MAINTENANCE OF COMMUNITY BUILT ROADS

A Review of Community Maintenance on Rural Roads built under the Kecamatan Development Programme (KDP) in NAD Province, Indonesia

2nd DRAFT

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The review team are also very much indebted to those who attended meetings on shaping the outcome and recommendations of the review.

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FOREWORD

ABBREVIATIONS

List of Abbreviations, Translations and Acronyms

APBN	Indonesian State Budget
BRR	Aceh Reconstruction and Rehabilitation Agency (Badan Rekonstruksi dan Rehabilitasi Aceh)
BPS	National Statistics Office, Indonesia (Badan Pusat Statistik)
DAK	Specific Allocation Budget (Dana Alokasi Khusus)
DAU	General Allocation Budget (Dana Alokasi Umum)
Desa	Village
DPUK	District Public Works Department
EC	European commission
FD	KDP village facilitator (Fasilitator Desa)
FK	KDP Sub-District Facilitator (Fasilitator Kecamatan)
FT	KDP sub-District Technical Facilitator (Fasilitator Teknik)
GNP	Gross National Product
ILO	International Labour Organisation
Rp	Indonesian Rupees
Kabupaten	District
KDP	Kecamatan Development Project
Kecamatan	Sub-District
Kimpraswil	Region of settlements and infrastructures (Pemukiman dan Prasarana Wilayah)=District Public Works
MDF	Multi Donor Fund
MIGAS	Gas and Petroleum budget (Dana Minyak dan Gas)
OTSUS	Specific Autonomy budget (Dana Otonomi Khusus)
PMD	Ministry of Home Affairs, Community Development Office (Pemberdayaan Masyarakat dan Desa)
PNPM	The National Programme continuing the work of KDP (Program Nasional Pemberdayaan Masyarakat)
TP3	Maintenance of Infrastructure Project Team (Team Pemelihara Pelaksana Prasarana)
TPK	Project Implementation Team (Team Pengelola Kegiatan)
UPK	Executive unit in sub district (Unit Pengelola Kecamatan

EXECUTIVE SUMMARY

Background

There is a general concern about the lack of infrastructure maintenance in Aceh. This issue is critical as there has been substantive investment in the infrastructure during the recovery and reconstruction periods after the Tsunami of 2004. The Multi-Donor Trust Fund for Aceh and North Sumatra (MDTFANS) alone allocated 36% of its funding to the infrastructure. The capacity of local governments to manage the maintenance of infrastructure of all types effectively will help safeguard the investments that have been made and further support sustainable economic development in the province.

The UNDP/ILO Creating Jobs: Capacity Building for Local Resource-based Road Works in Selected Districts of NAD and Nias (the Rural Road Project) has as immediate objectives to:

- capacitate district government and small-scale local contractors in undertaking local resource-based road works;
- provide the techniques, standards, systems and strategies for this approach; and
- involve the local communities in the provision and maintenance of district and other rural roads.

Systematizing the local resource-based methods in the rehabilitation and maintenance of district and village roads is an integral component of the project implementation approach. In Indonesia village roads are being rehabilitated chiefly through the Kecamatan Development Programme (KDP) which receives technical and management support from the World Bank. In Aceh, the KDP is also financed by both the Government of Indonesia and the MDTFANS.

This review represents an initial effort to assess the state of maintenance and possible synergies between the Rural Road Project and the KDP, following a series of collaboration in the areas of community economic empowerment and road facilitator training.

The review team consisted of Ms. J.M. Tournée, ILO consultant, and Mr. M. Effendi, the Rural Road Project's District Engineer for Pidie.

Purpose

The Purpose of the review was to:

i. Work together with KDP (PNPM), ILO and the District Public Works to review the existing rural road maintenance systems and practices (including the KDP supported community-based maintenance systems), their potential and challenges, financing mechanisms, and areas for collaboration between KDP, ILO and Public Works to improve and mainstream maintenance systems (including community-based maintenance).

ii. Recommend practical steps (a general guideline) for the establishment and improvement of community-managed road maintenance for rural roads in Aceh, in particular on the KDP improved road network.

Methodology

The review team studied relevant documentation, interviewed Ministry representatives, Programmes and Projects, at Provincial and District, and sub-District level - in particular KDP/PNPM. Within the time available, the team included field visits to three districts to gain an insight into road construction and maintenance practices, budget levels and organisational structures. The most intensive data gathering took place in Bireuen District, and therefore Bireuen District is used as a case study throughout this report.

Limitations and Strengths of the Findings

It should be noted that the findings which follow are specific to NAD Province and are based on documentation, discussions and site visits to a relatively small sample of districts within the province. The review team is of the opinion that findings reflect the general understanding, among actors in the road sector, of the road maintenance challenges facing the government and communities alike. The results reinforced certain assumptions, and the proposals offered suggestions of improvements to the situation.

The Findings:

Road Networks and Road Conditions

To effectively organise and budget for maintenance of the District and Village road networks, there is need for uniformity in recording the road links, their original construction, and their existing condition.

Terms such as "hotmix" or "hotmix/Latasir", used to describe the road type, cover a wide range of road construction techniques and specifications, ranging from commercially produced high quality asphalt concrete to a thin seal of locally mixed Latasir (manually mixed sand and bitumen). These two very different construction methods produce roads with very different traffic bearing capacities and maintenance needs.

In terms of the road condition, the review team was unable to ascertain the definition of the various descriptive terms for the road condition (good, moderate, medium, fair, bad, damaged, heavily damaged). In addition, the terminology changed with each road category (i.e. provincial, district, village).

Although information had been lost, there is an underlying need for a coherent system of record keeping (data-base) which could be regularly up-dated. This information could then be used as a basis for taking decisions on the planning for routine and periodic maintenance as well as rehabilitation and reconstruction.

Traffic counts were not available on district roads, apart from those carried out by specific projects or programmes.

Budgets

Available data and discussions at district level indicate that routine maintenance is the most neglected type of maintenance. There is no Government budget for routine maintenance on the village road network. The range of budget costs of routine maintenance, periodic maintenance and rehabilitation on the district roads

clearly indicates that the lines between these different activities are very blurred and that they all over-lap. A culture of preventative maintenance is not present as a cycle of construction, some periodic maintenance, rehabilitation and eventually new construction appears to be a prevailing norm. Limited up-grading works are being carried out on the village road network but some are being carried out under the rehabilitation budget-line.

The Agreement signed between the KDP/PNPM and the communities, places the responsibility for maintenance of the constructed community assets clearly with the benefiting communities. The District Governments are expected to contribute 20% of the funds for KDP/PNPM projects in their district. These funds must be invested before the KDP/PNPM budget is released. It is noteworthy that in other provinces the district budget contribution is higher (up to 60%)

KDP Road condition

Evaluation reports and site visits by the review team indicate that community maintenance of roads is minimal. The team were informed that there is only one day of training for the TP3 committees covering all types of infrastructure. The TP3 committees are responsible for organising and managing the maintenance of the created community asset. While there are maintenance training materials available at the level of the sub-district facilitators, but there are none for the use of the communities. The community has no examples of effective routine maintenance on the district and existing village road networks. Instead the community experience is that of a cycle of construction - worsening of the road condition, some rehabilitation by Government or the road deteriorating into a damaged condition or disuse. Maintenance can also be difficult if the quality of construction was not of certain standards.

Road Designs

The KDP/PNPM is a community driven programme. The community decides which type of project they wish to undertake. If improving/building a road is the top priority, then the community with the support of the community and technical facilitators decide on the type of construction. KDP community facilitators are tasked with assisting the community to make informed decisions. At present, it appears that facilitators and the community concentrate on the budget and how much can be achieved. The facilitators are not equipped for this discussion on investments versus longer-term maintenance at community level. Thus, there is a tendency to construct roads which are cheaper, but demand high levels of maintenance (Gravel - poor quality Telford)

Construction standards

Road specifications are available, and individual project documents had proper designs included in them. Translating standard designs into quality roads depends on the skills level and the amount of training provided to the village site supervisor. The sub-district technical facilitator could have up to 11 sites to visit although it was unlikely that all 11 would be simultaneously in the process of construction. However, the result is that the day-to-day site supervision was in the hands of the community supervisor.

The review team witnessed considerable variation in the quality of construction. This led to questions as to the level of quality control on the sites during the construction process. The pilot short course for KDP/PNPM sub-district technical facilitators on rural road construction by the Rural Roads Project in early 2008 was appreciated and there were many requests for the continuation of such training. A consolidated programme of training would be of even greater benefit.

Maintenance

Site visits revealed very few visible signs of routine maintenance taking place. Some roads had deteriorated dramatically within an 18-month to 2 year period due to structure failures, poor construction and no maintenance. The agreement between the KDP/PNPM and the communities, places the responsibility for maintenance of the constructed community assets clearly with the benefiting communities. Gravel haulage distances and quality of the gravel create a heavy periodic maintenance burden.

Proposals resulting from consultations on the findings with the Government, KDP/PNPM, and ILO – LRB Project.

1) With no resources to support maintenance readily available, the community should be encouraged to construct infrastructure which requires "minimum maintenance";
2) Communities could then concentrate their efforts on the off-carriageway (drainage) maintenance rather than on-carriageway maintenance;
3) For the constructed roads to require only "minimum maintenance", the design must be robust and the quality of construction good;
4) It should be recognised that participation in the construction of assets does not prepare communities for the maintenance of these same assets. There is need for advice, not only on the maintenance techniques, but the organisation, financing and management of maintenance.
   a) Maintenance of existing infrastructure is an urgent priority, and increased support to facilitators and communities needs to be offered immediately, while awaiting the outcome of the proposed maintenance trials. (See areas of possible cooperation, below).

Recommended actions to contribute to an improvement of the maintenance of infrastructure created through the KDP/PNPM.

These recommendations are made whilst acknowledging the existing manuals, training materials and training courses which have been developed and implemented as part of the KDP/PNPM:

1. Good standard designs should be made available for concrete roads (both strip and full width)
   a. Alternatives, such as the paving block roads commonly used in Java, could be considered especially for short flat sections of road;
2. Training for the technical facilitators, on road construction techniques should be continued;
3. The training of a group of foremen/women (mostly on-the-job) at sub-district level in the construction of the concrete and paved roads to a high standard with proper quality checks. These foremen/women could then be hired to

support the community on a daily basis on site during the construction period. This could be made a pre-condition for the approval of a road improvement project. The alternative is to train each village foreman/woman to an acceptable level of competence. This would place a huge training burden on the programme; therefore a core group of trained supervisors who will work on a daily basis with the community is a better option. KDP/PNPM would need to reach a decision on whether the programme pays for the supervisors on a contract basis or whether the community are asked to commit to hiring one of the trained supervisors as part of the agreement for funding their project.

4. Preparation of community level materials, combined with on-the-job training of trainers and mentorship arrangements for the facilitators, to enable them to lead discussions on the implications of road design and future maintenance with communities, as it is the communities who ultimately make the decisions on which type of construction to use;
5. Increase the training and preparation for the maintenance of the roads - this could also be extended to cover other infrastructure - by developing community level materials, on-the-job training of trainers combined with mentorship arrangements for the facilitators. The facilitators would then be in a better position to prepare communities for the effective maintenance of their road. It would also be advantageous to include the village road inspectors from Public Works in the training, as they are responsible for the village road network where most of the KDP roads are built;
6. Look at means of budgeting for assistance to communities, where possible for routine maintenance, but especially for periodic maintenance activities – re-gravelling, repairs to structures, re-sealing of paved roads) etc.. (The 20% district contribution to the KDP budget could be used as a basis for a maintenance fund instead of going for new works as is the case at present).

