1 Background

Nepal, with a per capita income around US$ 200 per annum (*World Bank, 1997*), is one of the least developed countries in the world. Adding to this, it has one of the most scattered rural road networks in the South Asian sub-region which limits the effective and comprehensive participation of rural population in the country's economic growth process. Almost 90 percent of the Nepali population lives in rural areas and much of the employment and income generation in rural areas depends directly or indirectly on agriculture. Therefore, the living standard of rural people cannot be improved unless the reliable access to agriculture services and technological advancement as well as the markets to agricultural products are guaranteed with respect to the growing demand. To improve the living condition of rural people, or in other words, to reduce the rural poverty, the basic human facilities such as health services, education and communication should also be made available to these communities. A reliable rural road network, though an expensive investment, is the answer to many concerns and will be the key factor in stimulating economic activities in the rural areas. That is why the Government has given its top priority to the eradication of poverty through the agricultural development and indicated its commitment to the 20-year Agriculture Perspective Plan (APP).

In the Ninth National Development Plan (1998-2002), bringing rural population into the mainstream of development through the sectors like agriculture, water resources, tourism, rural infrastructure and agro-based industries receives a prime importance. The Ninth Plan further highlights that the decentralisation of programmes (especially human resource development and rural infrastructure) as a mechanism for involving local communities in the development process is one of the meaningful means of alleviating the poverty. As envisaged by the APP document, expanding the present road network from 6 km to 11 km per 100 km^2 and maintaining it to the operational standards or serviceable conditions should receive the highest attention.

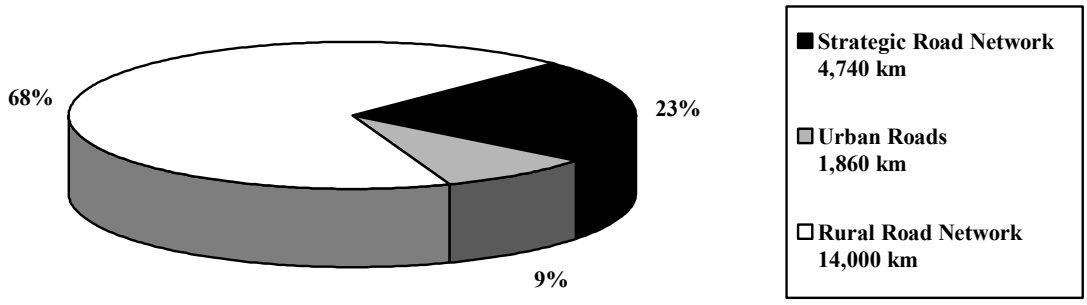
There is, at present, a network of about 14,000 km of rural roads (including motorable tracks) in the country[1]. Rural roads represent about 68% of the entire public road length. These roads link rural areas of 58 districts which are already connected by the national strategic road network[2]. The strategic road network and the urban roads constitute about 6,600 km of length by making the entire public road length to be 20,600 km (refer to **Graph 1**). It shows the present road density of Nepal as 14 km per 100 km^2, a rather surprising figure with respect to the APP target. This indicates that most of the districts connected with the

[1] **Rural road network** generally comprises of district roads (Class 'A') and a network of agricultural and village roads (mostly Class 'B'). The Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) is responsible for regulating the development of rural road network whereas the respective District Development Committees (DDCs) are supposed to develop, own, operate and maintain the network. Refer to **Annex I.** Out of 14,000 km of rural roads, there are about 6,600 km of district roads.

[2] **National strategic road network** comprises of national highways, feeder roads and other roads of national importance. The Department of Roads (DoR) is responsible for the development and maintenance of strategic network.

strategic road network have got enough length of rural road network against the planned long-term targets !

Graph 1
National Road Network by Ownership
Total length 20,600 km



Because of spontaneous efforts, ad-hoc construction methods and absence of proper technical back-up, most of these roads are, however, of sub-standard quality and lack sufficient road-side and cross-drainage structures. As such, they require a great deal of attention in order to be qualified as serviceable roads. There are several reasons for this state of affair. Some of the main reasons are as follows:

- The importance given to the opening up of more and more new motorable accesses at the cost of maintaining the rapidly deteriorating existing ones;
- The practice of ad-hoc distribution of available funds amongst electorates rather than allocating them on planned basis;
- Insufficient funds for road maintenance;
- Lack of interest to road maintenance;
- Inadequate technical capacity (manpower, equipment, skills, etc.);
- Lack of appropriate institutional and legal provisions supporting the maintenance aspects.

Given its steep and fragile mountainous terrain, varied climate and unstable geological structure, Nepal has also inherited one of the most vulnerable environments for natural disasters. Even the roads that are of standard quality are frequently subjected to natural damages such as slips, land slides, run-off cuts, scouring of side slopes and uneven settlements. Often, huge amounts of sediments and debris carried by the flood water block the cross-drainage structures resulting a complete washout of structures as well as the damages to road formations. Nearly 85% of rural roads is having earthen surface, and most of which are operational only during the dry season. During the monsoon rains, all weather earthen roads are the ones subjected to severe damages as no restrictions are imposed to regulate the heavy vehicular traffic. In some cases, there has been a huge, recurrent

expenditure on the maintenance. However, in many cases, the maintenance aspect has been completely neglected due to lack of resources. As a consequence, the backlog of road maintenance is ever increasing rendering the present rural road network unserviceable.

During the last couple of years, His Majesty's Government of Nepal (HMGN) has allocated a substantial amount of funds to the local governing institutions in the form of block or programme grants, a large chunk of which is being spent on rural roads. In addition, HMGN allocates a considerable portion of its scarce resources every year for the maintenance of its rural road network. **Table 1** shows the present trend of allocation of different district block grants (refer to **Annex II** for district-wise details).

Table 1 : Present Trend of Allocation of Different Block Grants

Year	**Annual Allocation** (NRs. '00,000)		
	Rural Road Grant	Other Block Grant	Total District Block Grant
1996/97	1,763	3,984	5,747
1997/98	1,763	4,489	6,252
1998/99	1,763	4,540	6,303

Despite these efforts, the public was not able to enjoy the desired benefits of the investments mainly due to the above-mentioned reasons. Attending to this situation, HMGN formulated the **National Strategy for Rural Infrastructure Development** in December 1997. Following the strategy, the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) was established under the Ministry of Local Development (MLD), particularly for regulating the development and maintenance of rural road network. On this background, the Government has prepared a **maintenance plan** for increasing the efficiency and effectiveness of road maintenance activities. The maintenance plan clearly addresses the key issues of concerns such as allocation of adequate resources, proper utilisation of available funds, enhancement of requisite skills and adoption of appropriate institutional arrangements. The Government is confident that with the implementation of this **maintenance plan**, the objectives laid down in the **national strategy** for the rural road sector will be fulfilled.

2 Introduction to Rural Road Maintenance

A road is a major capital investment and it is necessary to preserve it by means of an appropriate maintenance done at an appropriate time. Failure to maintain the road properly leads to rapid deterioration with subsequent increase in vehicle operating cost and road accidents and eventually demands for an expensive reconstruction. Road maintenance may be defined as a function of keeping the roadways, roadside structures, cross-drainage structures and other facilities in the best possible condition to ensure reliable and safe transportation along the roadways. It will (i) minimise the rate of deterioration of the road and thus prolong its life; (ii) provide better running surface and thus reduce the cost of vehicle operation; and (iii) ensure reliable and safe transport services.

