have been implemented, management procedures and administrative systems have been developed and tested and staff trained. This project was positively evaluated in 1993 and it has been proposed to expand and institutionalize these activities during a six year period starting mid 1994. SIDA and DANIDA will continue to provide financial and technical support, with 35% of the invest costs for the works being provided by the Government of Zimbabwe.

Design Standards

The design of these roads complies with the design standards used by the Department of State Roads for low-volume all-weather gravel roads. Figure 3.1 shows the cross section of the roads being constructed by the labour-based programme.

The roads originally dirt tracks which are now upgraded to a 6 m carriage way with a 15 cm gravel layer. The roads alignment runs through tribal communal lands in slightly rolling and rocky terrain. Before the rehabilitation works, access was restricted to the dry season, with approximately 20 vehicles per day. The average daily traffic on the completed road section has been registered at 50 - 70 vehicles per day.

Work Methods

The projects are executed using labour-based construction methods complemented with light equipment for compaction and hauling of gravel and water. All earthworks are carried out by manual labour. Excavation of gravel, drainage, camber formation and installation of culverts is done by hand. Gravel is transported by tractor drawn trailers but loaded, unloaded and spread by labour. Compaction is carried out by Bomag pedestrian rollers. Gravel sources have been located in the vicinity of the road alignment.

DANIDA Project

The DANIDA assisted project started out with the upgrading of 28.7 km of Road 185 in Mudzi and Mutoko District. These works were completed in August 1993, the project commenced construction on Road 278 and has so far completed 21.2 km.

The work has been carried out by extensive use of labour combined with a fleet of light equipment. Operating at full strength, the project has employed around 400 labourers, divided into two teams. Each team has 5 supervisors, with ne being in charge overall per team. This construction unit has experienced a maximum output of 4 - 4,5 km gravelled per month during the last half of 1992 and the beginning of 1993.

The equipment pool consists of the following:

- 6 tractors MF 390
- 12 Tinto non-tipping trailers 3 m^3
- 4 Bomag pedestrian rollers 950 kg
- 2 water bowsers 4500 l (Tinto)

- 2 water bowsers 1000 l (Tinto)
- 2 Honda water pumps
- 2 generators 11 & 5 kVA)
- 1 tipper truck (to be replaced by a 5 tonne flat bed truck)
- 2 Toyota Hilux single cab
- 2 Honda motor bikes

Table 3.1 and figure 3.2 and 3.3 summarize the costs and labour productivity achieved so far on this project.

Road No.	Prod. km	work days	Wd/km	Cost	Cost/km
185	28.72	99,084	3,450	2,572,264	89,564
278	21.2	54,883	2,589	1,311,633	61,869
Total	49.92	153,967	3,084	3,883,897	77,802

Table 3.1 Production and Cost Data
(Zimbabwean Dollars)

Major Constraints

- Long and expensive water haulage during the dry season, particularly May to November 1992.
- Inadequate cement supplies for drainage works.
- Considerable down time on the tractors and trailers as the equipment got older. This is mainly related to the hitch, fuel injectors, rims and tires on the tractors, and lacking A-frame on the trailers causing the trailer axle to become loose, and cracking o the bucket.

Figure 3.2

Figure 3.3

- Senior staff salaries for engineers, and partly superintendents and stores assistants.
- Staff housing and office units. These are costed instead on a monthly hire charge basis.
- Expatriate staff salaries and accommodation, and supervision vehicle costs.
- Miscellaneous costs such as classroom rental, photocopier, computer, etc.

Labour Statistics

Each of the road construction projects has provided temporary employment to approximately 1300 unskilled workers recruited from the nearby villages, of which on average 25% were women. The duration of their employment has varied, with approximately 50% recruited for a minimum period of three months. Table 3.2 summarizes the total numbers employed and their gender distribution.

Road No.	Men		Women		Total to date
185	1065	76%	327	23%	1,392
278	906	73%	336	27%	1.242

Table 3.2 Employment Data

90% of the works carried out by the unskilled labour has been organized as task work. The daily wage rate for casual unskilled labour is currently 8.73 Z$/day (US$ 1.34).

With financial assistance from SIDA and with technical assistance provided by the Swedish consulting firm SWEROAD, rehabilitation works commenced in April 1993 on the 18 km Mutoko -Nyamazuwe section of Road 185. Currently this project is progressing with a monthly production of 4 km executed by two teams of 200 labourers. Each team is assisted by an equipment fleet consisting of 3 tractors and 6 trailers, 1 water bowser and 2 rollers (1500 kg). Average number of work days is currently 2269 wd/km. The project is expected to be completed by November 1993 at a final cost of 70 000 Z$/km (11 500 US$/km).

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Small-Scale Contractors

I. Improve Your Construction Business:

Entrepreneurship Training for Small-scale Contractors in the Labour-based Road Sector

By Claes-Axel Andersson, ILO Improve Your Construction Business Programme

SYNOPSIS

This paper starts with a brief introduction to the Construction Management Programme of the ILO followed by a description of the Improve Your Construction Business (IYCB) programme, from how it was developed or a contractor training project in Ghana to the present plans for geographical and sectoral expansions. The paper ends with a discussion on the possibilities of applying the material and methodology for more specialized parts of the construction sector such as labour-based road maintenance and construction based on a presentation of the recently started project "Entrepreneurship training for labour-based road maintenance contractors" in Lesotho.

The ILO Construction Management Programme

Introduction

Since the middle of the 1970s, the ILO has been in the forefront of the development of national construction capacity and in the dissemination of construction management knowledge and skills. The growth of the ILO Construction Management Programme (CMP) has been aligned with, but separate from, the development of infrastructure programmes relying on the cost-effective utilization of locally available human and material resources.

Drawing on the results of 20 years' practical experience and research, the CMP offers a unique service in international construction industry development. It is based on the application of professional engineering and management skills coupled with extensive experience from numerous projects in Africa and Asia. A particular strength is the range of training methodologies that have been built up and tested in practical technical co-operation projects. Examples are the fourthcoming International Construction Management (ICM) series of textbooks for large construction firms, the Inter-active Contractor Training (ICT) modules to develop basic construction management skills, and the Improve Construction Business (IYCB) handtools and workbooks for owners and managers of small construction enterprises.

History

In the early 1970s support by the Overseas Development Administration (ODA) enabled the United Kingdom-based Intermediate Technology Development Group Ltd. (ITDG) to pioneer

management training for owners and managers of small contracting firms in newly independent developing countries. The demand for this assistance grew rapidly, and it became clear that it would be more appropriate for the work to be taken forward by a larger organization with greater resources and more extensive international links. The ILO, with its highly reputed general Management Development Programme and special interest in the development of small enterprises, sized this opportunity and started to promote programmes to assist the development of indigenous construction industries in member states. The development of this Programme has proceeded through three distinct phases:[1]

1. Exploration of needs and priorities; development of pilot training materials.

2. Pilot regional programmes, including seminars and workshops, to discuss experience, formulate strategies, and test out and publish training materials and prospective publications.

3. Institution building, primarily through the design and implementation of national technical co-operation projects.

The first phase from the mid 1970s to 1980 was exploratory im ore senses than one, since the needs of domestic construction industries in developing countries had been generally neglected and the ILO was unsure of its potential role in providing assistance to its member states in the specialist field of construction management. During this period the programme was run on a part-time basis by various ILO officials without any background in construction, and relied heavily on outside consultants for its field activities. The main event was a three week "training of construction management trainers" course for Africa held in Nairobi in 1976, and the three Publications as its "small building contractor" series[2].

The outcome of the exploratory phase was a growing appreciation of the importance of this neglected group of owners and managers of small enterprises, and the Government of Norway agreed to support an ILO project for the African region "to create in the participating countries a basic capability for delivering management training to small-scale building contractors". This provided a firm base for the establishment of the Construction Management Programme, and the first full-time Director was a qualified civil engineer who was also a management specialist and had extensive experience in developing countries.

With an experienced professional engineer in charge, the Programme began to benefit from the application of a more systematic and goal-oriented management style. Thus the second phase included an examination of the policy constraints which adversely affect the performance of domestic construction industries in developing countries in the books "Foundations for change"[3] and "Guide-lines for the development of small-scale construction enterprises"[4], while the earlier training initiatives were consolidated with the publication of three Interactive Contractor Training (ICT) modules[5] and an accompanying book "Training contractors for results".[6] It led naturally into the third phase which began with an examination of the policy constraints which adversely became clear that more emphasis needs to be put on institution building in order to achieve sustainable sectoral development. The lessons learned during these studies have been distilled in the recent book "Building for tomorrow".[7]

Current activities

A complete review of experience during the initial phases led to a decision to develop a comprehensive and distinctive rang of products and services covering three main areas of activity:

- management of technical cooperation projects;
- consultancy and advisory services;
- training and management development.

Table 1. *Construction Management Programme: Main activities*

The ILO was among the first international organizations to appreciate the need to develop a range of construction management training systems and methodologies to suit the special needs of its member states. These needs themselves are far from uniform, and range from large and sophisticated construction organizations employing computer-based management information

systems to small contractors specializing in the construction and maintenance of rural roads using labour-based techniques. With these considerations in mind, the CMP has been engaged in a major effort to develop a range of products and services to support its technical cooperation, consultancy and advisory activities. CMP publications can be divided into five categories:

- Conceptual studies and information papers
- Practical manuals
- International Construction Management text books (ICM)
- Interactive Contractor Training modules for trainers (ICT)
- Improve Your Construction Business handbooks and workbooks (IYCB)

Since the main focus of this paper is on training of contractors for the labour-based public works sector the following section will focus on the IYCB materials and methodology which are specifically designed to improve the performance of small construction enterprises (for a complete list of publications, see Appendix I).

The Construction Management Programme was transferred from the Management Development Branch to the Policies and Programme for Development Branch (E/DEV) in April 1993. The previously established link between CMP and the labour-based public works activities of E/DEV was thereby strengthened. The contractor training programme in Lesotho is a pilot project concerning utilization of previously developed training material (the IYCB material) when training contractors in this specific sector. Before presenting and discussing the Lesotho programme more in detail ti may be helpful to describe how the IYCB materials and methodology were developed.

Improve Your Construction Business

Target group

The CMP had already developed the Inter-active Contractor Training (ICT) training modules for construction enterprises of modest size. However, the target group for this material is sufficiently well established to employ a number of specialist managerial and supervisory staff and apply conventional construction management techniques. The many owners/managers of much smaller enterprises, or whom the management of their enterprises is a personal and part-time activity, required a more basic approach.

Improve Your Business (IYB)

In its search for means to assist this target group, the Construction Management Programme drew upon the experience of another ILO programme - IYB or "Improve Your Business". IYB consists of self-teaching material that introduces the user to basic management techniques such as business analysis, financial analysis (accounting, key ratios, etc.) and activity financial planning. The material is packaged neatly in the form of a "handbook" and companion "workbook", and includes checklists and a reference guide, together with advice on how to prepare an action plan and practical suggestions on how to bring the plan to fruition.

IYB had proved very successful in assisting small traders and manufacturers of simple products but, as CMP experience had shown, it was not sufficient when trying to cater for the specialized needs of small construction enterprises. A useful definition of a small business (and small construction businesses) is that it is one in which the manager or owner spends much of his or her time actually carrying out the function of business[8], so it follows that there are disadvantages in separating management from technical training. Indeed ILO thinking on small enterprise development now emphasises the importance of a sectoral approach to training and consultancy.[9]

Improve Your Construction Business

The answer seemed to be for the CMP to draw upon the experience of the IYB programme and develop a system which would meet the specific needs of small contractors called IYCB or Improve Your Construction Business. Rather than attempt to produce a generalized version and then test it in field conditions, it seemed best to develop the system in one country so that it would be possible to work practically with both the beneficiaries and the individuals and organizations who could provide training, advice and continuing assistance.

Luckily this idea coincided with a request to prepare a technical cooperation project to improve the performance of local construction enterprises in Ghana, which certainly offered a demanding environment and was of particular interest in view of the Government's action to secure an effective transition from a centrally planned economy to one based on enterprises within the private sector. Thus it seemed probable that if a system could be successfully developed in Ghana, it would be very likely to be suitable for replication in other countries with comparable problems and aspirations.

The Ghana IYCB project

Many small-scale contracting firms in Ghana claim to be capable of implementing basic building and infrastructure projects, but fail to deliver quality work at reasonable cost within designated completion periods. Clients, consultants and the contractors themselves all appreciated that these enterprises needed help, and the Government of the Netherlands was approached to support an ILO-executed Improve Your Construction Business project. In view of the ILO's emphasis on institutional support to ensure sustainability, the enthusiastic support of the Civil Engineering and Building Contractors Association of Ghana (CEBCAG) and the existence of a well-established management training institution in the Management Training and Productivity Institute (MDPI), was seen as two main pillars for the project to rely and build upon. The planning of project implementation started in early 1990.

The duration of this first IYCB project was two years and the promised outputs were somewhat optimistic for such a short project:

- 10/15 trainers/councellors to be trained;
- owners/managers of 120-150 small-scale construction enterprises in selected secondary towns in Ghana to be trained;
- development of IYCB handbook, IYCB workbook and trainers' guide.

Assessing problems and needs

The mainly step was to determine the problems, practises and needs of the target group.[10] This was done by circulating a questionnaire asking for a statement of problems and suggesting possible topics for training in six broad categories and was supplemented by face-to-face discussions with individual owners and managers at fact finding workshops in all ten provinces. These sessions were effectively "small-scale construction enterprise clinics" and respondents saw a "great need" for training in 42 topics, and there was general agreement that inadequate (or non-existent) construction management training was at the root of many of their problems. For example, contractors complained that "bank financing is difficult to obtain and is very expensive at 30 per cent interest". Following discussion, the complainants admitted that contractors generally have a poor repayment record and few have the skills to keep accurate accounts and make reliable forecasts of costs and cash needs. Thus it was decided that the training workshops should include discussion of the accounting needs of the small contractor, training in basic book-keeping and accounting, and advice on how to prepare a simple cash flow projection for a small building contract.

Another serious problem was that "a claim for payment has to go through no less than 30 separate stages before the cheque eventually reaches the contractor, and the whole process never takes less than 14 weeks (and often a good deal more)". Although training alone would not solve this problem, it was accepted that the workshops could help by developing the skills that contractors need in order to prepare certificates in a form that enables them to be rapidly and easily checked by the officials (50 or more!) through whose hands they pass.

The project team grouped the identified problems into ten different clusters as seen in Table 2 below.

Table 2. Ghana building contractors: Identified major problems

Problems

1. Contractual procedures
2. Inadequate market opportunities
3. Financing the work
4. Obtaining performance bonds
5. Site operations
6. Quality control
7. Availability of plant
8. Lack of skilled labour
9. Manufacturer’s problems
10. Getting paid

Result-oriented training

The preliminary discussions gave the project team a clear insight into the way in which these contractors run their business and the type and nature of the training required. What they were seeking was practical advice on how to improve the performance of their businesses, so it was decided that the IYCB workshops should be strongly result/action oriented with little formal lecturing, and heavy use of "action learning" groups to discuss problems and tackle them as case studies.

The sessions on estimating and tendering, for example, should enable each participant to produce a model of the bidding process to suit his or her own business environment, so the training was planned in eight successive steps (see following box).

Table 3. IYCB Training Example: Estimating and Tendering

1. The participants take measurements and notes during a site visit, then:
2. Prepare their own simple working drawings and site layout, then:
3. Produce a basic set of standard specifications, and:
4. Design a simple contract, then with the working drawings:
5. Prepare a list of quantities which allows them to:
6. Calculate direct project cost, and then to:
7. Estimate indirect project cost, and finally:
8. Prepare a quotation or bid.

Project strategy

With the training priorities identified, the project team faced three main tasks before the workshop programme could commence:

- preparation of training material;

- formulation of a strategy for training delivery, and;
- planning a 3-week training of trainers course.

In keeping with the findings of the training needs survey, the original versions of the handbook and workbook were each divided into six sections. It quickly became apparent that the result would either be to omit or gloss over matters of essential importance, or to end up with books that were too bulky to be readily used by the target group. The only answer seemed to be to split up topic into three broad subject areas, each with their own handbook and workbook, which would have the additional advantage that readers could start by tackling t hose areas of their business which were in most urgent need of improvement.

For small contractors, estimating and tendering are crucial activities. Construction is a fiercely competitive industry; profit margins are often low and a small mistake on pricing a tender document can make all the difference between a worthwhile profit and a serious loss. Furthermore each individual project is taken on at a fixed price and represents a significant proportion of the contractor's annual turnover, so one serious error in pricing a single project can undermine the stability of the enterprise as a whole. Yet many small contractors lack even the most elementary grasp of cost accounting, and estimates could frequently be more accurately described as "guesstimate". Thus the first handbook and workbook were entitled "Pricing and Bidding". The two priority topics of project planning and productivity are essentially site activities, so the second handbook and workbook covered "Site Management". This left the range of activities concerned with managing the enterprise as a commercial entity, including ensuring a reasonable balance between workload and resources, which comes under the general heading of "Business Management".

Selection of training cohorts

The number of participants at the training of trainers course was decided to be 18, which is the maximum for the kind of highly participative sessions that were judged necessary to achieve the project's team building objectives. The figure of 18 was significant, since all ten CEBCAG Regional Committees demanded that they should participate in project activities and the manufacturers of building materials also sought assistance. The answer seemed to be to form six three-person teams or "cohorts", one of which would work with the manufacturers while the other five should each be responsible for delivering training and consultancy advice to contractors in two adjoining regions.

The building materials' cohort was made up of manufacturing specialists and the five contractors' cohorts were well balanced, each containing one MDPI trainer together with one CABCAG member from each of the two participating regions. Preliminary enquiries showed that the demand for training far exceeded the provision in the project document; CEBCAG's regional members requested that the proposed 8-10 workshops of 1-2 weeks duration should be increased to 6 workshops of one week in each of the 10 regions, or 60 workshops altogether. In response to this request, the Government of the Netherlands agreed to support a 6-month project extension which would permit this increased output, and would also increase the number of owners and managers of construction business who would benefit from the programme from between 120 and 150 to more than 200.

Project outputs

In Ghana the IYCB project is an indisputable success. The formal project outputs have been substantially exceeded:

- 18 trainers have been trained (10/15 promised),
- 200 contractors trained (120/150 promised);
- 3 handbooks, 3 workbooks and a trainers' guide developed (one of each promised).

The new interest in contractors and their potential contribution to national prosperity cannot be measured by statistics alone; CEBCAG and its members feature regularly in the local press and members of training cohorts are generally proud to be part of the national IYCB team. The sustainability of improvements can never be guaranteed, but it is very encouraging that MDPI, together with CEBCAG, continues to deliver IYCB training in all regions of Ghana one year after the local project activities terminated in the autumn of 1992.

Lesotho, Entrepreneurship Development for Labour-based Road Maintenance Contractors

Applying the IYCB system

IYCB is now about three years old, and the Ghana project has shown that the concept has worked well in one country. The IYCB approach has potential for a geographical expansion and will probably also develop from its original focus on building contractors into several specialist sub-sectors such as the manufacture and distribution of building materials, building maintenance and labour-based road construction and maintenance.

A number of African countries have shown interest in using this methodology to increase the productivity of their local construction industries and some proposals have resulted in concrete initiatives. A pilot project, testing the validity of the IYCB concept in Kenya, is presently being evaluated to determine whether a full-scale intervention is feasible. A similar test has been prepared for Malawi and previously mentioned, a project to apply the IYCB concept to the development of labour-based road maintenance contractors in Lesotho started in April 1993.

Lesotho, background

In Lesotho, as in most countries which have initiated labour-based road construction and maintenance programmes, these activities have so far generally been organized on force account using labour recruited from local communities. The Labour Construction Unit (LCU) located within the Ministry of Works was founded in 1977 with two primary objectives; to promote efficient use of labour based construction methods in Lesotho and to create as much gainful employment as possible. It has since grown into a substantial organization with more than 260 support staff and a manual labour force of about 1,800 and is currently responsible for routine and periodic maintenance of about 700 km of gravel roads.

A long-term (20 years) LCU development plan was prepared in 1989, envisaging reorganization of the LCU. In line with general GoL policy, the LCU now intends to involve the private sector in undertaking the works, provided they can adapt to labour-based, employment-intensive techniques. This will entail considerable initial support and training for the contractors and government supervisory staff, but will significantly reduce the projected government establishment while substantially increasing private sector employment and achieving overall cost savings and greater operational efficiency and flexibility.

The Lesotho construction industry is currently dominated by foreign and non-Basotho, locally-based contractors. There are no domestic contractors specializing in roads and civil construction and domestic building contractors are poorly capitalized and lack essential managerial and business skills. This project is based on a step-by-step approach to contractor development helping them take advantage of relevant market opportunities. The niche market of labour-based road maintenance is one which offers potential growth and an opportunity for domestic contractors to develop the basic business and technical skills that will be needed if they are to take a larger share of the market for civil works.

Selection of participants

The fact that no domestic civil works contractors exist means that the training, in addition to management aspects, also must fully cover the basic technical aspects of road maintenance. Another complication was the absence of an apparent group to recruit the trainees from. Consideration was given to three alternative sources for recruitment of routine maintenance and regravelling contractors. Firstly, existing domestic building contractors having the advantage of understanding the competitive nature of the construction industry but lacking experience and plant for the road sector. Secondly, haulage contractors owning tipper trucks which could make them competitive for regravelling, although their experience in building contracting is limited and thirdly, LCU road supervisors - particularly Senior Technical Officers (STOs) and Technical Officers (Tos) - having relevant technical knowledge and experience but might lack capital and business experience. The selection of suitable LCU staff members to participate in the training course in order to later on administer the contractors work was done by LCU themselves.