Recommendations for Public Works at District Level

1. There needs to be an increase in planning for, actual expenditure on, and implementation of routine maintenance to maintain the improved and re-instated infrastructure and to escape from the cycle of road damage followed by rehabilitation or reconstruction. In this case the routine maintenance would also include recurrent maintenance to the road surface (repairing pot-holes; patching; repairing edges; sealing cracks on paved roads, and repairing pot-holes and ruts, and grading[1] where appropriate on un-paved roads)[2].

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[1] In many areas of NAD Province, grading is not appropriate on gravel and earth roads from consideration of the terrain or from the surrounding land use and irrigation schemes.

[2] **routine** maintenance: required continually on every road whatever its engineering characteristics or traffic volume

recurrent maintenance: required at intervals during the year with a frequency that depends on the volume of traffic using the road

2. The District Public Works should propose to the District Parliament that they allocate and approve more of the budget for routine maintenance and consider ways of increasing allocations to the village road networks.

Areas of possible PW-ILO-KDP/PNPM Cooperation

The following areas could be pursued to test assumptions and recommendations made in this report:

i. Preparation of a Terms of Reference for the piloting of community-based maintenance that can possibly cover up to 250 villages in 5 districts in Indonesia (50 villages per district). This should include: determination of maintenance methods and options, training material production, training of trainers, actual piloting, demonstration, baseline data collection, monitoring, and evaluation. This will cover the testing of both paid and unpaid alternatives in community-managed maintenance system including community contracting. The TOR will be further discussed with KDP/PNPM and the World Bank. Funding sources will have to be identified.
ii. Continue with the trials on small contractor routine maintenance currently being carried out by the ILO-LRB project and expand to include the budgeting, management and supervision aspects together with the district authorities.
iii. Enter into dialogue with government and their partners as to the importance of maintenance, adequate maintenance funding, and the prioritising of maintenance activities.

INTRODUCTION

BACKGROUND

The Kecamatan Development Programme (KDP) is a National Government of Indonesia Programme aimed at alleviating poverty, strengthening local government and community institutions, and improving local governance. KDP began in 1998 at a time of financial crisis. Currently KDP is in its third phase which is expected to run until 2009. The KDP is designed along the lines of the global Community Driven-Development (CDD) Programme of the World Bank. In August 2006, the President of Indonesia announced a national anti-poverty programme with two separate components: a National Programme for Community Empowerment, and a Conditional Cash Transfer Programme. The National Programme for Community Empowerment (Program Nasional Pemberdayaan Masyarakat-PNPM) aims to continue the work of KDP in empowering communities by providing skills, organization, tools and funds to prioritise, design and implement activities at the village/sub-district level. KDP/PNPM offers the community an "open menu" of activities that they can select in a democratic way at the village and sub-district level for Rural Infrastructure, Social and Economic Activities. Even if in theory, it is an open menu, in practice, 90% of the activities implemented by KDP have been infrastructure projects (mainly roads). Table 1 summarizes the main financial inputs into KDP at national level[3].

Table 1: KDP's Financial Structure and coverage (in USD million)

Project Phase	IBRD/IDA	Trust Funds	Government Contribution	Total	No. of Districts covered
KDP1	273.2	0.8	50.0	324.0	130
KDP Supplement /a	48.5	0.2	6.5	55.2	130
KDP2	320.2	60.0	101.3	481.5	245
KDP3a /b	91	105.0	125.0	321.0	185
KDP3b	160	30.0	81.3	271.3	172
KDP3b with additional financing /c	123	9.0	50.0	182.0	280
Total	1015.9	205.0	404.1	1635.0	

a/ The KDP Supplementary Credit covered additional years for KDP areas
b/ Figures include MDF Aceh and linked donor funding as follows: **Aceh KDP: USD 79.0 million, KDP Nias: 50 million; Aceh post–conflict: 30 million, MDF KDP-BRR: 65.0 million**
c/ Figures for KDP3b with additional funding are projections. Government contribution includes approximately USD 360 million from the 2007 national budget and USD 100 million projected from local government budgets.

There is a general concern about the lack of infrastructure maintenance in Aceh. This issue is critical as there has been substantive investment in the infrastructure during the recovery and reconstruction periods after the Tsunami of 2004. The Multi-Donor Trust Fund for Aceh and North Sumatra (MDTFANS) alone allocated 36% of its funding to the infrastructure. The capacity of local governments to manage the maintenance of infrastructure of all types effectively will help safeguard the investments that have been made and further support sustainable economic development in the province.

[3] Source: IDA

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ii. Recommend practical steps (a general guideline) for the establishment and improvement of community-managed road maintenance for rural roads in Aceh, in particular on the KDP improved road network.

The Terms of Reference for the study is provided in annex A. The review team consisted of Ms. J.M. Tournée and Mr. M. Effendi.

METHODOLOGY

The review team studied relevant documentation, interviewed Ministry representatives, Programmes and Project staff (in particular DKDP/PNPM) at Provincial, District, and sub-District level. Within the time available, the team included field visits to three districts to gain an insight into road construction and maintenance practices, budget levels and organisational structures. The site visits provided opportunities to meet community members and community foremen. The most intensive data gathering took place in Bireuen District, and therefore Bireuen District will be used as a case study throughout this document. The team is aware that the situation in Bireuen may not reflect accurately the picture in other districts,

but the findings were generally consistent with the situation in the other 2 districts visited. Therefore, examples from Bireuen district will be used to illustrate many of the issues raised. Findings were discussed and proposals developed in cooperation with government and KDP/PNPM at -District and Provincial level within Nanggroe Aceh Darusslam[4] (NAD) Province.

CONTENT OF THE REPORT

The report seeks to provide a background to the road sector in Indonesia and specifically NAD Province, so that the KDP/NPM roads are not considered in isolation. Only by setting the KDP/PNPM roads within the context of the size and condition of the road network and the current financing can opportunities for improvement be properly assessed. The report concentrates on the work of the KDP/PNPM and the options available to improve maintenance of the community-built roads, but also provides analysis and brief recommendations for village and district road networks.

[4] Nanggroe Aceh Darussalam is the official title of Aceh Province

AN OVERVIEW OF THE ROAD NETWORKS

It is important to set the discussion of district and village roads within the context of the Indonesian road network, and in particular NAD Province administration and road networks.

In Indonesia, of the classified roads, 27,668 km (8.5%) are national roads, 51,638 km (15.9%) are provincial roads and 244,844 km (75.5%) are district and municipal roads. Beyond the classified network is a further network of village roads. The Ministry of Public Works, through its Directorate General of Highways is responsible for the national and provincial networks. The district road network is under direct responsibility of District Government. The village road network is under jointly responsibility of Division of Settlements at district level and Ministry of Home Affair at national level.

ROAD NETWORKS IN NANGGROE ACEH DARUSSALAM (NAD) PROVINCE

NAD Province has 21 Districts[5] (Kabupaten) and each district has a number of sub-districts (Kecamatan). For example, in Bireuen District, there are 17 sub-districts. The highest category of roads is the national roads, followed by provincial, district and then village roads.

NATIONAL ROADS

The national road network in NAD Province[6] is 1,782.8 km. 84% of this road network has an asphalt surface. As can be seen from Diagram 1 below, half the roads are in good condition and half are damaged.

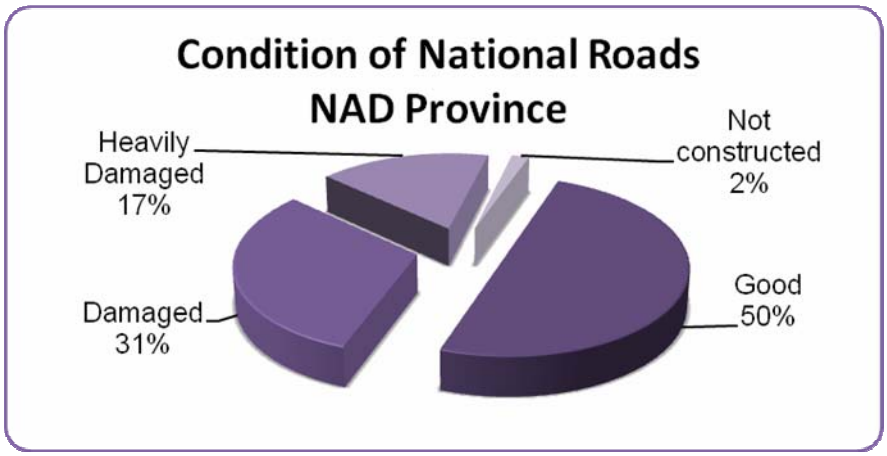


Diagram 1

PROVINCIAL ROADS

The provincial road network in NAD Province[7] is 1,701.8 km. In this case the proportion of the network with asphalt surfacing has reduced to 50%. As can be

[5] This number could have increased, as some of the districts have been split to create new administrative districts.
[6] Source: Provincial Department of Public Works ,2007
[7] Source: Provincial Department of Public Works ,2007

seen from diagram 2 below, the percentage of roads in good condition has also dropped and is assessed at 26%.

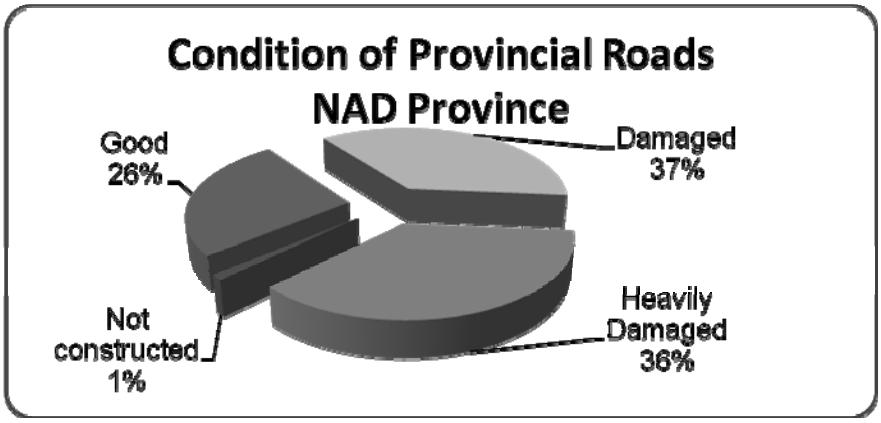


Diagram 2

THE DISTRICT ROAD NETWORK

The district road network in NAD Province[8] is 13,581.6 km. The photos below show two examples of district roads (i) gravel road and (ii) sealed surface road.

The percentage of each road surfacing type on the district road network is indicated in diagram 3 below. Again there is a reduction in the percentage of roads that have an asphalt / sealed surface.

[8] Source: Aceh in Figures 2005, Biro Pusat Statistic in Nanggroe Aceh Darusslam

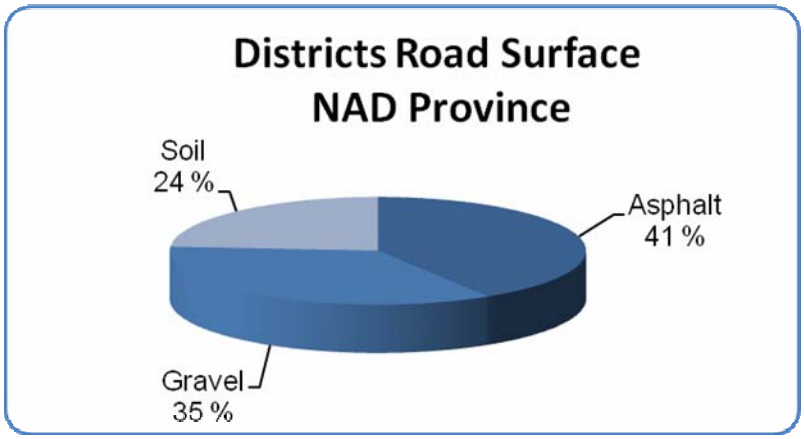


Diagram 3

The district road condition for NAD Province is assessed as shown in diagram 4 below.

