CHAPTER A-13 FINANCIAL PROCUREMENT PLAN

13.1 Investment Prospects in the Road Sector

13.1.1 Background

The MPWT and the MRD are the major implementation bodies for road development/maintenance in Cambodia. The budgetary components consist of: (i) expenditure for administration; (ii) expenditure for road maintenance; and (iii) external assistance.

Excluding external assistance, the annual budget for the road sector is very limited. In 2005, the budget for the MPWT, the largest organization for road administration, was only 15,460 billion Riel or $3.8 million. of the lack of budget has been the major cause of for the slow development of the road sector in Cambodia. On this basis, the majority of the current undertakings in the road sector are brought about through external assistance.

13.1.2 Official External Assistance to the Road Sector

The official external assistance provided to the road sector between 2001 and 2005 is shown in **Table 13.1.1.** The average annual amount of assistance during the period is calculated at approximately $71.9 million, of which loans make up $58.4 million and grant aids $13.5 million.

13.1.3 Internal Fund for the Road Sector

(1) Special Tax

The fund internally procured for the road sector has, for a long time, been very limited. However, with the introduction of Added Tax (Road User Special Fund) for road maintenance purposes in 2002, an institutional background for the application of the fund exclusively for road maintenance has been established.

The application of this fund is limited to only light road maintenance works by agencies/ministries such as the MPWT, MRD, MOWRAM and the Provincial/City Governors Office. At present, purchasing taxes on fuel (2 cents/liter for gasoline and 4 cents/liter for diesel), are being levied for this purpose.

(2) Vehicle Registration/Holding Tax

Vehicle registration/holding taxes are another funding source for the road sector, although the contribution from these taxes is very limited.

There are also other funding sources available, however they are not for road development purposes and cannot be recognized as road funding sources.

Table 13.1.1 Annual Amount of Loans and Grants for the Road Sector in Cambodia

2001-2005

ID	Source	Project Tytle	Amount	Starting	Ending	Period	Disbursement Unit: $ mil.				
							2001	2002	2003	2004	2005
A. Loan Assistance											
ADB-1	ADB	NR-1:Neak Loeung-VM Border	51.0	1999	2005	7	7.3	7.3	7.3	7.3	7.3
ADB-2	ADB	Primary Road Restoration	88.2	2000	2004	5	17.6	17.6	17.6	17.6	
ADB-3	ADB	Bmergency Flood Rehabilitation	41.0	2001	2004	4	10.3	10.3	10.3	10.3	
ADB-4	ADB	NR-5,6 Siem Reap-Poipet	77.5	2005	2008	4					19.4
ADB-5	*ADB	Trasport Dev.& Intrastructure	12.0	2006	2010	5					
ADB Total			**269.7**				35.2	35.2	35.2	35.2	26.7
WB-1	WB	Cambodia Road Rehabilitation	45.6	2001	2004	4	11.4	11.4	11.4	11.4	
WB-2	WB	Flood Emergency Rehabilitation	12.2	2002	2004	3		4.1	4.1	4.1	
WB-3	WB	Provincial/Rural Infra-Develop	16.6	2004	2007	4				4.2	4.2
WB-4/Grant	WB	NR-51 Rehabilitation	10.0	2003	2005	3			3.3	3.3	3.3
WB-5	*WB	Trasport Dev.& Intrastructure	10.0	2006	2010	5					
WB Total			**94.4**				2.3	15.5	18.8	23.0	7.5
TG-1	Thai	NR-48 (DBST Pavement)	21.7	2005	2008	4					5.4
TG-2	Thai	NR-67 Rehabilitation	27.8	2005	2007	3					9.3
TG Total			**49.5**				0.0	0.0	0.0	0.0	14.7
KG-1	Korea	NR-3 Rehabilitation	17.5	2004	2007	4				4.4	4.4
KG Total			**17.5**				0.0	0.0	0.0	4.4	4.4
VG-1/Grant	Vietnam	NR-78 Improvement	28.0	2005	2007	3					9.3
VG Total			**28.0**				0.0	0.0	0.0	0.0	9.3
CG-1	China	NR-7 Rehabilitation	50.0	2004	2007	4				12.5	12.5
CG Total			**50.0**				0.0	0.0	0.0	12.5	12.5
JG-1	*Japan	Trasport Dev.& Intrastructure	6.0	2006	2010	5					
JG Total			**6.0**				0.0	0.0	0.0	0.0	0.0
Total of Loan Assistance (1)			**515.1**				**37.5**	**50.6**	**54.0**	**75.0**	**75.0**
Annual Average of Loan Amount							**58.4**		**(2001～2005)**		
B. Grant Project											
J Grant-1	Japan	NR6 & NR7 Road Rehabilitation	41.6	1996	1999	4					
J Grant-2	Japan	Construction of 1st Mekong Br.	59.2	1996	2000	5					
J Grant-3	Japan	NR 6A Siem Read	14.1	2000	2001	2	7.0				
J Grant-4	Japan	NR 6A Bridge	12.3	2000	2001	2	6.1				
J Grant-5	Japan	NR 7 Road Rehabiliatation	18.7	2000	2003	4	4.7	4.7	4.7		
J Grant-6	Japan	NR 2 (Takeo - Vietnam Border)	13.3	2003	2005	3			4.4	4.4	4.4
J Grant-7	Japan	NR 51 Road rehabiliation	5.0	2003	2005	3			1.7	1.7	1.7
J Grant-F1	Japan	NR 1(Phnon Penh- Neak Loang)	45.0	2005	2010	6					7.5
J Grant-F2	Japan	Construction of 2nd Mekong Br.	70.0	2008	2010	3					
J Grant-F3	Japan	Main Trank Rd. Bridges	35.0	2005	2007	3					11.7
J G Total			**314.2**				17.8	4.7	10.8	6.1	25.3
T Grant-1	Thai	4 bridges on NR-48	**8.0**	2005	2007	3					2.7
Total of Grant Assistance (2)			**322.2**				17.8	4.7	10.8	6.1	28.0
Annual Average of Grant Amount							**13.5**		**(2001 ～2005)**		
C. Total of Loan and Grant (1)+(2)			**837.3**				55.3	55.3	64.8	81.1	103.0
Average of Loan and Grant Amount							**71.9**		**(2001 ～2005)**		

13.1.4 Road Investment Prospects

Many discussions have been conducted between the authorities on the amount of funds required for the development of roads in Cambodia. The amount differs according to the development concept envisioned. For instance, in the Rectangular Development Concept, the amount required by the road sector up until 2010 is estimated to be approximately $2,000 million. This is irrespective of the possibility of procurement and solvency of refunding in the case that it is financed externally. On the other hand, according to 'The study report on the prospect investment in infrastructure in the developing nations during 2005-2010*', it is estimated that approximately $1800 million per annum is required by a country such as Cambodia. Based on the Investment/GDP ratio this is equivalent to approximately 7%. Should this be optimal values, and assuming the share of road investment is 50% of the total infrastructure, the optimal ratio of Road Investment/GDP is calculated to be approximately 3.5%. There are no authorized values for the ratio of road investment to the size of GDP, however the Road Investment/GDP ratio for Cambodia in 2004 was 2.4% (GDP: $4360.8M, Investment Fund: $102.5M). This ratio is significantly below the benchmark value mentioned above.
Based on this fact, the road investment in Cambodia should be increased in order to catch up to the international standard.