Based on the tremendous interest in participating, it was decided that 14 potential contractors (project document: 10 No.) should accompany the three LCU representatives in the first round of training that started in May 1993. When carefully assessing the prospective road maintenance

contractors the likelihood of creating or strengthening a suitable contractor was emphasized. The conclusion was that relevant business experience was made an important criteria in the selection process.

After assessing expressions of interest from all three groups mentioned above, the selected 14 was composed of one very experienced and highly appreciated STO in LCU while the other 13 had their background in contracting or other construction related companies, either as owners or in a managing capacity. After one week of training, when the general conditions and associated risks for a contractor in the labour-based field had been presented, the former STO opted for staying on as LCU staff member and followed the rest of the training in that capacity. It was, of course, much better to opt out at this stage, before putting his and his family's savings at risk, but it was also another illustration showing that a technician, perfectly mastering those aspects of running construction work, does not necessarily make a successful contractor.

Training concept

Given the participant backgrounds it was considered necessary to offer them an integrated programme where classroom and practical training is mixed. The first step was a six-week "class-room" training that started on the 10th of May this year. Following an assessment during this course it was decided that additional training on "contracts and tendering" as well as practical on-site training was needed before the trainees could take on their test-contracts.

The first of these contracts, routine maintenance, running up until Christmas, is to start towards the end of September, so the contractors are currently mobilizing their resources. An assessment of the contractor's performance on the first contract will be undertaken in mid-January 1994, and their second test contracts (regravelling) are supposed to cover the time between February and June next year.

Training material

The IYCB material is designed according to a modular concept and its three original titles 1. "Pricing and Bidding", 2. "Site Management, and 3. "Business Management" each cover a coherent group of subjects. This main set of three Handbooks and three corresponding Workbooks are written so they can be used both for self-study and in a classroom setting. A Trainer's Guide, containing suggested exercises, discussion topics, suitable handouts and general training advice will be available to help the trainer design a contractor training programme that fits the identified needs of the trainees.

Training materials has unfortunately often been developed on a project related basis. This has led to numerous "re-inventions of the wheel" where previously developed material was completely ignored when designing material for a new project. Everybody, including the "training adviser", realizes, of course, that it would be useful to build upon existing material but either because he/she does not know it exists or because the material actually he/she finds is too country- or region-specific it is seldom of any help when designing methodology, books etc.

In order to achieve flexible and generally applicable material, these aspects need to be considered already during the design stage. Applying this principle does not mean that you do not adjust the training programme and your material to local conditions but rather that, for instance, "country-specific" rules and regulations are covered in separate modules that can be used together with the knowing local conditions well enough to be able to prepare exercises etc., based on local conditions, if the general ones in the Workbook do not correspond with the situation where the contractors are to work.

When developing the IYCB package, it was primarily designed for general building contractors. Building was seen as the best basis for "general material" since it coverers a larger number of activities compared to most other sub-sectors, for example road contracting. It includes virtually all stages and aspects of contracting normally forms the "centrepiece" of the domestic construction industry in virtually all developing countries.

By choosing building as the basis for the material, several positive features were automatically gained. The most obvious being it that represents the largest market for training but even more important, a better position to create or strengthen contractors for long-term survival or even expansion on the market. If you aim at creating strong small scale contractors, available to carry

out contracts several years down the road, the danger of too much specialization and accompanying inflexibility must be avoided. The ups and down of all domestic construction markets need to be bridged. By their size and often accompanying limited amount of resources tied in sector-specific plant they are more flexible than their colleagues in the medium sized companies but have less financial resources to overcome temporary changes in the market.

Although the three IYCB books use building contracting as a basis, the emphasis is primarily on the business and entrepreneurial aspects of running a small-scale contracting firm. These aspects are fairly similar regardless of which part of the construction business you work in. All contractors need to ensure all their indirect costs are included in their bids, plan deliveries of building material and prepare a simple cash-flow for a project to take one from each of books No. 1,2 and 3.

To extend the IYCB concept and facilitate tailor-made training for other sub-sectors than building contractors, a set of complementary Handbooks and Workbooks is planned to be developed when suitable projects are available. For the Lesotho project a ROMAR (Road Maintenance And Regravelling) package, currently only in draft form, is one of the outputs listed in the project document. This package covers all the technical aspects of how to maintain and regravel secondary roads using labour-based methods. Another output, to be produced in the project's later stages, is guidelines for an extended training, incl. training material, covering construction and rehabilitation of labour-based roads (ROCAR).

Training course

The six-week training course held in May-June this year in the LCU Training Centre in Teyateyaneng was divided into two major parts. The first three weeks covered the technical ROMAR material while the following three weeks were voted to the management aspects.

This entire course provided, because of the participants practical background, a mixture of short lectures, site visits, discussions and tutorials. The subjects were generally presented using a three-step approach where step one is an introduction and presentation by the trainer, often using examples from the Handbook. In the following step the trainees were given some exercises/problems to solve, either individually or in groups, and the last step was for the trainer to evaluate the trainee's results on the exercises and clarify and complement previous training, if necessary.

To ensure that the trainees are able to use the knowledge gained from each of the different training modules not only individually but also when interacting in a normal business environment a number of group tutorials were given where several skills had to be employed simultaneously. These tutorials were often coupled with a site visit to further underline the linkage between theory, learned in the class-room, and practical application in the normal small scale contractor element of the linkage between generally applicable training material and the local conditions pertaining.

An example:

1. The importance of undertaking a proper site inspection before preparing a bid was presented and discussed in the class-room, using IYCB Handbook 1 as a basis.
2. The trainees solved some exercises from the Workbook.
3. A tutorial was given where the trainees, after a site visit to an LCU site, should list all the necessary background information they discovered concerning location of gravel pits, where and how to establish a site camp, etc.
4. The trainees results were evaluated and some clarifications and explanations were given in a follow-up session.

The fully incorporate local laws, rules practice and regulations in the training some guest lecturers were invited to cover items such as local labour legislation and safety & health regulations. This is seen as a most important component in view of ILO's commitment to showing contractors that lower cost and higher productivity can be achieved by good management while adhering to standards and regulations.

The first training session in Lesotho was highly appreciated by the participants that felt well

prepared for their future tasks although they expressed a wish for repetition of selected parts of the training all through the programme.

Issues for discussion

1. Special needs of business training

2. Links between business and technical training

3. Characteristics of the ideal trainer

4. Training needs of client staff who will supervise contractors

5. How to select contractors for training

6. Value of a modular approach to training material preparation

7. Methods improving feed back from projects on training systems and case studies

8. Evaluation of training

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Appendix 1

ILO Construction Management Programme

Products and Services

1. Conceptual studies and information papers

The five conceptual studies produced by the CMP are intended to provide policy-makers with ideas and suggestions on new ways of improving the competitiveness and performance of national construction industries.

Foundation for change (1984) examines the patterns of organization of construction industries in developing countries, and shows how the institutional framework could adapt to make better use

of local human and physical resources.

Guidelines for the development of small-scale construction enterprises (1987) distils and analyses the extensive experience of the ILO in devising and implementing management development and training programmes for small-scale construction enterprises.

Training contractors for results (1987) provides guide-lines for the assessment of the management training needs of contractors, and delivering integrated training programmes to enhance technical, managerial and financial skills.

Building for tomorrow (1991) is a handbook of ideas, methods and techniques to help national construction industry development institutions to improve performance. It is based on four case studies of successful institution building, and offers a 12-point action plan that will have an immediate impact on the performance of the institution.

Training on tap (forthcoming) examines the scope for applying modern distance learning techniques to provide cost-effective training for construction managers and supervisors.

The Construction Information Papers (CIP/-) are the outcome of practical research on issues of international interest. The series was started in 1991, and current titles are:

CIP/1 *Small-scale construction enterprises n Ghana: Practices, problems and needs (1991)*

CIP/2 *The construction industry in Nepal: Practices, problems and needs (1991*)

CIP/3 *Women can build: Women's participation in the construction industry in Sri Lanka(1991*)

CIP/4 *A strategy for the China International contractors' Association: CHINCA (1991)*

CIP/5 *Room for improvement: a study of women building workers in Bombary (1992)*

CIP/6 *The impact of the ILO Construction Management Programme on the development of small construction enterprises (1993*)

CIP/7 *Building her future: Guidelines for encouraging women's participation in construction industry development projects in India (1993*)

2. Practical manuals

These four manuals provide succinct advice for practising construction managers, and take special account of the needs of managers in developing countries.

Managing construction projects (1984) is a fully illustrated guide to planning and controlling the construction process from briefing through to commissioning, and is based on internationally accepted procedures.

Construction management and technology: A bibliography for developing countries (1987) countries, divided into three sections "Maintenance strategy", "Maintenance management" and "Maintenance methods".

Improving site productivity in the construction industry (19870 provides a practical and readable introduction to the application of work study techniques in the construction industry.

3. International Construction Management (ICM)

This series of text books (all forthcoming) has been written to assist engineers and other construction professionals who will be involved in bidding for, negotiating and managing major international construction projects.
The titles are:

- International project accounting
- International bidding case study
- Project finance
- Bid preparation techniques
- Technology transfer
- International project marketing
- Managing international construction projects (Management guide for senior management)

4. Interactive Contractor training (ICT)

This range of training modules for upgrading the management skills of construction managers and owners of small and medium-scale construction firms contain learning texts together with worked examples, exercise and simulations. They also provide a model of how learning-effective material for construction managers should be structured.

Module 1 : Estimating and tendering (1987) provides the basis for a simple, but comprehensive, introduction to the calculation of quantities and pricing techniques.

Module 2 : Project planning (1987) describes how enterprises can improve profitability through effective planning, the preparation of schedules for labour and materials, and the forecasting of cash flow throughout the project. It also contains sections on network analysis, and offers advice on putting the plan into action.

Module 3 : Site productivity (1987) describes specific ways of improving productivity including better site layout, more effective supervision, measuring site activity and reviewing work methods.

5. Improve Your Construction Business (IYCB)

The Improve Your Business system (forthcoming) consists of **three handbooks** and **three workbooks** covering all the essential aspects of managing a small construction enterprise. They can be used for self-study or in training courses in conjunction with the **Trainers' guide**.

The titles are:

- *Pricing and bidding*
- *Site management*
- *Business management*.

Construction Management Publications

Currently in Print

Building maintenance: A management manual, by Derek Miles and Paul Syagga (London, Intermediate Technology Publications for the ILO). - 1987 - 213pp. ISBN 0 946688 92 3

Construction management and technology: A bibliography for developing countries, compiled by R.H. Neale (Aldershot, United Kingdom, Gower for the ILO). 1987 - 122pp. - ISBN 0 566 05379 9

Foundations for Change: Aspects of the construction industry in developing countries, by G.A Edmonds and D.W.J. Miles (London, Intermediate Technology Publications for the ILO). 1984 - 143pp. ISBN 0 946633 00 1 hb

Guide-lines for the development of small-scale construction enterprises (Geneva, ILO). 1987 - 136pp. ISBN 92-2-10569-3

Improving site productivity in the construction industry, by A. Heap (Geneva, ILO) 1987 - 124pp. ISBN 92-2-105694-5

Managing construction projects: A guide to processes and procedures, edited by A.D. Austen and R.H. Neale (Geneva, ILO). 1984 - 158pp. ISBN 92-2-103553-0

Training contractors for results: A guide for trainers and training managers, by Tor Hernes; edited by Derek Miles (Geneva, ILO). 1988 - 114pp. ISBN 92-2-2106253-8

Building for tomorrow: International experience in construction industry development, by Derek Miles and Richard Neale (Geneva, ILO). 1991 - 238pp. ISBN 92-2-107284-3

Training Manuals

Inter-active Contractor Training (Module 1: Estimating and tendering; Module 2: Project planning; Module 3: Site productivity), by Tor Hernes; edited by Derek Miles (Geneva, ILO). 1988 ISBN 92-2-105994-4

Construction Information Papers

CIP/1 Small-scale construction enterprises in Ghana: Practices, problems and needs, by Derek Miles and Jon Ward (Geneva, ILO). 1991 - 56pp. ISBN 92-2-107847-1

CIP/2 The construction industry in Nepal: Practices, problems and needs, by Derek Miles and John Ward(Geneva, ILO). 1991 - 40pp. ISBN 92-2-107940-6

CIP/3 Women can build: Women's participation in the construction industry in Sri Lanka, by Claes-Axel Andersson (Geneva, ILO). 1991 - 57pp. ISBN 92-2-108093-5

CIP/4 A strategy for the China International contractors's Association: CHINCA, by Derek Miles and Professor K.N. Vaid (Geneva, ILO) 1991 - 62pp. ISBN 9202-1-8157-5

CIP/5 Room for improvement: A study of women building workers in Bombay, by Vinita Shah (Geneva, ILO) 1992 - 63pp. ISBN92-2-108439-6

CIP/6 The impact of the ILO Construction Management Programme on the development of small construction enterprises, by Derek Miles (Geneva, ILO) 1993 - 19pp. ISBN 9202-108817-0

CIP/7 Building her future: Guidelines for encouraging women's participation in construction industry development projects in India, by Vinita Shah (Geneva, ILO) 1993 - 39pp. ISBN 9202-108xxx-x

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II. To What Extent Can Experiences in Training Contractors and Their Staff be Carried from One Country to Another?

Ghana and Tanzania: A Case Study

by Kwaku Osei-Bonsu, Chief Technical Adviser, Moshi, Tanzania

Introduction

It has often been said that "Experience is the best Teacher". However, the issue being discussed in this paper is whether experiences in training a group of contractors in one country could be carried to another.

This paper presents some of the central themes which have arisen in the implementation of the contractor training programme for rural road rehabilitation and maintenance in both Ghana and Tanzania. Since this is a case study, it is considered appropriate to briefly give some background information on the socio-economic environment pertaining in the two countries to the start of the training programmes.

Socio-Economic Environment

Ghana has an area of 239,000 km^2 and a population of 15 million of which over 70% live in rural areas. Agriculture constitutes the life blood of the economy and the country has a road network of 14,400 km of trunk and 22,000 km of rural roads. Most of the rehabilitation, improvement and maintenance works are contracted out to local contractors with a small percentage of the works being carried out by force account operations.

The move from force account to contracting started well over a decade ago, thus an environment for contracting had been created. Thus, an environment for contracting had been created. Thus, as of December 1991 only 2 out of the about 400 classified Road Contractors were foreign based.

Tanzania which is about four times the size of Ghana has a population of 25 million of which over 80% live in rural areas. Just as other developing countries, agriculture is the mainstay of the country's economy and the country has a total road network of 82,000 km of which 42,000 km are

designated as Regional and District roads. The roadwork contracting sector in Tanzania on the contrary is very weak or simply stated as non existent. There were only 43 "classified" road Contractors as at June 1992. The Government's policy prior to the recent liberalization programmes did not encourage the establishment of locally based road contractors. As a result the only contractors operational were either foreign or state owned and substantial percentage of the works had to be executed by force account brigades.

Project Objectives

With regards to the Ghana project, it was experimental in the sense that it was among the first in Africa to help a group of rather small private contractors develop the ability to employ cost effective and technically appropriate labour based approaches to rural road improvement and construction.

The Kilimanjaro project which forms part of a $ 1 billion Integrated Road Project Co-ordinated by the World Bank is based on the Ghana model with some new elements of contracting routine maintenance. The Project has been mandated to train 30 Contractors of which only 3 will be involved in rehabilitation.

Training Strategy

The development of any new abilities of an organization is always a very difficult and complex process. This normally involves several carefully designed steps which should be relevant to conditions for which the new system is being developed. It is a well known fact that quite a number of projects aimed at developing private companies have failed because trainees have been made to solve problems in environments totally different from that prevailing in real life in their organizations.

The training package developed in Ghana which could conveniently be termed as "ILO Training Package" adopts a "three prong" approach to the training of contractors namely

- The classroom Training Phase
- The Field Training Phase and
- The Trial Road Phase

This package recognises the interdependence of the 3 phases and takes into account of the phasing periods.

The Classroom phase deals with the normal teaching of principles of road building and maintenance whilst the Field Training phase is to expose the trainees to conditions similar to ones they will be encouraging on their sites. Although this phase is run by the project staff, an attempt is made to simulate that of a private contractor.

In the Trial road phase, the five trained supervisors are made to demonstrate effective team work by operating in the same environment (real life situation) as a private contractor.

Whereas in Ghana this package has been adequately tested for its effectiveness over a number of years, the Kilimanjaro project has just entered into the trial road phase of the programme for the first batch of 6 contractors.

To be able to address the question of transferring experiences in training contractors from one country to the other there is also the need to consider in detail the approach in the pre-training, training and post training phases.

Pre-Training

The major difference between the two models concerns the number of players involved in the implementation of the programme.

In the Ghana model, two players are involved namely the Ministry of Roads and Highways represented by the Department of Feeder Roads and the Contractor. The project is thus considered an integral part of the Ministry and decisions taken are implemented without reference to a third party.

The Kilimanjaro model involves three players, - the Ministry of Works (MOW), the Contractor and the National Construction Council (NCC) which is the Implementing Agency but acts in an

advisory capacity. Thus, unlike in Ghana, decisions taken by NCC will have to be referred to the Ministry of Works for approval in Tanzania.

The pre-training phase is considered to be the most crucial phase where experiences could be ported from one country to the other. It is vital that the planning of the pre-training phase is done properly to ensure commitment from contractors as well as the trainees.

The Training needs analysis carried out on the Contractors and their trainees revealed that there were some slight differences between the two countries i.e. as at the time of start of the Ghana project and the current condition in Tanzania.

Selection of Contractors

Ghana

Most of the small contractors identified at the inception of the project for training were already involved in the execution of roadwork using heavy machinery. Thus it could be said that these contractors had some knowledge of contracting.

The selection criteria currently in use was evolved over a number of years after some modifications had been made to the original one developed for the programme. The criteria for selecting Contractors takes into consideration the following factors:

(i) Contractors' ownership of Equipment;

(ii) Contractors' fixed assets;

(iii) Supervisory Capacity of the Contractor vis a vis the education/training background of staff;

(iv) Experience of the firm in roadwork;

(v) Educational background of the Managing Director

Tanzania

The factors listed in 5.2.1 with some slight modifications were considered in establishing the selection criteria for contractors.

Since most of the potential Contractors who responded to our questionnaire were Building Contractors, the factor on experience in roadwork was replaced with the number of workers handled by the Contractor on building projects. The marking scheme was therefore skewed to favour mainly the up and coming Contractors bearing in mind that the major thrust of the project is on maintenance for which most of the established Building Contractors do not find attractive.

Selection and Acceptance Process for Trainees

Ghana

Contractor's trainees are not screened before being accepted for training. The Department of Feeder Roads only stipulates that a selected Contractor submits certificated of 4 trainees with a minimum educational background of GEE O' level.

A one week intensive revision course in basic mathematics is conducted for all trainees at the start of the classroom training. Since trainees are accepted before being examined, the Training section finds itself in a tight corner and thus takes on the responsibility of running classes for the weaker ones.

Tanzania

A minimum educational background of form four was adopted (equivalent to the GCE'O' level in Ghana) and the trainees were interviewed and tested in basic mathematics before being accepted to the first training course. The major problem identified with the first batch of trainees was their inability to fully understand lectures conducted in English.

The Project further refined the process of screening trainees by developing and making available a set of guidelines to selected contractors which stresses on the importance of choosing well

qualified candidates for training. This approach involves the Project providing the Contractor some set questions which the Contractor uses to screen his trainees before submitting them for interview and further testing at the project office Fig (1).

The assessment of the capabilities and requirements of the trainees has enabled the project to make some modifications to the course content with the resultant effect of the shortening of the duration of the classroom and practical site training periods from 23 weeks to 16 weeks. It is premature to comment on the effectiveness of this approach however it is hoped that within the next six months, the project should be in a position to evaluate the course.

Training Phase

A comprehensive and clearly communicated training activities has been defined in the Kilimanjaro Project document based on the structure developed for Ghana. The training which is tailor made and very practically oriented provided a tarting point for preparing our training programme to suit the local conditions.

Classroom Training

As already stated, this phase deals with the teaching of basic principles in road construction and maintenance. References were made to the standards and codes prevailing in the country and the course content consisted primarily of topics appropriate to the Tanzania conditions.

For the management training, which is attended by the Managing Directors and their Site Agents, the focus is centred on Contract Administration, Costing and Estimating, Work Planning and Programming and Preparation of claims.

The fundamental difference in approach between the two countries is that a lot of emphasis is placed in the use of profile method in setting out in the Kilimanjaro Project as opposed to the Ghana Project. Also training needs analyses are carried out on all contractors selected for training in Kilimanjaro to enable the project identify their deficiencies and weaknesses.

Site Training

A rotational system is used in Ghana whereby a trainee is made to supervise an activity each week until he/she has been exposed to all the activities on the road.

This system was initially adopted in Tanzania but currently the five trainees from each of the six contractors are assigned 500 metres stretch and are made to plan and execute the works with the project providing all the inputs required.