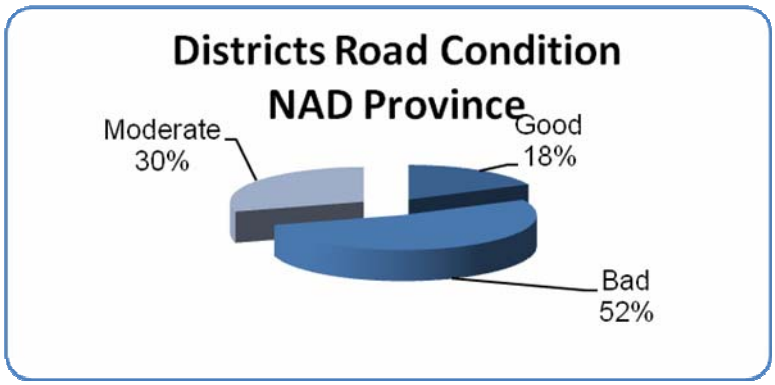


Diagram 4

The category descriptions used for the road condition for the District Road Network are different than those used for the National and Provincial Roads. However it can be seen that the roads in good condition have reduced to 18%.

The review team was not able to locate any information on the size and condition of the village aggregated at provincial level.

ROAD NETWORKS WITHIN DISTRICTS

To provide an example of information on the district and village road network, a closer look was taken at these road networks within Bireuen District. Bireuen was one of the three districts visited by the review team, and the situation in the other two districts - Pidie and Aceh Besar) - were judged to be comparable. This sample of districts was relatively small and geographically similar therefore the findings may not reflect the situation in some of the non-coastal districts.

Table 2 below provides an overview of the types of surfacing and the general condition of the roads in the district network. Due to the rehabilitation and maintenance work which has been carried out since 2005, the District is of the opinion that the road network has improved in condition. They are undertaking a new road condition assessment but the results are not available at present.

Table 2: District Road lengths and conditions within Bireuen District

ADMIN	TYPE OF	TOTAL	CONDITIONS				
			GOOD	MEDIUM	FAIR	DAMAGE	HEAVY

STATUS OF ROAD	SURFACE	LENGTH (KM)	(KM)	(KM)	(KM)	(KM)	DAMAGE (KM)
DISTRICT ROAD	HOTMIX/ LATASIR	369.86	94.04	22.50	97.33	37.05	118.94
	STONE	0.00	0.00	0.00	0.00	0.00	0.00
	GRAVEL	283.30	18.35	18.30	80.50	74.10	92.05
	EARTH	232.75	3.50	1.60	63.10	19.45	145.10
TOTAL		**885.91**	115.89	42.40	240.93	130.60	356.09

Source: compiled by M. Effendi from data collected from Bireuen District and Sub-district inventories for 2006/2007 based on 2005 data.

Diagrams 5 and 6 below illustrate the figures for the surfacing types and for the road condition of the District Road Network

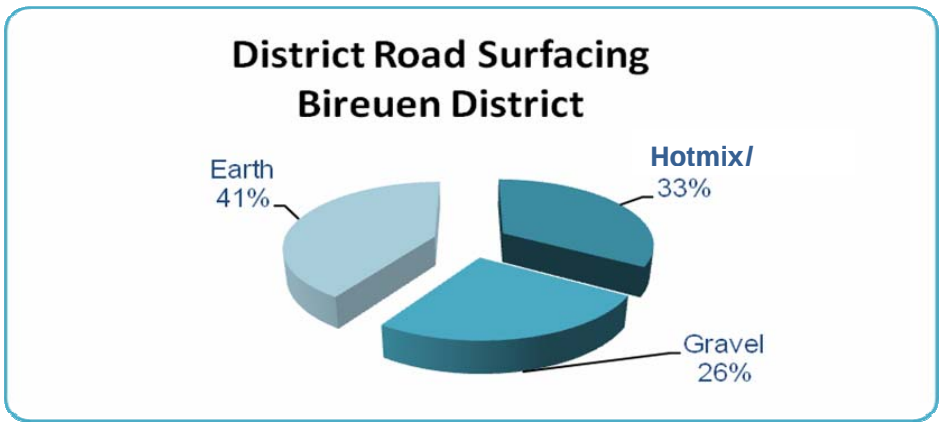


Diagram 5

As can be seen from diagram 5, only 33% of the district roads have a sealed surface. The district are commonly using three types of bitumen surfacing:

1. Hotmix: aggregate and bitumen mix by asphalt mixing plant
2. Latasir: manually mixed sand and bitument
3. Penetration Macadam

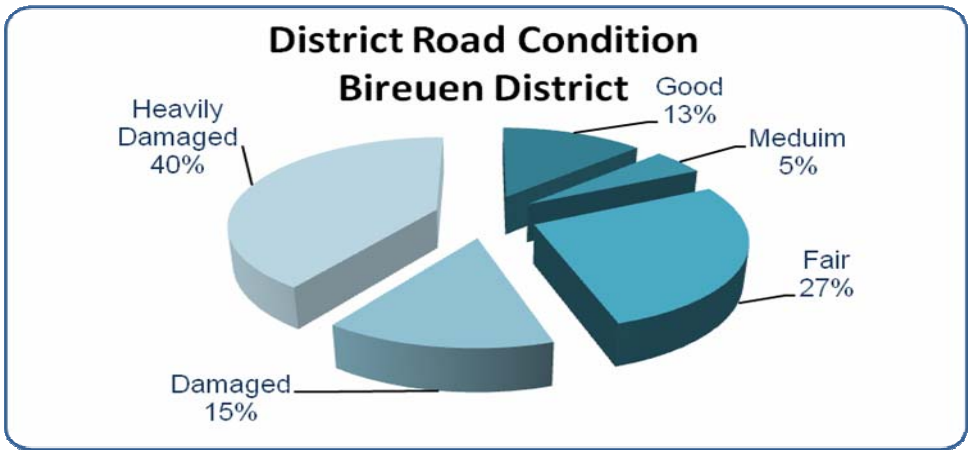


Diagram 6

Again the proportion of the road network deemed to be in a good condition has reduced to 13%. The damaged road length is 55% in total and the good to fair 45%.

Table 3 below provides an overview of the types of surfacing and the general condition of the village roads.

Table 3: Village Road lengths and conditions within Bireuen District

ADMIN STATUS OF ROAD	TYPE OF SURFACE	TOTAL LENGTH (KM)	CONDITIONS				
			GOOD (KM)	MEDIUM (KM)	FAIR (KM)	DAMAGE (KM)	HEAVY DAMAGE (KM)
VILLAGE ROAD	HOTMIX /LATASIR	166.38	34.14	11.30	2.70	98.20	20.04
	CONCRETE	3.55	0.00	0.00	0.50	0.00	3.05
	EARTH/ GRAVEL	775.87	0.00	0.00	93.77	168.90	513.20
TOTAL		945.80	34.14	11.30	96.97	267.10	536.29

Source: compiled by M. Effendi from data collected from Bireuen Sub-district inventories for 2006/2007 based on 2005 data.

The review team was unable, at district level, to collect data on the length of the village road network. The information is only available at sub-district (Kecamatan) level, where it was collected and put together to provide the figures in Table 3. Some new village roads, within the district, have been constructed by the communities, but these have not yet been registered by the government, and are therefore not included in Table 3.

Diagrams 7 and 8 below illustrate the road surfacing type and the road condition of the Village Road Network as collected from each sub-district.

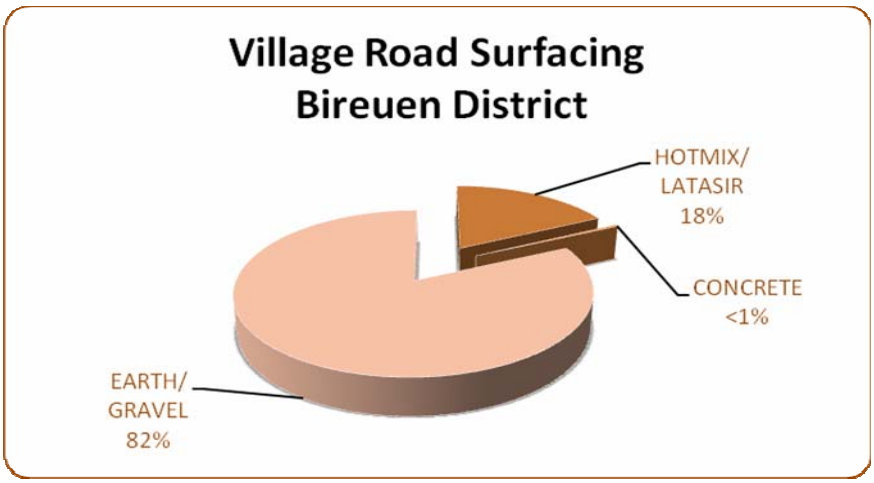


Diagram 7

The vast majority of the roads are either earth or gravel. The exact proportion between the earth and gravel was not available.

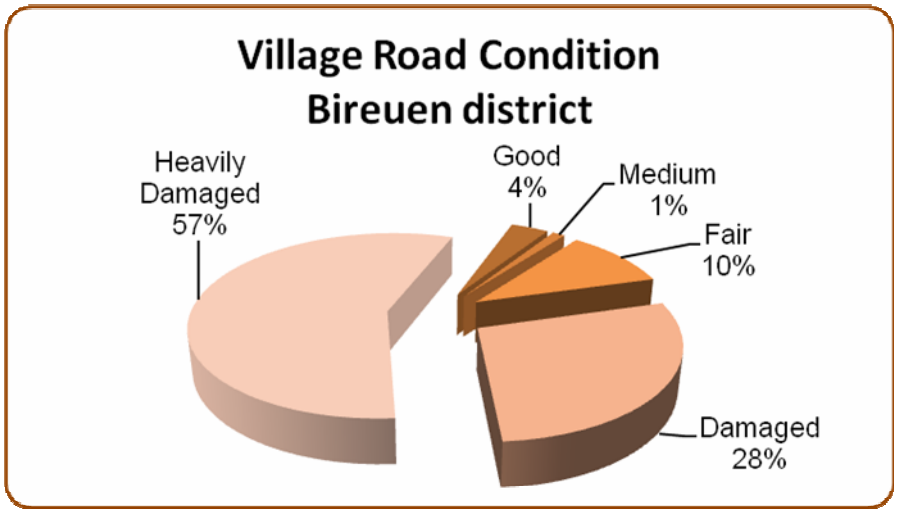


Diagram 8

The percentage of roads in good condition has now reduced to 4%. Damaged and heavily damaged account for 85% of the network. It should be borne in mind that the district and village road figures are based on 2005 assessments and that since then the Government and its partners have been improving the road networks. In the case of the village road network, the projects initiated by communities under the Kecamatan Development Programme (KDP) have improved the road conditions. The extent to which the improvements on all classes of roads are preserved through maintenance activities will be dealt with specifically under the section on road maintenance.

FINDINGS ON THE ROAD NETWORK INFORMATION

To effectively organise and budget for maintenance of the District and Village road networks, there is need for uniformity in recording the road links, their original construction, and their existing condition.

Terms such as "hotmix" or "hotmix/Latasir", used to describe the road type, cover a wide range of road construction techniques and specifications, ranging from commercially produced high quality asphalt concrete to a thin seal of locally mixed Latasir (manually mixed sand and bitumen). These two very different construction methods produce roads with very different traffic bearing capacities and maintenance needs.

In terms of the road condition, the review team was unable to ascertain the definition of the various descriptive terms for the road condition (good, moderate, medium, fair, bad, damaged, heavily damaged). In addition, the terminology changed with each road category (i.e. provincial, district, village).