* Investing in Infrastructure: What is Needed from 2000 to 2010?, M. Fay & T. Yepes, 2003

13.2 Expected Amount of External Funds for the Road Sector

Official external assistance is provided by international credit organizations and foreign donors in the following two forms;

- Budget Support External Assistance
- Project Aid

The external assistance fund committed after 1999 was $837 million as shown in **Table 13.1.1** of which $515 million was by loan and $322.2 million was by grant aid.

13.3 Expected Amount of Domestic Funds for the Roads Sector

13.3.1 Revenue from Special Tax

(1) Present Situation

For the foreseeable future, Special Taxes and Road User Taxes are two of the funding sources for road development. In relation to Special Taxes, the total amount of revenue and the expenditure details have not been officially published to date. However, according to the results of an interview with MEF, the revenue in 2004 was estimated to be approximately $21.1 million and it is expected that the amount will increase with the increase in GDP. However, this tax is not

accurately levied due to considerable amount of smuggling that is occurring. The import tax statistics shows a sharp decline in the amount of gasoline imported from 2002 onwards compared to the increasing demand for fuel for vehicles in Cambodia. It is expected that organized smuggling began in 2002.

The volume of gasoline being smuggled into the country is estimated to be as much as approximately 1.44 times the total amount of imported gasoline as shown by a simple regression analysis of the relationship between tax imports and vehicle numbers, as shown in **Table 13.3.1**. This is a great loss to the national economy.

Table 13.3.1 Gasoline Imports and an Estimation of the Smuggled Volume of Gasoline

(Unit: m.ton)

Year	Vehicle No.	Gasolin Import
1994	513,977	264,326
1995	545,315	394,441
1996	577,058	414,870
1997	600,912	466,310
1998	633,722	482,245
1999	671,822	478,355
2000	738,461	514,678
2001	798,416	605,923
Growth Rate	1.065	1.126

Year	Vehicle No.		Gasolin Import without and with Smuglling		
	Statistics Book	By Growth Rate	(a) Estimated Total Gasoline Import without Smuggle	(b) Import Data by Statistics Book	(a)/(b)
2002	850,313	682,269	655,374	487,603	
2003	905,583	768,235	707,405	504,741	
2004	964,446	865,033	762,818	481,331	
Total (2002-4)		2,315,537	2,125,597	1,473,675	1.442

*Gasoline Import Amount=0.94139 x Vehicle no.-145102 (Correlation Coefficient; 0.918)

(2) Possibility of Tax Rate Hikes

At present, taxes of two cents/liter for gasoline and four cents/liter for diesel are charged to the oil importer. These taxes are to be transferred to consumers, almost all of them are road user. The level of these taxes should be debated in terms of the "tax burden" on consumers and/or the "willing-to-pay" standard on consumer behavior.

In terms of the tax burden on consumers, the present index for the tax amount/per capita ratio, an index that measures the degree of solvency, is calculated at 9.1‰. This value may well decrease with the increase in per capita income.

According to the per capita income forecast calculated by the Study Team, it is expected that the per capita income in Cambodia in 2015 will reach almost 1.5 times the present level. This fact suggests that a tax rate hike of 1.5 times the present level will maintain the burden at 9.1‰. In other words, a tax rate hike of 1.5 times the present level, or taxes of three cents/liter on gasoline

and three cents/liter on diesel in 2015 would maintain the consumer's burden at the same level as at present. Based on this background, an increase of 1.5 times the present tax rate after 2015 is being introduced in the estimation of future revenue from this funding source. The justification for this is detailed in **Table 13.3.2**.

Table 13.3.2 Analysis of Tax Burden on Added Tax (Road User Special Fund)

			2005	2010	2015	2020
(a)	GDP ($ mil)		4,623	6,192	8,635	12,647
(b)	Pop. (mil)		13.1	14.4	16.0	17.7
(c)	Per Capita GDP ($)		353	430	540	715
(d)	Present Tax Rate ($)	0.032	0.032	0.032	0.032	0.032
(d-1)	- Gasolin (share 40%)	0.020				
(d-2)	- Diesel (share 60%)	0.040				
(e)	Tax Burden*		***0.091***	0.074	0.059	0.045
(f)	Hiked Tax Rate ($)	0.048				
(f-1)	- Gasolin (share 40%)	0.030				
(f-2)	- Diesel (share 60%)	0.060				
(g)	Tax Burden*		0.136	0.112	***0.089***	0.067

* Tax Rate/Per Capita GDP x 1,000

13.3.2 Revenue from Road User Charges

Revenue from vehicle registrations, holding taxes and vehicle weight taxes are the most suitable revenue sources for road development. The exact amount of revenue gained from these sources and the expenditure details are not publicly official. However, according to an interview of MEF the revenue was estimated to be approximately $0.26 million in 2004. It is expected that the revenue will increase with the increasing number of registered vehicles. This can be forecasted using a correlation analysis against GDP.

The future revenue stream from these taxes was estimated as shown in **Table 13.3.3**.

Table 13.3.3 Future Domestic Fund

(Unit: $ mil.)

Source	Cases	Remark	2004	2010	2015	2020
Added Tax	Special Tax	Gasoline 2 cent/litter, Diesel 4cent/litter (2004-2020)	21.1	29.9	62.7	91.7
		Gasoline 3 cent/litter, Diesel 6cent/litter (2015-2020)				
	Levying Evaded Special Tax due to Smuggling	Gasoline 2 cent/litter, Diesel 4cent/litter (2004-2020)			16.6	24.3
		Gasoline 3 cent/litter, Diesel 6cent/litter (2015-2020)				
Vehicle User Charge	Road User Tax	$25 per annum (2004-2020)	0.26	0.37	0.52	0.77
Total			21.4	30.3	79.8	116.8

13.4 Financial Plan

13.4.1 Introduction

Prior to determining the flow of funds throughout the planning horizon of the road development master plan study, the fund procurement prospects are discussed in terms of both offshore and domestic procurement. Three types of prospects, namely, the present pattern, a growth pattern and a growth acceleration pattern are discussed below.

13.4.2 Alternatives for Development

The proposals and the conceptual background for each alternative are as follows:

(1) Present Pattern

<Proposal>

External assistance at the present level shall continue for the foreseeable future:

<Basic Concept behind the Viewpoint>

The first stage of road development focused on the recovery of road function destroyed by prolonged war and resulting lack of maintenance. The reconstruction works on 1-digit national roads are only the first stage of road development. A large amount of road infrastructure development, similar to the amount of work that has been done over the past 10 years, has to be conducted over the next 15 years. For this reason, almost the same level of external assistance should be requested and should be injected into the development of the road infrastructure of the nation.

(2) Growth Pattern

<Proposal>

For the realization of national foundation, the intensive development of infrastructure needs to proceed. For this purpose, the available domestic resources need to be utilized as well as accepting external assistance.

<Basic Concept behind the Viewpoint>

There has been significant progress in infrastructure development since 1998, however this has mainly been the reconstruction of war torn infrastructure. In order to further develop the national economy, additional infrastructure development is required. This objective needs to proceed with the utilization of both internal and external available funds in order to support development policies such as the Rectangular Development Strategy, as advocated by Prime Minister Hunsen.

(3) Growth Accelerating Pattern

<Proposal>

For the purpose of improving the road infrastructure to an international standard, comparable to neighboring Thailand, additional external assistance should be channeled into the roads sector, along with maximizing the usage of domestic funds.