The payment of trainees during the site training phase by the Project to ease the financial burden on the Contractors and also the issue of paying bonuses to workers for completing their tasks were ideas ported from the Ghana project although some slight changes have been effected. For example, the maximum bonus paid to the worker is 4 days compared to 14 day in Ghana and workers are paid every fortnight.

Also from the onset of the Kilimanjaro project the issue of late delivery of equipment which was experienced at the inception of the Ghana project was envisaged and thus arrangements were made to hire equipment for the training programme. The initiative taken based on past experiences has enabled the project to successfully complete the first training course with the second one only 8 weeks from completion inspite of the fact that the Project is yet to take delivery of the training equipment.

Another area where one could rely on ones experiences is the preparation and administration of contracts. The rehabilitation of the model road in Tanzania had to be executed under a contract with MOW. The Project had to develop unit rates from first principle based on the Ghanaian experience by adjusting data on productivities achieved on a force account ILO project within Tanzania.

Post Training Phase

Trained Contractors in Ghana are classified immediately after the training phase. Trial contracts are executed on schedule of rates and all securities are waived for the Contractors. The DFR through a Financial Institution provides the contractor with basic equipment on a hire purchase

arrangement and the firm is expected to rehabilitate a 5km road in 4 months.

Slight changes were made to the system used in Ghana and proposed for adoption in Tanzania, however the Ministry of Works expressed the concern that since these Contractors had not been classified no recognition will be given by the Regional Tender Board for the award of the contracts. Secondly the Ministry was not in a position to waive the provision o performance bonds.

To circumvent these problems, it was agreed that NCC acts as a Management Contractor by entering into a contract with MOW and subletting the works to the six trained Contractors.

The current arrangement has resulted in amendments to the special conditions of contract to incorporate all the changes effected.

Conclusion

Building up the capacity of the Domestic Construction Industry could be a difficult task and the trainer's responsibilities in transferring such experiences should first and foremost be to study and understand the environment within which the programme is to be implemented. This should then be followed by identifying correctly the resources required to meet the objectives of the programme, analysing these resources and finally proposing a framework for the utilization of these resources.

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III. Labour-based Contracting: Contractor Management

A case study in Kenya

By Bruno Illi, NORCONSULT, Nairobi, Kenya

Introduction

In September 1991, Norconsult was commissioned to administer contracts and to develop guidelines for labour based gravelling operations through the implementation of 96 km of gravelling contracts. The terms of reference were amended in March 1992 to change the emphasis from gravelling to training.

Objectives and Scope of Work

The objectives of the project were to establish guidelines for the selection, training and supervision of small, local contractors in labour based gravelling operations.

In order to achieve this, we had to:

- identify suitable contractors
- establish training needs and methods and liaise with the Kisii Training
- School to undertake the training
- develop contract documents and select contractors
- supervise and monitor contracts.

Structure of the Programme

The programme initially comprised 22 activities over a period of 12 months. This was later revised and extended to include a second tender exercise. The four major activities in the programme were preparation, road appraisal, training and practicals/contracts. These are illustrated in the following chart.

Preparation

Trial Site

To test the technology and the procedures a contractor was appointed to undertake reshaping

and gravelling on a section of road 6.5 km long which was identified as a demonstration and trial site. Although the task rates recommended by the Minor Roads Programme were achieved, the result was not satisfactory because the contractor was not familiar with the technology and therefore did not want to employ it, and consequently paid no heed to the consultants instructions.

Selection of Contractors

Advertisements were placed in the three daily papers in January 1992 and notices displayed at the district headquarters of the target districts. As a result, total of 64 companies registered their interest in the training programme. Small-scale contractors were identified with the assistance of the Ministry's representatives in the respective districts. After reviewing the contractors' qualification data (organization, personnel, education, equipment, past contracts etc.) 24 firms were short-listed, gave a written test and were interviewed. Contract managers from 12 of these firms were selected for training.

Selection of Foremen

During the contractor selection process, it was noted that most contractors did not have sufficiently qualified candidates for foreman training. Over 300 applications were received in response to advertisements. After initial screening the number of candidates was reduced to 24, all of which were invited to sit a written test and oral interview. Finally, twelve candidates were selected for training.

Training Material

As all selected participants were either university graduates or holders of a polytechnic higher diplomas, the ILO Engineers manual and the MRP Technical Manual were considered appropriate as course documentation for the contractors. In addition to this, had-outs were prepared for special subjects such as planning, reporting, pricing contracts documents etc.

For the Foremen the Kisii Training School Manuals (Overseer, Technical Manual, Headman's Maintenance handbook etc.) and selected hand-outs were used as background material. Specific training materials for road contractors are not available and should be developed.

Tools

The availability and suitability of hand tools was investigated and it was found that quality and price varied considerably. Hand tools available in Nairobi were of very poor quality and were not considered suitable for heavy work in quarries. In the absence of a better alternative a full set of tools was purchased from suppliers in Nairobi for the contractors.

Templates, camber and profile boards, which were redesigned by the consultant, were manufactured by one of the contractors, and supplied to all course participants.

Road Appraisal

Based on the available study report on Rural Access Roads (RAR) gravelling backlog, an input of 300 mandays/km were anticipated for reshaping. However, the following problems were apparent with the majority of roads proposed by the Districts:

- they required extensive reshaping;
- they required additional drainage works;
- they were not accessible;
- they had nor or unsuitable quarry sites; and
- they were either technically or financially not considered feasible.

In view of this a new set of roads was reviewed and provisions were made for:-

1. more extensive training (rehabilitation, drainage works, gravelling);
2. expanded contract documents; and
3. gravel surveys.

Training

Contractor Training

The objective here was to introduce the contractors to labour based construction and gravelling techniques developed under the RAR and MR Programme. It comprised two one-week sessions at Kisii and four two-day sessions in Thika. The syllabus covered:

1. Project Planning, Supervision and Reporting Systems
2. Labour Based Road Construction and Maintenance Methods
3. Labour Intensive Gravelling Methods
4. Pricing, Tendering and Implementation of Labour Based Contracts.

An average attendance of 85% was recorded. Lecturers from the ILO and the Ministry of Public Works & Housing (MOPW&H) assisted in conducting the contractor training course.

Practical Assignments

It was also important for the trainees to acquire and develop practical skills in the effective use of labour based techniques. Each of the contractors were initially awarded a fixed rate contract for the reshaping and gravelling of a 3 km section of a rural access road (Assignment I). Two contracts were then awarded through competitive bidding, each for reshaping and gravelling a 5 km section of rural access road (Assignment II).

Foreman Training

The foreman training programme covered four main subjects, comprising classroom lecturers and practicals as indicated below:

	Classroom Weeks	Practical Weeks
(a) Labour-based road improvement	3	4
(b) Gravelling	1	3
(c) Contract Procedures	1	3
(d) Motorcycle riding & Maintenance	1	1
Total Weeks	6	9

10 participants successfully completed their training course in Kisii and were subsequently appointed as foremen on fixed rate contracts (3 months), and also on the two contracts awarded to contractors based on competitive bidding (6 months each).

Results

Trained Contractors/Foremen

In May 1993 course certificates were issued to 9 participants on the contractor training course and 9 participants on the foremen training course.

Gravelled roads

The average construction costs for contracts awarded in January 1993 ranged between US$ 5100 and US$ 11,600 per km, depending on the reshaping/reconstruction requirements and the transport distances for gravel. The cost of the main components of the work are set out in Table 1.

Contracts Documents

In view of the size of the contracts and the extent of the construction work which includes eathworks, drainage works and gravelling, it was considered necessary to prepare full tender documents covering the following aspects:

A. Conditions of Tender and Instructions to Tenders

B. Form of Agreement

C. Conditions of Contract

D. Specifications

E. Drawings

F. Bills of Quantities

Due to the special nature of the work, the conditions of contract included a number of clauses particularly relevant to labour based contracts, and gave special emphasis to management and labour issues.

Similarly brief specifications and measurement guidelines were provided for all items to supplement the details given in the Technical manual.

Apart from the standard cross sections, headwalls and culvert bedding details, a map and the quarry plan the road improvement plan forms MRP-E2 (B) and (F) were provided as contract drawings.

The Bills of Quantities were split into 7 different sections covering the main work components.

Costing/Tendering

As the local contractors were not accustomed to normal tender procedures and competitive pricing, the first set of contracts were awarded on the basis of fixed rates determined by the consultant. Prior to this, a special seminar was held with the contractors to discuss tender procedures and pricing during which each rate was analyzed and adjusted accordingly.

The contractors were given the first opportunity to submit competitive tenders for 6 contracts in January 1993. These contracts were scheduled for completion by late July/early August 1993. Competitive tenders for a further 7 contracts were received in June and some were awarded in Engineer's Estimates, while 40% of the tenders were within ±15%.

Apart from one contractor who submitted his tender document an hour after the deadline, all bidders complied with the conditions of tender.

Planning and Reporting System

The contractors were trained in the use of simple forms for estimating their input, costing the works, drawing up a work programme, and monitoring progress.

Project Outcome

The results of the programme indicate that:

- Rehabilitation and gravelling of roads undertaken by private contractors can be technically and financially feasible provided there is sufficient work to keep contractors interested and payments due to them are made regularly.
- The quality of workmanship achieved by contractors is equal or higher than that by force account.
- Donor finance is still required to cover the cost of continuation of the training programme for subsequent intakes of trainee contractors (SIDA is likely to finance the second intake up to December 1995).
- The road network considered suitable for rehabilitation and gravelling by contractors is in excess of 24,000 km. With an output of between 12 to 24 km per contractor about 165 to 330 contractors would be required to cover the total network.
- in view of the above the training potential should be substantially increased, and continued technical assistance will be required.

Problems Encountered

Institutionalization

Institutionalization of the procedures in the districts was difficult for the following reasons:

- Districts do not have the necessary funds to provide transport and facilitates required for the satisfactory planning and monitoring of contracts;
- Tender procedures currently used in the districts are not streamlined enough to handle tenders of this size and nature efficiently;

- Districts do not have a sufficiently steady cash flow to guarantee timely payments to contractors;
- Due to their frequent transfers/changes, it has been difficult to effectively involve district personnel in the development of the programme.

Gravel Sources

Extensive gravel surveys are required to identify quarries with gravel of acceptable quality and quantity within reasonable distance of the project roads. Furthermore natural grave appears to be a scarce resource and alternative materials have to be considered, e.g., quarry waste, crushed rock, etc.

Training Capacity

The high resource requirement, particularly during the field practicals, made it difficult to train more than 10 to 12 contractors at the same time. The training course currently takes about 24 to 30 months from inception to completion. The training capacity must therefore be increased.

Seasonal Movement of Labour

During certain times of the year, and depending on the activities within the area at that time (e.g. planting, harvesting, etc), labour may be a scarce resource. It may therefore be necessary to stop contracts for shot periods during these times.

Hand Tools

Tools are of very poor quality and negatively affect work output. Efforts must therefore be made to improve the quality of steel quality, the handles and the design of the individuals items. Standards for these items have been provided by ILO but do not seem to be compiled with.

Contractor Management: Procedures and Arrangements

Our experience from the project indicates that the following measures are required in order to successfully implement labour based contracting programmes:

1. Studies and trails need to be undertaken to ascertain the viability of labour based contracting which will depend on:

- the types of operation
- type of roads
- traffic
- labour availability
- contractor availability/capacity

2. The Government must make a policy decision where routine and periodic road maintenance should, in future, be undertaken by small-scale contractors rather than by force account.

3. In line with No.2 above, the Government will have to study the implications of this decision with regard to staffing, funding, tender and payment procedures. In this connection a decision has to be taken as to whether the preparation of documentation and contract supervision is to be undertaken by the Ministry or by private consultants.

4. There must be sufficient and qualified personnel to plan, prepare the documentation, tender and supervise such contracts.

5. Personnel must be trained in all aspects (planning, contract documentation, tender procedures, supervision, monitoring, payment procedures, etc.) both at headquarter- and district-level.

6. Tender procedures must be streamlined so that:

- only qualified and registered contracts are short-listed. A special register should be established for registration of trained labour based contractors;
- the tender board composition is reviewed;
- transparent contract award procedures;
- award procedures are simplified and speeded up.

7. Standard contract documents suited to labour based methods have to be developed to include:

- simplified conditions of tender
- simplified conditions of contract
- specifications pertinent to labour based methods
- appropriate methods of measurement
- simple Bills of Quantities.

8. Sufficient funding must be provided and payment procedures streamlined to guarantee timely payment to contractors.

9. Continued employment of contractors should be guaranteed through planning and budget provisions. Satisfactory performance on the part of the contractor can only be achieved by providing further training for foremen, contract supervisors and contractors (eg. seminars, lectures, etc)

10. Contractors must be involved in setting out policies and in the development of new techniques and procedures.

11. Social aspects need to be considered, particularly in terms of employment conditions and background of the contractors.

Table 1

SIDA Gravelling Project Estimated Cost in US Dollars - January 1993

Activity	Light Reshaping	Heavy reshaping	Reconstruction
1. Preliminaries	500 to 660	540 to 700	890 to 1055
2. Reshaping	990	1220	4160
3. Drainage	855	1440	2000
4. Gravelling	1560	1660	1560
5. Haulage	1175 to 2810	1175 to 2810	1175 to 2810
Total/km	**5080 to 6875**	**5935 to 7730**	**9785 to 11585**

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IV. Labour-based Contracting: Uganda's Experience

By Eng. W. E. Musumba, Chief Road Maintenance Engineer,

Ministry of Works, Transport and Communication, Entebbe, Uganda

Introduction

The Labour-based contracting for the routine manual maintenance of the classified network was launched in January, 1993 in order to respond to the renewed initiative of keeping the already reconstruction rehabilitated roads well maintained.

Over the past six years the government has reconstructed/rehabilitated over 45% of the classified network and 10% of the rural feeder roads. There was mounting need therefore to adequately protect this investment.

The existing Road Maintenance Policies coupled with their constraints could be no means enable the timely application of effective maintenance to the network.

This led to the formulation of new strategies geared towards solving the setbacks and constraints of the previous maintenance system - hence the adoption of the labour-based contracting option for the routine manual maintenance.

This paper is based on the Uganda experience in implementing the labour-based contracting programme for routine maintenance of its classified network. The organizational set-up of the Ministry of Works, Transport and Communication (MOWTC), the implementing Ministry, together with a review of the Road Network under its jurisdiction is briefly presented.

The new strategies in the Road Maintenance Initiative and the evolution of the labour-based contracting options is discussed.

The adopted methodology and implementation approach of the labour contracting programme is described together with the outcome and experience so far.

The paper finally outlines the future programmes in respect to labour-based maintenance approach.

The Road Network

The National Road Network

Uganda has a network of roads, amounting to approximately 30,000 km. It is most typically categorized into three main groups:

(i) Classified Roads - which amount to 8,085 km or 27 percent of the road network and come under the responsibility of the Ministry of Works, Transport and Communications (MPWTC);

(ii) Feeder Roads - which amount to 21,000 km of road or 70 percent of the total network and come under the responsibility of the Ministry of Local Government (MOLG); and

(iii) Urban Roads - which amount to 1,000 km or three percent of the network and come, again, under the MOLG through the urban and authorities.

The Classified Main Road Network

The classified main road network forms the principal inter-urban linkages. The structure of the network is shown in Table 2.1 below.

Table 1: Classification of the main road network (km)

Classification	Paved Roads	Gravel Roads	Total
Class I (Primary)	1,798	2,084	3,882
Class II (Secondary)	127	2,392	2,519
Class III (Tertiary)	171	1,513	1,684
	2,096	**5,989**	**8,085**

Class I roads are defined as those roads crossing national borders linking regions, Class II are those connecting Districts and Class III are inter-District. The network has been fully inventoried and a 7-day traffic survey is carried out at least once a year every February.

Organization Set-up

The overall management of the classified road network is under the Ministry of Works, Transport and Communications while local authorities under the Ministry of Local Government are responsible for rural feeder roads. The work is executed through District Engineers based in the field.

Road Network Condition

Inadequate road maintenance and often total neglect during the 1970s and early 1980s resulted in the road network deteriorating into an appalling state of disrepair. A maintenance study undertaken in 1982 estimated that only six percent of the main roads had been resealed or regravelled in the previous ten years. By the end of 1985, only 350 km out of 2, 000 km of bituminous trunk roads were in good condition, while all the gravel trunk roads were in poor condition.

The condition of Rural Feeder Roads (RFP) was not any better. In 1986 about 25% of the REPs were impassable during rainy seasons. Even during dry seasons the passable REPs were very rough thereby increasing vehicle operating costs. As a result vehicular traffic on the RFPs had reduced by 50% and it is estimated that, at least 30% of agricultural potential remains untapped.

At the moment 26 percent of the main road network while 60% of the RFPs are in a poor or very poor state. This essentially represents the current maintenance backlog that needs rehabilitation

prior to effective and planned maintenance.

Road Maintenance Policy and Strategies

Policy Direction

(a) The application of effective and planned maintenance to the entire network, on a priority basis ensuring that:

(i) Adequate maintenance measures applied in a timely manner and at the right place.

(ii) The measures are most appropriate and most cost effective.

(b) The adoption of appropriate and sustainable institutional, funding and operational reform policies and strategies.

The evolution of the new strategies involved a two-fronts approach:

(a) Domestic front to internally, within Government and the Ministries (MOWTC & MOLG), discuss the road maintenance problem and formulate corrective measures.

(b) An external front which ensured full participation n the Road Maintenance Initiative Programme. This involved collaboration with the various international Financing Institutions and Multilateral organizations to prepare way for policy reform.

Medium Term Road Maintenance Strategies

In pursuance with the Road Maintenance, Initiative Programme, the policy reforms called for the following strategies, the progress of which is briefly discussed:

(a) *Awareness campaign*

To enlist the commitment of all, Public Road Maintenance awareness Campaigns have been undertaken and are being stepped up.

(b) *Funding and Disbursement*

(i) A study financed by GTZ for the establishment of a Road Fund is ongoing.

(ii) Road Maintenance Project Accounts were opened in all the Ministry of Works, Transport and Communications 21 No. districts in January, 1993.

(c) Operations

(i) Manual Routine Maintenance is to be undertaken by contract. Such work started on all the rehabilitated roads this January, 1993. The total of 2500 km has been taken on first, and will be expanded to 4000 km in 1993/94 Financial Year and then to cover the entire classified network in the Financial Year 1994/95.

Appropriate Road Maintenance Management Manual have been developed and issued to the MOWTC districts.

(ii) Mechanized operations have been reorganized into maintenance units with specific targeted output and on a performance oriented basis. A performance allowance has been introduced as a motivational consideration.

A maintenance management system has been developed and launched. A Road Maintenance Management Guidelines Manual has been produced and distributed to all District Engineers for us.

However, private contracting is to be resorted to where it proves to be more appropriate and viable in future.

(iii) Rehabilitation and Periodic Maintenance will be undertaken by mechanized contractors. At least 100 km will be let to private contractors this financial year.

The Road Maintenance Programme for 1993/94 has been prepared on the basis of the new policy options discussed above.

(d) Capacity Building

(i) A study to be founded by the World Bank for the establishment of a Plant Hire Pool is expected to start in October, 1993.

(ii) The 5 year training programme covering the training needs of the entire local construction industry is being drawn.

With the view of creating a pool of in-house trainers, 12 MOWTC experienced Engineers an 3 Senior technicians attended a 6 weeks course of Training of Trainers (ToT) at ESAMI Arusha in October/November, 1992. More ToT programmes are expected to be launched as required.

A workshop conducted by International Labour Organization (ILO) and financed by the World Bank was held in October, 1992.

As a follow up of one of the recommendations of the workshop, a training programme for the labour-based operations for all Engineers was held in May, 193 and another one for Engineering Assistants, Road Inspectors and Road Overseers was held in June, 1993.

(e) Institutional Reform

The Study for the establishment of the Road Authority is subject to the outcome of the current Road Fund Study.

Planning of the Labour-based Programme

Basis

According to the new maintenance strategies, all Manual Maintenance has ultimately to be carried out by contract.

Ministry of Local Government has been trying the one man per kilometre task oriented contact (lengthman system) on many RFPs including unrehabilitated roads with some reasonable results.

However, this paper will mainly present the experience of the Ministry of Works, Transport and Communications programme.

Planning Phase

The MOWTC commenced a planning and preparatory phase over the period January-December, 1992. Over this period:

(i) An appropriate Road Maintenance Management Manual was developed with guidelines on the implementation and management of labour-based contracts for routine manual maintenance.

(ii) A workshop on the utilization of labour-based methods in Road Maintenance was held in September, 1992. It was jointly organized by the Ministry of Works, Transport and Communications (MOWTC), the Ministry of Local Government (MOLG) and the International Labour Office (ILO). The workshop brought together high level Government Officials, technicians responsible for the implementation of the Road Maintenance in Uganda. Donor representatives, local consultants, local contractors, and District Resistance Council Chairmen representing selected local communities.

(iii) Road Maintenance Project Accounts were opened in al the MOWTC districts and funds deposited in there. The local decentralized funds were entirely for the labour-based contractors payments.

(iv) Public awareness for the programme was identified, inventorized, work assessment and packaging was carried out, Bills of quantities were prepared in contract packages.

(v) The interested individuals/groups applied and were pre-qualified. The successful ones entered into contract in December 1992.

All was now set for commencement, and the programme was launched in January, 1933.