Although information had been lost, there was a need for a coherent system of record keeping (data-base) which could be regularly up-dated. This information could then be used as a basis for taking decisions on the planning for routine and periodic maintenance as well as rehabilitation and reconstruction.

Traffic counts were not available on district roads, apart from those carried out by specific projects or programmes.

PRIMARY RURAL ROAD PROVIDERS IN ACEH

There follows a brief description of some of the programmes which are implementing improvements to the roads in NAD Province. The list may not be complete, but the review team have tried to capture the most relevant.

AGENCY OF THE REHABILITATION AND RECONSTRUCTION FOR THE REGION AND COMMUNITY OF ACEH AND NIAS (BRR)

Following the end of emergency response phase, in the aftermath of the tsunami and earthquake, the government assigned the National Development Planning Agency (BAPPENAS) to coordinate the establishment of a rehabilitation and reconstruction plan for Aceh and Nias. Several institutions in cooperation with international bodies participated in the process of developing the Master Plan (Rencana Induk). The Master Plan outlined the need to establish an agency responsible for the coordination and implementation of the rehabilitation and reconstruction plan for Aceh and Nias. Following on from laws passed to enable the work of the BRR, through the Presidential Decree No. 63/2005, the governing bodies of BRR were formulated and comprised: an Advisory Board; a Supervisory Board; and an Executing Agency. This decree stipulated that each of the governing bodies had a complimentary role and responsibility within the agency which are described below.

BRR'S Vision: The process of the rehabilitation and reconstruction of the Aceh and Nias regions, coordinated by the BRR, must be in accordance with and supportive of the vision and mission of each region affected by the disaster. In its capacity as the executing agency for the rehabilitation and reconstruction program for the Aceh and Nias regions and their communities, BRR has formulated the following vision statement;

"Building reliable, dignified, prosperous and democratic Aceh and Nias"

BRR'S Mission: In the Indonesian Government's Master Plan for the rehabilitation and reconstruction of Aceh and Nias the basic policies formulated can be encapsulated in the following four principle objectives:

- To rebuild Aceh and Nias societies for both the individual and for the community;
- To rebuild the physical and institutional infrastructure;
- To rebuild the economy in order that businesses can return to normal; and
- To rebuild the government as a facility to serve the people.

Principle Points of BRR's Mandate:

- Coordinate and implement rehabilitation and reconstruction projects based on the implementation guidelines set forth in APBN and;
- Facilitate and coordinate the implementation of rehabilitation and reconstruction programs by the central and local government and foreign institutions such as INGOs and Donor agencies[9].

The total commitment gained from APBN and Non-APBN (development partners and financial institutions) funding, up to the end of year 2007, reached a total of Rp 57,2 trillion. That amount is equal with 76 percent total funds required for rehabilitation and reconstruction.

[9] Adapted from: http://www.e-aceh-nias.org/about_brr/profile.aspx

Within the road sector, the BRR has supported improvements to the national, provincial, district and municipal roads to a value of Rp 1,074,493 million. In Bireuen District they have financed the construction of 28.7 km of roads at a cost of Rp 23,891 million[10].

As was highlighted in the notes to table 1 in the introduction section of this report, BRR also provided additional funding of USD 65 million to the KDP/PNPM.

KDP/PNPM PROGRAMME ROADS

As stated in the introduction, KDP has been active in Aceh since 1998. The length of road repaired/constructed by KDP in NAD Province[11] from 1998 to 2004 was 1,413 km, and from 2005 to February 2007 is 1,672 km. For the whole of NAD Province plus Nias, the KDP has constructed/ repaired 2,329 km of roads in the period August 2005 to March 2008.

The work carried out under KDP cannot be regarded in terms of a "KDP network" as most of the improvements have taken place on the village road network or new roads have been built to extend the existing network. The sub-district inventories and the KDP records are based on different systems. The village road network is mostly listed as links, whereas the KDP inventory is based on village and sub-village names related to the communities which were awarded the projects. As a result of the different systems, it is difficult to estimate the total length of the village plus KDP roads. In addition, part of the works carried out by KDP prior to 2005 will have been destroyed as a result of the Tsunami, and therefore the length constructed prior to 2005 cannot be simply added to the total for 2005 to 2008.

Diagram 9 illustrates the construction/surfacing of the KDP roads built between 2005 and February 2007 in NAD Province. The assessment is made on the total length in km. It can be seen that the majority of roads built have a gravel surface.

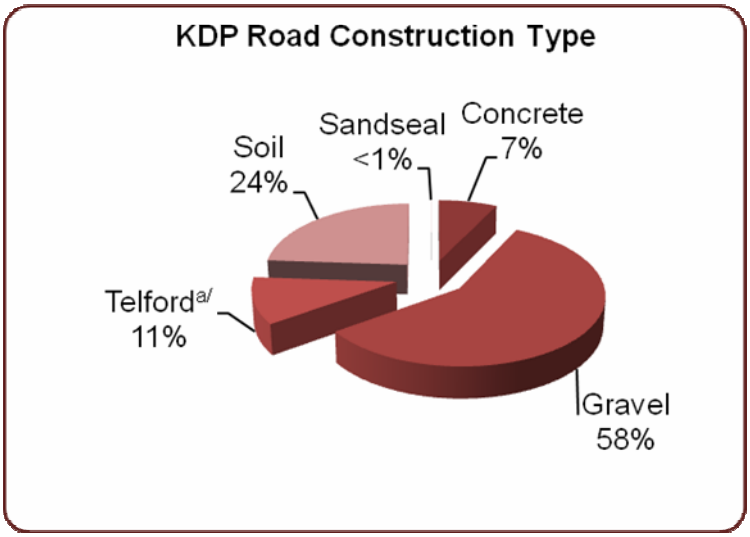


Diagram 9

[10] Figures provided by BRR.

[11] Source: ILO and KDP/PNPM

a/ The Telford method of road construction is to set a layer of large stones, on a prepared soil base, to carry the weight of the road. This is followed by a layer of broken stone on top followed by a third layer of gravel. The road should have a camber (roof shape) to allow the water to run off into the drains at the side of the road.

In 2006, a village survey in Aceh – "An Assessment of Village Infrastructure and Social Conditions" was carried out by KDP. One of the major conclusions of the study was that on average, 19.5% of the damage to infrastructure was caused by conflict, 38.6 caused by natural disasters, and 41.9% due to lack of maintenance. This result applies to all infrastructure constructed at village level, not just roads. The implication is that community assets created under KDP/PNPM are being lost, and will continue to be lost, due to lack of maintenance. As a result the benefits to the communities are also being lost. In the case of NAD Province, lack of maintenance has proved to be more destructive than either conflict or natural disasters.

LOCAL RESOURCE-BASED ROAD WORKS IN ACEH AND NIAS

This project has been designed to provide district governments with financial and technical support to:

- capacitate district government and small-scale local contractors in undertaking local resource-based road works;
- provide the techniques, standards, systems and strategies for this approach.
- involve the local communities in the provision of district and other rural roads.

The project provides short–term employment opportunities for the local workforce in the rehabilitation of roads, and longer-term opportunities in the maintenance of the roads.

The project is operating in 3 districts of NAD province and is concerned with the contractual processes, introduction of new techniques, and capacity building during rehabilitation and reconstruction of 95 km of district roads. Funding is provided by the Multi Donor Fund for Aceh and Nias (MDF).

The picture on the left shows trials for alternative road construction using cold emulsion instead of bitumen. The picture on the left shows the emulsion being spread on the prepared road

As part of the project, trials are also being carried out on routine maintenance contracts for some of the district roads improved under the project. The routine maintenance contracts are being implemented through local small contractors.

NGOS

Many international NGOs such as Mercy Corp, Oxfam, Caritas, Catholic Relief Service, Save the Children (to name but a few) have been assisting communities in reconstructing their homes and infrastructure. Part of this work has involved the construction/rehabilitation of roads. In some cases the NGOs have also re-built roads unconnected with community reconstruction.

As is the case with KDP, the communities are provided with support to improve their infrastructure, but the maintenance is reliant on their own continued efforts.

ROAD MAINTENANCE

Having established as nearly as possible the size and condition of the road networks, the next issue to be addressed is that of how the roads are being maintained once they have been constructed or improved. As a starting point, it is best to clarify what exactly is meant by different types of maintenance.

MAINTENANCE DEFINITIONS[12]

For the purposes of management, the most useful way to classify maintenance activities is in terms of their frequency. There are four categories:

- **routine** maintenance, required continually on every road whatever its engineering characteristics or traffic volume
- **recurrent** maintenance, required at intervals during the year with a frequency that depends on the volume of traffic using the road
- **periodic** maintenance, required only at intervals of several years
- **urgent** maintenance, needed to deal with emergencies and problems calling for immediate action when a road is blocked.

Examples of activities within these categories are as follows:

- **routine:** grass cutting; drain clearing; re-cutting ditches; culvert maintenance; road signs maintenance;
- **recurrent on unpaved roads:** repairing pot-holes and ruts; dragging; grading;
- **recurrent on paved roads:** repairing pot-holes; patching; repairing edges; sealing cracks;
- **periodic on unpaved roads:** re-gravelling;
- **periodic on paved roads:** resealing (surface dressing, slurry sealing, fog spray, etc.);
- re-gravelling shoulders; road surface marking;
- **urgent:** removal of debris and other obstacles; placement of warning signs and diversion works.

Table 2 below illustrates the order of importance for the different maintenance activities.

Table 2: Matrix of Maintenance Priorities

Category of Maintenance activity	Priority							
	Traffic Category							
	1	2	3	4	5	6	7	8
Urgent	**1**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Routine Drainage Works	**2**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Recurrent Work on Pavement	3	21	24	27	30	33	36	39
Periodic work	4	22	25	28	31	34	37	40

[12] Overseas Road note 1, Maintenance management for district engineers, 2nd edition, Transport and Road research Laboratory Overseas Unit, Department of Transport, Overseas Development Administration, 1995

Other Routine Work	5	23	26	29	32	35	38	41
Special	6	42	43	44	45	46	47	48

Table source: Overseas Road note 1, Maintenance management for district engineers, 2nd edition, Transport and Road research Laboratory Overseas Unit, Department of Transport, Overseas Development Administration, 1995

Matrix notes:

- Under the title Traffic Category, 1 represents the highest trafficked roads and 8 the lowest trafficked roads
- The highest trafficked roads have priority for all maintenance activities (1 to 6)
- The numbers in the remainder of the table are a priority ranking of the order of importance of each of the maintenance activities.

From the matrix of maintenance priorities it can be seen that for each category of road (1 to 8) the first priorities are **urgent repairs** and **routine maintenance of the drainage works**. In other words, maintaining the drainage system is the most important preventative maintenance measure. This reflects the basic principle that water is the road builder's worst enemy.

Routine maintenance is a year round activity. It is not necessarily true that maintenance work will be taking place throughout the entire year, but it is important that certain activities are carried out before the rains, during the rains, after the rains and in the dry periods. Routine maintenance must be organised to reflect this need and the budgets must be available in a timely manner for the work to be executed. The example below from Peru, demonstrates the savings hat can be made by properly organised and implemented routine and periodic maintenance.

The rural road programme in **Peru** demonstrated that initial rehabilitation of rural roads had an average cost of US$ 16,500 per kilometre. Subsequent routine maintenance with micro-enterprises averaged a cost of US$ 700 per kilometre per year, through which the lifespan of the road could be extended to 5 years. After these 5 years periodic maintenance was generally required, costing on average US$ 3,000 per kilometre, resulting in a total cost every 5 years of US$ 6,500 per kilometre (5 x US$ 700 + US$ 3,000). In the alternative without maintenance, the roads tended to require full rehabilitation after 5 years, resulting in a total cost of US$ 16,500 per kilometre. The subsequent savings due to a combination of routine and periodic maintenance were thus calculated to be US$ 10,000 per kilometre every 5 years (US$ 16,500 - US$ 6,500). Given the nearly 15,000 kilometres of roads covered by the programme, this implies a savings of approximately US$ 150 million every 5 years.[13]

The next section considers the actual road maintenance and budgeting situation as ascertained by the review team.