<Basic Concept behind the Viewpoint>

Over the last few decades, there has been a large amount of investment by external assistance towards the road infrastructure in relatively developed economies such as Thailand. Cambodia, as a member country of ASEAN, is eligible to receive more external funds to cope with the accelerating economic development.

13.4.3 Expected Outcomes of Investment Scheme Alternatives

In-depth discussions need to be carried out between the relevant decision makers for the determination of a future financing policy not limited to the roads sector.

However, the advantages and disadvantages of each financial proposal, especially in terms of road sector development, are described in **Table 13.4.1**.

Table 13.4.1 Alternative Investment Plans

Alternative	Methodology	Expected Outcomes
Alt 1 Present Pattern	- Added tax (Objective Tax) at present level - External assistance at present level	- Same level of achievement as attained in the last decade - Sustainable development at present level - Increase in foreign debt at a moderate rate
Alt.2 Growth Pattern	- Maximum procurement of domestic resources - Increase in Grant Aid	- Promote infrastructural development at an appropriate pace - Increase in foreign debt at a moderate rate
Alt 3 Growth Acceleration	- Maximum procurement of domestic resources - Large amount of external assistance	- Supporting large development proposals - Acceleration of external debt

13.4.4 Road Development Fund Sources

In conjunction with the development concepts described above, the available funding sources in the road sector are set out according to the development alternatives, as shown in **Figure 13.4.1** and **Table 13.4.2** and the following assumptions are introduced:

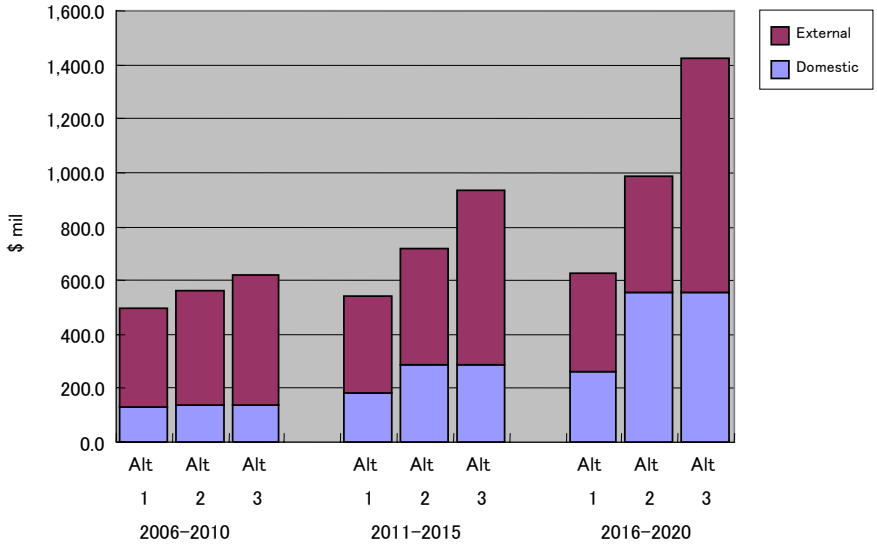


Fig. 13.4.1 Comparison of Alternatives

Table 13.4.2 Procurement Plan by Alternative

Alternative 1: Present Pattern (Unit: $ mil)

Year	Domestic Procurement					External Assistance					Total	
	Special Tax (Added Tax)	Levying from Smuggle	Vehicle Reg. Tax	Total	Accumulate	Loan International Credit Bank	Bilateral Loan	Grant Aid	Total	Accumulate	Total	Accumulate
2006	23.7	-	-	23.7	23.7	46.9	11.6	13.5	72.0	72.0	95.7	95.7
2007	25.1	-	-	25.1	48.8	46.9	11.6	13.5	72.0	144.0	97.1	192.8
2008	26.6	-	-	26.6	75.4	46.9	11.6	13.5	72.0	216.0	98.6	291.4
2009	28.3	-	-	28.3	103.7	46.9	11.6	13.5	72.0	288.0	100.3	391.7
2010	30.0	-	-	30.0	133.6	46.9	11.6	13.5	72.0	360.0	102.0	493.6
2011	32.1	-	-	32.1	32.1	46.9	11.6	13.5	72.0	72.0	104.1	104.1
2012	34.2	-	-	34.2	66.3	46.9	11.6	13.5	72.0	144.0	106.2	210.3
2013	36.5	-	-	36.5	102.8	46.9	11.6	13.5	72.0	216.0	108.5	318.8
2014	39.0	-	-	39.0	141.8	46.9	11.6	13.5	72.0	288.0	111.0	429.8
2015	41.8	-	-	41.8	183.6	46.9	11.6	13.5	72.0	360.0	113.8	543.6
2016	45.2	-	-	45.2	45.2	46.9	11.6	13.5	72.0	72.0	117.2	117.2
2017	48.7	-	-	48.7	93.9	46.9	11.6	13.5	72.0	144.0	120.7	237.9
2018	52.5	-	-	52.5	146.4	46.9	11.6	13.5	72.0	216.0	124.5	362.4
2019	56.5	-	-	56.5	203.0	46.9	11.6	13.5	72.0	288.0	128.5	491.0
2020	61.2	-	-	61.2	264.2	46.9	11.6	13.5	72.0	360.0	133.2	624.2
Total											**1,661.4**	

Alternative 2: Growth Pattern (Unit: $ mil)

Year	Domestic Procurement					External Assistance					Total	
	Special Tax (Added Tax)	Levying from Smuggle	Vehicle Reg. Tax	Total	Accumulate	Loan International Credit Bank	Bilateral Loan	Grant Aid	Total	Accumulate	Total	Accumulate
2006	23.7	-	0.2	23.9	23.9	46.9	11.6	27.2	85.7	85.7	109.6	109.6
2007	25.1	-	0.3	25.4	49.3	46.9	11.6	27.2	85.7	171.4	111.1	220.7
2008	26.6	-	0.3	26.9	76.2	46.9	11.6	27.2	85.7	257.1	112.6	333.3
2009	28.3	-	0.4	28.6	104.9	46.9	11.6	27.2	85.7	342.8	114.3	447.7
2010	30.0	-	0.4	30.3	135.2	46.9	11.6	27.2	85.7	428.5	116.0	563.7
2011	32.1	12.8	0.4	45.2	45.2	46.9	11.6	27.2	85.7	85.7	130.9	130.9
2012	34.2	13.6	0.4	48.2	93.4	46.9	11.6	27.2	85.7	171.4	133.9	264.8
2013	36.5	14.5	0.5	51.5	144.9	46.9	11.6	27.2	85.7	257.1	137.2	402.0
2014	39.0	15.5	0.5	55.0	199.9	46.9	11.6	27.2	85.7	342.8	140.7	542.7
2015	62.7	24.9	0.5	88.1	288.1	46.9	11.6	27.2	85.7	428.5	173.8	716.6
2016	67.8	27.0	0.6	95.4	95.4	46.9	11.6	27.2	85.7	85.7	181.1	181.1
2017	73.1	29.1	0.6	102.8	198.2	46.9	11.6	27.2	85.7	171.4	188.5	369.6
2018	78.8	31.4	0.7	110.9	309.0	46.9	11.6	27.2	85.7	257.1	196.6	566.1
2019	84.8	33.8	0.7	119.3	428.4	46.9	11.6	27.2	85.7	342.8	205.0	771.2
2020	91.8	36.5	0.8	129.1	557.4	46.9	11.6	27.2	85.7	428.5	214.8	985.9
Total											**2,266.2**	