Labour-based Contracting (Financial Year 1992/93)

Background

Routine Maintenance by labour contracts started on the ground in January, 1993, for a six months period (Jan. - June, 1993). Over this period formulated plans were put into implementation and served very much as an experience period for the implementation, supervisors and the labour contracts.

Methodology

(i) The labour contracts implemented were of two forms. The lengthman contracts involved single individuals taking up 2 km stretches of road in a single package; while the small group contracts involved a team/group of people taking up stretches of up to 10 km.

(ii) The contracts were open for application by any interested individual/group of individuals after being advertized locally by way of information passed through the existing local government structures to the various localities.

(iii) Application Forms are available at the nearest Ministry of Works, Transport and Communications (MOWTC) station, to which completed forms are returned.

To ensure the contracts are availed to the particular people within a particular vicinity, all applicants are recommended by the Chairman of their respective Resistance Council III (Sub-county level).

(iv) Selection is carried out by the District Engineers (MOWTC) basing on, among others, previous experience (if any) in Road Maintenance, physical capability etc.

(v) Participation is opened to both men and women; and considerable effort has been taken to interested women into taking up these contacts.

(vi) The District Engineer signs an agreement/contracts with the successful applicants, and the contracts is witnessed by the District Executive Secretary.

(vii) The type of contracts adopted are fixed rate contracts whose rates are determined annually after a county-wide market-rate survey before approval by the Central tender Board. The rates are representative of the going market rates so as to ensure retention of the attracted contractors.

(viii) To ensure job-continuity throughout the year for the contractors, the workload for the various activities has been spread out evenly bu taking into account the seasonal variations and applicable frequencies for the various activities. This factor also contributes to our capability to retain the successful contractors.

(xi) The supervision of the contractors is carried out by the District Engineer and his team of Engineering Assistants and Rad Inspectors/Overseers each assigned to a particular section of road. The supervisory role ranges from giving planned working instructions to contractors, inspection during execution, work evaluation and measurement etc.

(x) The measurement of work is done once a month during an end of the month inspection, together with the contractor. The final work measurement is counter-signed by the contractor and the months payment is prepared based on it. Payment is b cheque signed by both the District Engineer (D.E) and the district Executive Secretary (D.E.S). The payments are decentralized to D.E level and is effected from project accounts at these levels. This ensures prompt payments to contractors.

Contract Documents

Every successful applicant for a maintenance contract signs a contract agreement with the

Ministry (MOWTC) District Engineer on behalf of the Ministry of Works, Transport and Communications.

The contract document is small and simple and consists of a form of agreement, Bills of quantities and the specifications.

Form of Agreement (with 6 articles)

(contents)

- Obligations of contractors
- Obligations of the Ministry
- Contract Price and mode of payment
- Commencement, duration and Termination
- Modification
- Settlement of disputes

1. Bills of quantities

2. Specifications

The first set of contracts entered into in January, 1993 were for 6 months (January-June, 1993) and consisted of both lengthmen contracts and small group contracts.

The contract is signed between the District Engineer with the District Executive Secretary as his witness on one hand and the lengthmen or group leader with his witness on the other hand.

Measurements

The evaluation for the work done by the contractor is done at the end of every month during an end-of-month inspection.

This end-of-month inspection is carried out by the District Engineer, the particular supervisor, and the contractor, to evaluate work-plan issued to him.

The measurement of the progress is taken and the measurement-sheet is jointly signed by the team and thereafter used for processing payment.

Two options were left to the District Engineer in effecting progress evaluation work:

- Assessing the approximate percentage of the workplan for that month which has been executed by the contractor, and pay a similar percentage of the approved Central Tender Board monthly rate. The assessed percentage must be agreeable to the contractor. Otherwise:
- Take measurement of the executed work and use the approved unit rates to determine the actual payment due to the contractor.

Outcome of the Programme

The labour-based contracts programme for manual routine maintenance has been in operation over the past six months (Jan-June, 1993) on a coverage of about 30% (Approx. 2500 km) of the total classified network.

The other 70% (Approx. 5500 km) still continued under the old system of manual routine maintenance using direct labour gangs.

This obviously serves as a control network for the quick comparison with the network under the new approach. One quick result of the new system was that:

Results

(i) Output

The actual output station by station ranged from 50% to 85% performance with an average of 60%. The table below gives the order of the achievements:

1992/93 Labour-based contracts programme period of implementation Jan-June, 1993 coverage 2500 km.

Activity	Unit	Programmed (Jan-June) 1993	Achieved	%
Grass cutting	m^2	80,000,000	48,000,000	60%
Cleaning culverts	m	150,000	75,000,000	50%
Opening stream channels	m	25,000	22,500	45%
Cleaning side drains	m	675,000	303,750	70%
Clear side drains	m	9,000,000	6,300,000	80%
Clear Bush + Debris	m^2	10,000,000	8,000,000	80%
Average %				65%

(ii) Backlog

The manual maintenance backlog that had accumulated over the years was cleared within the first three to four months of commencement (Jan-April, 1993) and this enabled such stretches of the network to be reverted into a routinely maintainable state.

The performance was able to attract back most of the past experienced labour which has abandoned work out of frustration. The availability of this trained manpower enabled to smooth and efficient take-off of the programme. The actual output of work ranged from 50% to 90% performance with a ranged average of 65%.

(iii) Training Programmes

While some of the labour contractors might have had some experience in the various maintenance activities, a great majority however are new entrants. Appropriate training therefore had to be offered to the contractors to ensure performance.

All the contractors have received on-the-job training from the supervisors by way of instructions and site demonstrations during the course of their work.

Prior to and during the six months period of operation of the labour contracts programme, the Ministry (MOWTC) had to organize appropriate relevant training for the supervisory and implementation teams (i.e District Engineers, Engineering Assistants, Road Inspectors, Road Overseers).

- A workshop on the utilization of labour-based methods in Road Maintenance was organized in September, 1992. It was organized by MOWTC/MOLG/ILO and was attended among others by the MOETC District Engineers and Engineering Assistants.
- A two week orientation course on the Labour-Based Contract Maintenance Programme for the District Engineers organized by MOWTC/ILO was held in May 1993.
- A workshop on the Supervision and Management of labour-based contracts was organized by MOWTC in June, 1993 for all Engineering Assistants, Road Inspectors and Road Overseers involved in the programme.

The above training sessions were in addition to the all-together approach that brought all the District Engineers during other meetings and seminars in the conception and planning phase of this labour-based contractors programme

(iv) Unit Costs

An earlier attempt to come up with unit rates through competitive bidding resulted in excessively high rates. For this programme, the Ministry worked out appropriate unit rates.

Unfortunately, some of the rates like for grass cutting turned out to be low. This also affected the programme as some contractors got discouraged. The Maintenance cost trend is illustrated in the table below.

Table 3

YEAR	MAINTENANCE METHOD	AVERAGE MAINTENANCE STRETCH PER CONTRACT	ANNUAL AVERAGE COST PER KM US$	REMARKS

1988/89	Lengthman, Direct labour	2	49	Old method
1990/91	Lengthman, Direct labour Labour Contract	4 10	18 1500	Old method Average unit rates arrived at through bidding
1992/93	Lengthman, Direct labour Lengman/Labour Rated	4 2/10	30 300	Old method Group Contract determined by MOWTC
1993/94	Lengthman, Director labour Lengthman/Labour Group	4 2/10	36 360	Old method Rates Contract determined by MOWTC

(v) Tools

The ministry had earlier on committed itself to providing the tools. This later proved difficult and not all the tools were supplied. This had some negative influence on the performance.

Other Experience

The six months period over which this programme has been implemented so far has also served as an experience attaining phase for both the supervisors and the contractors.

Similarly the various training courses over this period indeed enabled comparison of the various experiences from the countryside.

The short term experience indicates that:

(i) The level of performance was higher among the lengmen contractors than among small group contractors. This could be due to the personal/individual commitment in a one enterprise.

(ii) In effect, small group contractors never operated as "groups" as they were designed. Instead the group leader was indeed that owner of the contract who hires and fires the other supposed members of the group and also decides on the level of wages to pay them.

The other members of the group are therefore employees of the "group leader" and have no sense of ownership of the contract. The level of motivation and commitment in a group contract is therefore lower than in a lengthman contract.

In some instances the small group disintegrates into lengthmen contracts manned y the former members of the group contract.

(iii) Training of the contractors on the job is indeed continuous more so in group contracts whose internal compositions tend to frequently vary.

(iv) On the face of it, small group contractors look simpler to supervise than the lengthmen contracts by virtue of their numbers within a given road. But the effectiveness of supervision proved better in lengthmen contracts than in small group contracts.

Working instructions and plans from a supervisor are received direct by the lengthman contractor while the members of the group contract usually get it second hand through their group leader. More often than not, the group leader is not directly engaged in the execution and is not available on the road all the time.

(v) This programme was targeted for the direct participation of the people living in the rural communities along the roads. The Ministry implemented four categories of payment rates applicable to different areas in the

country.

The trend of contractors that emerged was such that for those areas where the rates were appropriately, the majority of contractors were lengthmen and small groups contractors in the range of 4-6 km, with direct participation by the rural dwellers as from the areas where the areas were appropriately high there were few lengthmen contractors with the majority of contractors being taken by small group contracts with stretches of 10-30 km. The rural dwellers mainly were secondary participants in these contracts, being employed by the owner of the contract.

The level of pricing the contracts therefore influences the pattern of contracting. Where the rates are low the profit margin is also low, and the contracts are small and are taken by people who personally participate in the execution. Where the rates are high, the profit margin is high and therefore the contracts are large and utilize secondary employment of the labour force in the locality.

(iv) Labour contracts for routine manual maintenance is recently implemented strategy. There is need for continued training and re-training of the implementing/supervisory team who will in turn train the contracting teams.

(vii) There should be a continued annual review of the rates for the various activities to keep them realistic, applicable and up to date.

(viii) To keep a good level of strained contracting manpower, the contractors should be easily renewable subject to performance, so that people already trained are retained.

Future Programmes

Expansion of the Programme

The labour-based contracting programme started during the 1992/93 financial year (F.Y) corresponding budgetary provisions have already been made in line with this planned increase.

Improvements to the Programme

From the experiences gained in the 1992/93 Maintenance Programme, major improvements have been put in place. These include the following:

(i) A revised ‘Road Maintenance Management Guidelines’ booklet has ben prepared, mass produced and issued to District Engineers and relevant staff.

(ii) The Maintenance activities have been increased from 6 to 12 and appropriate production rates and cost unit rates determined.

(iii) It is of interest to not that grass cutting, tree planting and tree nursing have been included as part of the Ministry’s contribution to environmental protection.

(iv) Work-method statements for the different activities and specifications have been given.

(v) Revised contract documents have been mass produced for use by the stations.

(vi) A document for use by the labour contracts entitled "Maintenance Guidelines for Labour Contractors" has been mass produced.

(vii) Contractors are now issued with Half-Yearly Work Plan

(viii) The Monthly Reporting Form has been improved.

(ix) A comprehensive training programme for labour-based activities is being developed.

Donors will be contracted to assist with logistic support and provision of Training experts.

Conclusion

The labour-based contracting programme for the routine manual maintenance of the classified network has so far been a success with a glaring impact.

It is of course reorganised that the successful implementation of this maintenance programme was made possibly because of the full commitment and support of the Government of Uganda, and the MOWTC, the executor, in particular.

There has been particular enthusiasm showed by the contractors towards this programme. Much as the programme of the full commitment opportunity to the rural dwellers in the localities, it does increases their awareness of the road in their midst, as their property worth protecting from undue encroachment and misuse.

The involvement of the local leaders in selecting the people to participate in the programme means that similar channels can be exploited in a reverse way, to educate the masses on the importance of the road as their facility one feature of the programme is that the traditional tools mainly used for agricultural activities in the localities are the ones suitable for this programme.

Therefore the purchase of the various tools for the road work by the successful contractor is easily welcomed since the tool set is applicable both on the road and on the farm.

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Small-Scale Contractors continue..

V. Introduction of Labour-based Contractors to the Bank: Some Pitfalls

By Bashiru Kakibu, Director, Department of Feeder Roads, Accra

Introduction

In the earlier paper on "The Labour-Based Contractor, the Role of the Bank" the point was made on the need to introduce the contractor early to the Banks for the firm to derive maximum support/benefits from the contract.

This current paper takes a look at some possible dangers inherent in this association and possible ways out. Again, due to limited data in this field, the reliance will be on the Ghanaian experience.

As has been reported elsewhere, Ghana embarked on the use of the labour-based technology quite recently, around 1986/87. Unlike other countries, Ghana decided to develop the new technology around the local contractors. Since that time 55 local contracting firms have been trained and 26 of them have been fully equipped and working full time. This paper focuses on 26 fully equipped and the state of repayment of the loans.

The 26 firms have been equipped under two separate grant/loan agreements; that is:

(a) The Fourth Highway Project - IDA (a loan in US Dollars) - 21 Contractors.

(b) Programme of Action to Mitigate the Social cost of Adjustment (PAMSCAD) (a grant in Cedis) - 5 Contractors.

The Programme used to fund the Contractors

The 4th Highway Project or Road Rehabilitation and Maintenance Project was aimed at supporting Ghana Government's effort at rehabilitating and maintaining the road network in the country. Part of the loan was used to equip local contractors to enable them perform well.

The project was US$ 40 million with only about US$ 6 million - US$ 8 million going into the development of the labour-based technology. The 4th Highway Project was effective from 1/11/85 360 30/6/91.

The PAMSCAD: the PAMSCAD programme aimed at supporting Ghana Government's social programmes to alleviate social tension resulting from the adoption of structural Adjustment Programmes. Funding for the programme came mainly from donors. Part of the grant was given to the Department of Feeder Roads (DFR). DFR used the fund received to train and equip 5 contractors who now work full time. These 5 contractor now provide employment to between 600-800 workers daily, thus fulfilling the PAMSCAD objectives.

The Terms and Conditions under which Bank for Housing and Construction received the funds

Fourth Highway Project/RRMP

The funds were loaned to BHC by Ghana Government at 8% (in dollars). BHC used these resources to bring in the places of equipment and then hire-purchased these to the selected/trained contractors.

PAMSCAD

The PAMSCAD fund was a grant to DFR. DFR then contracted the BHC to manage the fund on its behalf for a fee.

Again BHC has the free hand to bring in the pieces of equipment and hire-purchased these to the contractors previously trained by DFR under prevailing banking terms and conditions.

Terms and Conditions under which Bank for Housing and Construction Hire-purchased the Equipment to the Contractors

Extracts from agreements signed with BHC show the following details among others:

	Fourth Highway Project	**PAMSCAD**
Currency of Loan	US Dollar	Ghana Cedi
Interest	20% on the Dollar Loan	30% on the Cedis
Repayment Period	4 years	4 years
Service Charge	2¼ on Foreign loan	1%
Foreign Exchange Risk	To be borne by Contractors	Nil
Number of Contractors	21	5

The 4th Highway Project

Foreign Exchange Risk

The contractors were made to bear the full foreign exchange risk. At the time of receiving the equipment in 1987/88 the cedi-dollar parity was one US$ to 175 cedis. In December 1992 that parity was one US$ to 519 cedis. An increase of 79%.

The full impact of the foreign exchange risk was softened through the insertion of contract price adjustment formula in each contract. The contract price was adjusted on monthly basis. This was the changes in prices of materials, labour costs and changes in US Dollar - Cedi parity were captured and corrected for the large extent.

Interest Rate of 20% on US Dollar Loan

The biggest change the Labour-based Contractors faced with the high interest rate of 20% on the dollar loan. The interest rate was so high that efforts to pay back the loan have proved futile as indicated in the Table 1A.

The high interest rate was what was agreed between the Government of Ghana (GOG) and international Development Association to charge the contractors as contained in the sub-loan agreement between GOG and the Bank for Housing and Construction (BHC). Thus the BHC did not have a hand in fixing the rate and therefore cannot be blameable. It is interesting however to note that, the sub-loan agreement between GOG and BHC on-lent the fund to BHC at 8%.

Table 1A: Repayment of Loans by Contractors

Contractor	**Initial Amount of Loan in Oct. 1988**	**Amount Paid Back Principal and Interest Dec. 1992**	**Outstanding Amount Principal & Interest Dec. '92**
Gabasan Const. Ltd.	US $67,028.53	US$99,122.18	US$43,528.67
Sodonor Ltd	US%67,028.53	US%92,477,89	US$56,386.36
Contractor	**Initial Amount of Loan in June 1989**	**Amount Paid Back Principal and Interest Dec. 1992**	**Outstanding Amount Principal & Interest**
Fakye Ltd.	US$96,540.28	US$117,281.23	US$18,123.05
Jokokyere Ltd.	US$96,540.27	US$91,860.55	US$72,269.72

The PAMSCAD Project

Foreign Exchange Risk

There was no foreign exchange risk passed on to the contractor. The loan was wholly cedi. In addition, the contract price adjustment formula was inserted in every contract. Thus changes the prices of materials, labour and dollar Cedi parity were cushioned off to a large extent.

Table 1B: Repayment of Loan by Contractors

Contractor	Initial Amount of Loan in March 1992	Amount Paid Back Principal and Interest Dec. 1992	Outstanding Amount Principal & Interest Dec. 1992
Bert Rock Ltd	c57,074,883.00	c5,720,000.00	c63,553,201.00

Payment of Loan

The 4th Highway Project

Despite the dismal picture in Table 1A, two of the contractors - M/s Bekel and OPM - have completed the repayment of their loans.

A credit to their business acumen more than any thing else since the adds weighed heavily against them like every one else. The 19 have woken up to the danger they faced and are doing all they can to reverse the situation. A series of meetings have been held with the bank involved i.e BHC, and the outstanding debts have been re-scheduled:

It is proposed that those contractors who still have heavy amounts to pay will have their debt in dollars converted into cedis and therefore will remain fixed except for the interest.

On the other hand, who have little to pay back will do so in dollars

Comments

The lessons learnt are obvious. In an unstable economy such as we have in Africa generally, care should be taken to avoid the type of agreements we had; to load a small scale local contractor with a dollar loan at 20% was unfair! But in 1988, this was not obvious. Now this is known and all efforts should be made to avoid contracting this type of loan. Preferably, the loan should be denominated in local currency. This way, the contractor will only have the interest on the local currency to deal with and not the interest and the foreign exchange risk combined.

Scheduling and Repayment of Loan: PAMSCAD Project

Having ensured that the equipment loan agreement of the small-scale labour-based contractor is fair and just, let us turn our attention to the repayment of the loan in a situation where the fund belongs to the road agency and the bank has been hired to manage it. Table 2 below shows a real life situation involving one of the labour-based contractors in Ghana. Table 2 is to be studied together with Table 2B - Repayment Schedule.

Table 2B: Repayment Schedule

ROA AGENCY LEVEL Interim Payment Certificate Releases			AT THE BANK LEVEL		
Item	**Date**	**Amount**	**Outstanding Debt at Bank**	**Amount Deducted**	**Debt Level after Deduction**
1.	24/6/92	ç6,071,700.00	ç62,450,896.00	ç1,000,000	ç67,450,896
2.	04/9/92	3,836,225.00	64,262,987.00	1,200,000	63,062,987
3.	21/12/92	9,484,402.67	67,073,201.00	3,520,000	63,553,201
4.	04/2/93 (PAF)	1,832,221.50	66,511,206.00	1,500,000	61,996,265
5.	04/2/93	1,920,702.26	(Retention)		
6.	08/4/93	14,016,150.48	67,996,265.00		
7.	8/6/93	12,531,744.52			

DFR-PAMSCAD PHASE 1

Month	Principal c	Principal Instalment c	Interest Payable c	Total Amount Payable c
1	57,074,883		**1,454,237**	**1,454,237**
2	57,074,883		**1,454,237**	**1,454,237**
3	57,074,883		**1,454,237**	**1,454,237**
4	57,074,883	**1,268,331**	**1,454,237**	**2,772,567**
5	55,806,552	**1,268,331**	**1,421,920**	**2,690,251**
6	54,538,222	**1,268,331**	**1,389,604**	**2,657,935**
7	53,269,891	**1,268,331**	**1,357,288**	**2,625,618**
8	52,001,560	**1,268,331**	**1,324,971**	**2,593,302**
9	50,733,229	**1,268,331**	**1,292,655**	**2,560,986**
10	49,464,899	**1,268,331**	**1,260,339**	**2,528,669**
11	48,196,568	**1,268,331**	**1,228,022**	**2,496,353**
12	**46,928,237**	**1,268,331**	**1,194,705**	**2,464,037**
13	**4,659,906**	**1,268,331**	**1,163,389**	**2,431,720**
14	"	"	"	"
	"	"	"	"
	"	"	"	"
	"	"	"	"
	"	"	"	"
	"	"	"	"
25	"	"	"	"
26	"	"	"	"
27	"	"	"	"
28	"	"	"	"
30	"	"	"	"
43	"	"	"	"
44	"	"	"	"
46	"	"	"	"
47	"	"	"	"
48	"	"	"	"

Item 1 in Table 2 is quite revealing. The contractor presented a cheque for c5 million to the bank and only a million cedis was taken out completely ignoring the repayment schedules attached to the loan. The net of the under-deductions is that the contractor's arrears to the bank stood at c28,804,421.00 as at 30/6/93.

The impression being created here is that the project is not viable. This is very far from the truth! What is presented here is a private unofficial arrangement between the contractor/Businessman and the Bank to manipulate the system.