ROAD MAINTENANCE WITHIN ASIA AND INDONESIA[14]

Maintenance funding is a major problem in the road sector. There are several reasons for this however; the result is that major parts of the road networks of countries in the Asia region receive little or no maintenance from one year to the next. The further down the network one goes the lower the amount of funds that are

[13] Source: Cartier van Dissel, Microenterprise-based Routine Road Maintenance in Latin America, ILO

[14] Source:, Donnges, Edmonds, Johannessen, Rural Road Maintenance: Sustaining the Benefits of Improved Access, ILO, 2007

available. Table 4 illustrates the maintenance funding gap, and table 5 illustrates the maintenance budgets as a percentage of Gross National Product (GNP) for a selection of countries in the Asia-Pacific Region.

Table 4: Maintenance Funding Gap

Country	National km	Maintenance cost	Rural km	Maintenance cost	Total cost $million	Budget $million	Percentage cost covered
Cambodia	4,757	17	27,800	42	58	7.7	13
Indonesia	26,300	92	291,841	438	530	45	8
Lao PDR	6,420	22	21,710	33	55	19	35
Mongolia	11,063	39	37,923	57	96	1	1
Philippines	29,900	105	164,719	247	352	140	40
Thailand	52,960	185	179,484	269	455	258	57
Vietnam	15,284	53	198,230	297	351	87	25
Jarkhand	7,883	28	104,727	157	185	21	11

Table 5: Road Maintenance Budgets as % of GNP

Country	Maintenance as a percent of GNP
Indonesia	0.03
PNG	0.04
Mongolia	0.08
China	0.10
Philippines	0.16
Lao PDR	0.17
Cambodia	0.19
Thailand	0.19
Vietnam	0.22
Bhutan	0.38

The figures in these tables should be viewed as an order of magnitude only.

MAINTENANCE ON NATIONAL AND PROVINCIAL ROADS

The information on national and provincial roads relates to these networks within the boundaries of NAD Province.

In interviews with government officials and development actors in the road sector, it became increasingly clear that greater attention needed to be paid to financing and managing routine maintenance. It was recognised as an issue which needed addressing, and various options were being tried out.

One of the options was to include an allowance in construction contracts for the contractor to continue with routine maintenance once the construction was

completed. However this only appears to delay the problem as once the contract period and maintenance period were finished, the burden of maintenance returned to the authorities. Budgets are available for maintenance, but are deemed inadequate. Even where budgets are available, there was not always a clear demarcation of what is allocated for routine and what is allocated for periodic maintenance. There was a tendency to neglect routine maintenance in favour of periodic maintenance. For the national roads, budget was set aside for routine (and recurrent) maintenance and these were disbursed in January/ February of each year. However the rate per km for 2007 was Rp 10 million per km (equivalent to USD 1100) which the review team was informed was inadequate to meet the road network needs.

DISTRICT ROAD AND VILLAGE ROAD MAINTENANCE

BUDGETS

Through discussions and information gathering in Bireuen, Pidie and Aceh Bisar Districts and NAD Provincial Public Works, the review team developed flow charts illustrating the annual planning and budgeting process for district roads from different budget sources. These charts are included in annex 2. The process may vary slightly from District to District, but the process is long and time consuming, especially as there appears to be no multi-year planning, and this process must be followed each year, even for the routine maintenance budgets.

In general terms, the budgets and programmes of work are approved by April/ May and the project preparation including tendering completed in June/ July. Therefore work on the roads starts from about July /August and had to be completed by December. Roughly, a maximum of half a year is available for implementation.

The staff costs are catered for through a separate budget from the budgets for roadworks. There are 224 staff at Bireuen District and sub-district level of which 130 are at district level. There are a total of 25 road inspectors – 15 for district roads and 10 for village roads. The 10 road inspectors for village roads cover 17 sub-districts.

Table 6 provides an example of the 2007 budgets from Bireuen District.

Table 6: Budget Allocation

Network	Type of activity	Budget (Rp)	Source	length (km9	Cost/km (Rp)	Cost/km (USD)
District Road	Routine Maintenance	9.539 billion	DAK 90%	22.7	120 million	13,300
District Road	Periodic Maintenance		DAU 10%	62.7	210 million	23,500
District Road	Rehabilitation	17.222 billion	DAU	138	125 – 245 m	13,900 – 27,200
District Road	New construction	9.906 billion	DAU	(24)*	125 – 490 m	13,900 – 54,400
Total				247.4		

Village Road	Rehabilitation	3.096 billion	DAU	10	250 – 320 m	26,800 – 35,600

Exchange rate used: USD 1 = Rp 9,000

Notes to table:

- *The budget includes estimates for structures such as retaining walls but these are not included in the estimated km total.
- These are planned activities, which the district informed the team they have achieved, but no report was available.
- Different road widths and road standards contribute to the varying costs per km for some of the activities.
- In 2007, the district planned work on 247 km out of 885.9 km (28% of the district road network)
- On the village road network, the amount of work planned covered only 10km from 946 km, about 1%.

The following findings are based on table 1, discussions at district level and site visits:

1. The range of budget costs of routine maintenance, periodic maintenance and rehabilitation clearly indicate that the distinction between these different activities is very blurred and that they all over-lap. At some of the sites visited, routine maintenance was in reality a limited section of re-sealing (a periodic maintenance activity) with some attention to clearing of the drainage. Normally the cost of activities would increase from routine maintenance to periodic, to rehabilitation to new construction. It would also be anticipated that routine maintenance would cost less than one tenth of the periodic maintenance.
2. Routine maintenance is planned for only 3% of the district road network, although the percentage of roads in good, medium and fair condition amount to 45%.
3. There is little or no culture of preventative maintenance but a cycle of construction, periodic maintenance, and rehabilitation.
4. There is no budget allocation for routine maintenance on the village road network, reliance being placed on self-help maintenance by community members.
5. There are very limited up-grading works being carried out on the village road network, but some are being carried out under the rehabilitation budget-line.

IMPLEMENTATION OF CONSTRUCTION AND MAINTENANCE ON THE DISTRICT ROAD NETWORK

The District Public Works implements the road works planned for the District Road Network, and where the limited budget allows, also the improvements to the Village Road Network. The majority of the works are carried out through contracts with private contractors, but some of the maintenance work is carried out by force account[15] operations. The contractors are local contractors and must be registered as a company, registered with a contractors association and with the Department of Public Works at district level. Contracts are put out for open tender. If the budget is

[15] Force account is a term used for works carried out directly by a department, not using a contractor, but its own staff and labour force.

less than Rp 50 millions (approx 5,000 USD) then direct sourcing is permitted (there is no tender procedure, a contractor is appointed). Any sum over 50m must be tendered.

The standards for construction are not based on traffic counts as the review team was informed that there was no budget for carrying out traffic counts. Individual projects have carried out traffic counts on the roads to be improved or rehabilitated, but not the District Public Works Department. The most frequently used standard designs for the roads at district level are:

- Latasir surfacing (sandseal) 2 cm

  Base course 10 cm

  Sub-base course 10 cm
- Penetration Macadam 5 cm

  Base course 10 cm

  Sub-base course 10 cm

When rehabilitating a road or up-grading a road from gravel to a paved surface, it may not always be necessary to re-lay the sub-base and base course, but reshaping would always be needed and compaction of these layers.

The district road shown in the picture on the left was rehabilitated in 2003. Since then, routine maintenance was only once carried out in 2005. In all other years no budget for routine maintenance for this road had been allocated. This affected not only the road surface, but also the drains and culvert.

The picture on the right shows an example of routine/regular maintenance patching of the road surface where cracking had appeared. This work was carried out on a completed road in Bireuen District by the construction contractor during the maintenance

IMPLEMENTATION OF CONSTRUCTION AND MAINTENANCE ON THE VILLAGE ROAD NETWORK

The sub-district put forward proposals for improvements to the village road network in their areas to the District. The District Public Works, then propose road links to be improved to the District Parliament which makes the final decision. The sub-districts are informed of the decision, but do not participate in the implementation which is organised from District level. The village road network falls under the Settlements section of Kimpraswil (Public Works). This section reports to the Directorate of Community Development of the Ministry of Home Affairs who are responsible for the Village roads.

As has been discussed above, there is no budget for maintenance of the village road network and there is an assumption that the village communities will carry out some maintenance on the village roads. From the field visits, the review team saw only a few examples of routine maintenance (grass cutting and drain clearing) on village roads.

The category of earth road as found in diagram 7 is a very general term as some of the village roads did have gravel surfacing and some showed evidence of a form of Telford base.

The road shown in the picture on the left was originally constructed through KDP funding and later up-graded to a surfaced road by the District Public Works from the village rehabilitation budget.

KDP/PNPM ROADS

BUDGETS

KDP is budgeted for centrally as it is a national programme. In NAD Province extra money has been made available in the aftermath of the Tsunami from the Multi Donor Fund and from the BRR. Table 1, in the background section, provides an overview of the national funding. From January 2005 to February 2007, the amount of KDP funds spent on road construction / improvements in NAD Province amounted to Rp 131,669 million (approximately USD 14 million)[16]

The money provided under the BRR, was specifically earmarked for road construction and the construction was stipulated as a sealed surface (latasir or penetration macadam). The photo below illustrates a road constructed using BRR funding within the KDP/PNPM.

In NAD province, from 2008, the districts are expected to contribute 20% of the funds for KDP/PNPM projects within their district. These funds must be invested before the KDP/PNPM budget is released. In other provinces the district budget contribution is higher (up to 60%)

In Bireuen District the budget for 2007 was as follows:

- BRR allocation spread over 13 sub-districts = Rp 20,546 million
- KDP/PNPM allocation for 2 sub-districts only[17] = Rp 6,800 million

In Bireuen District the budget for 2008 is Rp 13,750 million and will be distributed across 5 sub-districts selected centrally based on poverty data. The budget is made up from Rp 11,000 million from Central Government and Rp 2,750 million from Bireuen District as their 20% cost-sharing contribution.

A SUMMARY OF ROAD COSTS

[16] Source: KDP/ILO

[17] In the period 2005 to 2007 KDP/PNPM had been supplying budgets for 17 sub-districts

Although roads are being built in different terrain and with different specifications, there has been an attempt to cost the actual construction of several different designs of roads. Table 7 below provides an average cost for construction. The figures are taken over three years and some of the samples are very small in number such as for the concrete and latasir roads, and therefore the figures should be taken as indicative of costs.

Table 7: The Cost Comparison of KDP Roads in 2005-2008

No	Type Constructions	Cost/Km	Remarks
1	Concrete	149,030,037.10 260,000,000.00	Concrete Strip Full Concrete
2	Gravel	71,447,033.29	
3	Telford	130,857,867.29	New Road Opening
4	Soil	76,581,922.04	New Road Opening
5	Latasir	342,857,142.86	

Source: The KDP Project in Nanggroe Aceh Darussalam Province/ILO

The KDP roads constructed in Bireuen District from 2005 – February 2007 Feb amount to 242 km.

The picture on the left shows a KDP road under construction funded by BRR.

The road is budgeted to cost Rp 484 million (USD 48,000) for a 1.1km length.

The sealed width will be 3m. The road specification is for

- Latasir surfacing (sand seal) 3 cm
- Base course 10 cm
- Sub-base course 15 cm

The photo illustrates the road with a

The agreement between the KDP/PNPM and the communities, places the responsibility for maintenance of the constructed community assets clearly with the benefiting communities. The programme has no budget for maintenance.