2.1 Definition of rural road

A rural road may be defined as a motorable road or track owned, regulated and maintained by the local governing institutions. These roads may have either earthen or gravelled or paved surface and are operational either during a part of or throughout the year.

In the districts, the key arterial roads linking the villages (often referred to as 'District Roads') combined with other auxiliary network of village roads form the '*Rural Road Network*'. The roads within the municipality areas (often referred to as 'Urban Roads') are, however, not considered as rural roads. For the purpose of this **maintenance plan**, all rural roads are supposed to be owned, regulated and maintained by the local governing institutions. The roads in the district which are either built and/or regulated and/or maintained under the jurisdiction of other agencies like Department of Roads (DoR), Department of Irrigation (DoI), Nepal Electricity Authority (NEA), Royal Nepalese Army, etc. are not eligible to become rural roads until the ownership of these roads are handed over to the respective local governing institutions.

2.2 Classification of rural roads

The rural roads may be classified according to the following criteria:

i. Serviceability condition

- All-weather roads (*passable throughout the year*)
- Fair-weather roads (*passable only a part of the year*)

ii. Pavement (or surface) material

- Earthen roads (*just the road formation; no pavement*)
- Gravelled/WBM roads (having gravelled or WBM surface)
- Black-topped roads (*paved with Asphalt as binding material*)

iii. Importance

- Class 'A' (*District Roads - main rural roads*)
- Class 'B' (*Village Roads - auxiliary rural roads*)

2.3 Categorisation of rural roads according to maintenance needs

All rural roads in Nepal may fall under the following categories according to their maintenance requirements.

i. Maintainable roads (*roads built according to proper engineering standards*)

- Routine or regular maintenance (*required to keep the road operational at all times; needs nominal funds*)

- Periodic or planned maintenance (*required to deal with major repairs demanded over a set period of time; needs considerable amount of funds which basically depends upon the frequency of its intervention*)

- Rehabilitation (*required when the road is not serviceable even after the routine and periodic maintenance; needs a lot of resources and a great effort to bring it to serviceable condition; may include the activities such as redesigning, realigning, reconstruction and upgrading*)

ii. Non-maintainable roads (*These roads mainly refer to sub-standard roads or tracks built through spontaneous efforts and ad-hoc construction methods without following engineering standards; cannot bring them up to serviceable condition simply by rehabilitation; require almost the same resources and efforts needed for constructing a new road*) This **maintenance plan** does not address these roads as they need to be constructed as new roads.

2.4 Objectives of maintenance

It is important to recognise that, as with most infrastructure maintenance, road maintenance is not intended to prolong the life of a road into perpetuity. Roads of any type will deteriorate over time due to the twin forces of ageing and use. The **objective of maintenance**, therefore, is to lessen the deterioration effects of these two forces vis a vis providing for increased service performance of the road in the short run.

From an engineering point of view, there is a set of interventions that are required over the life of a road. The following are the key maintenance interventions in rural roads:

- routine or regular maintenance;
- periodic or planned maintenance;
- rehabilitation (redesigning, realigning, reconstruction and upgrading).

Optimal timing of these interventions depends primarily on climate, traffic levels and the original quality of construction. The specific activities to be carried out, however, depend on the type of road surface.

2.5 Scope of various maintenance interventions

Routine Maintenance:

All minor maintenance works which are of regular nature and can not be accurately estimated or measured are categorised under routine maintenance. It covers the work involved in keeping the road in proper shape and in protecting it from deterioration. Generally, routine maintenance does not require skilled labour.

The following works may fall under this heading:

- Safety inspection and removal of obstructions;
- Cleaning of culverts and bridges;
- Cleaning of mitre and side drains;
- Filling and compaction of potholes;
- Trimming of road edges for water shedding;
- Reshaping carriageway and compaction;
- Removal of small-sized slides/slips that fall on the road surface;
- Cutting grass, bushes and branches of trees for visibility splays;
- Maintaining trees along the road sides;
- Clearing of vegetation from drainage paths;
- Maintaining and placing of road signs and delineators;
- Any other simple works.

Periodic Maintenance:

All maintenance works that are of higher volume and to be carried out periodically shall be categorised under periodic maintenance. These works, requiring skilled labour can be planned and estimated. The following activities are common in practice.

- Re-cambering and re-grading of the road surfaces for longer stretches, in case of earthen and gravelled roads;
- Regravelling on carriageway and shoulders;

- Pavement repairs such as resealing, surface dressing or overlaying, in case of black-topped roads;
- Removal of medium and large-sized earth slips and associated preventive works;
- Repair of scour checks and the damaged portions of side drains;
- Repairing erosion on shoulders and planting grass;
- Repairing or replacing of earth retaining walls (dry stone, masonry or gabion);
- Repairing, replacing or adding of parapet walls and railings at bridges and culverts;
- Repairing, replacing or adding of guard walls at road sides;
- Repairing works on abutments, wing walls or apron/cut-off walls at bridges and culverts;
- Construction of small-scale river training structures; and
- Preparation of road-side nurseries and planting of trees, bushes and other vegetative cover wherever necessary.

Many of the above activities can be delayed and consequently, their costs can be diminished by proper application of routine maintenance activities. Nevertheless, they will have to be undertaken lest the roads reach a state of deterioration where even the routine maintenance activities are no longer beneficial.

Emergency repair works also fall under the category of periodic maintenance. These repair works are necessary to ensure the free movement of traffic which is either obstructed by or vulnerable to a rapid and unexpected deterioration of road condition. Such accidental damages may occasionally be caused by natural calamities or the sudden failure of structures. Dealing with a major or unexpected landslide just after the road construction can be considered as an emergency maintenance.

Rehabilitation (redesigning, realigning, reconstruction and upgrading):

Routine and periodic maintenance programmes alone may not be sufficient all the time to upkeep the road to the required standard. Upon heavy use, the road may be subjected to a rapid deterioration mainly due to the fatigue failure of materials. Sometimes, the unexpected natural causes such as landslides, earthquakes and floods may also expedite this process, causing a sudden lowering of road's quality with respect to serviceability, comfort, reliability and safety. When a certain stretch of such road requires a considerable intervention, it is subjected to a process called **rehabilitation** which may comprise of activities such as '*redesigning*', '*realigning*', '*reconstruction*' and '*upgrading*'. The following works may fall under rehabilitation.

- Reconstruction of road pavements for longer stretches;
- Reconstruction and/or addition of road structures;
- Reconstruction and/or addition of cross and road side drainage structures;
- Strengthening and/or construction of slope protection structures;
- Improvement of geometric standards of the road;
- Upgrading of road surfaces;
- Any other works deemed necessary to make the road intact.

2.6 Unit maintenance cost

The deterioration of a road depends on the pavement standards used in original construction, its traffic level, climate and the environment. Therefore, the maintenance cost is, in part, a function of construction cost, itself. In addition, current maintenance cost also depends, in part, on deterioration of road surface which, in turn, is affected by past maintenance at any particular time. Thus, maintenance cost of a rural road broadly depends on the following factors:

- Level of deterioration of road formation, its surface and structures;
- Available technology for maintenance;
- Quality of original design and construction;
- Prices of inputs; and
- Existing maintenance management practices.