The way out is for the road agency to:

(a) keep in constant touch with the Bank;

(b) request repayment schedules on each contractor. The schedules must be kept up to date at all times;

(c) prepare two (2) cheques each time. One cheque reflecting the amount due to the Bank.

This should go straight to the Bank. The second cheque goes to the contractor.

Conclusion

In this short paper, an attempt has been made to highlight some pitfalls inherent in introducing the private sector into the labour-based technology system. Firstly, was the type of equipment loan agreement that should exist between the contractor and the local bank. As far as possible, this should be denominated in Local Currency. Passing on the Foreign Exchange Risk to the contractor will create quite a problem for him, though this is not insurmountable. In this regard, the use of price adjustment formula in the contract for the civil works is crucial. The other area to watch is the repayment of the loan. Whatever schedule is attached to the repayment of the loan. Whatever schedule is attached to the repayment of the loan should be observed as far as possible.

In support of this, the road agency and the bank should meet from time to time to review strategies in support of the programme for the repayment of loan.

With these problem areas taken care of, I do not see why the loan cannot be paid back in four years or less.

The greater danger when it comes to repayment of the loan has to do with the attitude of the contractor and the large extent, that of the Bank Manager. As long as both have the commitment to clear the loan, this certainly could be done within four (4) years. Where there is no commitment on their part, then the Road Agency should extend its supervisory role to the bank as well to ensure full loan repayment.

(Top)

VI. Earth Roads; Team Task Calculation Aids

By Rob Little, Senior Lecturer, Department of Civil Engineering, University of Natal, South Africa

Introduction

The first labour intensive project in South Africa in modern times to the writer's knowledge was begun in 1985 near Durban. It was sparked by a visit by the writer to Botswana in 1982 where he saw the pilot road project between Serowe and Shoshong being build under the supervision of Robert Mc Cutcheon, who was then employed by the ILO. On arriving in Durban the writer suggested to The Valley Trust, an NGO outside Durban, that they should start a similar project in the Valley of 1000 Hills where they were located, to which they agreed. After two years of research funds were eventually obtained and the first road was built under the writer's supervision. The project was successful and since then The Valley Trust has continued to build roads using a formula which has not changed much. This type of project has since spread across the country.

Earth Road Construction Method

1. The method which the writer uses is to work in teams and to set tasks for a whole team, not individuals tasks. The method of working is listed below:
2. Remove topsoil and grass and stockpile to one side.
3. Put in centre-line peg in peg at top of backslope at start and end of each team task.
4. Cut to fill until the correct cross-section is achieved. N.B. The centre-line height is unknown at the beginning. If the original ground is uneven some cut to fill in a longitudinal direction is necessary.
5. The camber of the road must be achieved toward the end by using two templates with a level and straight edge. The earth must be rammed to consolidate it a much as possible if a compactor is not available. The side drain shape must also be achieved by checking frequently towards the end with two side-drain template and a straight edge. Check that the transition with the next team is smooth.
6. Spread the topsoil on the fill slope and replant the grass.

7. Ask the supervisor to inspect the completed task. Permission to go home is given if the task is satisfactory.

Task Calculation

The above method includes the following tasks:

		Unit	Daily Task	Qty
1. Cut to stockpile of topsoil		m^3	5	B.T.
2. Cut to fill transversely in	soft			
3.	medium	m^3	5	H.C.L
4.	hard	m^3	3	I.C.L
Cut to fill longitudinally		w/b	1	J.C.L
5. - Excavate and load in	soft	w/b	100	
6.	Medium	w/b	60	
7.	hard	w/b.m	20	
8. Haul and tip		w/b	3000	
9. Spread		m^3	300	
10. Compact fill by hand rammer		m	5	C.L
11. Shape camber with templates		m^3	6	L
12. Shape sidedrain with templates		m	30	L
13. Replace topsoil on fill slope		m	5	B.T.L
14. Replant grass		m	60	L

Here L is the length of road completed by 1 person in 1 day

B,C, and T are defined in Section 8

The problem is to calculate L.

Slots must be cut at least one day before the task is set. From the slots the supervisor must estimate:

T the thickness of black topsoil unsuitable for the road

B the width of the topsoil

H, I, and J the proportions of the cut which are soft, medium and hard respectively

(H + I + J = 1,0)

Items 5 to 9 include quarrying, loading, hauling and spreading. These should be given to a separate team when required.

Determine whether the cut cross-section is more rectangular or triangular.

Calculate C = W.D. or ½.W.D = f

Area of topsoil in cross-section = B.T

Where C_1, C_2, and C_3 are constants and cross-section area = A.D.W.

Two sets of charts are produced, for A = 0,5 and 1,0. The Supervisor thus has to measure Depth D and W and decide whether the cut is more triangular (A = 0,5) or rectangular (A = 1,0).

Note that if the tasks are not confidently known for each activity the table can be compiled empirically by selecting three values of L based on experience.

These are substituted into the equation to give three simultaneous equations with unknown C_1, C_2 and C_3, which are then solved. Then the equation is used to find the remaining values in the table.

Table 1:
5 Person Team Task for one day
Triangular Cross-section
Soft ground
L = 5/(0,2.DW + 0,22)m

Width Depth	0	1	2	3	4	5
0,2	23	19		6		12
0,4	23					
0,7	23					
1	23			6		
1,5						
2	23	6				
3	23					

Table 2:
5 Person Team Task for one day
Triangular Cross-section
Medium ground
L = 5/(0,27.DW + 0,22)m

Width Depth	0	1	2	3	4	5
0,2	23	18				10
0,4						
0,7						
1,0						
1,5				5		
2,0						
3,0		5				

Table 3: 5
Person Team Task for one day
Triangular Cross-section
Hard ground

I = 5/(0,6.DW + 0,22)m

Width Depth	0	1	2	3	4	5
0,2	23	15				
0,4						
0,7						
1,0						
1,5				2,5		
2,0						
3,0		2,5				

Conclusion

A calculation method and resulting tabular presentation has been given for the basic road construction task. It can also be used for pure maintenance where there is no excavation required. It has been found suitable for supervisors with a low level education and training, and results in roads of a satisfactory standard.

(Top)

VII. A Review of Recent Labour-Intensive Construction in South Africa

By Robert Mc Cutcheon, University of Witwatersrand, South Africa

Introduction

On his return to South Africa late in 1987 the author began to explore the extent to which the success of the programmes in Kenya and Botswana could be replicated in South Africa. Initially the author assumed that replication would only e feasible in rural areas because South Africa was far more industrialized and thus heavy equipment was readily available together with the operation and maintenance systems for achieving high productivity.[1] Subsequent experience in South Africa has led to the conclusion that the degree of dislocation between the industrialized portions of South Africa and the remainder, means that the scope for labour-intensive methods in much greater than appeared at first sight, this view being strengthened by social and political factors.

Other conclusions have been derived from experience related to labour-intensive construction in South Africa itself. Through extensive involvement in some projects, limited involvement in others and observation of the remainder, the author has been able to gain a broad perspective of the recent development of labour-intensive construction in South Africa from its beginnings in a few brave initiatives to the present where hundreds of millions of rand are being spent on so called labour-intensive work.[2] The author will first provide a brief review and then focus upon the initiatives which have involved the greatest expenditure.

Initial Projects and Relatively Small-Scale Developments

In the early to mid-1980s odd pilot projects of rural road construction were initiated in the Transkei and Kwazulu.[3] These projects demonstrated that in South Africa labour-intensive methods could be used for low-volume rural road construction. However, none of these projects progressed beyond the construction of a short stretch of road. This is because they had been carried out on

an *ad hoc* basis: the organizations responsible for the work were not linked into a regional or national institution, there was no programme for future work.[4] Isolated pilot projects did not lead to programmes of construction.

During 1989 negotiations for a longer term programme were initiated in Kwazulu. Funded by the Development Bank of Southern Africa (DBSA) the Kwazulu Tribal Roads Maintenance Study was located within Kwazulu's institution responsible for Tribal Authorities with formal links to the Roads Branch of the Kwazulu Works Department (Roads Branch). The study led to the formation of the Kwazulu Tribal Upgrading and Maintenance Programme. Recently this has begun to develop along the lines of the programmes in Botswana and Kenya.[5] The programme is now operational in over 20 Tribal Authorities and scheduled to expand to a further ten during the coming year and throughout all 230 over the next ten years.[6] Policy is in place, funding has been committed, suitable posts in the process of being established and formal training will begin later this year. While progress is encouraging it must be pointed out that it has taken several years to establish the programme and many problems have had to be surmounted.

Similar initiatives elsewhere have not yet taken root in relation to rural road construction.

However, in the Transkei, starting in 1986, innovative work has been carried out using labour-intensive methods for the construction of a wide range of municipal public works in Ilinge (water supply and reticulation, sewerage reticulation and treatment, stormwater drainage and streets). Furthermore under the overall guidance of a consultant, small contractors were established and trained.[7] In 1987 the consultant responsible for these innovations became involved in the upgrading of the water mains for the Soweto City Engineer's Department.[8] Somewhat later this project became the Soweto Contractor Development Programme.[9] Elsewhere one contractor has reported significant progress in relation to trenching for pipelines.[10]

This work has demonstrated that in South Africa labour-intensive methods may be used for a wide range of civil construction. In the case of replacement of water mains and pipeline trenching, it has been demonstrated that the quality, cost and speed are comparable to equipment-intensive methods. The work in Ilinge and Soweto has also shown that small contractors may be developed capable of using labour-intensive methods. The main weakness of the work in Ilinge and Soweto is that it was project based - there was no long-term programme (learning curve, training, overheads).[11]

Turning from projects to research for a moment: research in the Department of Civil Engineering at the University of the Witwatersrand indicates that labour-intensive methods may be used for surfaced roads in urban areas and that significant employment opportunity may be created.[12]

In the meantime several public authorities and development agencies have attempted to increase the use of labour-intensive methods by putting the onus upon the contractor. The contract documentation has contained exhortations to use these methods "wherever feasible" or "whenever possible". There has been a singular lack of effect. Such conscience salving exercises have not only failed to understand that the greater use of labour-intensive methods starts with the design but also that at present the contractor is bound into a socio-technical system based upon the use of equipment and this cannot be changed overnight.[13] On the one hand the designs, specifications and documentation hardly exist; on the other, the industry does not have organizational structures, planning, procedures and supervisors to handle highly labour-intensive construction works. However, we will see below that the industry may be influenced to move in that direction but this has to be from a national perspective and not from that of one contractor engaged on a single contract.

Large-Scale Projects and Initiatives

While the above projects involved several millions of rand we will now turn to those that deal in billions: the Special Employment Creation Programme, the Strategic Oil Funds and the Independent Development Trust's Sites and Services Programme.

The Special employment Creation Programme (SECP) was launched in 1985: "to provide temporary relief to the unemployed but to refrain from giving them handouts, and to deploy them as productively as possible". This led to the commitment of large sums of money to so-called labour-intensive construction and maintenance. From April 1985 to June 1990 R719 million was

spent on the programme itself and R423 million on an allied Training Programme (but the training was not linked into the SECP). Funds were still being dispensed during the 1992/3 financial year. Thus well over a billion rand has been spent through the Programme.

The entire Programme has not yet been systematically evaluated. However, various reports allow the following overall observations.[14] The structure of expenditure meant that, in relation to the Programme itself, at best only half the money was allocated to the poor; in relation to the training component considerably less. In relation to projects with short term and temporary objectives:

- no permanent employment opportunities were created;
- no physical and social infrastructural assets were created;
- projects were not integrated into development programmes;
- projects were inadequately planned, designed, co-ordinated and implemented;
- institutional capacities were inadequate to deal with short-term programmes in addition to normal activities;
- in some instances permanent workers were replaced by temporary workers.

It has been reported that long-term projects did contribute to the creation of permanent employment opportunities and physical and social infrastructure. However, no evidence has been provided as to the balance of expenditure between the short-term and permanent aspects of the programme and there is no evidence that in the latter more employment was created per unit of expenditure. Thus, despite much bandying about of the phrase "labour-intensive", observation of several projects indicates that they were actually labour-extensive.[15] Of greatest importance was the fact that this money was spent through at least 28 different institutions. Despite its title, the Special Employment Creation Programme was not a programme but mainly a number of poorly conceived, unplanned, unco-ordinated projects. Its major weakness is that it was not a programme situated within a firm institutional base.[16]

In 1991 the South African Cabinet decided to allocate one billion rand from the sale of strategic oil reserves to special programmes and projects which would benefit undeveloped areas in particular. The overall objective was "to achieve the greatest possible degree of involvement, employment creation, meeting needs and stability through the most cost effective allocation of funds possible".[17] The funds were allocated to various government departments and public sector authorities.

Once again, no scholarly review of the expenditure of the Fund has been carried out. However, it is possible to discuss progress with respect to roads to which approximately R250 million was allocated.[18] Less than three months were allowed for proposals to be submitted, work had to begin within three months of approval. A preliminary survey has shown that R125 million was allocated to authorities who used it for conventional equipment-intensive projects. Of the remaining R125 million well over half is being carried out labour-extensively, while the attempts to carry out effective labour-intensive work are severely hampered by the lack of the prerequisites enumerated earlier. Similarly, one of the objectives of the IDT’s sites and services projects was to create employment opportunities through the use of labour-intensive methods - given the lack of lead-in time was a similar lack in effective use of labour-intensive methods. The ineffectiveness in relation to labour-intensive construction was not the fault of the executing agencies, apart from a lead-in time of 3-6 months. By contrast for a R100 million road project at least two years’ planning and preparation would be allowed.

The above review reveals negative and positive aspects. The vast majority of the expenditure on job creation has been unsystematic and certainly has not made effective use of labour-intensive methods (no institution, no training). The majority of the so-called labour-intensive work has either been conventional construction (i.e. product with no extra employment created) or labour-extensive. However, developments in South Africa have shown that good quality, cost-effective and timely construction can be achieved for a range of work far greater than low-volume rural roads. Equally that contractors could play a role in the execution of the work, provided that preparatory work hd been done: designs, specifications, contract documentation and the training of personnel. Further expansion of employment creation in public works is limited by the lack of a long-term perspective, national planning and institutional development. Over the past year there have been some positive developments in this direction.

During 1992 a National Consultative Forum on Drought was initiated. The Forum decided to set

up four Task Forces, one of which was the Employment Task Force. In tun this task force has explored short-term and long-term options. In relation to the long-term it has made recommendations as to the pre-investment work that needs to be carried out for a National Employment Creation Programme using Labour-intensive methods for the construction and maintenance of public works (water, supply, sewerage, roads, stormwater drainage and electricity). An intrinsic part of this proposal is the development of individual and institutional capacity (community, local, regional and national): extensive training is envisaged. While the full benefits of such work would be revealed in a long-term programme, the short term has not been ignored. The pre-investment work for this programme is hopefully about the begin.[19]

A second initiative is being championed by the National Committee of Labour-intensive Construction (NCLIC) and COSATU. Early in 1992 a member of South African Federation of Civil Engineering Contractors (SAFCEC) realised that greater use of labour-intensive methods of construction could alleviate unemployment and bring more work into an industry that had been crippled by recession, cutback in government spending and civil war. Representatives of several civil engineering industry associations (SAFCEC, South African Institutional of Civil Engineers, South African Association of Consulting Engineers, South African Road Federation) met and decided to convene a symposium on labour-intensive construction.[20] The author was invited take part in preparatory meetings and present a paper "Setting the Scene".[21] The author advised that if the group were intending to take the subject seriously they should invite COSATU to take part in the symposium. This led to a series of meetings between NCLIC (which by this time included the Institute of Municipal Engineers in South Africa) and COSATU. In part this has led to the Executive Director of SAFCEC defining the industry as labour-intensive.[22] More importantly this has led to the drafting of a Framework Agreement. The Framework Agreement consists of over 40 items. While each is important, in the first item the industry commits itself:

1.1 To maximize the se of labour intensive systems of construction within public works programmes, with due regard to economics.

In turn COSATU has agreed to the linking of payment to production in public works. Both of these commitments have been made within the context of community involvement in the definition of what has to be constructed, where, and in the construction process itself (not just employment creation but also skills: i.e. as much emphasis upon process as product). Training is an intrinsic part of the Agreement.[23]

Are these not fundamental components of the long-term programme advocated by the Employment Task Force? Is this not the same as the long-term programme? Yes and No. All aspects of the Framework Agreement would be either critical or useful for the long-term programme. But the industry is currently equipment-intensive. Despite its assertion "to maximize the use of labour-intensive systems of construction..." it cannot restructure itself overnight. This is explicitly acknowledged in the first item of the Framework Agreement by reference to "... with due regard to economics", supplemented by the examples provided by the industry to support this position which indicate that it has yet to appreciate the extent to which equipment can be replaced by labour.

However, the author considers that, for example, in road construction the Framework Agreement could lead to the proportion of cost going to labour increasing from 10% to 15% in the short term. For example, in relation to the N1 between Johannesburg and Pretoria there were two options: 6% or 15% to labour. At that time the 6% option was chosen. The fact that there was a 15% option shows that within **existing** civil engineering practice it would be possible to generate employment opportunities. The author considers the Framework Agreement, if signed and implemented, could lead to such developments.[1]

While not to be sneered at, it pales by comparison to the proportion of cost that could be achieved by labour-intensive methods (60%-70%).

Nevertheless the author considers the language of the Framework Agreement is sound and as such this initiative would be an ally of the long-term programme: together with other sensible and organized short-term work it would form part of the lead-in phase thus creating some employment and public works, and responding to social needs and political demands.

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such this initiative would be an ally of the long-term programme: together with other sensible and organized short-term work it would form part of the lead-in phase thus creating some employment and public works, and responding to social needs and political demands.

Conclusion

In conclusion there are several implications for South Africa of labour-intensive construction throughout sub-Saharan Africa (i.e. including South Africa).

Specifically: rural roads may be constructed and maintained by highly labour-intensive means: 5 to 7 times more employment being created per unit of expenditure. It is also possible to create a significant increase in employment opportunities per unit of expenditure across a wide range of civil construction including most municipal or urban engineering services and using contractors. Research at this university indicates that there is a high employment potential in urban road construction, for example.

The national programmes of rural road construction indicate how to establish a national employment creation programme for the construction of public works: the process resulting not only in greater employment but also in the generation of individual and community capacities in technical and institutional terms.

National programmes have been established through:

- the adoption of a long-term national perspective in which a programme is developed;
- attention to technical, institutional, administrative, organizational and socio-economic detail during the preparatory lead-in phase and throughout the programme;
- institution at community, regional and national levels;
- extensive training at site, multi-site and national levels.

In order for greater success to be achieved in the long run a four phased approach should be adopted:

- Orientation
- Preparatory Work: Analyses and Design
- Pilot/Initial Training
- Expanded Training - National Programme.

The above approach has to be located within an institutional framework: national, regional, local.

A "lead-in" time is necessary. During this lead-in period phases 1 and 2 are carried out. Below the components of the different phases are listed.

Phase One

Education and agreement at national regional and local levels as to:

(i) Concepts and Objectives: asset creation plus significant additional employment opportunities per unit of expenditure;

(ii) Nature of long-term "programmes";

(iii) Conditions of employment, wages and linking of payment to production. Brief local and national authorities as to type, standard, funding and method of construction; the importance of training, institution (local and national), long-term political and financial commitment.

Agreement that labour-intensive public works programmes are not emergency or drought relief projects.

Draft long-term programme.

Phase Two

Analysis: institution (local and national); organization; levels of funding; specific technical analyses; criteria for staff recruitment; identification of initial communities and training sites.

Preparatory Work: design, specification, documentation; administrative, technical and training manuals; selection of trainees; briefing of communities; priorities.

Revise forward plans.

Phase Three

Orientation and training of trainers; start pilot projects and embryonic training programmes; revise training and national programmes; revise manuals and reporting systems prior to initiation or large-scale national programmes.

Phase Four

Expand initial training programmes within each sub-sector into a national programme. But the expansion should only be allowed to proceed in the following manner:

> (i) at the rate at which the training programme can produce skilled site supervisors and managers (training must pay as much attention to character as technical competence);
>
> (ii) to the degree to which local communities have the capacity to absorb the trained personnel;
>
> (iii) to the degree to which the national institution is able to absorb the trained management personnel and maintain its overall planning, co-ordinating, monitoring and evaluation role.

Through the "programme" approach (as opposed to "project") the institution is established together with the human resources required to implement the work from site level through to national planning and co-ordination.

The four-phased approach, outlined above, is the result of many years of experience and analysis.

Although it has a proven track record that does not mean that it will be adopted in South Africa. The World Bank has recommended that where no previous experience exists a start-up period of at least three years should be considered.[24] But in the present political climate even policy makers who are sympathetic towards labour-intensive construction are reluctant to face the reality of the need for a lead-in period. Policy makers who are only concerned with jobs and have little interest in product have even less appreciation of the need for a start-up period. It is recommended that the dilemma be resolved through (i) initiating a long-term employment creation programme and (ii) at the same time taking advantage of the Framework Agreement and other sensible, short-term initiatives for immediate impact. And that the programme is not treated as emergency-relief. In this way the process of labour-intensive construction could indeed make a contribution to alleviating unemployment and generating individual and community skills in technical and institutional terms.

So much for specific conclusions. More generally, the author wishes to close with the following comments.