IMPLEMENTATION OF CONSTRUCTION AND MAINTENANCE ON KDP ROADS

DESIGNS

The KDP/PNPM is a community driven programme. The community decide which type of project they wish to undertake. If improving/building a road is the top priority, then the community with the support of the community and technical facilitators decide on the type of road they would like to build.

Facilitators and the community concentrate on the budget and how much can be achieved within the given budget, thus there is a tendency to construct roads which are cheaper, but demand high levels of maintenance (I.e. gravel - poor quality Telford).

Road designs are available, and individual project documents had proper designs included in them.

CONSTRUCTION

Construction is either carried out through a contractor hired by the community or directly by the community themselves under the direction of a village foreman/woman. The hiring of contractors and arrangements for material supplies are carried out in line with programme procurement regulations. Where the community opts to construct the road themselves, a village foreman/woman is chosen from within the community and should ideally be some-one with previous construction experience either with government or the private sector. The quality of construction is dependent on the skills level and the amount of training there is provided to the village site supervisor. The sub-district technical facilitator could have up to eleven sites to visit although it was unlikely that all eleven would be simultaneously in the process of construction. However, the result is that the day to day site supervision was in the hands of the community supervisor not the technical facilitator.

The picture above shows a KDP funded road constructed in Aceh Besar District in mid-2006. The road already existed and had a Telford base . A 7 cm layer of

The picture above shows a KDP funded concrete road built in 2001 in Bireuen District. In general, the concrete is still in good condition but as can be seen in the lower right corner there is now need for minor repair works. The road was constructed with concrete strips on the

The review team witnessed considerable variation in the quality of construction. This led to questions as to the level of quality control on the sites during the construction process.

One set of the materials developed to support the construction process was a series of picture books – "Picture Book, The Good & the Bad Infrastructure". Of particular relevance is number 1 for Roads and Bridges[18]. This provides photos of good examples of construction and poor examples and illustrates the improvements needed at the construction stage.

Training is an on-going process within the KDP/PNPM, and is designed to address areas of concern. In addition to the training carried out by KDP/PNPM, a short course was piloted for KDP/PNPM technical facilitators on road construction by the Rural Roads Project in NAD Province in early 2008. This was very much appreciated by those fortunate enough to attend and there were many requests for the continuation of such training and an increase in the numbers having the opportunity to attend. A consolidated programme of training would be of even greater benefit.

Below is a small example of how one missing detail in a construction process can negatively affect the quality of the infrastructure being built.

[18] Hartmann and Unger, The Good & the Bad Infrastructure, Road and Bridge, World Bank, 2006

The concrete road, pictured on the right, was under construction when the review team visited. The site was well organised, the setting out well done and the preparation and compaction of the base very good. The quality of the concrete work seemed also to be good, but the process fell down as there was no water for curing the concrete. The freshly poured concrete was left exposed to the heat of the mid-day sun. The review team were informed that the area suffered from a lack of water which would be addressed by another project in 2008.

MAINTENANCE

The following findings are based on evaluation reports and team site visits:

1. The agreement between the KDP/PNPM and the communities, places the responsibility for maintenance of the constructed community assets clearly with the benefiting communities;
2. Community maintenance of roads is minimal;
3. A TP3 committee is formed from community members and is responsible for managing the operation and maintenance of the KDP supported community asset. The review team was informed that there is only one day of training for the TP3 committees covering all types of infrastructure – not just roads;
4. The facilitators have been provided with training and information on maintenance for their own use when supporting the communities. They have not been provided with materials for the communities which can be introduced to them and then left behind as a guide to the organisation and implementation of routine maintenance and to assess periodic maintenance needs.
5. As can be seen from the discussion on the national, provincial and district road networks above, there are practically no models of organised routine maintenance to serve as an example for the communities. Instead, the community experience is that of a cycle of construction, worsening of the road condition, and then either rehabilitation or reconstruction.
6. In the case of village roads they are either up-graded (1%), receive some community maintenance, or fall into a poor condition or disuse;
7. Some KDP gravel roads had deteriorated dramatically within an 18 month to 2 year period due to poor construction and no maintenance. The quality of the original construction can cause problems in subsequently trying to maintain the asset. For example, if slopes are not cut back at the correct angle, then they will continue to be a source of loose material which will fall into the road and could cause landslides during rains.

The picture on the left shows a section of a KDP funded gravel road built in Bireuen District in 2005. There was no evidence of maintenance and the road shape was deformed. The road was not passable along its full length as a

8. In general, although the sample visited was small, the concrete roads were remaining in better condition than the gravel and Telford roads. In some cases there was evidence of routine maintenance such as grass cutting in the centre and the edges of the road

The road pictured on the right was built in 1998 and therefore is almost 10 years old. Due to the elevation of the road there are no drainage problems apart from when severe flooding occurs. The concrete running surface is still in very good condition and the community assured the review

LESSONS FROM INTERNATIONAL EXPERIENCE

When considering maintenance, one of the first hurdles to cross is an attitudinal one about the necessity for organised maintenance.

There is a general perception that maintenance is an activity that needs to be done when things go wrong. This may be in part cultural. You go to the doctor when you are sick; you mend your car when it breaks down. To change this attitude as regards rural road maintenance at the local level requires more than exhortations and instruction. Vested interest plays a major part and if the key people involved do not see the benefit to themselves they are unlikely to respond to these pleas[19]

Where there is a commitment to maintenance, the most successful models for community-based maintenance are those where maintenance work is paid for. The following model demonstrates a situation where the government budgets for maintenance, and employs organisations formed within the community or group of communities to carry out the work. In both cases the labour is paid.

The majority of routine road maintenance micro-enterprises in Latin America are non-profit Associations or Cooperatives, or even Committees, whereas a small minority are Companies (Public or Private). Despite the increased initial input required in creating and strengthening these micro-enterprises, the main advantage has been the lower requirements for supervision, as a section of road of up to 50 km can be evaluated at a single time, rather than having to assess each 2-3 km stretch separately, which would be the case if the district / village roads department were organising individual lengthmen/women instead of contracting a micro-enterprise. A second important advantage has been the effect on the local economy and productive activities, where the entrepreneurial training and experience have resulted in the creation of new business endeavours, both by the micro-enterprise members themselves, as well as their family members and others. Thirdly, it has been found that the maintenance work carried out by micro-enterprises is generally of better quality and more efficient than that of individual workers, mainly as a result of mutual assistance and group dynamics[20].

A popularly proposed alternative is for the community to take responsibility for organising themselves to carry out the maintenance. Then it becomes the decision of the community whether work is done on a voluntary basis (self-help) or if the community pool their resources and pay for members to do the work on the community's behalf. Leaving the responsibility for maintenance entirely with the community has proved fairly problematic, not only in Indonesia.

One important finding of the World Bank portfolio review is that over time, the social investment funds have moved toward closer monitoring of project sustainability and to better practice with respect to sustainable service delivery.

The problem arises because the agreements that the funds make with these organizations are not always effective, especially in the case of community groups with little operational support experience and a lack of resources to absorb recurrent costs. Non-compliance occurs particularly with projects that make the beneficiaries responsible for the maintenance and operation of the facilities (e.g. water and basic sanitation infrastructure). Sustaining social

[19] Source: Donnges, Edmonds, Johannessen, Rural Road Maintenance: Sustaining the Benefits of Improved Access

[20] Source: Adapted from: Cartier van Dissel, Micro-enterprise-based Routine Road Maintenance in Latin America, ILO

services is also difficult for poor municipalities that do not have the sources of revenue or the technical capacity to manage the operations.

Sustainability is better assured when maintenance and follow-up operations fall within the plans and programs of the line ministries, recurrent costs are fully covered (direct appropriations from central or local government budgets and planned recovery provisions from user fees), and responsibilities for future operation of the services created are explicitly laid out.[21]

Maintenance activities must be well designed and supported to ensure that maintenance is properly organised and implemented. Wherever maintenance is budgeted for, and properly managed, there is an opportunity to build local capacity to maximise the use of local resources. These local resources can be organised either through community groups or through local contractors. The resulting employment can boost income in the local area and at the same time ensure the sustainability of assets important to communities, sub-districts and districts.

ASSESSMENT OF THE CAPACITY TO CARRY OUT COMMUNITY-BASED MAINTENANCE

The communities have the capacity to carry out minor off-carriageway maintenance works, but not for expensive or technically challenging works.

FINANCING MAINTENANCE

The recommendations below advocate for constructing road pavements with a longer life and reduced maintenance needs. This is looking to the future; however, there are many roads which have been improved by communities under the KDP/PNPM. The majority of the improved roads are of gravel, earth or Telford construction. While the communities may be assisted to organise themselves for off-carriageway maintenance (drainage, grass cutting etc.) they will need external assistance to deal with the carriageway maintenance. If this assistance is not forthcoming the roads will deteriorate and the community may then only carry out occasional emergency repairs when the road becomes impassable and this affects their access negatively.

The question remains as to which partners have the necessary budget and commitment to support maintenance of the KDP improved roads. Most of the roads are on the village road network and it has already been shown that the budget from Government is absolutely minimal for these roads.

If the 20% contribution from the districts to future KDP/PNPM projects is considered what could this bring in terms of periodic maintenance?

Example of Bireuen District (20% =Rp 2,750 million)

If all gravel roads constructed from 1998 to February 2007, are added together, this comes to 251.5 km.[22] To re-gravel every 5 years would mean that each year approximately 50km would need to be re-gravelled. At a rough cost of Rp 105 million per km, this would require a budget of Rp 5,250 million per year for re-gravelling alone. This does not include other maintenance to structures and is only addressing roads not other infrastructure created under KDP/PNPM. The district 2008

[21] Source: Siri, Employment And Social Investment Funds In Latin America, ILO 2000

[22] As previously explained, some may have been destroyed and then rebuilt so the total number of kilometres of gravel roads could be less. .

budget contribution to KDP/PNPM, if put to maintenance rather than new works, would still only cover 50% of the re-gravelling needs. It would of course be a start, but it would not address the full gravel road network. This result reinforces the argument for not extending the gravel road network, but to look for other road construction solutions.

Are there other government budget resources that could be brought in to address the roads through the village road network? This would need a radical change in policy by government, as there is no budget allowance for maintenance on village roads.

The conclusion on maintenance budgets is that they are inadequate at the moment and are unlikely to be fully adequate in the foreseeable future unless the implications are considered and policy changed. If the village network is viewed as private community access then the approach of the community maintaining their own road is an option. If however the roads are adopted into government ownership, then the routine and periodic maintenance must be funded by the owner.

One budget that is new to NAD Province is the special autonomy and petroleum budget. Some of this could have been put towards maintenance on all road networks, but the review team understand that it is being set aside for new works only.

COMMUNITY CAPACITY

The community may have been involved in the construction of their own roads, or they may have opted to contract out the works and just manage the process. Whatever the case, the communities need additional support to be able to manage their maintenance. Maintenance does not just consist of doing the work, but requires planning (what to do, when and how), costing (how much will it cost), funding (fund raising or organisation of self-help inputs) what tools and materials are needed and who is responsible?

With proper training, community oriented handbooks and mentorship, the communities can be better equipped to deal with the simple maintenance activities which will help to prolong the life of their road.

POSSIBLE PARTNERS

The most obvious partner for the communities is the Community Development Department and the Settlements Division within Public Works. There are road inspectors assigned to the village road network. These inspectors will have technical knowledge and remain in the districts and sub-districts. They should be part of any training programme and support mechanism for community maintenance in addition to the KDP facilitators.

The road inspectors would also be the first point of contact for the community to ask for assistance to address maintenance activities which were out with their capacity either financially or technically.