Therefore, it shows calculating a unit maintenance cost is rather complicated task with reference to the above-mentioned variables. However, for the purposes of financial planning and realistic fund allocations, the following indicative unit costs are adopted for routine maintenance, periodic maintenance and rehabilitation (see **Table 2(a)** & **2(b)**).

These indicative unit costs are derived on the assumption that the labour-based, local resource-oriented, environment-friendly construction techniques are applied in rural road maintenance. This is in line with the objectives set out in the *National Strategy for Rural Infrastructure Development* as well as in the *Ninth National Development Plan*.

Table 2 (a) : Indicative Unit Maintenance Cost

Type of Road	Unit Maintenance Cost for		
	Routine Maintenance NRs(*US$*)/km	**Periodic Maintenance** NRs(*US$*)/km	**Rehabilitation** NRs(*US$*)/km
Earthen	14,000 (*200*)	100,000 (*1,500*)	300,000 (*4,500*)
Gravelled/WBM	21,000 (*300*)	150,000 (*2,250*)	600,000 (*9,000*)
Black-topped	42,000 (*600*)	300,000 (*4,500*)	1,200,000 (*18,000*)

Table 2 (b) : Frequency of Maintenance Intervention

Type of Road	Frequency of		
	Routine Maintenance	**Periodic Maintenance**	**Rehabilitation**
Earthen	*every year*	*once in two years*	*whenever required*
Gravelled/WBM	*every year*	*once in three years*	*whenever required*
Black-topped	*every year*	*once in five years*	*whenever required*

3 Rural Road Maintenance Plan

Studies carried out in developing countries have shown that significant returns can be achieved from investments on rural road maintenance. Such internal rate of returns has been found varying from 17%, in case of regravelling, to as high as 74% in routine maintenance. Not only due to this fact but also with a view to protect its ever expanding rural road network, the Government has made its choice of investment on rural road maintenance.

The **aim of Maintenance Plan** is to ensure conducive funding arrangement among the stakeholders; to establish an effective and efficient management system under the jurisdiction of local governing institutions; and to define the overall regulatory mechanism for maintenance process. Such efforts made through the implementation of this maintenance plan are expected to produce one or more of the following effects:

- reduced transport prices and increased use of roads;
- increased farm gate prices of produce;
- increased agricultural production and cropping intensity;
- lower prices of agricultural inputs;
- enhanced management capability of local governing institutions on road maintenance; and
- better serviceability and increased safety and reliability for road users.

3.1 National Rural Road Inventory

Out of the total rural road length[3] of 14,000 km, there are about 11,650 km of earthen roads, about 2,050 km of gravelled roads and about 300 km of black-topped roads in Nepal. However, about 32% of the earthen road length, i.e., about 3,700 km, is expected to be non-maintainable as they are required to be re-built as standard new roads (refer to **Table 3** for National Rural Road Inventory).

Table 3 : National Rural Road Inventory as of 1999

Type of Road	**Maintainable** (km)	**Non-maintainable** (km)	**Total** (km)
Earthen	7,950	3,700	11,650
Gravelled/WBM	2,050	0	2,050
Black-topped	300	0	300
Total (km)	10,300	3,700	14,000

This plan primarily deals with the maintenance aspects of 10,300 km of present maintainable roads. In due course of time, this length will be increased and thus, for

[3] This data is based on the District Transport Master Plans-DTMPs and the District Rural Road Inventories (wherever available) as well as the data provided by the DDCs. This is also supplemented by the road statistics provided by the *Road Management & Finance Reform Implementation Committee*.

planning purpose, the annual increment of road length is assumed to be 5%. The rest of 3,700 km of present non-maintainable roads are required to be reconstructed properly in order to be eligible for maintenance investments. Therefore, the reconstruction of these roads will also be a part of the assumed 5% growth.

3.2 Physical targets on maintenance

Yearly requirement Vs. base target

Given the present level of management and absorption capacity at the local level, and the limited resources available at the centre, the Government has planned a manageable workload (about 25% of total maintenance requirement) as the first year's base target on maintenance. Accordingly, the Government has fixed the annual base targets so as to arrive at the full maintenance requirement (100%) over a period of eight years with an expectation that the national economy and the local management capacity will improve favourably as a result of proper management of road maintenance. **Table 4** provides the base targets against the actual maintenance requirements for the next eight years (from 1999/00 to 2006/07), covering the remaining period of Ninth Plan as well as the period of Tenth Plan.

Table 4 : Yearly Requirement Vs. Base Target

Year	**Maintenance** (km)							
	Earthen		Gravelled/WBM		Black-topped		Total	
	Reqd.*	**Target**	**Reqd.***	**Target**	**Reqd.***	**Target**	**Reqd.***	**Target**
1999/00	7,950	2,000	2,050	500	300	75	10,300	2,575
2000/01	8,350	3,315	2,155	840	305	125	10,810	4,280
2001/02	8,770	4,630	2,265	1,185	320	170	11,355	5,985
2002/03	9,210	5,945	2,380	1,525	335	220	11,925	7,690
2003/04	9,670	7,260	2,500	1,870	350	265	12,520	9,395
2004/05	10,155	8,575	2,625	2,210	370	315	13,150	11,100
2005/06	10,665	9,890	2,755	2,550	390	360	13,810	12,800
2006/07	11,200	11,200	2,895	2,895	410	410	14,505	14,505

* 5% annual growth of network is assumed.

Physical targets for each type of maintenance

Prior to fixing the financial targets on maintenance, it is necessary to fix the individual target for each type of maintenance which is intended to be carried out in each year for each category of road (refer to **Table 5**). For routine maintenance, it is simply the same target as mentioned in **Table 4** while for periodic maintenance, it is fixed on the basis of frequency given in **Table 2 (b)**. In case of rehabilitation, the individual yearly target is fixed at 5% of the base target by assuming the life span of road as 20 years.

Table 5 : Physical Targets for each Type of Maintenance

Type of Road and Intervention	Yearly Target for each Type of Maintenance (km)							
	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Earthen								
Routine (100%)	2,000	3,315	4,630	5,945	7,260	8,575	9,890	11,200
Periodic (50%)	1,000	1,660	2,315	2,975	3,630	4,290	4,945	5,600
Rehabilitation(5%)	100	165	230	300	365	430	495	560
Gravelled/WBM								
Routine (100%)	500	840	1,185	1,525	1,870	2,210	2,550	2,895
Periodic (33%)	165	280	395	510	625	735	850	965
Rehabilitation(5%)	25	40	60	75	95	110	130	145
Black-topped								
Routine (100%)	75	125	170	220	265	315	360	410
Periodic (20%)	15	25	35	45	55	65	70	80
Rehabilitation(5%)	4	6	9	11	13	16	18	20

3.3 Financial targets on maintenance

Resource contribution on maintenance from different stakeholders

Nepal's rural population is the key beneficiary of the rural road network. As the VDCs and the DDCs are the first institutions to realise the impact of economic stimulation resulted by the effective operation of rural road network, their active participation in the road maintenance process should be an essential pre-condition for its success. In line with its policies in promoting local participation in the development process as well as in strengthening the decentralised local governance process, the Government has decided to involve the local governing institutions actively in funding the maintenance activities under this plan. As fixed by the Government, the level of resource contribution for each maintenance intervention is given in **Table 6**.