Alternative 3: Growth Accelerating Pattern (Unit: $ mil)

Year	Domestic Procurement					External Assistance					Total	
	Special Tax (Added Tax)	Levying from Smuggle	Vehicle Reg. Tax	Total	Accumulate	Loan International Credit Bank	Bilateral Loan	Grant Aid	Total	Accumulate	Total	Accumulate
2006	23.7	-	0.2	23.9	23.9	46.9	11.6	27.2	85.7	85.7	109.6	109.6
2007	25.1	-	0.3	25.4	49.3	49.7	12.3	28.8	90.8	176.5	116.3	225.9
2008	26.6	-	0.3	26.9	76.2	52.7	13.0	30.6	96.3	272.8	123.2	349.1
2009	28.3	-	0.4	28.6	104.9	55.9	13.8	32.4	102.1	374.9	130.7	479.8
2010	30.0	-	0.4	30.3	135.2	59.2	14.6	34.3	108.2	483.1	138.5	618.3
2011	32.1	12.8	0.4	45.2	45.2	62.8	15.5	36.4	114.7	114.7	159.9	159.9
2012	34.2	13.6	0.4	48.2	93.4	66.5	16.5	38.6	121.6	236.3	169.8	329.7
2013	36.5	14.5	0.5	51.5	144.9	70.5	17.4	40.9	128.9	365.1	180.3	510.0
2014	39.0	15.5	0.5	55.0	199.9	74.8	18.5	43.4	136.6	501.7	191.6	701.7
2015	62.7	24.9	0.5	88.1	288.1	79.2	19.6	46.0	144.8	646.5	232.9	934.6
2016	67.8	27.0	0.6	95.4	95.4	84.0	20.8	48.7	153.5	153.5	248.8	248.8
2017	73.1	29.1	0.6	102.8	198.2	89.0	22.0	51.6	162.7	316.2	265.5	514.3
2018	78.8	31.4	0.7	110.9	309.0	94.4	23.3	54.7	172.4	488.6	283.3	797.6
2019	84.8	33.8	0.7	119.3	428.4	100.0	24.7	58.0	182.8	671.4	302.1	1,099.8
2020	91.8	36.5	0.8	129.1	557.4	106.0	26.2	61.5	193.8	865.2	322.8	1,422.6
Total											**2,975.4**	

<Alternative 1; Present Pattern>

-Domestic Funds: Two revenue sources are special taxes and road user taxes. The tax rate up until 2020 remains at the current level. It is assumed that the smuggling of oil will be completely controlled by the year 2011.

-External Funds: Loans from International Credit Institutes and bilateral assistance are assumed to be at the same level as that received between 2001 and 2005. Grant aid also remains at the same level as that received between 2001 and 2005.

<Alternative 2; Growth Pattern>

-Domestic Funds: Two revenue sources are special taxes and road user taxes. The tax rate after 2015 is assumed to be 1.5 times the current tax rate. It is assumed that the smuggling of oil will be completely controlled by the year 2011.

-External Fund: Loans from International Credit Institutes and bilateral assistance are assumed to be at the same level as that received between 2001 and 2005. Grand aid is expected to increase during 2006-2010 as large portion of grant aid is expected to be drawn down due to the many large scale projects scheduled in this period.

<Alternative 3; Growth Accelerating Pattern>

-Domestic Fund: Two revenue sources are special taxes and road user taxes. The tax rate after 2015 is assumed to be 1.5 times the current tax rate. It is assumed that the smuggling of oil will be completely eliminated by the year 2011.

-External Fund: Loans from International Credit Institutes and bilateral assistance are assumed to increase in proportion to GDP growth, i.e. at 6% per annum.

13.5 Possible Resources in the Case of a Shortage in Road Funds

There are several methods for procuring additional funds in the case of a shortage in funds. These measures, among others, are:

- Setting out a new road fund or reallocation from another fund;
- An increase in special taxes and/or road taxes;
- An increase in external assistance;
- The issuance of construction bonds;
- Private financing.

However, it is strongly recommended that the measures that are adopted are those that do not affect the national economy and do not contribute towards excessive debt for Cambodia.

The following are measures for procuring additional funds which will place less burden on the

national economy:

- Introduction of Toll Roads

It is possible to procure a portion of the required road maintenance fund through the introduction of a toll system on certain road sections. Experimental toll collection sites have been introduced in two locations on National Road 4 since January 2005. The present toll rates are; $0.69 for passenger cars, $5.50 for buses and $8.00 for dump trucks. It is still too early to determine the effects of this undertaking. However, should this type of toll system be introduced in other road sections, it will contribute towards the mitigation of the financial burden of the road sector.

- Collection of Heavy Vehicle Surcharges

The MPWT plans to install weigh-stations in seven locations on the 1-digit national roads. The regulation of heavily loaded vehicles will not only contribute towards the preservation of the road surface conditions but also towards the expansion of the road funding sources.

- Introduction of Transit Taxes

The levying of transit charges on foreign registered vehicles passing through Cambodian territory is another possible source of funds for the road sector.

CHAPTER A-14 IMPLEMENTATION PROGRAM

14.1 Concept for the Implementation Program

In order to establish a realistic and effective implementation program, the Study Team adopted a basic concept for the implementation program for the Master Plan as follows:

(1) On-going projects should be completed in the short-term plan

National roads, especially 1-Digit and 2-Digit roads are very important as they form the basis of the national and regional economy. Therefore, all of the on-going rehabilitation projects relating to 1-Digit and 2-Digit roads being implemented or committed by international funding agencies and donors shall be completed in the short-term plan.

(2) Access to the provincial capital should be improved as soon as possible

Taking into consideration the importance of governmental administration services in the rural areas, 2-Digit roads linking to the provincial capitals that are in poor condition should be improved as early as possible either in the short-term or medium-term plan.

(3) Implementation of the Urgent Bridge Rehabilitation Program

Although most of the 1-Digit and some important 2-Digit roads have already been rehabilitated, many temporary bridges still remain in narrow and poor condition within the completed sections of the 1-Digit and 2-Digit roads. The rehabilitation of these temporary bridges is included as a part of the upgrading works in the master plan; however, the upgrading of these roads is planned in the medium-term of long-term plan. As the collapse of a bridge on a major road would have an adverse impact on local socio-economic activities, the Study Team recommends that these bridges should be improved as soon as possible and implemented under the "Urgent Bridge Rehabilitation Program".