The review of the projects and programmes in South Africa that have purported to use labour-intensive methods reveals that they were largely unplanned, resulting in the labour-extensive production of ill-defined products of doubtful value through processes which did not lead to individual, community or institutional capacities. This darker side is partly the result of the unplanned nature of the projects and programmes, but on reflection it seems to be based upon a fundamental lack of appreciation of the worth of manual labour and the need to develop individual and community skills. Frequent exposure to these attitudes has led me to conclude that one of the major stumbling blocks is the perception that labour-intensive work is simple work by simple people in simple places using simple tools and, therefore, there is no need for sophisticated people to take the matter seriously - consequently no need to plan; no appreciation of the need for development of skills. Putting it another way, to consider a person who can move 5 to 7 tons of material in a day ‘unskilled’ is a measure of the lack of understanding of: (i) the individual skill necessary to achieve such a task; and (ii) the commitment, training and organization required to enable a worker to become so productive.

In South Africa a long-term ‘programme’ approach to labour-intensive construction and maintenance of public infrastructure could alleviate the unemployment problem (not solve it), and

contribute to individual and institutional capacity building at local, regional and national levels.[25]

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Introduction

Most labour-based road works have previously been public works schemes carried out by force account. In recent years, there has been a move towards an increased involvement of the domestic private sector in the execution of road construction and maintenance works using labour-based methods.

When involving the domestic private sector in the execution of labour-based road works, there are several important issued which need proper attention during project design and implementation. Contractors will not provide an easy solution to road construction and maintenance problems. Caution should be taken so as not to be pushed too fast by Thatcher-like ideas. The development of small-scale contractors entails a series of new activities such as training in business management, development of user-targeted training material, development of contract procedures, streamlining of payment procedures and developing banking facilities.

Experience has also shown that while the involvement of the private sector may come easily in some countries, there may be an initial reluctance towards this concept in other places. People's mentality towards these concepts is governed by the political and economic environment which results in a totally different environment from one country to another.

Training

Training is a key element in the development of small-scale contractors for labour-based road works. The training programme usually includes both government staff and personnel from the contracting firms ranging from general management staff, plant operators, store keepers and site supervisory staff.

Training of contractors is usually provided by the Government with financial assistance from a donor. The contractor receives the training of his/her staff free of charge. In addition to staff salaries and accommodation, they are usually only obliged to pay an enrolment fee (approximately US$ 100). This serves as a guarantee for the full commitment of the contractor to the training programme.

Contractor development programmes in the region have followed two major training approaches. In Ghana, the Department of Feeder Roads decided to train the contractors in all types of labour-based road works ranging from routine maintenance to new construction in one training programme. In Lesotho, the strategy chosen has been to follow a step-by-step training approach by first training the contractors in executing routine and regravelling works, where only the best performing firms are awarded the larger regravelling contracts. The involvement of the private sector in rehabilitation works is only expected after the road maintenance training programme has been completed.

Training Material

The Improve Your Construction Business Programme has produced a series of publications which are relevant for small-scale road contractor development programmes. This material was originally developed for the building construction industry and therefore needs to be modified before it can be used in training programmes for labour-based road sector programmes.

ILO's three volumes on Interactive Contractor Training were used in the small-scale road contractor development programme in Kenya. The training material used for the small-scale contractor development programme in Lesotho is also based on literature development for the Improve Your Construction Business Programme. However, this material is not suitable for the training of local consultants for involvement in labour-based road programmes.

Institutionalization

A key element in small-scale road contractor development programmes is the involvement of the government line agency at all stages of implementation and training. When the contractor training programme commenced in Ghana, ministry officials were always present, thus facilitating their integration into the programme.

In the Kilimanjaro contractor training programme in Tanzania, the Government as yet has not provided any counterpart staff for training, and is therefore in no position to play its full role yet. In

the mean time, the National Construction Council (NCC) has been engaged to manage the trained contractors. The daily supervision of the road works is now carried out by the NCC in close collaboration with ILO technical advisers. Eventually, a contracts management capacity will have to be established in the Regional Engineer's Office. At that stage the NCC, which has been the counterpart agency for this training programme, can revert to an advisory capacity. It is expected that the ATATAP project may improve this situation.

Involvement of Consultants

The involvement of domestic consultants in labour-based roads works is still an area which has not been looked into very much. There is considerable scope for involving local consultants in the implementation and monitoring of road projects executed by small-scale contractors. For this purpose, specific guidelines for the consultants need to be developed. However, when such initiatives are taken, it is important to do this in a co-ordinated manner, in the same way as the approach has been for the training of contractors where the ILO has provided a co-ordinating role.

In South Africa, several local consultants have already been involved in the implementation and supervision of labour-based projects. The University of Witwatersrand has produced interim guidelines for consultants on how to manage labour-based construction projects.

Classification of Contractors

It is important that newly established labour-based road contractors are registered by the Government and certified to carry out a certain type of contractors. Experience show that in some countries it is easy to accommodate the labour-based contractors in the existing classification of construction firms, while in other countries it is necessary to establish new categories of contractors for this purpose.

As an example, the licensing procedures in Tanzania are very flexible, allowing for a wide range of contractors, while in Ethiopia the procedures are very rigid and require a high liquidity from the contractors. In Ghana, the labour-based contractors were not originally classified, and a special category had to be established before they could be certified.

Payment Procedures

Due to a limited access to capital, small-scale contractors are vulnerable to cash flow distortions caused by late payments. on labour-based projects a considerable portion of the total costs are related to labour wages. When the contractor is unable to pay the workers on time, site productivity is seriously hampered. This is an issue which must be seriously addressed by the project management in order to ensure that the contractors achieve the expected productivity rates, in the worst cases, are not forced into bankruptcy.

In Lesotho, an important part of the pilot project has been to establish efficient procedures ensuring that the Government process payments to the contractors in time.

In exceptional cases, when Government fails to pay a contractor in time, the contractor can obtain short-term loans with security in the payment certificate. However, this is only possible once the contractor has established a good business relationship with a private bank.

Selection of Contractors

In Ghana, the size of the contractors was crucial for the identification and selection of contractors to receive training in labour-based technology. the programme targeted contractors who would use labour-based methods as a source of livelihood. The large contractors were not interested in the labour-based road contracts since these contracts were considered to be too small.

Kenya used the same criteria for selection of contractors, namely:

- ownership of equipment,
- supervisory capacity,

- access to capital,
- background of company, i.e. track record
- size of company, wanted small contractors, and
- residence.

Some of the contractors had previous experience from the building industry, others were transport contractors.

During the first trial contracts, the contracts were given fixed rates. the second batch of contracts were distributed after competitive bidding. Six contracts were offered to 10 bidders.

Firms providing bids which were 50% below or above the original estimates, or if they did not comply to tender specifications, were disqualified.

Supply of Contracts

When developing small-scale contractors to implement labour-based roadworks, it is important that the road authorities would be able to supply a steady amount of works to the newly established construction firms. In order to defend their investments in staff and equipment, a firm Government commitment on future work prospects is required.

When the contractors are well established, they will also look for assignments in other sectors, thereby reducing the dependency on the roads authorities. Secondly, it is envisaged that the labour-based contractors will eventually be able to bid successfully on works which are not embarked for labour-based methods, competing with traditional equipment-intensive firms.

The Role of Private Banks

From the experience in Ghana, it is evident that the project management should be fully involved when negotiating the loan conditions offered to the contractors by the private banks, thereby avoiding unreasonably high interest rates being claimed by the banks.

Furthermore, the banks may insist on a repayment schedule which is in conflict with the interests of the project. it is thereby strongly recommended that the project staff closely monitor the schedule of repayment of the equipment loans.

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I. Women and Labour-Based Roadworks in Sub-Saharan Africa

By John Howe and Deborah Fahy Bryceson, IHE Delft, The Netherland

SYNOPSIS

Reviewing project-related literature, this paper explores the incidence of, and attitudes towards, rural women's participation in labour-based road works. Synthesizing findings regarding the social and economic impact on female participants and their households suggests that labour-based road works meet an essential employment need for some categories.

Because of the dynamic nature of road work activities, caution must be exercised in interpreting the results of survey data which normally provides only a snapshot impression. Generally, in rural societies where the opportunity costs of labour are low, both men and women have adapted rapidly tot he somewhat alien concept of labour-based road works. Many case studies demonstrate the viability of female participation in almost all roadwork task. The low-wages, however, ordain that women participants' economic returns are modest. Nonetheless, road works are a welcome source of income for asset-poor women.

Introduction

For at least a decade there have been efforts by some aid agencies to promote the employment of more women in public works including those on roads [Van den Oever-Pereira 1984]. It remains a complex and , in some respects, controversial subject although there is now a growing body of experience and literature ranging from a priori attitudinal surveys, to routine project monitoring reports incorporating gender aspects, to studies specifically concerned with the impact of project employment on the lives of participating women.

Most of these women-centred investigations have been conducted with respect to projects with main objectives other than the employment of women. The efficient construction, rehabilitation or maintenance of physical infrastructure remains the goal of most projects. Few of the studies have been based on rigorous scientific methods of sampling and analysis. As such the evidence is very uneven in quality and often impressionistic. Despite these limitations a great deal of useful experience has been accumulated. The purpose of this paper is to examine project efforts to employ women, identity attitudes and obstacles that have been experienced, and summarize what is known of the results that have been achieved in such projects.

Theoretical Considerations

There are two key assumptions which underline most donor efforts to promote greater female involvement in public works. First, the existence of a (female) labour surplus in rural areas is implicitly taken for granted. Second, and more explicitly, it is generally asserted that rural women need to earn cash for economic welfare and power enhancement within the household. Each of thes assumptions will be considered in turn.

"Rural Surplus Labour" Assumption

This is a standard assumption of Western economists which can be traced back to a number

of influential theorists. W.A. Lewis proposed a model for areas with rural land scarcity, and argued that because of low returns to labour, migration to urban industrial jobs with higher productivity would enhance national development. [Lewis 1954]. Since the publication of Lewis' seminal article, economists have, over the last 30 years, revised the view that urban migration is such a beneficial outcome. But they have generally not revised the rural surplus labour assumption and it continues to be applied to rural areas throughout the Third World, notably Sub- Saharan Africa (SAA).

Going further back, Malthus, Ricardo and Karl Marx, all held the view that rural land shortages were inevitable and created a "labour surplus". Karl Marx saw rural surplus labour arising from a process of primitive accumulation whereby peasants were dispossessed of their land and means of production by capitalists and became exploitable as proletarians. Although the process envisaged by Marx may not have materialized everywhere, one can argue that growing rural landlessness is increasing in its incidence in some African countries. According to 1988 data, landlessness is thought to affect more than 11% of SSA's rural population. Among those countries for which figures are available, the three most severally affected in SSA are Lesotho (26%), Ethiopia (16%) and Kenya (13%). [Jazairy et. al. 1992].

Nonetheless, these proportions are not large compared with Asia and Latin America [1].

Furthermore, such incidences of landlessness cannot be equated with rural surplus labour. There are strong counter arguments which cast doubt on the universal relevance of the surplus labour assumption in terms of African conditions, especially as it is applied to women.

Ester Boserup's work offers an alternative and more realistic approach so far as SSA is concerned. [Boserup 1965, 1970, 1981]. She assumes that the nature of land usage in agricultural systems is never fixed. Over time and in the absence of significant capital investments, both land and labour usage is intensified as the density of population on the land increases. There are many stages of this evolution before one could claim that there is a rural labour surplus that cannot be absorbed and must therefore leave agriculture. Such a stage is usually associated with absolute landlessness. Until this stage is reached, the need for labour in agriculture becomes greater with increasing population density rather than less [2].

The intensification of land use introduces all sorts of time-consuming labour activities. With the abandonment lf long-fallow shifting agriculture, involving the natural regeneration of the soil, there is an increased need for weeding and soil fertilizing activities, as well as the possibility of introducing animal husbandry and the labour demands of fodder crop production as grazing land availability decreases. The main inference of Boserup's perspective is that in some circumstances labour-based road works could be in competition for labour with, rather than alleviating a labour surplus in, peasant household agricultural production units.

"Women Need Cash Earnings" Assumption

Who would dispute that poor women need cash earnings? But this is not the only question to pose in the case of women's involvement in labour-based construction. No doubt, cash would be helpful to some if not the majority of women, but the process of earning cash can raise many problems which begs the question of whether or not earnings cash is the dominant priority in all rural women's lives. Very often, and related to the Boserup line of reasoning, the alleviation of female labour time constraints is a more pressing need for rural women in SSA.

African farming systems have been undergoing extremely rapid change over the past century. Rapid population growth has triggered the transition from land and labour-extensive systems, to systems with heavy labour inputs. But whose labour has been intensified.? So much of African agriculture has traditionally been what is known as female farming. In other words, men were involved in activities such as hunting and defense while farming was left to women.

[1] Sub-Saharan Africa's rates are about a half that experienced in Asia, or a third that of Latin America and the Carribean.

[2] This statement assumes that capital investment is held constant as is so often the case in contemporary African smallholder agriculture.

Colonial policies magnified this gender dichotomy, channelling men into wage labour and cash crop production, leaving women responsible for household food production. To the present, women continue to be the mainstay food producers, while men are involved in cashcropping and off-farm activities.

Women's intensified work day includes agricultural labour, so-called "housework" and childcare. Their labour is expended without the convenience of labour-alleviating devices which is in sharp contrast to Western women's relatively advantaged access to domestic technology. Domestic technology improvements, labour-saving appliances, men's help with childcare, and state provisions for childcare, have played a role in women's lives in the West making it possible for them to work "outside the home" to earn cash. These factors are virtually absent in SSA. Under these circumstances, it may not be realistic to expect that many African rural women will have the time, energy and spatial mobility to work on labour-based road construction. For women to benefit from cash earnings opportunities, it might be necessary for household labour-saving improvements to be introduced first. [Bryceson 1993]

Furthermore, it is necessarily the case that cash earnings will represent an improvement in rural women's economic welfare and power relations within the household? Rural African societies tend to be characterized by relatively low levels of market development. Studies suggest that attitudinal foundations of power and resource control within African households are complex and cash earning does not necessarily give women enhanced status. [McCormack et. al. 1986] In fact, in some societies men view female earnings as theirs to have and control. [Mbilinyi 1987] With these reservations in mind regarding the context and potential benefits of women's participation in these reservations in mind regarding he context and potential benefits of women's participation in income-generating labour-based roadworks we can turn to a review of project outcomes.

Project Experience

Overview

To many people labour-based road works embody two alien ideas:

(i) it is possible to improve and maintain roads manually; and

(ii) women can participate fully in such activities.

Despite the novelty of these concepts, the appearance and growth of women's participation in labour-based roadworks to the levels currently prevailing in many African rural societies demonstrates remarkable adaptability. It has entailed the expansion of work tasks undertaken by women, relative to those considered traditional in their societies, and, in some instances, has afforded women entry into skilled job categories.

However, attitudes and practices vary from place-to-place even within one country. There is a learning curve and rates of change have been very uneven in each locality. Moreover it has to be borne in mind that orad sites are dynamic locations: they open, close, shift, and have a fluctuating mix of tasks and thus labour requirements. Thus, any survey is likely to be no more than a snapshot of a fast changing situation. Great caution should therefore be exercised in trying to draw general conclusions from observation at a particular point in time of a given project.

[3] The sequel to the RARP the Minor Roads Programme was reported in 1988 to have a participation rate of 17%. [Wamalwa 1988]

Currently in Africa the percentage of female workers is generally a fraction of that of males, with figures in the range of 10-30 % not being uncommon [Riverson et. at. 1991]. By contrast, in Bangladesh the CARE road maintenance programme deliberately targets destitute women who comprise almost the entire workforce [Adeeb 1989].

In Kenya and Tanzania some projects reached levels of about 50-80% female participation. The women were single, and usually mothers. [Norconsult 1988, Scheinman et. al. 1989]. They were predominantly drawn from among those with few land assets and the economically worse off. It is thought hat the difficult economic situation these women found themselves in, forced them to seek employment on road works. This tends to be confirmed by evidence from Madagascar showing women walking 2-3 hours daily each way to work . [NORAD 1992]

Experience on the Kenya Rural Access Roads Programme

The labour-based Rural Access Roads Programme (RARP) in Kenya is one of Africa's oldest and most successful. It is instructive, therefore, to begin by considering the experience of women on the RARP and how this has changed with time. [Devres Inc. 1984].

In the early years, after the start in 1974, about 16% of the RARP work force was female who, on average, tended to be more economically disadvantaged than male workers [3]. Female labourers were seldom heads of household, had more children, owned less land and fewer assets, and averaged less education than male workers.

Female workers also has less prior wage work experience than men, and those who had worked for wages before the RARP project had received lower pay. Once accepted in the RARP, however, women were treated equitably, receiving the same pay and work schedules as males.

The percentage of women participating in the programme increased over time, for initially women were not considered capable of road construction work. As fewer men were willing to work for Ksh 7.9 per day, more women entered the programme. Later, a doubling of wages, in May 1980, resulted in increased competition for available jobs and women tended to be replaced.

To the degree that the RARP attracted female workers, it reached the most needy in the rural areas, many of whom depended on the RARP wage to meet their basic needs. However, job recruitment was principally through sub-chief's (baraza) meetings, not normally attended by women. A recommendation of a study on road workers was to target recruitment efforts to the most needy, particularly women and the landless.

Since the RARP labour-based road works have met varying degrees of success with regard o women's involvement in other countries in SSA. The remainder of this paper concentrates on various aspects of the employment of women, noting some contrasts with other parts of the developing world.

General attitudes towards the suitability of roadwork for women

In most case studies, the general perception of the rural dwellers themselves seems to be that road work is a low status activity undertaken by those who have no real alternative means of enhancing their standard of living. It is considered "poor people's work". [NORAD 1992]. "We are poor and that is why we work on the road; because we have no money at all". [Scheinman et. al. 1989].

The socio-economic status of the area in question plays an important role in the attitudes of people towards the prospects of employment on road projects. The availability of alternative sources of employment and the relative wages paid appear to be the main determining factors. Thus, in one area of Kenya only a quarter of women wished to be road workers whereas in another, more deprived area, the proportion increased to two-thirds. [Lexow et. al. 1989]. Clearly, in deprived areas the lure of cash, however poor the wages may seem in relation to average values in other sectors of the economy, is a strong incentive. [Milimo 1987].

The belief that it is culturally inappropriate for women to seek employment outside the household does not seem to be quite so prevalent as it used to be. There appears to be a wider appreciation that some women need to work and earn for economic reasons. A priori

surveys in Zambia indicated that 70% of both men and women thought road work was a task that could be undertaken by both sexes. [Milimo 1987]

In some countries there is virtually no task discrimination between the sexes. In others, women themselves shun the most arduous activities such as excavation in rocky soils, on steep slopes, or in quarries [NORAD 1992]. However, there are countries where women are still only allowed to undertake the relatively lighter and poorer paid activities such as water collection, grubbing or road maintenance. [Norconsult 1988, COWIconsult 1988, Ghanexim Economic Consultants 1990]

The restrictions imposed largely by men is in marked contrast to the willingness of women to undertake all sorts of tasks outside those traditionally assigned to them. [Tomoda et. al. 1987]. The danger of such restrictive practices is that acceptance that women are only able to do certain tasks will inevitably lead to low participation rates. [Wamalwa 1989]

In some countries there have been deliberate attempts to reserve road maintenance for women, or at least to give them more favourable consideration for these activities than for construction or rehabilitation [Norconsult 1988, Adeeb 1989]. These area variety of reasons advanced for such a policy:

> (i) In Bangladesh "destitute" women are recognised as one of the most underprivileged groups in the country who are in need of special consideration [Adeeb 1989]. Also, the work is intermittent and offers only a modest remuneration which male heads of households might find unattractive.
>
> (ii) There is a belief that women are more conscientious in undertaking the repetitive tasks involved. [Hussain 1993]
>
> (iii) The fixed location of road maintenance makes it more suited to women who need work close to their homes.
>
> (iv) In general maintenance tasks are less arduous than those of construction or rehabilitation and thus, it is felt, more suited to women.

Attitudes of men towards women working

Whilst there are cases in the literature of women being treated on an equal footing to males in all respects, there are also persistent reports of discrimination and negative attitudes by men. Some of these attitudes are deeply felt and ingrained in local culture. For this reason alone the subject is a sensitive one and needs to be treated as such.

In some cases the negative attitude of men is manifest in an outright refusal to let their women participate in work. This is often justified on moral grounds (e.g., the immorality of women working among strange men). In one case in Ghana the contractor said that the level of familiarity between the sexes was affecting the progress of the work, so he dispensed with the services of the women! [Ghanexim Economic Consultants 1990]. There are, however, counter opinions to the morality arguments. In the case of Nigeria it has been contended that no religion or tradition in the country is against income-earning by women, but are only concerned about circumstances and setting in which such income is earned. [Hussain 1993]. That is all-female gangs, as in the norm in Bangladesh [4] might well be acceptable even in the Muslim north.