Table 6 : Resource Contribution

Type of Maintenance	DDC/VDC	HMGN
Routine Maintenance	50%	50%
Periodic Maintenance	33%	67%
Rehabilitation	25%	75%

Based on the proposed local contribution (counterpart funds) for each type of maintenance, the Government will provide the supplementary funds as an attempt to encourage local governing institutions for maintenance of their own networks. The total amount of the local counterpart funds and the respective allocations for each maintenance activity will indicate, (i) the prioritised maintenance needs of the district, (ii) the readiness and the commitment of the local government, and (iii) their desire to be partners in the development process. In the long run, such financial details could even be used as a yard stick to measure the improved local capacity for road maintenance.

Financial targets

The problems of ensuring adequate maintenance spending within a budgetary process are not new, nor are they unique to roads. As the present practice of allocating road grants has not resulted in a significantly greater proportion of total road spending on planned maintenance (new construction is more favoured than maintenance), the Government will tie up the grant allocation mechanism with the local counterpart funds made available for a specific maintenance activity. By doing so, a larger and more certain spending on maintenance is guaranteed on the part of local governing institutions. The following financial targets (refer to **Table 7**) are fixed with reference to the physical targets given in **Table 5**.

Table 7 : Financial Targets for each Type of Maintenance

Type of Road and Intervention (Cost per km)	**Yearly Target for each Type of Maintenance** NRs '00000 (US$ '000)							
	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Earthen								
Routine (NRs. 14,000) (US$ 200)	280 (400)	464 ((663)	648 (926)	832 (1,189)	1,016 (1,452)	1,201 (1,715)	1,385 (1,978)	1,568 (2,240)
Periodic (NRs.100,000) (US$ 1,500)	1,000 (1,500)	1,660 (2,490)	2,315 (3,473)	2,975 (4,463)	3,630 (5,445)	4,290 (6,435)	4,945 (7,418)	5,600 (8,400)
Rehab. (NRs.300,000) (US$ 4,500)	300 (450)	495 (743)	690 (1,035)	900 (1,350)	1,095 (1,643)	1,290 (1,935)	1,485 (2,228)	1,680 (2,520)
Total	1,580 (2,350)	2,619 (3,896)	3,653 (5,434)	4,707 (7,002)	5,741 (8,540)	6,781 (10,085)	7,815 (11,624)	8,848 (13,160)
Gravelled/WBM								
Routine (NRs. 21,000) (US$ 300)	105 (150)	176 (252)	249 (356)	320 (458)	393 (561)	464 (663)	536 (765)	608 (869)
Periodic (NRs.150,000) (US$ 2,250)	248 (371)	420 (630)	593 (889)	765 (1,148)	938 (1,406)	1,103 (1,654)	1,275 (1,913)	1,448 (2,171)
Rehab. (NRs.600,000) (US$ 9,000)	150 (225)	240 (360)	360 (540)	450 (675)	570 (855)	660 (990)	780 (1,170)	870 (1,305)
Total	503 (746)	836 (1,242)	1,202 (1,785)	1,535 (2,281)	1,901 (2,822)	2,227 (3,307)	2,591 (3,848)	2,926 (4,345)
Black-topped								
Routine (NRs. 42,000) (US$ 600)	32 (45)	53 (75)	71 (102)	92 (132)	111 (159)	132 (189)	151 (216)	172 (246)
Periodic (NRs.300,000) (US$ 4,500)	45 (68)	75 (113)	105 (158)	135 (203)	165 (248)	195 (293)	210 (315)	240 (360)
Rehab. (NRs.1,200,000) (US$ 18,000)	48 (72)	72 (108)	108 (162)	132 (198)	156 (234)	192 (288)	216 (324)	240 (360)
Total	125 (185)	200 (296)	284 (422)	359 (533)	432 (641)	519 (770)	577 (855)	652 (966)
Total								
Routine	417 (595)	693 (990)	968 (1,384)	1,244 (1,779)	1,520 (2,172)	1,797 (2,567)	2,072 (2,959)	2,348 (3,355)
Periodic	1,293 (1,939)	2,155 (3,233)	3,013 (4,520)	3,875 (5,814)	4,733 (7,099)	5,588 (8,382)	6,430 (9,646)	7,288 (10,931)
Rehabilitation	498 (747)	807 (1,211)	1,158 (1,737)	1,482 (2,223)	1,821 (2,732)	2,142 (3,213)	2,481 (3,722)	2,790 (4,185)
Grand Total	2,208 (3,281)	3,655 (5,434)	5,139 (7,641)	6,601 (9,816)	8,074 (12,003)	9,527 (14,162)	10,983 (16,327)	12,426 (18,471)

Maintenance Plan

Table 8 provides the Maintenance Plan with details such as yearly physical and financial targets, the respective local (DDC/VDC) and HMGN contributions for each type of maintenance, etc.

3.4 Resource mobilisation for maintenance

Total resources required

According to **Table 8**, the anticipated total resource requirement for the production of road maintenance is NRs. 220.8 million (about US$ 3.28 million) in the fiscal year 1999/00 and it is expected to be increased up to NRs. 1,242.6 million (about US$ 18.47 million) by the final fiscal year 2006/07. This excludes the funds requirement for institutional capacity building which will be fully financed by the Government.

Local resource mobilisation

As envisaged in the previous section, the concerned local governing institutions must arrange their share of contribution for the maintenance in order to be eligible for receiving proportionate supplementary funds from central Government. The local contribution may include resources generated by the DDC/VDC (*under the provisions made in Local Self-Governance Act 2055*), the funds contributed by the participating VDCs, the funds raised by the road beneficiaries, any other legal contributions made by other organisations (INGOs, NGOs, Transport Entrepreneurs, etc.) or individuals and block grants received from the central Government. These contributions should not account any commitment made in kind or free labour.

According to **Table 8**, the anticipated total local contribution is NRs. 76 million (about US$ 1.12 million) in the fiscal year 1999/00 and will be increased up to NRs. 427.7 million (about US$ 6.33 million) by the final fiscal year 2006/07. This constitutes about ***thirty four percent*** of total fund required for maintenance.

HMGN contribution

The Government will provide NRs. 144.8 million (about US$ 2.16 million) as its share of contribution (representing ***sixty six percent*** of total fund required for maintenance) in the fiscal year 1999/00 and it will be increased up to NRs. 815 million (about US$ 12.14 million) by the final fiscal year 2006/07.

In addition to this allocation made available for road maintenance programme, the Government plans to provide additional funds for **institutional capacity building** at every level in order to perpetuate a well-institutionalised road maintenance at the districts. Such funds will be spent on logistic supports to DDCs, human resource development activities at all levels, technical resource bases such as quality control facilities, equipment maintenance facilities, etc., various consultancy services

required for the design, supervision and management of maintenance works, and on the preparation/updating of Transport Master Plans (DTMP), technical documents and so on. These funds will, however, be provided by the Government for the initial eight years, i.e., the period covered by this plan. **Table 9** provides the details of total fund requirement for the implementation of this maintenance plan.