Based on the above concepts, the Study Team set the targets for the implementation program in the short-term, medium-term and long-term by type of road as shown below:

Table 14.1.1 Targets for the Implementation Program

<table>
<tr><th>Short Term Plan
(2006-2010)</th><th>Medium Term Plan
(2011-2015)</th><th>Long Term Plan
(2016-2020)</th></tr>
<tr><td>All the on-going rehabilitation projects by international funding agencies and donors shall be completed.</td><td colspan="2">All 1-Digit Roads become an all weather conditions road having a high design standards with a asphaltic concrete and sufficient traffic capacity.</td><td rowspan="3"></td></tr>
<tr><td colspan="3">Urgent Bridge Rehabilitation Program</td></tr>
<tr><td>Phase I (South-east Blk)</td><td>Phase II (North-west Blk)</td><td>Phase III (South-west Blk)</td><td>Phase IV(North-east Blk)</td></tr>
<tr><td colspan="3">All 2-Digit Roads linking to a provincial capital will be improved to a paved road with asphalt concrete resisting a disaster in rainy season.</td><td rowspan="3">Remaining 2-Digit Roads will be improved to become a paved road with asphalt concrete or DBST.</td></tr>
<tr><td colspan="3">Urgent Bridge Rehabilitation Program</td></tr>
<tr><td>Phase I (South-east Blk)</td><td>Phase II (North-west Blk)</td><td>Phase III (South-west Blk)</td><td>Phase IV(North-east Blk)</td></tr>
<tr><td colspan="2">Among 3-Digit Roads and Rural Roads, 40% of roads will be passable in wet season owing to the proper maintenance work.</td><td>Among 3-Digit Roads and Rural Roads, 60% of roads will be passable in wet season owing to the proper maintenance work.</td><td>Among 3-Digit Roads and Rural Roads, 80% of roads will be passable in wet season owing to the proper maintenance work.</td></tr>
</table>

14.2 Implementation Program in the Short-term, Medium-term and Long-term

The implementation program has been examined taking into consideration the results of the project evaluation and the available funds based on the financial study. **Figure 14.2.1** shows the routes to be improved in the short-term, medium-term and long-term plans and **Table 14.2.1 (1)**, **Table 14.2.1 (2)**, **Table 14.2.1 (3)** are the implementation programs by type of roads, including national roads and provincial roads.

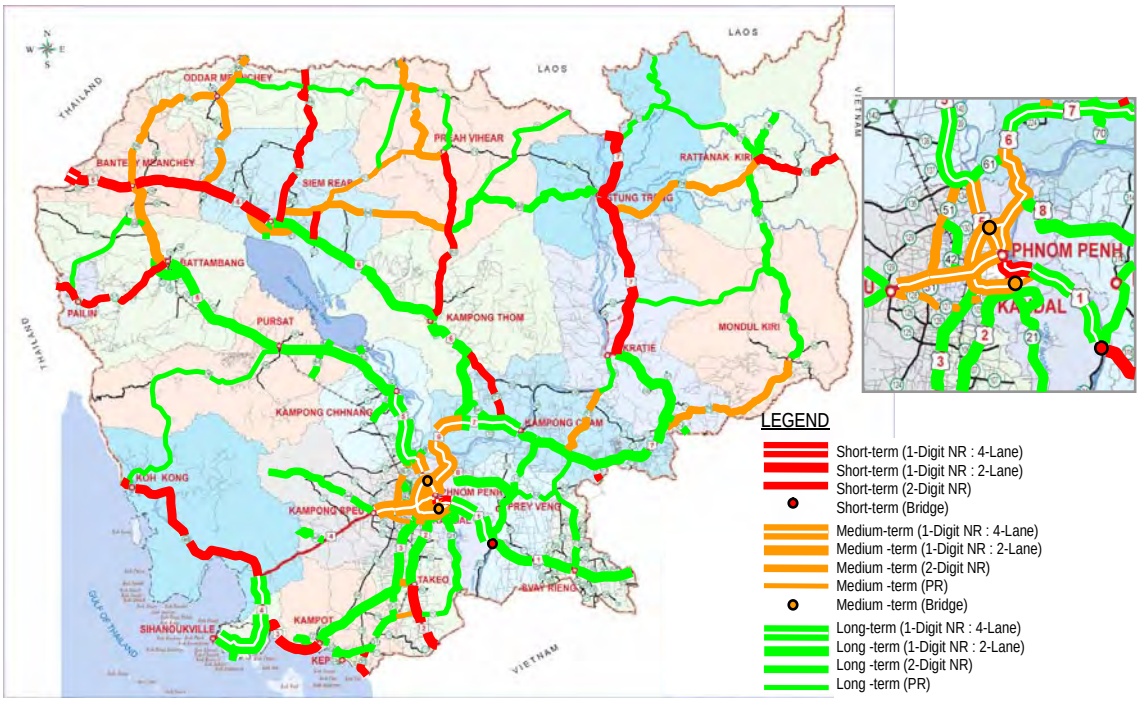


Figure 14.2.1 Road Implementation Program in the Short, Medium and Long-Term

The following projects in **Table 14.2.1(4)** are selected as high priority projects to be implemented in the short-term plan (2006-2010).

Table 14.2.1(4) Summary of High Priority Projects

Road Classification	Short-term Plan (2006 – 2010)
1-Digit Road	NR.1(1-1,1-2)*, NR.2(2-2)*, NR.3(3-2)*, NR.5(5-5)*, NR.6(6-4)*, NR7.(7-3,7-4)*
2-Digit Road	NR.33-2*, NR.48*, **NR.57**, NR.62-1*, NR.64-1*, NR.64-2*, NR.65*, NR.71*, NR.72*,NR.78-2*

Note (1): The figures in brackets ( ) show the number of sub-sections on each 1-Digit road.
(2): The road numbers with an asterisk (*) are on-going projects or projects committed to by donors.