RECOMMENDATIONS FOR MAINTENANCE SYSTEMS

CONSULTATIONS WITH THE GOVERNMENT (PROVINCIAL, DISTRICT AND SUB-DISTRICT) KDP/PNPM, BRR, AND ILO–LRB PROJECT ON THE REVIEW TEAM FINDINGS

The initial findings of the review team, resulting from their discussions and site visits were presented at an open meeting in Aceh, and the results modified to reflect the outcome of the discussions in the meeting. The resulting recommendations from the meeting are as follows:

- With no resources to support maintenance readily available, the community should be encouraged to construct infrastructure which can be kept in good conditions with a minimum of maintenance. The carriageway of the road should be as "permanent" in nature as possible, such as concrete. Communities could then concentrate their efforts on the off-carriageway (drainage) maintenance.
- For the constructed roads to result in a minimum maintenance burden, the design must be robust and the quality of construction good
- Participation in the construction of assets does not prepare communities for their maintenance. There is need for advice and practical guidance, not only on the maintenance techniques, but the organisation and management of maintenance.

RECOMMENDED ACTIONS TO CONTRIBUTE TO AN IMPROVEMENT OF THE MAINTENANCE OF INFRASTRUCTURE CREATED THROUGH THE KDP/PNPM

These recommendations are made whilst acknowledging the existing manuals, training materials and training courses which have been developed and implemented as part of the KDP/PNPM.

1. Good standard designs should be made available for concrete roads (both strip and full width)
    a. Alternatives such as the paving block roads commonly used in Java could be considered especially for short flat sections of road in peri-urban areas.
    b. The designs should be such that sections damaged through earthquakes can be easily removed and replaced. This implies that the road would be either constructed from slabs or cast in sections.
2. The training of the technical facilitators, on road construction techniques, should be continued.
3. The training of a group of foremen/women (mostly on-the-job) at sub-district level in the construction of the concrete and paved roads to a high standard with proper quality checks. These foremen/women could then be hired to support the community on a daily basis on site during the construction period. This could be made a pre-condition for the approval of a road improvement project. The alternative is to train each village foreman/woman to an acceptable level of competence. This would place a huge training burden on the programme; therefore a core group of trained supervisors who will work on a daily basis with the community is a better option. KDP/PNPM would need to reach a decision on whether the programme pays for the supervisors on a contract basis or whether the community are asked to commit to hiring

one of the trained supervisors as part of the agreement for funding their project.

4. Prepare community level materials, combined with on-the-job training of trainers and mentorship arrangements for the facilitators, to enable them to lead discussions on the implications of road design and standards with communities. It is important that communities understand the implications of their design choice, as it is the communities who ultimately make the decisions on which type of construction to use.
5. Increase the preparation for the management and implementation of maintenance of the roads with the TP3 committees - this could also be expanded later to include other types of infrastructure. The recommended approach would be to develop community level materials, to be introduced through on-the-job training of the facilitators (Training of trainers) for preparing the community for maintenance management and implementation. This should be combined with a mentorship arrangement for continued support to the communities into the maintenance phase of the project. The training should concentrate on off-carriageway maintenance. It would also be advantageous to include the village road inspectors from Public Works in the training, as they are responsible for the village road network where most of the KDP roads are built;
6. Government needs to look at means of funding maintenance. The funds could be used to assist communities in maintaining their infrastructure, where possible for routine maintenance, but especially for periodic maintenance activities.
    a. If maintenance is to be paid for, then the process must be managed including the planning, funding, issuing and supervision of contracts to communities, community groups or community contractors for the maintenance work.
7. For KDP/PNPM, the 20% district contribution could be used as a basis for a maintenance fund instead of going towards new works).

COST IMPLICATIONS FOR CONSTRUCTION

The recommendation 1 above has cost implications for the construction as well as the maintenance.

Table 8 below looks at the cost implications for different road construction (excluding the drainage works which should be a constant factor). For the same width of road (3 m plus two 0.5m shoulders) the following costs have been estimated based on current prices and experience on the district road network.

Table 8: costing for road construction options

No	Type of Construction	Width	Unit	Unit Rate Rp	Price Rp	Price(Rp) for 1 km
1	**Latasir Pavement**					**303,500,000.00**
	Latasir 2cm	3.00	m2	38,000.00	114,000,000.00	
	Base Course 10 cm	3.00	m3	340,000.00	102,000,000.00	
	Sub base course 10 cm	4.00	m3	175,000.00	70,000,000.00	
	Shoulder 15 cm	1.00	m3	175,000.00	17,500,000.00	
2	**Penetration Macadam**					**333,250,000.00**
	Penetration Macadam 5 cm	3.00	m2	55,000.00	165,000,000.00	
	LPA Crush Stone 10 cm	3.00	m3	240,000.00	72,000,000.00	

	Sub base course 10 cm	4.00	m3	175,000.00	70,000,000.00	
	Shoulder 15 cm	1.00	m3	175,000.00	26,250,000.00	
3	**Telford**					**125,000,000.00**
	Gravel Surfacing 5 cm	4.00	m3	175,000.00	35,000,000.00	
	Telford 10 cm	4.00	m3	225,000.00	90,000,000.00	
4	**Gravel**					**125,000,000.00**
	Gravel Surfacing 15 cm	4.00	m3	175,000.00	105,000,000.00	
	Repair Subgrade 5 cm	4.00	m3	100,000.00	20,000,000.00	
5	**Concrete (full slab)**					**498,750,000.00**
	Concrete 15 cm K225	3.00	m3	900,000.00	405,000,000.00	
	Sand 5 cm	3.00	m3	100,000.00	15,000,000.00	
	Gravel base 10 cm	3.00	m3	175,000.00	26,250,000.00	
	Shoulder 30 cm	1.00	m3	175,000.00	52,500,000.00	
6	**Concrete (Strips)**					**376,250,000.00**
	Concrete 15 cm K225	2.00	m3	900,000.00	270,000,000.00	
	Sand 5 cm	2.00	m3	100,000.00	10,000,000.00	
	Gravel Middle 10 cm	1.00	m3	175,000.00	17,500,000.00	
	Gravel base 10 cm	3.00	m3	175,000.00	26,250,000.00	
	Shoulder 30 cm	1.00	m3	175,000.00	52,500,000.00	
7	**Paving Block**					**311,250,000.00**
	Paving Block 10 cm	3.00	m2	75,000.00	225,000,000.00	
	Mansonry Frame (15CMX30CM)	0.30	m3	500,000.00	45,000,000.00	
	Gravel Surfacing 10 cm	3.00	m3	175,000.00	26,250,000.00	
	Sand 5 cm	3.00	m3	100,000.00	15,000,000.00	
	Shoulder 25 cm	1.00	m3	175,000.00	43,750,000.00	

These costs are commercial costs and could possibly be reduced under the KDP implementation modalities.

Looking at the Bireuen District as an example, the KDP/PNPM budget for 2008 = Rp 13,750 million. Allowing for an even number of kilometres of full concrete and strip concrete roads (50:50), then the length of road which could be constructed per year (if all projects chosen were roads) would be 16 km.

What are the longer term costs of different road construction choices? If the base cost for construction of a road is taken to be the value for gravel and Telford = Rp 125 million, then the construction costs of the other options are in the order of magnitude of:

Gravel and Telford	1.0
Latasir	2.4
Paving blocks	2.5
Penetration macadam	2.7
Concrete strips	3.0
Concrete full slab	4.0

However, if there is an assumption that a concrete road will last for a minimum of 15 years with minimum carriageway maintenance, whereas a gravel road will need re-gravelling every 5 years, then the life cycle costs move closer together. Table 9 illustrates the life-cycle cost comparison.

Table 9: Life cycle costs (excluding routine maintenance)

Year	discount	Gravel road construction m Rp	Grading m Rp	Discounted Costs m Rp	Concrete strip road construction m Rp	Concrete road construction m Rp
0		125.00		125.00	376.25	498.75
1	0.9259		2.25	2.08		

2	0.8573		2.25	1.93		
3	0.7938		2.25	1.79		
4	0.7350		2.25	1.65		
5	0.6806	105.00		71.46		
6	0.6302		2.25	1.42		
7	0.5835		2.25	1.31		
8	0.5403		2.25	1.22		
9	0.5002		2.25	1.13		
10	0.4632	125.00		57.90		
11	0.4289		2.25	0.96		
12	0.3971		2.25	0.89		
13	0.3677		2.25	0.83		
14	0.3405		2.25	0.77		
Residual value				0.00	20%	25%
15	0.3152				-23.72	-39.30
Total		355.00	27.00	270.34	352.53	459.45
Ratio				1.00	1.30	1.70

Notes to Table 9

- The discount rate is 8% based on the Indonesian Government Lending Rate
- Grading cycles/ regular maintenance will vary depending on the quality of the gravel, the construction quality and the traffic levels. Assume the roads will be graded once a year at a cost of approximately Rp 250,000 / km. Where grading is not practical (some areas of NAD Province) then the same funds can be used for hand repairs and reshaping.
- Year 5 assumes re-graveling only, and year 10 includes repair to sub-grade.
- The quality of the gravel road surface will vary with time as the gravel layer reduces prior to re-gravelling.
- It is assumed that the off-carriageway routine maintenance remains the same for all options and therefore is not included in the comparison.
- It is assumed that at the end of the 15 years, the concrete roads would have a residual value.

The issues to be considered are not just balancing the costs, but looking at who bears the burden of the costs. The question is whether communities can afford to carry the costs of periodic maintenance, and how easily can they access the materials they need. It appeared to the review team that it would be easier for a community to buy a bag of cement to do some minor repairs, if needed to concrete slabs, compared with accessing bitumen and equipment for pothole repairs and surface dressing. Depending on the location of the source of gravel, the communities could face large expenses to bring, spread and compact a replacement gravel layer. Added to this was the concern that some of the gravel sources being used were not suitable for road surfacing.

The conclusion reached was that it is better to increase the initial investment for good quality construction and reduce the subsequent burden of maintenance left with the communities. The communities could then focus on “preventative maintenance” rather than repairs. However the challenge remains as to the perceived need and motivation for “preventative maintenance”.

RECOMMENDED ACTIONS TO CONTRIBUTE TO AN IMPROVEMENT OF THE MAINTENANCE OF INFRASTRUCTURE AT THE DISTRICT LEVEL

The problems of maintenance are not confined to the KDP roads or the village road network, but are also visible on the district roads. There is a need for a fresh look at maintenance prioritisation and budgeting. Therefore the review team recommend that:

1. There needs to be an increase in planning for, actual expenditure on, and implementation of routine maintenance to maintain the improved and re-instated infrastructure and to escape from the cycle of damage followed by rehabilitation or reconstruction. In this case the routine maintenance would also include regular maintenance to the road surface (repairing pot-holes; patching; repairing edges; sealing cracks on paved roads, and repairing pot-holes and ruts, and grading where appropriate on unpaved roads[23]).
2. The District Public Works should propose to the District Parliament that they allocate and approve more of the budget for routine maintenance and consider ways of increasing allocations to the village road networks.

AREAS OF PW-ILO-KDP/PNPM COOPERATION

The following areas could be pursued to test assumptions and recommendations made in this report:

i. Preparation of a Terms of Reference for the piloting of community-based maintenance that can possibly cover up to 250 villages in 5 districts in Indonesia (50 villages per district). This should include: determination of maintenance methods and options, training material production, training of trainers, actual piloting, demonstration, baseline data collection, monitoring, and evaluation. This will cover the testing of both paid and unpaid alternatives in community-managed maintenance system including community contracting. The TOR will be further discussed with KDP/PNPM and the World Bank. Funding sources will have to be identified.
ii. Continue with the trials on small contractor routine maintenance currently being carried out by the ILO-LRB project and expand to include the budgeting, management and supervision aspects together with the district authorities.
iii. Enter into dialogue with government and their partners as to the importance of maintenance, adequate maintenance funding, and the prioritising of maintenance activities.