Table 9 : Total Fund Requirement

Activity	**Fund Requirement** NRs. '00000 (US$ '000)							
	1999/00	**2000/01**	**2001/02**	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**2006/07**
Road Maintenance (*x*)	2,208 (3,281)	3,655 (5,434)	5,139 (7,641)	6,601 (9,816)	8,074 (12,003)	9,527 (14,162)	10,983 (16,327)	12,426 (18,471)
Institutional Capacity Building (10% of *x*) - Logistic Support - Human Resource Develop. - Technical Resource Base - Consultancy services	221 (328)	366 (543)	514 (764)	660 (982)	808 (1,200)	953 (1,416)	1,098 (1,633)	1,243 (1,847)
Total Fund Required	**2,429 (3,609)**	**4,021 (5,977)**	**5,653 (8,405)**	**7,261 10,798)**	**8,882 (13,203)**	**10,480 (15,578)**	**12,081 (17,960)**	**13,669 (20,318)**
Local Contribution	760 (1,124)	1,259 (1,865)	1,768 (2,618)	2,271 (3,364)	2,777 (4,112)	3,278 (4,853)	3,778 (5,593)	4,277 (6,331)
HMGN Contribution	1,669 (2,485)	2,762 (4,112)	3,885 (5,788)	4,990 (7,434)	6,105 (9,091)	7,202 (10,725)	8,303 (12,367)	9,393 (13,987)
- For programme	1,448 (2,157)	2,396 (3,569)	3,371 (5,024)	4,330 (6,452)	5,297 (7,891)	6,249 (9,309)	7,205 (10,734)	8,150 (12,140)
- For programme support (100% from HMGN)	221 (328)	366 (543)	514 (764)	660 (982)	808 (1,200)	953 (1,416)	1,098 (1,633)	1,243 (1,847)

4 Institutional Arrangements and Funding Mechanism

Decisions concerning the use of resources made available for maintenance may be as important and as difficult as the task of raising the funds. Most problems that exist with road maintenance are institutional or managerial in origin, rather than technical. It is a known fact that all local governing institutions are not equally capable with regard to technical, financial and managerial aspects. Therefore, the institutional arrangements and funding mechanism set forth in this plan have been so devised that the local governing institutions will eventually become capable and feel responsible for the management of rural road maintenance.

4.1 Policy reforms related to institutional aspects

Ownership of rural roads

The Government has already decided that the responsibility of developing and maintaining the rural road network shall lie with the local governing institutions under the technical guidance and facilitation of newly established Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR). As other government agencies such as DoR, DoI, etc. are still holding the responsibility of the development of a large portion of rural roads, there is a confusion over the responsibility prevailing both at the central and district levels. Therefore, prior to implementation of this maintenance plan, the ownership of all rural roads has to be handed over to the respective DDCs so that these DDCs can prepare and implement a comprehensive maintenance plan of rural roads within their jurisdiction.

Establishment of sectoral unit at district

Unlike the other technical departments, DoLIDAR does not have its technical office at the district level. The technical unit at DDC, presently staffed with the employees from the central Government, will likely be staffless once all central Government employees are withdrawn according to the newly enacted Local Self-Governance Act (2055). As per this Act, the DDCs could establish *Rural Road Units* by recruiting their own staff based on the Local Service Act which is yet to be formulated. Adding to this situation, not all DDCs may financially be able, in near future, to establish such a new unit by affording the remuneration and other fringe benefits of employees. Under these circumstances, it is very unlikely that these sectoral units will be established at all candidate districts. Therefore, for the candidate districts who cannot establish their sectoral units or who are not managerially capable, the DoLIDAR shall establish its district office in order to assist those DDCs in implementing the

maintenance plan. This office will, however, be withdrawn once the respective DDCs become capable in managing the road maintenance work.

Technical manpower at districts

National Strategy for rural infrastructure Development has specified the number of technical personnel required for each category of districts. It envisages that these technicians shall be in place at the DDCs for effective implementation of the rural infrastructure programmes. The following **Table 10** gives the required number of technical staff in the districts as per the *National Strategy*. Therefore, staffing of DDCs' sectoral units with the adequate technical personnel shall be accomplished prior to implementation of this plan.

Table 10 : Projection of District Technical Staff for Next Ten Years' Period

District		Projection of District Technical Manpower (Number)											
		At the beginning in 2054/55 (1997/98)				**Phase I** by 2059/60 (2002/03)				**Phase II** by 2064/65 (2007/08)			
Class	No.	SDE	E	Overseer		SDE	E	Overseer		SDE	E	Overseer	
				District	Ilaka			District	Ilaka			District	Ilaka
A	26	-	26	104	81	15	52	104	81	26	52	104	81
B	32	-	32	96	-	-	32	96	121	-	32	96	121
C	17	-	17	34	-	-	17	34	-	-	17	34	50
TOTAL	75	-	75	234	81	15	101	234	202	**26**	**101**	**234**	**252**

SOURCE.....*National Strategy for Rural Infrastructure Development (1997)*

Note : Class 'A' districts - Jhapa, Morang, Sunsari, Saptari, Siraha, Dhanusa, Mahottari, Sarlahi, Bara, Rautahat, Nawalparasi, Rupandehi, Kapilbastu, Dang, Kailali (by Phase I) and Parsa, Chitwan, Banke, Bardiya, Kanchanpur, Syangja, Kaski, Tanahu, Kathmandu, Lalitpur, Kavrepalanchok (by Phase II)

Class 'B' districts - Taplejung, Panchthar, Ilam, Sankhuwasabha, Tehrathum, Dhankuta, Bhojpur, Khotang, Okhaldhunga, Udayapur, Dolakha, Ramechhap, Sindhuli, Dhading, Nuwakot, Sindhupalchok, Makwanpur, Gorkha, Lamjung, Baglung, Gulmi, Palpa, Rukum, Salyan, Rolpa, Pyuthan, Dailekh, Surkhet, Achham, Doti, Darchula, Baitadi

Class 'C' districts - Solukhumbu, Rasuwa, Bhaktapur, Manang, Mustang, Myagdi, Parbat, Arghakhanchi, Humla, Mugu, Dolpa, Jumla, Kalikot, Jajarkot, Bajhang, Bajura, Dadeldhura

SDE - Senior Divisional Engineer (Class II)

E - Engineer (Class III)

Annex III provides the district-wise staff requirements as specified in the *National Strategy*.

Institutional support from the centre

As described in previous sections, the task of road maintenance needs a wide range of managerial skills and demands a well co-ordinated approach amongst providers, producers, financiers and the users of the rural road. Considering the present capacity of the DDC, it is obvious that they, at least for sometime in future, require continued technical expertise and guidance from the centre in managing their road maintenance activities effectively. Adding to this, the DoLIDAR which was formed recently to provide such technical support to local bodies, too needs further strengthening in fulfilling its responsibility. To this end, the Government decides to seek external donor assistance, both at the local and central level, for the management of road maintenance.

4.2 Institutional Arrangements

The following institutional arrangements are envisaged at different levels for effective implementation of this plan.