Table 14.2.1 (1) Implementation Program for 1-Digit Roads

1 Digit Road Section	Location	Existing Road	Improvement Measures						Implementation Program			Remarks
		Length (km)	Scope	Lane Nos.	Pavement	Typical Cross Section	Future Traffic Volume (PCU)	Amount (Million US$)	Short Term (2006-2010)	Medium Term (2011-2015)	Long Term (2015-2020)	
NR 1	**Phnom Penh - Vietnam Border**	**166.0**						**209.0**				
1-1	Phnom Penh - Neak Leuong	60.0	On-going	4Lanes	AC	Type A	41,090	** 103.0	* 65.0		38.0	On-going Project is 2-lane road which will be widend to 4-lane AC in the long-term
1-2	Neak Leuong Ferry	(2)	Construction of 2nd Mekong Bridge	2 Lanes	AC	Type B	28,570	70.0	20.0	50.0		Under Study by Japan
1-3	Neak Leuong - Bavet (Vietnam Border)	106.0	Road Upgrading (from DBST to AC)	2Lanes	AC	Type B	12,410	36.0			36.0	
NR 2	**Takhmao - Phnom Den (VN Border)**	**120.0**						**35.0**				
2-1	Takhmao - Takeo	68.0	Road Upgrading (from DBST to AC)	2 Lanes	AC	Type B	15,190	23.0			23.0	
2-2	Takeo - Phnom Den (VN Border)	52.0	On-going	2 Lanes	AC	Type B	4,490	* 12.0	12.0			On-going Project. Road structure to be upgraded based on traffic demand (AC)
NR 3	**Phnom Penh - Veal Rinh**	**202.0**						**67.5**				
3-1	Phnom Penh - Kampot	148.0	Road Upgrading (from DBST to AC)	2 Lanes	AC	Type B	13,890	50.0			50.0	
3-2	**Kampot- Veal Rinh**	54.0	On-going	2 Lanes	AC	Type B	7,210	* 17.5	17.5			(32.5 Km) On-going Project. Road structure to be upgraded based on traffic demand (DBST)
NR 4	**Phnom Penh - Sihanoukville**	**214.0**						**81.0**				
4-1	Phnom Penh - Kampong Speu	36.0	Widening of Existing 2 lane road to 4 lanes	4 Lanes	AC	Type A	18,170	24.0		24.0		BOT Road
4-2	Kampong Speu - NR-48	92.0		2 Lanes	AC							
4-3	NR.48 - Sihanoukville	86.0		4 Lanes	AC	Type A		57.0			57.0	BOT Road
NR 5	**Phnom Penh - Poi Pet**	**406.0**						**162.6**				
5-1	Phnom Penh - Odongk	37.0	Widening of Existing 2 lane road to 4 lanes	4 Lanes	AC	Type A	34,410	24.0	⇨	24.0		
5-2	Odongk - Kompong Chhnang	53.0	Widening of Existing 2 lane road to 4 lanes	4 Lanes	AC	Type A	37,850	35.0			35.0	
5-3	Kompong Chhnang - Battambang	205.0	Road Upgrading	2 Lanes	AC	Type B	22,000	70.0			70.0	
5-4	Battambang - Sisophon	64.0	Road Upgrading	2 Lanes	AC	Type B	16,510	22.0		22.0		
5-5	Sisophon - Poi Pet	47.0	On-going	2-4 Lanes	AC	Type B	17,460	* 11.6	11.6			On-going Project. Road structure to be upgraded based on traffic demand (AC)
NR .6	**Phnom Penh - Sisophon**	**416.0**						**162.4**				
6-1	Phnom Penh - KM20	20.0	Widening of Existing 2 lane road to 4 lanes	4 Lanes	AC	Type A	50,880	13.0		13.0		
6-2	KM20 - Skun	55.0	Widening of Existing 2 lane road to 4 lanes	4 Lanes	AC	Type A	35,210	36.0		36.0		
6-3	Skun - Siem Reap	243.0	Road Upgrading	2 Lanes	AC	Type B	20,650	83.0			83.0	
6-4	Siem Reap - Sisophon	98.0	On-going	2 Lanes	AC	Type B	16,050	* 30.4	30.4			On-going Project. Road structure to be upgraded based on traffic demand (AC)
NR 7	**Skun - Doung Krolor (Laos Border)**	**464.0**						**161.0**				
7-1	Skun - NR-11	61.0	Widening of Existing 2 lane road to 4 lanes	4 Lanes	AC	Type A	33,270	40.0			40.0	
7-2	NR-11 - Kratie	210.0	Road Upgrading	2 Lanes	AC	Type B	8,950	71.0			71.0	
7-3	Kratie - Stoeung Treng	137.0	On-going	2 Lanes	AC	Type B	1,530	* 50.0	50.0			On-going Project. Road structure to be upgraded based on traffic demand (DBST)
7-4	Stoeung Treng - Laos border	56.0	On-going	2 Lanes	AC	Type B	2,570					
NR 8	**Preak Tameak - NR13**	**64.0**	Road Upgrading	2 Lanes	AC	Type B		**22.0**			22.0	
Total of 1 Digit Road (Existing)		**2,052.0**						**900.5**	**206.5**	**169.0**	**525.0**	**900.5**
New Construction	**Phnom Penh Ring Road**	**50.0**	Construction of New Road	4 Lanes	AC	Type A		100.0		50.0	50.0	
	2nd Chruoy Changvar Bridge crossing Tonle Sap	**1.5**	Construction of New Bridge	2 Lanes	AC	Type B		53.0		53.0		
	2nd Monivong Bridge crossing Bassac	**1.2**	Construction of New Bridge	2 Lanes	AC	Type B		42.0		42.0		
	Battambang Bypass	**30.0**	Construction of New Road	2 Lanes	AC	Type B		23.0			23.0	
	Siem Reap Bypass	**30.0**	Construction of New Road	2 Lanes	AC	Type B		23.0		23.0		
	Kampong Chhnang Bypass	**20.0**	Construction of New Road	2 Lanes	AC	Type B		15.0			15.0	
Total of Bypass (New)		**133.0**						**256.0**	0.0	168.0	88.0	
Total of Improvement cost		**2,185.0**						**1,156.5**	**206.5**	**337.0**	**613.0**	
Total of Maintenance cost		**2,052.0**						**91.8**	**30.6**	**30.6**	**30.6**	
TOTAL COST FOR 1 DIGIT ROAD								**1,248.3**	**237.1**	**367.6**	**643.6**	