[23] In many areas of NAD Province, grading is not appropriate on gravel and earth roads from consideration of the terrain or from the surrounding land use and irrigation schemes.

Terms of Reference

Review of Community Maintenance on Rural Roads built under the Kecamatan Development Programme (KDP) in Aceh Province (Indonesia)

1. Background

1.1. The KDP programme is the Indonesian version of the global Community Driven-Development (CDD) programme of the World Bank. In 2005, the ILO Crisis unit in Geneva and the CDD World Bank unit in Washington initiated a joint analysis of the complementary of the ILO's Local Economic Development (LED) Programme and CDD.

1.2. The KDP program has been running since 1998 in various provinces of Indonesia including Aceh. KDP is supported and implemented by the Government of Indonesia with loans from the World Bank. The program aims to empower communities by providing skills, organization, tools and funds to prioritize, design and implement activities at the village/sub-district level. KDP offers to the community an "open menu" of activities that they can elect in a democratic way at the village and sub-district level: Rural Infrastructure, Social and Economic Activities. Even if in theory, it is an open menu, in practice, 90% of the activities implemented by KDP are infrastructure projects (mainly roads). The KDP Aceh program has in addition been supported by the Tsunami "Multi Donor Trust Fund" with a total of 64 million US dollar grant for a period of one year.

1.3. In October 2005, KDP, ILO and the World Bank signed a Memorandum of Understanding. This shaped the foundation for collaboration in Aceh, a province affected both by a civil strife and the tsunami. The ILO, KDP and World Bank initially joined efforts to develop and implement a pilot short-cycle capacity building project in Aceh Besar district. The pilot exercise included a training of trainers and a training course for kecamatan facilitators and UPK chiefs in Aceh Besar.

1.4. In June 2006, the ILO was invited by the World Bank to participate to the two days Aceh KDP evaluation organized by the Multi Donor Trust Fund (MDF). At the KDP evaluation debriefing, members of the MDF including World Bank, EC, Canada, UK, Sweden, US and Finland were generally pleased by the outputs of the programme but two main concerns were raised by the MDF members:

1- The lack of maintenance of infrastructure (no community maintenance systems have been set up); and

2- The lack of economic "quality" projects

1.5. It was agreed that KDP, ILO and the district Public Works offices would collaborate to review and identify options for community-based road maintenance systems and financing scenarios. An external collaborator consultant is to assist KDP, ILO and district Public Works in Aceh in reviewing KDP's maintenance system, its challenges, good practices and training and capacity building needs make recommendations for developing a community-based maintenance system for up keeping roads constructed under KDP.

2. Objectives of the Consultancy

To review with KDP, ILO and district Public Works the existing rural road maintenance systems and practices (including the KDP supported community-based maintenance systems), their potential and challenges, financing mechanisms, and areas for collaboration between KDP, ILO and Public Works to improve and mainstream maintenance systems (including community-based maintenance). The consultancy will recommend practical steps (a general guideline) for the establishment and improvement of community-managed road maintenance for rural roads in Aceh.

3. Expected Outcomes

A report on existing maintenance needs, practices and systems in Aceh (including the KDP maintenance system); challenges, good practices and financing mechanisms; guidance on improving the community-based maintenance systems and areas for joint collaboration between KDP, ILO and district Public Works. A draft report shall be shared and consulted with the three parties. The recommendations may result in a joint KDP-ILO activity.

4. Tasks

1. Situational analysis of rural road network in Aceh to identify present road conditions and the scope for rural road maintenance (assess the network size and features including road conditions, connectivity, location and quality).
2. Collect and analyze information on traffic patterns (if available) and assess traffic volumes on different types of rural roads.
3. Identify the planning, technical, institutional and financial responsibilities for rural road maintenance in Aceh.
4. Review existing maintenance practices in Aceh in general and community-based maintenance systems in particular (KDP and non-KDP).
5. Assess the quantity and quality of KDP roads in Aceh at Kabupaten level and their maintenance suitability. Describe the initial design standards and age of the road networks. Identify the initial construction costs.
6. Identify and describe contracting modalities during KDP road construction. Analyze the maintenance implications of different modalities
7. Review of ILO's local resource-based road works approach as developed and implemented in Aceh. Look at other approaches as well and assess the implications for future maintenance needs.
8. Liaise and coordinate with the KDP technical team in Aceh the different activities which make up the community maintenance study.
9. Identify and discuss with KDP technical, financial, institutional and management issues and challenges of the KDP road maintenance programme.
10. Discuss current maintenance systems and practices with district Public Works offices.
11. Assess the feasibility of community-based maintenance systems to maintain KDP roads.
12. Assess maintenance capacity for community-based maintenance systems.
13. Compare community-based maintenance with alternative maintenance modalities in Aceh.
14. Identify with district Public Works, the KDP team and the ILO team in Aceh possible actions (technical, financial and organizational) to develop and strengthen community-managed rural road maintenance systems.

15. Identify areas for ILO-KDP collaboration to improve KDP road maintenance in Aceh (prepare a general guideline).
16. Prepare a draft report discussing the activities above.
17. Present the findings and draft report to district Public Works, KDP and ILO to discuss the findings and recommendations during the final days of the mission.
18. Finalize the report.

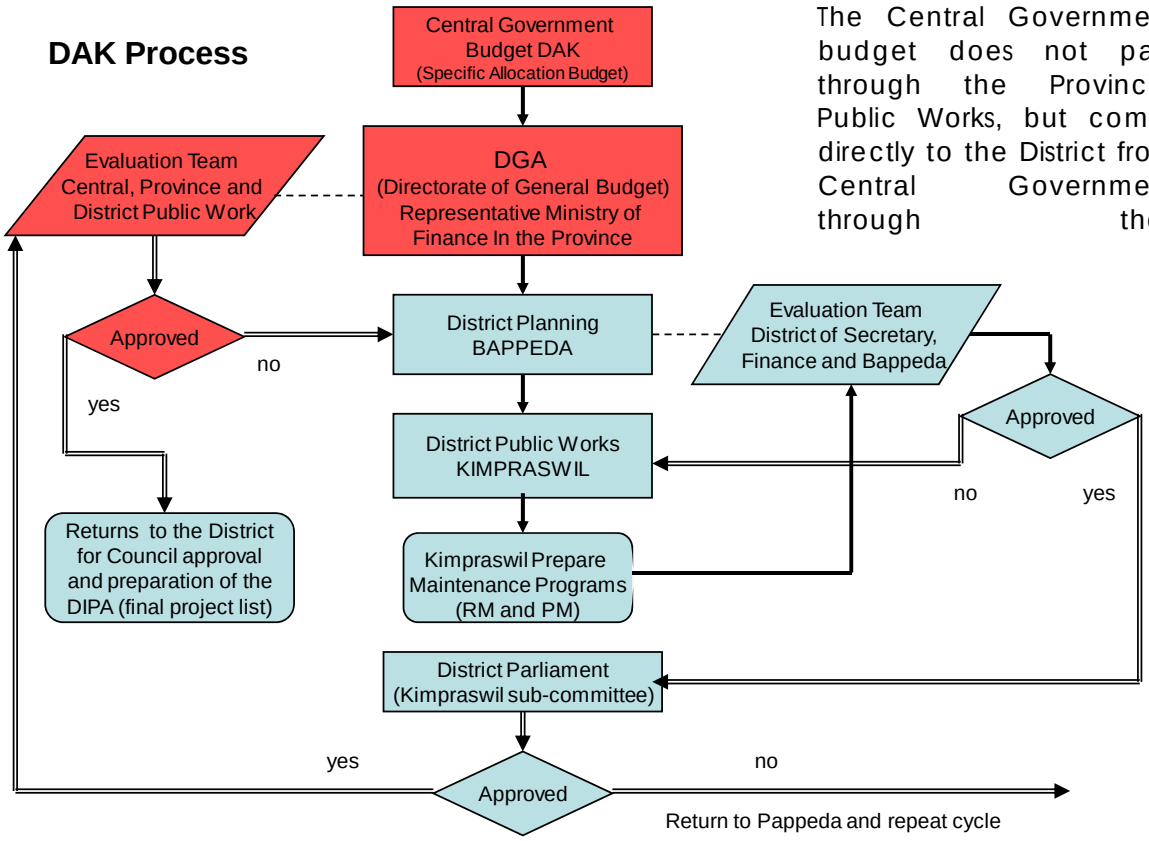
5. Amendments to TOR at the inception meeting with ILO (Jakarta and Banda Aceh)

- The main object is how to effectively maintain (i) the village level roads and (ii) the district roads.
    - The question is how and by whom.
- What is needed in terms of skills – capacity building?
- What budgets are available for maintenance?
- What immediate actions should be taken?
- What longer-term approach should be considered?

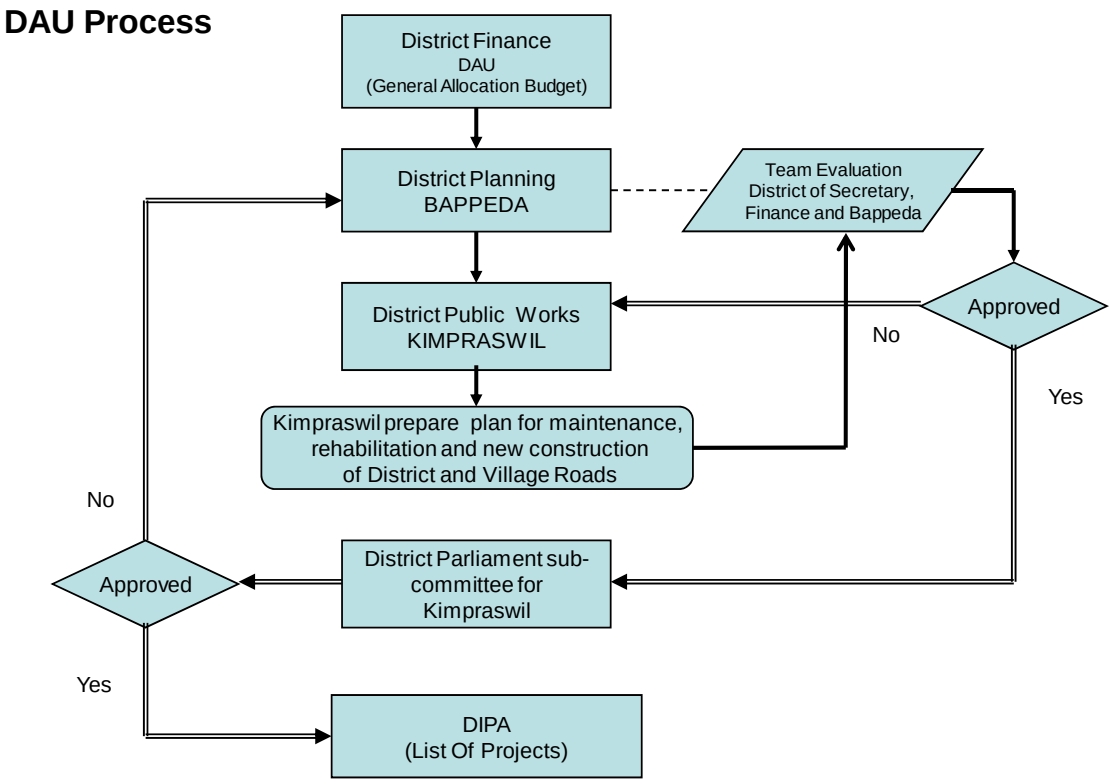
Planning and Approval Route for Works to be undertaken from the Central Government Budget Allocation for Road Maintenance

Note:

The Central Government budget does not pass through the Provincial Public Works, but comes directly to the District from Central Government through their



Planning and Approval Route for Works to be undertaken from District Budget Allocation for Road Construction and Maintenance



Planning and Approval Route for Works to be undertaken from Oil and Gas (Autonomy) Budget