At district level

The DDC (through its *Rural Road Unit*) will be the sole responsible agency for implementing all road maintenance activities at the district. The functions of DDC regarding the road maintenance are as follows:

- Prepare District Rural Road Inventory;
- Prepare District Transport Master Plan (DTMP) and get it approved by the District Council;
- Identification of links to be maintained;
- Prioritisation of such links with reasonable justifications;
- Preparation of Annual District Maintenance Programme (ADMP) which includes all designs and cost-estimates;
- Approval of ADMP by the DDC;
- Commitment and allocation of local counterpart funds for the programme;
- Submission of proposal (as per the specified format) for maintenance programme to central Government, requesting proportionate HMGN supplementary funds;
- Co-ordinate all stakeholders (VDCs, users committees, road beneficiaries, NGOs, CBOs, transport entrepreneurs, etc.) at district level for road maintenance;
- Resource mobilisation for road maintenance activities;
- Opening of the Bank Account for District Rural Road Maintenance Fund and its regular operation;
- Assignment of technical staff and defining their roles, responsibilities and power;
- Preparation of specifications, tender documents, Terms of Reference (ToR), etc.
- Procurement of goods and services for road maintenance;
- Taking measurements of work; preparing bills; and settlement of payments;
- Supervision and Monitoring of the implementation of ADMP;
- Reviewing, auditing and reporting on the implementation of ADMP;
- Enactment of regulations for the management and proper use of rural transport system;
- Operate and regulate the rural transport system.

At central level

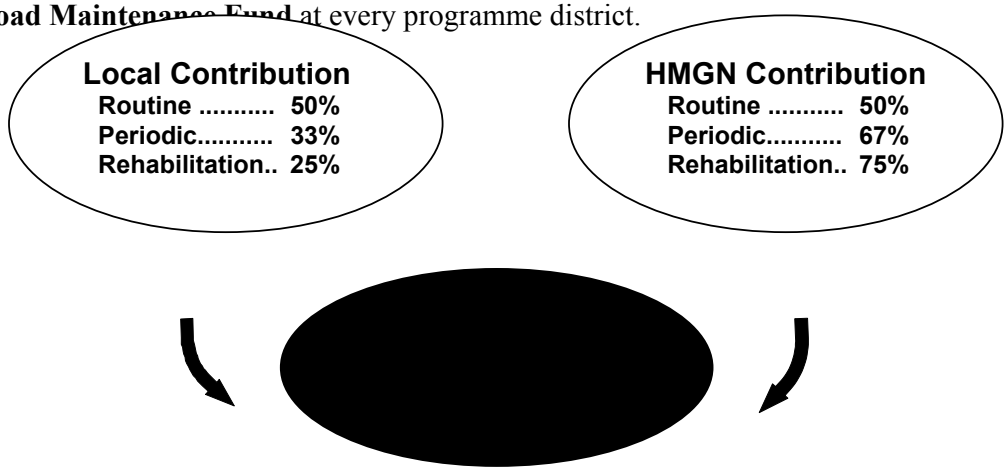
DoLIDAR will be the main co-ordinating agency for the implementation of the road maintenance programme throughout the country. The main functions of DoLIDAR regarding the road maintenance are as follows:

- Preparation of the Annual National Maintenance Programme (ANMP) by reviewing and accommodating the proposals submitted by the DDCs;

- Ensuring and release of adequate supplementary funds from the central Government;
- Monitoring and periodic review of the implementation of ANMP;
- Provision of technical and managerial support as and when required;
- Carrying out the periodic assessments on local institutional capabilities and arranging the logistic support and technical resource bases accordingly;
- Conducting training needs assessments for various target groups at local level and facilitating the organising of workshops, seminars and other training programmes accordingly;
- Arranging the study tours, regional and central level seminars and other training required for the implementation of ANMP;
- Assisting in formulating the Government policies and ensuring the exercise of such policy decisions.

4.3 Funding Mechanism

Since, implementation of road maintenance plan is a cost-sharing, decentralised, participatory process, the fund flow mechanism should be smooth and prompt for its success. Therefore, it is essential to establish a separate fund called **District Rural Road Maintenance Fund** at every programme district.



District Rural Road Maintenance Fund

The District Rural Road Maintenance Fund (DRRMF) mainly consists of local counterpart contribution and the proportionate HMGN supplementary allocations made available for the programme. The local counterpart contribution may consist of the resources generated by the DDCs/VDCs (*under the provisions made in Local Self-Governance Act 2055*), the funds contributed by the participating VDCs, the funds raised by the road beneficiaries, any other legal contributions made by the other organisations or individuals and block grants received from the central Government.

Upon the approval of the proposal for ADMP by the appropriate authorities, the local counterpart funds mobilised by the respective DDCs shall be credited to the Bank Account opened exclusively for the District Rural Road Maintenance Fund. Based on the amount credited, the Government will release its specified share of contribution (refer to page 11; **Table 6 : Resource Contribution**) from the programme allocation to the respective DRRMF account. Prior to the release of HMGN funds, the candidate district should, however, become a programme district by fulfilling the following **Preparedness Criteria**.

Preparedness Criteria to become a programme district

In order to participate in this road maintenance programme, every candidate district should prove its readiness by fulfilling the criteria given below.

Every candidate district should,

i. at least, prepare the District Rural Road Inventory;

ii. commit to prepare the District Transport Master Plan within the first two years of its engagement with the programme;

iii. prepare and approve its ADMP by the DDC, with details such as
   - identified links and their maintenance requirements;
   - prioritisation with reasonable justifications;
   - designs and cost-estimates of each road;
   - total fund requirements for each type of maintenance and respective share of local contribution;
   - brief description of *Rural Road Unit* with details on its staff;
   - description on available logistics and technical resource bases;
   - selected implementation modality (force account, local contracting, users' committee);
   - work plan;
   - etc.

iv. commit its share of contribution in cash and indicate its readiness to follow the specified guidelines provided by the Government.

Any candidate district who fulfils the above criteria may submit a proposal in the specified format (later to be provided by the DoLIDAR) to DoLIDAR by expressing its willingness to participate as a programme district of the road maintenance plan. If this proposal is acceptable to the Government, the district will become qualified for the programme.

Candidate districts for the programme

The Government has identified 58 candidate districts which have already got access to strategic road network. These districts may be eligible to become programme

districts once they fulfil the **preparedness criteria** to show their readiness for participation. The list of candidate districts is given in **Table 11**.

Table 11 : Candidate Districts

EASTERN REGION	20. Dhading	***Dhaulagiri Zone***
Mechi Zone	21. Nuwakot	42. Parbat
01. Taplejung	22. Kathmandu	43. Baglung
02. Panchthar	23. Lalitpur	44. Myagdi
03. Ilam	24. Bhaktapur	**MID WESTERN REGION**
04. Jhapa	25. Kavrepalanchowk	***Rapti Zone***
Koshi Zone	***Narayani Zone***	45. Rolpa
05. Terathum	26. Makawanpur	46. Pyuthan
06. Dhankuta	27. Rautahat	47. Dang
07. Sunsari	28. Bara	48. Salyan
08. Morang	29. Parsa	***Bheri Zone***
Sagarmatha Zone	30. Chitwan	49. Banke
09. Udaypur	**WESTERN REGION**	50. Bardiya
10. Okhaldhunga	***Lumbini Zone***	51. Surkhet
11. Saptari	31. Nawalparasi	**FAR WESTERN REGION**
12. Siraha	32. Rupandehi	***Seti Zone***
CENTRAL REGION	33. Kapilvastu	52. Kailali
Janakpur Zone	34. Arghakhanchi	53. Doti
13. Dhanusha	35. Palpa	54. Achham
14. Mahottari	36. Gulmi	***Mahakali Zone***
15. Sarlahi	***Gandaki Zone***	55. Darchula
16. Sindhuli	37. Syangja	56. Baitadi
17. Dolakha	38. Tanahu	57. Dadeldhura
Bagmati Zone	39. Gorkha	58. Kanchanpur
18. Sindhupalchowk	40. Lamjung	
19. Rasuwa	41. Kaski	

5 Implementation Arrangements

How the road maintenance work is carried out, mainly depends upon (i) the implementation approach - whether centralised or decentralised, labour-based or equipment-based, etc. and (ii) the modality - whether direct employment of labour through force account system or involvement of users' groups through lengthman/labour gang system or contracting of local firms/individuals. These factors further outline the extent to which the public sector, private sector and the communities are involved in the road maintenance activities. This chapter describes the Government position on such issues, particularly with reference to its recent policies and strategies.