⇨ : Projects to be shifted to the Subsequent Term due to financial constraints

* Contract Amount of On-going Project

** Improvement Works Plus Contract Amount of On-going Project

Table 14.2 1 (2) Implementation Program for 2-Digit Roads

2 Digit Road Section	Location	Existing Road	Improvement Measures						Implementation Program			Remarks
		Length (km)	Scope	Lane Nos.	Pavement	Typical Cross Section	Future Traffic Volume (PCU)	Amount (Million US$)	Short Term (2006-2010)	Medium Term (2011-2015)	Long Term (2015-2020)	
NR 11	Neak Leoung-Thnal Toteoung	90.4	Road Upgrading	2 Lanes	AC	Type B	17,430	26.0			26.0	
NR 13	Svay Rieng - Traok	44.6	Road Upgrading	2 Lanes	DBST	Type C-2	170	8.0			8.0	
NR 21	Takhmao - Chrey Thom	65.6	Road Upgrading	2 Lanes	AC	Type B	4,400	19.0			23.0	
NR 21A	Takhmao - Wat Chhoung Leab	20.1	Road Upgrading	2 Lanes	DBST	Type C-2		4.0				
NR 22	Ou Chambok - Ang Tasom	9.6	Road Upgrading	2 Lanes	AC	Type B	14,710	3.0		3.0		
NR 31	Thnal Bek Koas - Kampong Trach	54.8	Road Upgrading	2 Lanes	AC	Type B	2,680	16.0			16.0	
NR 32	Road to Bokor - Bokor top	33.3	Road Upgrading	2 Lanes	DBST	Type C-2		6.0			6.0	
NR 33-1	Kampot - Kampong Trach	35.3	Road Upgrading	2 Lanes	AC	Type B	2,090	10.0			10.0	
NR 33-2	Kampong Trach - Lork	17.0	Road Upgrading	2 Lanes	AC	Type B	2,090	5.0	5.0			(17.0 Km) Committed Project
NR 33A	See Sor (Keb) - Krong Keb	19.7	Road Upgrading	2 Lanes	DBST	Type C-2		4.0			4.0	
NR 41	Korng Keng - Ream	9.3	Road Upgrading	2 Lanes	DBST	Type C-2		2.0			2.0	
NR 42	Bek Chan - Bat Doeng	24.3	Road Upgrading	2 Lanes	DBST	Type C-2	14,340	5.0			5.0	
NR 44	Chba Morn - Khtes Village	84.8	Road Upgrading	2 Lanes	DBST	Type C-2	2,140	16.0			16.0	
NR 46	Treng Tro Yeung - Kiririom Mount - Thai Border	27.0	Road Upgrading	2 Lanes	DBST	Type C-2		5.0			5.0	
NR 48	Chamker Loung - Thai Border	161.3	On-going	2 Lanes	AC	Type B	3,260	* 29.7	29.7			On-going Project. Road structure to be upgraded based on traffic demand (DBST)
NR 51	Veang Chass - Wat Ang Metrey	44.9	Road Upgrading	2 Lanes	AC	Type B	19,550	13.0		13.0		
NR 52	Ponley - Chhnang Trou	8.0	Road Upgrading	2 Lanes	DBST	Type C-2		2.0			2.0	
NR 53	Kampong Chhnang - Teuk Phos	27.3	Road Upgrading	2 Lanes	DBST	Type C-2	470	5.0			5.0	
NR 54	Krakor - Tonle Sap	4.9	Road Upgrading	2 Lanes	DBST	Type C-2		1.0			1.0	
NR 55	Anlong Thnaot - Kam Reng	22.3	Road Upgrading	2 Lanes	DBST	Type C-2		4.0			4.0	
NR 56	Banteay Mean - Oddar Mean Chey	113.6	Road Upgrading	2 Lanes	AC	Type B	1,240	33.0	⇨	33.0		Committed Project
NR 57	Battamborng - Ou Prum - Thai Border	103.3	Road Upgrading	2 Lanes	AC	Type B	3,710	45.0	45.0			
NR 59	Thma Kom - Khoum Lvea	16.3	Road Upgrading	2 Lanes	DBST	Type C-2	510	3.0			3.0	
NR 60	Sambor Chey - Prey Toteng	19.9	Road Upgrading	2 Lanes	AC	Type B	3,460	6.0			6.0	
NR 61	Prek Kdam - Thnal Keik	15.9	Road Upgrading	2 Lanes	AC	Type B	17,800	5.0			5.0	
NR 62-1	Thnal Baek - Tbeng Meanchey	128.4	On-going	2 Lanes	AC	Type B	2,420	37.0	37.0			On-going Project. Road structure to be upgraded based on traffic demand (DBST)
NR 62-2	Tbeng Meanchey - Prasat Peah Viear	114.3	Road Upgrading	2 Lanes	DBST	Type C-2	1,010	22.0	⇨	22.0		
NR 63	Siem Reap - Chong Khnaes	14.3	Road Upgrading	2 Lanes	DBST	Type C-2		3.0			3.0	
NR 64-1	Svay Thom (NR6) - 18km	18.0	On-going	2 Lanes	AC	Type B	5,130	* 2.2	2.2			(18.0Km) On-going Project. Road structure to be upgraded based on traffic demand (DBST).
NR 64-2	18km - Dang Rek	116.0	Road Upgrading	2 Lanes	AC	Type B	5,130	* 25.6	25.6			Committed Project
NR 65	Dam Deck (NR67) - Trapeang Prey	21.5	On-going	2 Lanes	DBST	Type C-2	1,740	4.0	4.0			On-going Project. Road structure to be upgraded based on traffic demand (DBST)
NR 66-1	Trach Chrum(NR67) - Phnom Deak	139.9	Road Upgrading	2 Lanes	AC	Type B	1,740	41.0		41.0		
NR 66-2	Phnom Deak - Thalabarivat	145.4	Road Upgrading	2 Lanes	AC	Type B	460	42.0			42.0	
NR 68	Kralanh - Osmacth (T-B)	117.7	Road Upgrading	2 Lanes	AC	Type B	3,120	34.0		34.0		Committed Project
NR 70	Prey Toteung - Peam Chikong	13.5	Road Upgrading	2 Lanes	DBST	Type C-2	2,650	3.0			3.0	
NR 71	Treung (NR7) - Kompong Thmar (NR6)	57.8	On-going/Road Upgrading	2 Lanes	AC	Type B	13,790	17.0	17.0			(15.5 Km) On-going Project. Road structure to be upgraded based on traffic demand (DBST).
NR 72	Kreak Tboung (NR7) - Smach	13.5	Road Upgrading	2 Lanes	AC	Type B	6,030	4.0	4.0			Committed Project
NR 73	Pratheat - Chhloung	57.4	Road Upgrading	2 Lanes	DBST	Type C-2	2,480	11.0		11.0		
NR 74	Snuol - Khum Thnu (Vietnam B)	17.9	Road Upgrading	2 Lanes	DBST	Type C-2	940	3.0			3.0	
NR 76-1	Srei Char (NR7) - Mondlikiri	130.7	Road Upgrading	2 Lanes	AC	Type B	2,590	38.0	⇨	38.0		
NR 76-2	Mondorikiri - Ta Ang (NR78)	193.5	Road Upgrading	2 Lanes	DBST	Type C-2	260	37.0			37.0	
NR 78-1	Ou Pong Moan - Bang Lung	124.0	Road Upgrading	2 Lanes	AC	Type B	810	36.0		36.0		
NR 78-2	Bang Lung - Vietnam B	70.0	Road Upgrading	2 Lanes	AC	Type B	810	* 26.0	26.0			(70.0 Km) Committed Project.
NR 78A	Rattanak Kiri - Veun Sai	36.9	Road Upgrading	2 Lanes	DBST	Type C-2		7.0		⇨	7.0	
NR 78B	Thrang Svay - Ta Veng	39.0	Road Upgrading	2 Lanes	DBST	Type C-2		7.0		⇨	7.0	
Total of Improvement cost		**2,643.2**						**675.5**	**195.5**	**231.0**	**249.0**	
Total of Maintenance cost		**2,643.2**						**87.1**	**23.9**	**34.1**	**29.1**	
TOTAL COST FOR 2 DIGIT ROAD								**762.6**	**219.4**	**265.1**	**278.1**	

⇨ : Projects to be shifted to the Subsequent Term due to financial constraints　　* Contract Amount of On-going Project