The main reason given by male road workers who are not in favour of women working on roads is that they are physically weak or because the work is thought to be too arduous. [Lexow et. al. 1989, Wamalwa 1989, Ghanexim Economic Consultants 1990]. Actual output studies from Botswana showed that there was no difference in performance between men and women even on the heaviest of tasks [Brudefors 1989]. There is a similar suggestion from Tanzania that the output of men and women was not significantly different, although it is not clear that they were doing the same mix of tasks [Scheinman et. al. 1989]

A common bone of contention by men is women receiving equal pay for road work, even for

the same tasks, which is unusual in traditional activities where they receive 50-70% of the men's wage. [Hussain 1993]. This attitude is usually justified by the widespread belief that women have a lower rate of productivity. Indeed this argument has been employed to justify limiting the percentage of women participating so as not to endanger the production schedule. [NORAD 1992]. A counter argument is that women's greater dedication to tasks requiring meticulous work, and greater reliability - and thus lower turnover - more than compensates for any lower rate of productivity [Scheinman et. al. 1989, Hussain 1993]. Moreover some men have acknowledged that since women are more likely to spend their earning s for the general benefit of the family, they are prepared to accept the principle of equal pay. [NORAD 1990]

Recruitment

In practice it is well established that there are often biases against women's involvement due to the methods of recruitment. A common feature is that work is only advertised through forums in which women rarely participate e.g. the regular meetings of traditional leaders. Another bias can be the requirement to present ID cards or birth certificates which men may, but few women, have. [Wamalwa 1989, NORAD 1990]. The effort to obtain an ID card - a photograph costing nearly a day's wages, and two visits to a major town - might well be beyond the resources of many poor women. In one instance this problem was considerably reduced by only requiring proof of identity from young girls to ensure they were more than 18 years of age. [NORAD 1992]

Experience indicates that unless efforts are made to make women aware of job opportunities their numbers will remain low. [Devres Inc 1984, COWIconsult 1988, Norconsult 1988]. There have been instances where women have been recruited without understanding the terms on which they were employed [Scheinman et.al. 1989]. In particular it had not been made clear that they would be liable for tax on any earnings which exceeded the minimum wage.

Participation

Caution should be exercised in interpreting quoted female participation rates observed at any one time, and then assumed to be representative of average conditions, because of their correlation with the stage of roadworks and the nature of the tasks being undertaken at that moment. This is especially the case on sites which practise the concept of "women's work" - which usually denotes haulage, grubbing, spreading and maintenance.

According to the World Bank, women's low participation rate in Africa is explained by the following factors [Roverson et.al. 1991]:

> [4] The Nordic RESP programme has succeeded in getting women to set up work teams which are contracted to develop infrastructure, and informal work teams for more routine maintenance. [Yakub 1992]
>
> (i) priority given to domestic activities such as milling maize, fetching water, collection of wood, cooking , etc;
>
> (ii) lack of information about women's eligibility for employment;
>
> (iii) scarcity of forewomen;
>
> (iv) lack of transport to the work sites combined with already mentioned time constraints;
>
> (v) lack of pilot projects using labour-based methods with special emphasis on women's participation.

Whilst in both Kenya and Tanzania young women were predominant female participants, with more than 60% less than 30 years of age [Riverson et.al. 1991], this cannot be assumed always to be the case. In Lesothon in the early 1980s a number of conditions - the out-migration of males to mining work in South Africa, high landlessness (+20%) and poverty - combined to produce a labour force on one nationwide project that was more than 85%

female with 50% aged over 45 years [Simpson 1983]. A relatively old female labour force is also undoubtedly the case in Bangladesh since many of the "destitute" women involved have been abandoned due to their age.

A priori studies in Madagascar identified the long work day of childbearing women)10-16 hours) as a barrier to their involvement. It was predicted that they might only be available during favourable periods of perhaps 3-4 months a year and for limited hours each day. [Skjortnes et.al. 1989]. Predictions of women's limited availability, especially daily, have led to suggestions for the introduction of part-time work. [Koda et.al. 1987, World Bank 1990]. In practice there is no reliable evidence of seasonal variability in female availability - it may exist, there is just no evidence - but on one project women workers emphatically rejected the idea of part-time work. [NORAD 1992]. An additional factor in Madagascar was that men appeared to be permitted greater substitutability than women. They were allowed to send a substitute worker if ill, but women did not seem able to do this. [NORAD 1990]

Given women's arduous working day in the hoe-based agricultural systems of SSA, it would be surprising if a high proportion of women were able to participate in public works programmes, almost regardless of the wage paid, unless special efforts were first made to tackle their daily labour time constraints. Indeed, in several Sahelian countries with heavy seasonal out-migration of men, the absence of men, leaving women with the bulk of the rural workload, is considered to be a constraint to executing public works programmes. [Von Braun et.al. 1991]

A number of factors have, however, been identified which facilitate women’s participation in labour-based roadworks. Among these are:

(i) existence of women’s groups in the project area;

(ii) familiarity with the aims of the project;

(iii) payment in cash not kind; and

(iv) a high number of female members in the family.

[Van den Oever-Pereira 1984]

The fourth factor, which relates to having child minders for working mothers, was not confirmed in Tanzania [Tomoda et.al. 1987]

Care is needed in setting targets as a means of enhancing female participation. In Madagascar such targets setting led to the notional figure of 25% being interpreted as a maximum. The commentators’ assessment was that this level would have been exceeded under free recruitment.

[NORAD 1990]

To date women have participated mainly as casual workers. Progression into skilled grades of employment has been slow even in the long-established programme in Kenya. The latest available data (1990) indicates the following rate of participation in the Minor Roads Programme [COWIConsult 1992]:

% women

HQ 8

Casual, road improvement 25

Casual, routine maintenance 9

Casual, periodic maintenance 21

The low level of female participation in routine maintenance is surprising since the light, repetitive, intermittent and essentially fixed location of the tasks is generally held to suit women more than men. However, in general the main difficulty confronting women in their

progression into skilled grades of employment as road overseers or inspectors in the level of education required. The majority of village women have not gone beyond primary education. Surveys in Tanzania confirmed that women expressing an interest in road work were mostly semi-educated.

[Koda et.al. 1987]

Special provisions may need to be considered to ensure that women are able to participate on road works let to contractors. The employment of women by contractors is not a general practice in many countries [NORAD 1992, Hussain 1993] and few can be expected to feel a social obligation to do so. If contractors are left to their own devices there is evidence that working conditions for women may deteriorate - zero recruitment, gender division of tasks, irregular payments, different wages for men and women, wages lower than minimum and long working days; also, in some cases tasks have been gradually increased. [NORAD 1990, 1992, Hussain 1993]

Household implications of women's participation

Little is known about the social cost of women's participation, that is the resultant impact on child care and the health of both child and mother. Evaluations in Kenya and Tanzania have indicated that road works can become an important targeted income generator, especially for women who are not able to harvest enough food [Riverson et.al. 1991]. The extended family structure allows women to leave household activities and the caring of infants and smaller children to grandmother, older children, or other female relatives. If for any reason (e.g. pregnancies or illnesses within the family) they cannot attend their job, relatives and friends may be able to stand in for them. [norconsult 1988, Lexow et.al. 1989]

The element of family support appears crucial to a mother's ability to absorb the additional burden of road work. An impact study in Tanzania concluded that the alternative of child care facilities, to be provided by the project, as has sometimes been proposed, made little sense for activities which move everyday along the road and were likely to be completed within 1-2 years. [Scheinman et.al. 1989]

Despite the relatively low wages received on road projects, and the additional workload rendered, the evidence is that given the chance needy women will nonetheless seek employment on rads in order to earn extra income and obtain a measure of financial independence. [Ghanexim Economic Consultants 1990]. May express gratitude for the opportunity to work since there are few alternatives. [Scheinman et.al. 1989]. Women who earn wages claim that a major benefit is the fact that they "control" their money. Furthermore, this is spent mainly on food, clothing and school fees, thus contributing to an increase in the standard of living of the family. [Lexow et.al. 1989

Labour-based road works: vital income source or destitution trap for women?

Do all women benefit from participation on labour-based roadworks? Wage levels seem to vary with the socio-economic background from which women come, and the extent of their deprivation. The most seriously deprived women are likely to be those who receive very low wages fro road work. In Botswana remuneration for work on roads was set by government at 60% of the minimum casual labour wage [Lexow et.al. 1989]. In Tanzania wages were (1989) one-third of those in neighbouring Kenya and known to have been the cause of labour supply problems in some areas. Because of these low wages it has been claimed that most workers are as poor when they leave the job as when they started [Lexow et.al. 1989].

The justifications offered for such a low wage are that:

(i) it guarantees that only very poor people will want to work;

(ii) low wages means more jobs for more people; and

(iii) the cost of labour-intensive road works compare favourably with

those by equipment-intensive methods.

With such low wages it is unlikely that many people can invest to give long-term improvement in living standards, although a few manage to do so. [Scheinman et.al. 1989]. Earnings from labour on roads are likely to be consumed on necessities such as food, clothing and school fees. [Norconsult 1988, Lexow et.al. 1989, Scheinman et.al. 1989]. Indeed, an evaluation of the RRM project in Tanzania concluded that works on the road acted as a 'social net' by employing women who could not generate enough cash from their farms to buy clothing, sugar, cooking oil and other essentials. [Scheinman et.al. 1989]. In contrast, evidence from more generously paid work in Ghana indicates that most money earned by women was kept for investment in land, house building, trading, sewing machines and savings. [Ghanexim Economic Consultants 1990]

Some research suggests that there has been no negative effects on agricultural production of female employment. This conclusion was based on the observation that women either work in the agricultural slack season or hire others to do their farming tasks for them. [Scheinman et.al. 1989, NORAD 1992]. In Madagascar auxiliary farm labour earned 30-40% of the earnings paid for road work. [NORAD 1992]. Thus in addition to the direct beneficiaries of the programme other poor men and women indirectly received a share of the wages paid. However, on the RARP female-headed households experienced a decline in the value of agricultural production, although this was compensated for by an increase in total income earned. [Devres Inc 1984]

Conclusion

It is extremely difficult to come to any general conclusions on the benefits and disbenefits women experience when participating in labour-based rural roadworks. It is however evident, given overall low levels of female participation in such schemes and the prevailing attitudes of the women themselves, that labour-based roadworks do not represent an economic panacea.

Most rural women are already coping with extremely full work days and earning cash in the low-paid, often arduous work conditions of road sites is not alluring. Nonetheless, there is abundant evidence that labour-based roadworks are a welcome source of income for asset-poor women. Furthermore, it is possible that the demonstrator effect of such women doing non-traditional roadwork tasks could help to challenge fixed notions of the rural gender division of labour and male dominance in cash earning. If this were the case, it could have beneficial repercussions for rural women more generally, regardless of their economic standing in the rural community.

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Introduction

Labour-based district roadworks contribute to the introduction of a cash economy in rural areas. However, the wages paid to the unskilled labour are very low. To further improve the standard of living of the rural population, it is important to increase the productivity, and thereby be able to bring up the level of the wage rates, without disturbing the feasibility of using labour-based methods.

Employing women on labour-based road projects is adding an additional burden to their daily responsibilities. However, through surveys it is evident that they are very interested in this economic opportunity. One of the objectives of this programme is to alleviate poverty, and by directing it towards the female population in the rural areas, it certainly reaches the core target group.

In Zimbabwe it was experienced that, during the recent drought period, there was an increased interest in employment from women in the vicinity of the road sites. When the drought ended the interest decreased, since agricultural work was prioritized.

Wage Rate

The positive effect of piecework proves to a certain extent that there is a positive correlation between the wage rate level and the productivity rates of the workers.

However, the wage rate level is often a politically sensitive issue. In many countries, the purpose and interpretation of the minimum wage rage has been inversed, and it is applied as a maximum wage rate. Examples in Botswana and Tanzania show that the Government refuses to pay more than the minimum wage for casual labour.

In some programmes, low wage rates for unskilled labour have been used as a rationale for targeting the poorest part of the rural population. If the wage rates reach a level which is regarded as atrective by a wider group in the rural communities, the poorest are squeezed out.

In many countries (i.e., Tanzania and Botswana) the Government salary scales are lower than what is regarded as a reasonable pay for a day of manual work. In order to secure the interest and motivation of the unskilled labour, piecework and other production bonus systems are introduced. However, this results in situations where unskilled workers actually receive higher wages than the supervisors and engineers.

An effective way of avoiding the problem of rigid and too-low wage levels is by involving the

private sector in our programmes. Private contractors are free to increase the wages and salaries of their staff, and can respond easier to the market forces.

However, when introducing the private sector, there is a chance that women may be excluded. It is therefore important to take special measures to secure the involvement of women at all staff levels. This can be done during the selection of contractors for training, and special clauses can be incorporated in the conditions of contract.

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Proceedings 1996 - pg6

ASIST Information Services

By David Mason, Information Specialist, ASIST, Nairobi

History

1988

The ILO and the Swiss Development Cooperation (SDC), in collaboration with the Ministry of Public Works in Kenya (MoPW), developed and ran an International Course for Engineers and Project Managers on labour-based road programme management.

1990

A project planning workshop identified the main objective as:

to increase the effectiveness of labour-based programmes in sub-Saharan Africa

and agreed three main outputs:

- training of engineers, site supervisors, senior management staff and trainers
- provision of information services
- conduct appropriate research and development.

1991

In October the ASIST project was launched.

The objectives set for the Information Services (IS) component were:

- labour-based roadworks information to be made available to practitioners
- technology information available to labour-based programmes to be improved.

The principal component of the Information Services was seen as a Technical Enquiry Service (TES). This was set up at Kisii Training School in western Kenya and staffed by a Technology Specialist and a National Professional engineer.

During the first year, the main activities of the IS involved accessioning and cataloguing documents, and carrying out research into the Botswana method of setting out roadworks.

Very few enquiries were received during this period, apparently because few people knew of the existence of the ASIST project, let alone the IS component.

1992

At the Lesotho regional seminar in March, the operation of TES was reviewed and recommendations made:

- TES should be proactive rather than purely reactive
- TES should sell itself and its services
- TES should publish a bulletin twice a year, each issue concentrating on s specialist subject, the first of which should be on maintenance.

1993

In January, David Mason joined ASIST as Information Specialist, and Collins Makoriwa as

Data systems Specialist.

In May, the first issue of the bulletin was published. About 1500 copies were distributed, mostly in sub-Saharan Africa. Each bulletin contained a registration form. About 150 have been returned to date.

In September, following an SDC review of KTS, the decision was taken to relocate the main activities of TES to Nairobi to streamline the management of documents and incoming enquiries. KTS remains as a branch office, to serve the staff and students there.

The Current Position

To date, 1580 publications have been accessioned and catalogued. The records are kept in a computer database. A keyword system allows searches to be made according to topics selected by the client.

To date, about 50 formal enquiries have been received (not including requests for advice from advisory support staff carrying out their normal duties). Most of these requests have been for publications.

During the past six months, the Information Service had undergone a change of emphasis. The setup is now as follows and has four components:

Networking

To keep practitioners in touch with each other and up to date with the latest news and developments.

- publication of a bi-annual bulletin
- mounting of an annual regional seminar.

Technical Enquiry Service

To respond to specific requests for publications and information.

- an expert "living database" of experienced advisers
- a bibliographic database of reports, publications, and other literature.

Publishing

To produce material, culled and digested from the expert and bibliographic databases, appropriate to the needs experience level of practitioners.

- technical briefs
- training material.

Research and Development

To keep practitioners up to date with the latest R & D findings.

- maintain a watching brief on research being conducted
- publish and disseminate the results of research.

Enquiry procedure

- request received
- enquiry form opened
- computer database searched
- response formulated and publications copied or purchased as appropriate
- response despatched.

Small quantities of photocopied extracts are sent free of charge, as are some ILO publications such as Country Technology Reports. Commercial publications and large quantities of photocopying are charged at cost.

Finally

The Information Service exists to serve you, the labour-based practitioners. Help us to serve you better by giving us feedback. Most of you were sent a copy of the Bulletin. What did you think of it? Write and let us know, and if you want to be included on the mailing list for the next issue, complete and send in the Registration Form.

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Questions Discussed in Work Groups

During the last day of the seminar, the participants were divided into working groups, each of which were given specific questions related to the previous topics addressed by the seminar during the previous days. The questions and findings as they were presented are briefly described in this chapter.

Group (1)

What are your recommendations for appropriate design and specifications for the tractor-trailer combination in relation to the:

- tractor,
- trailer and
- hitch?

Group (2)

What are your recommendations on the desirability and type of training to be provided to contractors and consultants in terms of labour-based road construction and maintenance technology?

- What new material needs to be developed?
- How can existing training material be utilized in such a training programme?
- Action Plan.

Group (3)

What organizational systems do we need to set up to make small-scale contracting works?

- two player or three-player system
- large vs. Small contractors
- role/involvement of consultants
- role of Government
- type of contract
- wage rates

FINDINGS OF GROUP 1

General

Before a decision is taken on the choice of hauling equipment, a careful analysis should be carried out on the alternative means of transport which may be appropriate (i.e., animal drawn carts, tractors and trailers, trucks). Only when a proper cost analysis has proved the viability of the tractor-trailer alternative, should the following recommendations be considered.

Tractor-trailer Combination

Various labour-based programmes have run trails using different design and sizes of trailers and tractors. Experience has shown that basic, unsophisticated and solid designs provide the most reliable services, reducing the amount of mechanical maintenance and ensuring a high rate of plant availability.

The work group tried to find recommendations for the design and specifications for a tractor and trailer suitable for gravel haulage for labour-based road works. This trailer should be considered

for new projects which as yet do not possess any equipment.

The findings of Group 1 can be summarized as described in the table on the following page.

Trailers

The trailer loading capacity should be limited to 3 cubic metres.

The chassis should be carried by an A-frame and a single axle. In order to increase the traction capability of the tractor, at least one third of the trailer weight and load should be transferred to the rear axle of the tractor. The choice of tyres should correspond to the most common truck tyre available in the country.

Side doors for unloading are not recommended. Experience from Kenya shows that this item often breaks and requires a great deal of maintenance. Secondly, it has been proven through time studies that the increased unloading time is marginal. When also considering the increased availability rates of trailers without side doors, it is clear that this is the most feasible alternative.

Variations

In order to reduce the unloading time, one may experiment with the use of front side doors. However, it is recommended that the increased efficiency due to using side doors should be closely monitored and documented before it is introduced as a standard item.

A second variation may be the introduction of removable tail gates in order to increase the carrying capacity of the trailer as well as reducing spilling.

It is not recommended that new programmes introduce or initiate trails on tipping trailers. Ongoing test trails with non-hydraulic tipping trailers in Kenya are promising. However, it should be emphasized that they are still at the prototype stage. If the trails finally show positive results, this experience will be disseminated to other projects. New projects should wait with the introduction of tipping trailers until the MRP has reached its conclusions.

Equipment Item	Basic Recommendation	Variations to be considered/tried out
Trailer Design developed by MRP in Kenya seems appropriate.	Size: $3m^3$ Tyre size: Most common truck size 900x20 Load distribution: Min. 1/3 on hitch Axle: Single axle, A-frame	i) Front side doors ii) Removable tail gate
1) Hitch 2) Connection	Heavy duty hydraulic pick up hitch Pin and eye	Ball and cup
Tractor Supplier should have a significant market share in the client country = good spares availability	55 - 65 HP 2 wheel drive Heavy duty rims and industrial tires	
WHAT	WHO	WHEN
ILO to produce specifications for clients to apply for tender boards. Incorporate these specifications into updated Tools and Equipment Guide.	ASIST - TES ILO/ASIST to incorporate manual update in 1994 operation plan. Direct buying donors also to follow tractor-trailer specifications.	November 1993 Depending on review meeting for ASIST in January 1994. Whenever procurement is done by donors.

Tractors

The appropriate tractor for hauling a 3 m^3 trailer of gravel is a 2 wheel drive with a 55 - 65 HP engine. 4 wheel tractors are not necessary for this purpose. If the tractor is to be used for other purposes (ploughing, towed grading, etc.), one may consider more powerful models. One solution is to invest in a limited number of more powerful multi-purpose tractors. The remaining fleet of tractors with the above specifications would be entirely designed for gravel haulage.

Trailers are repeatedly hitched and unhitched from the tractor. The tractor should therefore be fitted with a heavy duty automatic hitch which picks up and detaches the trailer automatically. The pin and eye lock is the most common lock system and cheapest solution. The ball and cup mechanism is more solid but also more expensive.

The rough environment on labour-based road sites and in the gravel quarries requires that the tractor be fitted with heavy duty rims and industrial tyres.

To ensure a regular and sufficient supply of spares, the chosen tractor supplier should have a significant market share in the client country.

If the equipment is to be used in mountainous or steep terrain, it is advised that the tractor be fitted with roll-over bars. In flat terrains this is not necessary. It is not very often that the tractors capsize due to the trailer tipping over to the side. Usually the hitch brakes before rolling the tractor over.

Further Action

The above specifications are similar to the trailer-tractor combination recently developed by the Minor Road programme in Kenya. It is proposed that these specifications be distributed by ASIST to the various labour-based programmes in the region. One way of doing this, is to publish the design and technical drawings in the next issue of the ASIST journal.

The above findings should also be incorporated in a revised version of the ILO Guide to Tools and Equipment for Labour-based Road Construction. A final decision on this activity will be taken based on the review and evaluation of the ASIST programme scheduled for January 1994.

Finally, the national executing agencies responsible for the road programmes should insist on these standardized specifications when equipment is supplied by the donors.

FINDINGS OF GROUP 2

Main Question

The main issue discussed in Group 2 was how to move labour-based road construction and maintenance from the public sector to the private sector involving domestic small-scale contractors as well as consultants.

In order to achieve this transfer, there is a great demand for training of Government staff, as well as the various levels of staff in the local construction and consultancy firms. Therefore, the group focussed on the desirability and type of training to be given to contractors and consultants.