5.1 Implementation Approach

As stipulated in the *National Strategy for Rural Infrastructure Development (1997)*, all rural road maintenance works should be carried out by adopting the *labour-based, local resources-oriented, environment-friendly techniques* and in accordance with the *HMGN decentralised, participatory approach*. Adopting this approach in rural road maintenance will ensure the achievement of Government's prime goal of poverty alleviation by lowering the rural unemployment and supplementing the level of rural income.

5.2 Implementation Modalities

There are three distinct implementation modalities used in Nepal for rural road maintenance work. These modalities and their respective characteristics are discussed here so that each DDC (implementing agency) can choose the most appropriate option with reference to the situation (availability of local labour, material and equipment; interest of the local contractors for maintenance work; the degree of user involvement in development works; etc.) prevailed at the respective district.

Direct employment of labour through force account system

Under this modality, the implementing agency directly employs labour (either as permanent staff or as temporary basis) and uses this labour along with the agency's maintenance equipment to carry out maintenance activities. This is the most traditional modality being used in Nepal, particularly by the Department of Roads (DoR). Several factors have contributed to the frequent use of force account system. First, the bias toward equipment-based technology, common in the past, created a situation in which most contractors could not afford the necessary maintenance

equipment. Second, it was often felt that alternative modalities such as contracting would lead to a lowering of maintenance standards.
These views have, however, changed dramatically in recent years with more and more agencies attempting to involve users' groups or to use contracting as the alternative modalities for road maintenance. As the force account system, a rather input-oriented system, offers no or little incentives to improve the efficiency, most of them now prefer to adopt the other alternative modalities. This modality may still be preferred for *emergency maintenance* against other alternatives as it is extremely difficult, by its nature, to plan for emergency work.

Involvement of users' groups through lengthman/labour gang system

Under the supervision of a DDC technician, a *lengthman* or a *labour gang* can be employed through the local road users' committee which is accountable to the public (local beneficiary community) regarding the operational condition of the road. The chosen lengthmen or labour gang, paid generally on task basis, live adjacent to the section of the road which is assigned to them. Since their road using neighbours know that they are being paid to maintain the road, additional pressures can be placed on them to carry out their tasks effectively. In this way they are likely to be more effective in comparison to the labourers working under the force accounts modality. Involving users in road maintenance (mainly for routine) may also take the form of labour contributions popularly known as "*Jana Sahabhagita*", particularly in districts where raising of local counterpart funds (cash) is difficult. This modality is more suitable for managing the routine maintenance work as, in most cases, locally available skills could well be sufficient to carry out such type of activities.

Contracting of local firms/individuals

Most road maintenance activities are simple and can be undertaken by small local contractors who tend to use labour rather than heavy equipment, and local resources rather than imported ones. Contracting of local firms and individuals can have additional advantages. As they have to compete each other to win the job, every firm tends to perform better in order to ensure or maintain the reputation of its work. This is more efficient and effective system to manage road maintenance as far as a conducive environment, which allows adequate resource management and promotes free and fair competition, can be guaranteed by the DDCs. The districts where the labour is scarce can opt for this modality as the local contracting firms and individuals could bring the labour from elsewhere. The DDCs who do not have enough technical manpower to supervise a large number of labour groups (appointed by users' groups or employed under the force account system) can choose this modality as it requires comparatively lesser technical staff from the part of DDC. This modality is more preferred for *periodic maintenance* and *rehabilitation*.

5.3 Implementation Matrix

The following matrix given in **Table 12** describes various functions that each stakeholder (public sector, private sector or community level) should perform while implementing an effective system of road maintenance.

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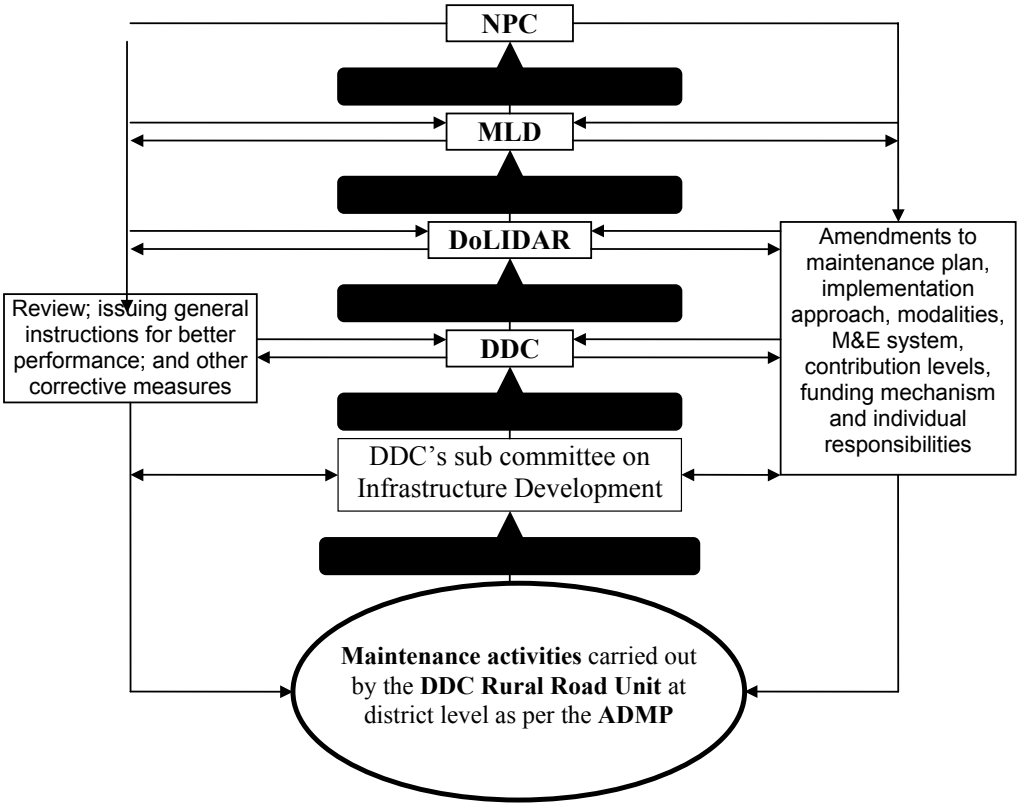
Table 12 : Implementation Matrix