The topic was sub-divided into the following key questions:

- Is training for small scale contracting desirable?
- Type of contractor development.
- What material is available?
- What new material is needed?
- How do we integrate existing material?
- How do we encourage women's involvement?

There was full agreement along the group members that a structured training programme is a key element for the successful involvement of the domestic private sector in labour-based road construction and maintenance works.

Classification of Contractors

Before a training programme is formulated, it is important to define the various types of contracting companies which can be found in developing countries. The table below provides a general description of the different types of contractors categorized according to their size and the

type of works they are able to carry out.

Petty Contractors

The petty contractor is generally referred to as the one-man contractor. This category of contractors usually consists of one man firms, sometimes assisted by a limited amount of unskilled workers. They may be labour contractors, usually consisting of a businessman sub-contracted to carry out specific work relying mainly on unskilled casual labour.

Organized local community groups such as farmers associations and village welfare groups can also be classified as petty contractors.

Types of Contractors

Type	Description
Petty Contractors	Single person Labour only Not registered Basic skills
Small-scale Contractors •Registered	Possess basic equipment Capital security low Entrepreneurial skills Technical and managerial skills
Large-scale contractors - not interested	

A common feature for this group is that they are not formally registered and do not possess any capital and are therefore extremely vulnerable to cash-flow problems such as mobilization capital and late payments.

The petty contractors normally do not possess any equipment, and lack any means of transport. Due to their lack of mobility, they are normally recruited from the vicinity of the project work sites.

These contractors are mainly used for maintenance works or simple, clearly defined sub-contracts requiring a minimum of skilled labour and equipment. In Kenya, the lengthmen securing the routine maintenance of the minor roads network are organized as one-man contractors. In Lesotho, the Labour Construction Unit utilizes one-man contractors for contracting out masonry works for small bridges and culverts.

Small-scale contractors

Most domestic small-scale contractors are found in the building construction industry and the transport sector and are normally registered companies. Often limited, they still possess certain technical and managerial skills. However, experience shows that their organization requires further training in business management, accounting, mechanical maintenance, road and concrete technology, as well as in labour-based methods.

Their equipment fleet is spares and often old and poorly standardized. Before they can be used for road rehabilitation works, it is usually necessary to assist them in the acquisition of additional light construction equipment (i.e., hauling and compaction equipment).

Similar to the petty contractors, the small-scale contractors are often underfinanced and vulnerable to cash-flow distortions. Normally, these contractors do not operate their accounts through a bank. In many cases the local banks do not consider these firms as attractive clients and therefore do not provide them any service.

After receiving appropriate training development assistance, these contractors have proven to be highly efficient in carrying out both road construction and maintenance works. They have shown good supply of work, regular and timely payments, etc.: they will survive as sound construction firms and an important component of the domestic construction industry.

Large-scale contractors are often subsidiaries of large foreign multi-national companies in international competitive bidding and are often only present in the country while they are carrying out a contract. Once their assignment has been completed, they leave the country, including evacuating equipment and skilled staff. Due to this, their involvement provides a minimal technology transfer to the recipient country, resulting in a low sustainability and little institutionalization of skills and experience. In most cases, they regard the size of labour-based road contracts as too small for their interest. For these reasons, this category of contractors is not regarded as part of the beneficiary target group for training and development assistance.

Training Material

For the training and development of petty and small-scale contractors, it was acknowledged that there already exists a certain amount of training material produces by ongoing contractor development programmes in the region (ghana, Madagascar, Lesotho and Tanzania). This training material consists of (i) general literature on labour-based road construction and maintenance technology developed by the ILO, and (ii) specific material developed for contractor development and management.

In addition, the ILO has produced a series of publications on domestic contractor development and management for the construction industry in general under its Improve Your Construction Business Programme (IYCB). However, this material needs to be further developed and specifically adapted to labour-based road works.

Required Training Material Yet to be Developed

Country Specific

When commencing on a new programme the above mentioned literature needs to be adapted into country specific training material, taking into consideration local conditions, technical standards and type of works to be carried out.

In some instances, it would be useful to translate the material into local language.

Finally, it should be adapted to the level of education among the target group, in relation to the skills of the staff of the contractors, as well as the government implementing agency, i.e., supervisors, inspectors, mechanics, administrative staff, etc.

Training of Trainers

In order to ensure a sustainable programme, it is crucial that the training capacity for this type of programme be fully institutionalized in the country. To achieve this objective, there is a demand for a structured training programme for trainers.

Available Technical and Managerial Training Material

ILO	Guide to the Training of Supervisors International Course for Engineers and Managers of Labour-based road Construction and Maintenance Programmes
LESOTHO	LCU training material
BOTSWANA	Training Course Notes for Gangleaders Training Course Notes for Technical Assistants
UGANDA	Final Preparation Report of the Transport Rehabilitation Project Course notes for inspectors and overseers
KENYA	Maintenance Management Manual
GHANA	??
IYCB	Interactive Contractor Training Improve Your Construction Business Material currently being developed for Lesotho

Selection of Contractors

Depending on the type of works to be carried out, there is a demand for developing guidelines for the identification and selection of contractors with the appropriate skill profiles.

Employment Conditions

In order to ensure smooth working relations between the workers and employers, it is recommended that a standard set of guidelines for employment conditions be developed.

Training of Local Consultants

When involving the private sector in the execution of labour-based road works, it is important not to leave out the consultancy firms. In the process of involving more and more parties in labour-based programmes, this knowledge and experience should also be disseminated to consultants. The preferred target group is local or indigenous companies, well established in the country.

In order to transfer labour-based technology to consultants, there is a demand for training. As a basis, materials already available cover the various topics required. However, this material would have to be adapted to meet the specific future role and tasks of the consultants.

In South Africa, local consultants have been involved in the design, implementation and monitoring of labour-based public works. For this purpose, they have developed a set of interim guidelines for the involvement of private consultants for this type of works, which may be a good basis for the further development of similar guidelines for other countries.

Women's Involvement

It was acknowledged that women should play an important role in this programme and should be mobilised as contractors and consultants as well as being properly represented among the work force of both skilled and unskilled labour. In order to provide equal employment opportunities to both men and women, it is essential that proper guidance be provided on procedures and actions required to achieve this objective.

Guidelines should be developed for selection and identification of contractors/consultants describing specific measures which ensure an active participation of women in the rural areas.

Further Action

Training programmes at national level should undertake the translation of the training materials into national or local languages. Furthermore, trainers should make better use of existing material as identified by the group. The Technical Enquiry Services of ALIST can assist in the distribution of the material.

Training of trainers for small-scale road contractors development programmes is important. The ASIST Training of Trainers Course is still under development and should cater for this recommendation. Through the participation of two trainers for Ghana in the ALIST Training of Trainers course in Kenya, ALIST has established a contact with resource persons in the small-scale road contractor development programme in Ghana. During their visit to Kenya, ALIST requested them to design a purpose-made course for small-scale road contractors based on their past experience in contractor training.

The registration and certification of the various types of contractors is an important issue. Identifying the unregistered contractors can often be difficult. If all contractors were registered, could also lead to improved Government recognition and commitment to this sector.

FINDINGS OF GROUP 3

Introduction

The main task of this group was to look at the organizational system required when developing small-scale contractors to execute labour-based road construction and maintenance works.

As a general remark, it was acknowledged that the type and size of the programme and works to

be carried out determine the type of contractors required, as well as the need for consultants. Furthermore, the availability, size and skills of the domestic contractors and consultants influence the design of a programme. This type of project, when involving the private sector, should be programmed on a long term basis.

Role of Local Consultants

When road rehabilitation and regravelling works of a certain size are awarded to labour-based contractors, local consultants can play a useful role. For routine maintenance, petty contracts and direct control by the road agency are more appropriate.

The main advantages of involving local consultants in the design and implementation of labour-based orad programmes are:

The main advantages of involving local consultants in the design and implementation of labour-based road programmes are:

- Consultants represent an additional capacity (manpower, skills), which can reduce the tasks of the respective Government organizations;
- The consultants can act as a neutral body;
- In order to protect their reputation, they will perform their duties on time (i.e., prepare certificates leading to timely payment of contractors).

Training

Before consultants can play a full role in labour-based road programmes, there is a demand for training of the consultants in labour-based technology, as well as establishing a capacity within the Government technical line agencies to control both the contractors and the consultants. This training programme will need to be developed in line with the size of the programme and the consultancy input requirements.

Conclusions

In order to involve the private sector fully in labour-based road works, the following activities were identified:

(i) Define tasks (terms of reference) for consultants in every phase of a programme. Attache engineers from consultancy firms to labour-based road programmes (typical consultant tasks might include prioritization of roads and technical auditing).

(ii) Standardize methodology of project management, control and documentation.

(iii) Clearly define roles of Government, client, consultants and contractors.

(iv) Consultant involvement will imply selection, training, special registration, conditions of involvement, etc.

(v) Large consultants could be used to train small consultants if tasks are well-defined.

Relationship between large and small contractors

The group discussed the possibility of using large contractors for training of small-scale contractors through sub-contracts.

Their motivation of the large contractors to carry out such a training programme will depend on their terms of reference and the main objective of the project. Is the main objective the construction works or the development of private construction firms? In case of the latter, the role of the large contractors is better defined, and he will be judged on his training role performance. His motivation and interest will also depend on his fear of future competition.

Training of small-scale contractors by large contractors could be initiated in two different ways:

(i) Large contractor awarded contracts, but is forced to sub-contract a certain percentage of the works to smaller firms.

(ii) Large contractor's role is defined as training and development of smaller firms only.

The second option means that project outputs should be defined in terms of competent small contractors trained in management, accounting, site management, etc.

In general, the workshop participants had limited positive experience with on-the-job training by large contractors, and, in conclusion, recommended that the Government hire individual contractor specialists to work as consultants to train and guide small contractors.

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Proceedings 1996 - Agenda

AGENDA

Regional Seminar on Labour-based Roadworks Technology

Zimbabwe Institution of Engineers, Harare, Zimbabwe

28 September to 01 October

Tuesday 28 September

08:00 - 08:30	Registration at Conquenar House
08:30 - 10:00	**Session 1 Introduction to the Seminar** Opening address by Rod Mitchell, Senior Vice-President of the ZIE. Scene setting - Chairperson Peter Bentall, COWIconsult, Harare Seminar context and objectives by David Stiedl, Programme Director of ALIST, Nairobi, Kenya. Administration arrangements and seminar conduct by David Mason, information Specialist of ALIST, Nairobi Kenya.
10:00 - 10:30	Coffee
10:30 - 12:00	**Session 2 Tools and Equipment** Chairperson David Jennings, Training Adviser, kisii Training School, Kenya. Handtools and Equipment for Labour-based Construction - Lesotho's Experience by Athie Lehobo, ILO Civil Engineer, Maseru, Lesotho. Handtools and Equipment - The Current Scene by Collins Makoriwa, ALIST National Professional, Nairobi, Kenya.
12:00 - 13:30	Lunch
13:30 - 15:30	Equipment Maintenance by jim Hamper, CIDA Mechanical Engineer, Ministry of Public Works and Housing, Nakuru, Kenya.
15:30 - 16:00	Coffee
16:00 - 18:00	Intermediate Equipment to Support Labour-based Roadworks - Development, Testing and evaluation of Prototype Equipment by Roberts Petts, Intech Associates, united Kingdom.

Wednesday 29 September

08:00 - 18:00	**SESSION 3 Field Visit to labour-based road construction sites.**

Thursday 30 September

08:30 - 10:00	**Session 4 Small-Scale Contractors** Chairperson Peter Bentall, COWIconsult, Harare. • Improve Your Construction Business - Entrepreneurship Training for Small-Scale Contractors in the Labour-based Road Sector by Claes-Axel Andersson, ILO Improve Your Business Programme, Geneva. • Can Experiences in Contractor Training be Transfer for one Country to Another? By K.D. Osei-Bonsu, ILO Chief Technical Adviser, Moshe, Tanzania.
10:00 - 12:00	• Labour-based Contracting: Contractor Management - A Case Study in Kenya by Bruno Illi, Norconsult, Nairobi, Kenya • Labour-based Contracting - Uganda's Experience by W.E. Musumba, Chief Road Maintenance Engineer, Ministry of Works, Transport and Communication, Entebbe, Uganda. • Introduction of Labour-based Contractors to the Bank - Some Pitfalls by Bashiru Sakiba, Director of Department of Feeder Roads, Accra, Ghana.
12:00 - 14:00	Lunch
14:00 - 15:30	**Session 5 Women and Labour-based Roadworks** • The Involvement of Women in the Construction Industry in general and in Roadworks, Activities in Particular by John Howe, International Institute for Infrastructural, Hydraulic and Environmental Engineering, Delft, the Netherlands.
15:30 - 16:00	Coffee
16:00 - 17:30	• A Review of Recent Labour-Intensive Construction in South Africa by Robert McCutcheon, Professor, Department of Civil Engineering, University of Witwatersrand, South Africa. • Group Discussion

Friday 1 October

08:30 - 10:00	**Session 6 ALIST Information Services** Chairperson Jan de Veen, ILO Geneva • An update of the ALIST Information Services by David Mason, Information Specialist, Nairobi, Kenya.
10:00 - 10:30	Coffee
10:30 - 12:00	Findings of Group Discussions
	Closing of Seminar

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Proceedings 1996 - Names

Names and contact details of attendees:

Name	Fax	Telex	Postal Address
Hakon A Berger	+267-352384		P O Box 41213 Gaborone, Botswana
Ephraim Masimega	+267-305975		P O Box 10105 Gaborone, Botswana
Phala Radikgomo			Private Bag 005 Tsabong, Botswana
Jacob Raphalane	+267-320432		Private Bag 349 Molepolole, Botswana
Molebi Setlhoka	+267-289263		Private Bag 004 Masunga, Botswana
Ørnulf Strøm	+267-320432	2436 NORAD	P O Box 349 Molepolole, Botswana
Negede Lewi	+251-1-514866		P O Box 31476 Addis Ababa, Ethiopia
Dellelegne Teshome	+251-1-550655	21205	P O Box 385 Addis Ababa, Ethiopia
Bashiru L. Sakibu			2514 DFR GH PMB Ministries PO Accra, Ghana
Yaw Tuffour			University of Science and Technology, Kumasi, Ghana
Barnabas Ariga	+254-2-559398		P O Box 57511 Nairobi, Kenya
Jim Hamper	+254-37-44018		P O Box 4170 Nakuru, Kenya
Bruno Illi	+254-2-337703	22627	P O Box 48176 NORCO N Nairobi, Kenya
David Jennings	+254-381-21634		P O Box 2254 Nairobi, Kenya
Francis Kiranga	+254-2-720044		P O Box 2254 Kisii, Kenya
Collins Makoriwa	+254-2-566234	22486	P O Box 60598 ALIST Nairobi, Kenya
David Mason	+254-2-566234	22486	P O Box 60598 ALIST Nairobi, Kenya
Curt Nilsson	+254-2-566234	22486	P O Box 60598 ALIST Nairobi, Kenya
Justin Runji	+254-2-720044	22174	P O Box 30260 Nairobi, Kenya
George Simba			P O Box 62000 Nairobi, Kenya
David Stiedl	+254-2-566234	22486	P O Box 60598 ALIST Nairobi, Kenya

Athie Lehobo	+266-1-310125	4342 UNDPLO	P O Box 1283 Maseru 100, Lesotho
Michael Letlola		4508	Private Bag A 155 PAMOPS LO Maseru 100, Lesotho
Mrs M. Pama	+266-1-3-310125	(MoW)	Private Bag X 0052 Maseru West, Lesotho
Dejene Sahle	+266-1-310125	4342 UNDPLO	P O Box 301 Maseru 100, Lesotho
Marinus Augustijn	+265-783637		P O Box 30135 Lilongwe 3, Malawi
Tint Swe	+265-783637		P O Box 30135 Lilongwe 3, Malawi
Ted Greenhalf	+258-1-491691	6364	P O Box 4595 Maputo, Mozambique
John DGF Howe	+31-51-122921	38099 IHE NL	P O Box 3015, 2601 DA Delft, The Netherlands
George Banjo			University of Lagos Akoka, Lagos, Nigeria
T, Gandy-Williams			P O Box 1324, Kissy Freetown, Sierra Leone
John H. Byrnes	+27-21-9134748		P O Box 593 Durbanville 7550, South Africa
Spike Kennedy	+27-21-9134748		P O Box 593 Empangeni 3580, South Africa
Rob Little	+27-31-8161411	621231 SA	University of natal, King George V Avenue Durban 4001, South Africa
Robert McCutcheon	+27-11-3391762	4-27125 SA	P O Box 43 WITS 2050, South Africa
Andreas Beusch	+41-81-221210		Wingertweg 8 7000 Chur, Switzerland
Claes Anderson	+41-22-7988685	415647ILO	CH E/DEV, ILO 1211 Geneva, Switzerland
Jan de Veen	+41-22-7988685	415647ILO	CH E/DEV, ILO 1211 Geneva, Switzerland
Bjorn Johannesses	+41-22-7988685	415647ILO	CH E/DEV, ILO 1211 Geneva, Switzerland
Ray Cahoon	+255-57-8285		P O Box 2291 Arusha, Tanzania
Madaniyo Mutabazi		41561	P O Box 35131 UNIVIP TZ Dar es Salaam, Tanzania
Kwaku-Due Osei-Bonsu			P O Box 8445 Moshi, Tanzania
Asfaw Kidanu +256-41-254244			P O Box 7184 Kampala, Uganda
W E Musumba	+256-42-20135	61313	P O Box 10 WORKS UGA Entebbe, Uganda

Robert C. Petts	+44-372-458955	53	The Park Great Bookham Surrey KT23 3LN, UK
Gary Taylor	+44-235-832186	838055	The Old Power Station Ardington, near Wantage OX12 8PJ, UK
John de Blaquière	+260-4-221756	PC05	P O Box 410720 ZA 64070 Kasama, Zambia
Peter Bentall	+263-4-732544	24677	12 Sable Street, Mandara Harare, Zimbabwe
Hans Bergman			P O Box 8476, Causeway Harare, Zimbabwe
Ulf Brudefors	+263-4-728492		P O Box 8476, Causeway Harare, Zimbabwe
Terry Carter	+263-4-68403		P O Box 2432 Harare, Zimbabwe
John Drury			P O Box 37677 Harare, Zimbabwe
John Drybrough	+263-4-794851		P O Box 2980 Harare, Zimbabwe
Godfrey Gamba			P O Box 98 Tsholotsho, Zimbabwe
John Goddard	+263-4-39521		P O Box 5738 Harare, Zimbabwe
Jon Hongve			P O Box 124 Mutoko, Zimbabwe
Don Hoyle	+263-4-64726	22434 ZW	P O Box 2356 Harare, Zimbabwe
Bertil Jonsson			P O Box 8057, Causeway Harare, Zimbabwe
Ralph Karhammar			P O Box 4110 Harare, Zimbabwe
Dembe Killrow			Private Bag 7735 Harare, Zimbabwe
Nelson Kudenga			16 Dempster Road, Cranborne, Harare, Zimbabwe
N. Letha			Private Bag 83 Z, Zaka Masvingo, Zimbabwe
K. Machibaya			P O Box 94 Chinhoyi, Zimbabwe
Victor Magaya			P O Box 94 Chinhoyi, Zimbabwe
Standford Mandiyenya			P O Box 780 Bulawayo, Zimbabwe
Arthur Mathews	+263-4-39525 3		Crowrough Road, Mount Pleasant, Harare, Zimbabwe
David Maunder	+263-4-735662		P O Box 8271, Causeway Harare, Zimbabwe

Jairos Mavhiza			P O Box 8109, Causeway Harare, Zimbabwe
Richard Miranzi			Private Bag 7735, Causeway Harare, Zimbabwe
Rod Mitchell +263-4-708225			P O Box 8109, Causeway Harare, Zimbabwe
Julius Moyo			22 Overbury Road, Southwold, Bulawayo, Zimbabwe
Pythias Mpofu			P O Box 8057, Causeway Harare, Zimbabwe
S. Musharo			P O Box 8109, Causeway Harare, Zimbabwe
Benson Mushavi			P O Box 8057, Causeway Harare, Zimbabwe
M. Narotam	+263-4-738376		P O Box 1502 Harare, Zimbabwe
Jackson Njunga			P O Box 85 Mutare, Zimbabwe
Kevin North	+263-4-69884		P O Box 590 Harare, Zimbabwe
Carl Østergaard			P O Box 98 Tsholotsho, Zimbabwe
David Paget			9 Maasdorp Avenue Alexandra Park Harare, Zimbabwe
Jonas Persson			P O Box 8476, Causeway Harare, Zimbabwe
Godfrey Pfachi			P O Box 8057, Causeway Harare, Zimbabwe
David Pichanick	+263-4-794851		P O Box 2980 Harare, Zimbabwe
Lars Pihl			P O Box 1188 Masvingo, Zimbabwe
Arthur Sandwith			P O Box BW 632 Borrodale Harare, Zimbabwe
Philip C. Simpson	+263-4-787101		P O Box 3143Harare, Zimbabwe
J Tsuedemu			P O Box 8109, Causeway Harare, Zimbabwe
Vera Vokolkova			P O Box MP 167 Mount Pleasant Harare, Zimbabwe
Mekonem Zemariam			P O Box 8057, Causeway Harare, Zimbabwe

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