S. No.	Function	Activities	Responsible Parties
1	PLANNING	• Preparation of Rural Road Inventory • Preparation of DTMP • Identification of links against each maintenance intervention	DDCs (thro' Consultants) DDCs (thro' Consultants) DDCs (thro' Consultants)
2	PROGRAMMING AND PRIORITISATION	• Prioritisation of links with justifications • Preparation of ADMP including designs and cost-estimates • Approval of ADMP • Commitment and allocation of local counterpart funds • Submission of proposal for maintenance programme • Review and approval of the district proposals at centre • Preparation of ANMP	DDCs (thro' Consultants) DDCs (thro' Consultants) District Councils DDCs DDCs DoLIDAR/MLD/NPC DoLIDAR/MLD/NPC
3	REVENUE GENERATION AND FUNDING	• Co-ordination among local stakeholders • Local resource mobilisation • Opening of the bank account for DRRMF • Credit the local counterpart funds as per the approved plan	DDCs DDCs DDCs DDCs
4	BUDGETING	• Annual budget allocation • Release of proportionate HMGN funds	MoF/NPC/Parliament DoLIDAR/MoF/FCGO
5	PREPARATORY WORK	• Preparation of specifications, tender documents, ToR, etc. • Preparation of labour and material schedules • Formation and registration of users' committees	DDCs (thro' Consultants) DDCs (thro' Consultants) DDCs/NGOs
6	TENDERING	• Bid notice • Tender evaluation • Procurement of goods and services	DDCs DDCs DDCs
7	SITE TECHNICAL SUPERVISION	• Assignment of technical staff • Technical guidance and assistance • Supervision/quality control of maintenance work • Taking measurements • Preparing bills	DDCs DDCs DDCs (thro' Consultants) DDCs (thro' Consultants) DDCs (thro' Consultants)
8	CONTRACT MANAGEMENT	• Contract monitoring • Payments • Performance evaluation	DDCs (thro' Consultants) DDCs DDCs/DoLIDAR
9	MAINTENANCE WORK	• Supply of materials, tools and equipment • Equipment rental • Carrying out of maintenance activities • Dispute resolution/Mediation	DDCs/Contractors Contractors/Suppliers Contractors/Labour Groups/Lengthmen Legal System/UGs
10	TRAINING	• Conducting training needs assessments • Conducting awareness campaigns for local leaders and users • Conducting training for local contractors • Conducting training for technicians • Workshops, seminars and study tours	DoLIDAR DDCs/DoLIDAR DoLIDAR DoLIDAR DoLIDAR
11	TECHNICAL AND	• Provision of technical and managerial support to DDCs • Assisting in formulating the policies and ensuring the exercise	DoLIDAR DoLIDAR

	MANAGERIAL SUPPORT	of such decisions • Arranging logistic support, technical resource bases, technical assistance, etc. to DDCs	DoLIDAR/Donors
12	MONITORING AND EVALUATION	• Reviewing, auditing and reporting on the implementation of ADMP • Monitoring and periodic review of ADMP • Conducting periodic assessment on local institutional capabilities • Performance evaluation studies	DDCs DoLIDAR DoLIDAR/MLD/NPC DoLIDAR/MLD/NPC
13	REGULATING THE USE	• Enactment of regulations for the management and proper use of rural transport system • Operation and regulation of the rural transport network	District Councils DDCs

5.4 Monitoring and Evaluation

Regular monitoring of the implementation of rural road maintenance plan is very important as it helps (i) to keep an eye on the progress of maintenance activities; (ii) to check whether the stipulated approach and modalities are being followed by the DDCs; (iii) to make periodic assessments on the built-up capacity of DDCs; and (iii) to identify the areas where further policy reforms are deemed necessary. The following flow chart describes the entire M&E mechanism suggested for this purpose.



The Government plans to perform two major reviews on the entire RRMP each at the end of Ninth and Tenth Plan. In the reviews to be performed in August 2002 and August 2007,

- the total length of rural road network will be re-assessed along with the number of new candidate districts. With the completion of many DTMPs, this exercise will compile the most realistic data base of the rural transport system;

- the performance of the DDCs and their Rural Road Units will be evaluated with reference to their increased workload, resources, capacities, etc. This will provide the basis for subsequent withdrawal of HMGN financial and technical assistance from the DDCs;

- the overall performance of the programme and its impact will be evaluated. The key effect monitoring indicators used for this purpose will be travel time, travel cost, length of roads in operation, level of local participation (both financially and socially), socio-economic benefits, etc.; and

- views and opinions of stakeholders regarding the implementation aspects of the programme and their contribution will be discussed on random sampling basis. Outcome of these discussions will be considered in determining the future course of action for the RRMP.

5.5 Options proposed for further decentralisation of maintenance work

Based on the outcome of these reviews, the ownership of certain rural roads (village roads and agricultural roads) may be handed over to further grass root level agencies such as VDCs, CBOs, NGOs, etc. Such action will promote and strengthen the decentralisation process from district to further down with clearly demarcated responsibility on regulation and maintenance of these roads.

Another option under the Government's consideration is privatising some of the rural roads which have a single principal user (or a user group with common interest) such as the owner of a sugar mill, a garment factory or a similar enterprise. Such users, however, should have a strong incentive to provide road maintenance and should anticipate that no agency would be interested to take care of these roads.

6 Summary

Ensuring the effective maintenance of rural roads in Nepal is not a simple task. As the existing rural road network is becoming so deteriorated, it is only with the massive infusions of new investment and improved maintenance efforts that the rural roads will be able to sustain economic development efforts. The roads can yield significant benefits to users and constitute one critical portion of the public infrastructure needed to support development. Despite the difficulties, problems and complexities prevailed in the sector, continuing maintenance activities in real terms is, therefore essential, particularly for the upliftment of rural economy and for the alleviation of poverty.

In summary, this maintenance plan ensures that the maintenance of rural roads in Nepal is well-attended. It initially addresses twenty five percent of total maintenance requirement of Nepal's rural roads and eventually covers the entire network (about 11,200 km) by the year 2007. This time-bound plan outlines an effective funding mechanism which envisages the importance of a joint effort from both the local governing institutions and the central Government. As per the maintenance plan, there will be a local counterpart contribution, ranging from 25% to 50% made available for this endeavour. According to the financial plan, the total funds earmarked by the HMGN for Ninth Plan period is NRs. 831.6 million (about US$ 12.39 million) as its contribution whereas NRs. 378.7 million (about US$ 5.61 million) is expected to be supplemented by the local governing institutions. For Tenth Plan period, the shares of HMGN and the local governing institutions will be NRs. 3.6 billion (about US$ 53.61 million) and NRs. 1.64 billion (about US$ 24.25 million), respectively.

The maintenance plan further outlines an institutional arrangement which supports and strengthens the process of decentralisation. The framework proposed in this regard will ultimately enhance the capacities of local institutions thus making them feel responsible for the management of rural road maintenance. The plan spells out the implementation approach for road maintenance and highlights the options for implementing various maintenance interventions. The responsibility of monitoring the entire maintenance exercise lies mainly with the DoLIDAR, MLD and the NPC. Furthermore, the Government intends to perform two major reviews on the RRMP each at the end of Ninth and Tenth Plan. May it be a change in the proportions of contribution or a complete withdrawal of HMGN assistance from the district or a redefining of the implementation modality, these reviews will certainly help the Government in determining the future course of action for the maintenance of Nepal's rural road network.

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