Table 14.2.1 (3) Implementation Program for 3-Digit Roads and Rural Roads

3 Digit Road and Name of Province	Existing Road	Improvement Measures						Implementation Program			Remarks
	Length (km)	Type of Improvement Measures	Road Category	Lane Nos.	Pavement	Typical Cross Section	Amount (Million US$)	Short Term (2006-2010)	Medium Term (2011-2015)	Long Term (2015-2020)	
PR 104	9.6	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	1.4		1.4		
PR 111+Connection to NR-21	41.0	TYPE 3-2	Provincial / Collector	2	DBST	Type D	5.0			5.0	
PR 114	16.4	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	2.0		2.0		
PR 127	15.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	2.0		2.0		
PR 2082+2081+2076 (NR 59)	101.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	15.0			15.0	NR-59 Extension
Stung Treng-Cham Khsan	135.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	20.0			20.0	
Kampong Thom-Kratie	102.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	15.0			15.0	
PR 210	91.7	TYPE 3-2	Provincial / Collector	2	DBST	Type D	10.0		10.0		
PR 210A	70.0	TYPE 3-2	Provincial / Collector	2	DBST	Type D	8.0			8.0	
PR 212	77.0	TYPE 3-2	Provincial / Collector	2	DBST	Type D	8.0			8.0	
PR 213	112.4	TYPE 3-2	Provincial / Collector	2	DBST	Type D	12.0			12.0	
PR 274	132.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	20.0			20.0	
PR 301	47.4	TYPE 3-2	Provincial / Collector	2	DBST	Type D	5.0			5.0	
PR 301-1	59.0	TYPE 3-2	Provincial / Collector	2	DBST	Type D	6.0			6.0	
PR 301-2	59.0	TYPE 3-2	Provincial / Collector	2	DBST	Type D	6.0			6.0	
PR 305	120.0	TYPE 3-2	Provincial / Collector	2	DBST	Type D	13.0			13.0	
PR 308	34.6	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	5.0			5.0	
PR 316	35.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	5.0			5.0	
PR 148	114.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	17.0			17.0	
PR 148A	120.0	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	18.0			18.0	
Road connecting NR13 to NR 7	61.4	TYPE 3-1	Provincial / Collector	2	DBST	Type C-2	9.0			9.0	
Total of Improvement cost	**1,553.5**						**202.4**	**0.0**	**15.4**	**187.0**	**202.4**
Banteay Meanchey	443.0		Provincial / Collector	NA	NA	NA	10.2	3.4	3.4	3.4	
Siem Reap	535.0		Provincial / Collector	NA	NA	NA	12.3	4.1	4.1	4.1	
Kandal	306.0		Provincial / Collector	NA	NA	NA	7.0	2.3	2.3	2.3	
Kep	18.0		Provincial / Collector	NA	NA	NA	0.4	0.1	0.1	0.1	
Koh Kong	5.0		Provincial / Collector	NA	NA	NA	0.1	0.0	0.0	0.0	
Kompong Chhnang	167.0		Provincial / Collector	NA	NA	NA	3.8	1.3	1.3	1.3	
Kompong Speu	355.0		Provincial / Collector	NA	NA	NA	8.2	2.7	2.7	2.7	
Kompong Thom	413.0		Provincial / Collector	NA	NA	NA	9.5	3.2	3.2	3.2	
Kompot	354.0		Provincial / Collector	NA	NA	NA	8.1	2.7	2.7	2.7	
Kratie	149.0		Provincial / Collector	NA	NA	NA	3.4	1.1	1.1	1.1	
Mondulkiri	103.0		Provincial / Collector	NA	NA	NA	2.4	0.8	0.8	0.8	
Kompong Cham	749.0		Provincial / Collector	NA	NA	NA	17.2	5.7	5.7	5.7	
Odor Meanchey	199.0		Provincial / Collector	NA	NA	NA	4.6	1.5	1.5	1.5	
Pailin	18.0		Provincial / Collector	NA	NA	NA	0.4	0.1	0.1	0.1	
Battambang	410.0		Provincial / Collector	NA	NA	NA	9.4	3.1	3.1	3.1	
Peach Vihear	344.0		Provincial / Collector	NA	NA	NA	7.9	2.6	2.6	2.6	
Prey Veng	464.0		Provincial / Collector	NA	NA	NA	10.7	3.6	3.6	3.6	
Pursat	517.0		Provincial / Collector	NA	NA	NA	11.9	4.0	4.0	4.0	
Rattanakiri	172.0		Provincial / Collector	NA	NA	NA	4.0	1.3	1.3	1.3	
Stung Treng	112.0		Provincial / Collector	NA	NA	NA	2.6	0.9	0.9	0.9	
Svay Rieng	478.0		Provincial / Collector	NA	NA	NA	11.0	3.7	3.7	3.7	
Takeo	300.0		Provincial / Collector	NA	NA	NA	6.9	2.3	2.3	2.3	
Sihanoukville	0.0		Provincial / Collector	NA	NA	NA	0.0	0.0	0.0	0.0	
Phom Penh	4.0		Provincial / Collector	NA	NA	NA	0.1	0.0	0.0	0.0	
Total of Maintenance cost	**6,615.0**						**152.1**	**50.7**	**50.7**	**50.7**	**152.1**
TOTAL COST FOR 3 DIGIT ROAD							**279.9**	**54.9**	**97.0**	**128.0**	**279.9**

Rural Road	Existing Road	Improvement Measures						Implementation Program			Remarks
	Length (km)	Type of Improvement Measures	Road Category	Lane Nos.	Pavement	Typical Cross Section	Amount (Million US$)	Short Term (2006-2010)	Medium Term (2011-2015)	Long Term (2015-2020)	
Total of Maintenance cost	**18,948.0**	NA	NA	NA	NA	NA	**21.7**	**3.6**	**7.2**	**10.9**	
TOTAL COST FOR RURAL ROAD							**21.7**	**3.6**	**7.2**	**10.9**	

14.3 Investment Allocation Plan

The following is a summary of the investment allocation plan required to achieve the targets of the master plan.

Table 14.3.1 Investment Allocation Plan

Description	Total Amount ($ million)	Short-term 2006 - 2010	Medium-term 2011 - 2015	Long-term 2016 - 2020	Remarks
A. Required Cost					
(1) Road Improvement/Rehabilitation Project					
1-Digit Roads	1,157	207	337	613	NR1, 2nd Mekong Bridge, NR2, NR3, NR4, NR5, NR6, NR7, NR8
2-Digit Roads	676	196	231	249	NR11, NR21, NR33, NR48, NR57, NR62, NR64, NR68, NR78, and other 28 routes
3-Digit Roads	202	0	15	187	PR104, PR114 and other 16 routes
Urgent Bridge Rehabilitation Program	(40)	(20)	(20)	(0)	Short-term: Phase I (South-east BL) and Phase II (North-west BL) Medium-term: Phase III (South-west BL) and Phase IV (North-east BL)
Total (1)	**2,035**	**403**	**583**	**1,049**	
(2) Road Maintenance Works					
1 digit, 2 digit, 3 digit and rural roads	481	113	169	199	daily and routine maintenance only
Total (2)	**481**	**113**	**169**	**199**	
Total (B)=(1)+(2)	**2,516**	**516**	**752**	**1,248**	
B. Fund to be Procured					Financial procurement plan of Case 2
International fun Total (3)	1,284	428	428	428	Support by International Banks, Bilateral Loans, Grant Aids
Domestic fund Total (4)	982	135	288	559	Allocation of Added Tax and Road Use Tax to Road Sector
Total (B)=(3)+(4)	2,266	563	716	987	
Difference (surplus/▲shortage)	▲ 250	47	▲ 36	▲ 261	Surplus in the short-term shall be transferred to medium-term.
Additional fund required	**250**	**0**	**0**	**250**	To be procured by introduction of BOT system or 3rd private sector

14.4 Improvement of Traffic Control and Administration

In Cambodia, the traffic accident death rate stands out in comparison to neighboring countries. It is a characteristic of Cambodia that there is a high rate of motorcycle accidents. The improvement of the regulations and education for road users is necessary, together with the improvement of infrastructure such as the provision of an exclusive traffic lane for motorcycles and a traffic light facilities.

Improvement of road safety / management:

* The introduction of a driver's license system for motorcycles is required as well as; the reinforcement of the registration system, introduction of a car inspection system, expansion of the insurance regime and riding regulations for cow carriages within cities.

* Provision of traffic lanes on suburban roads for exclusive use by motorcycles, reinforcement of the traffic signal system, full-size vehicle regulations within cities, and the establishment of a sustainable public transport system including bus operation.

* Road and traffic safety through daily inspection and repair of roads, educating road users through the media and schools.

14.5 Effects of Road Development

14.5.1 Economic Benefits derived from Road Network Development

The economic effect in both 2010 and 2020 was calculated in Chapter 13 assuming that all of the road projects were carried out in accordance with the master plan. The assumptions used in the calculation, such as the timing of construction, construction periods and construction costs were very rough and the results of the calculation should be considered as approximate values only.

The economic benefits were determined from the sum of the VOC and TTC for the cases of with/without the project. The resulting economic benefit was $221 million in 2010 and $515 million in 2020 as shown in **Table 14.5.1**. The cumulative economic benefit over 15 years is estimated to be approximately $3,800 million-$4,200 million, and the benefit ratio becomes B/C=1.62, which can be judged as a comparatively good road investment.

Table 14.5.1 Summary of Economic Benefits

(Unit: US$ Million)

Items		2010			2020		
		W/O Master Plan	W/ Master Plan	Benefits	W/O Master Plan	W/ Master Plan	Benefits
1-Digit Roads	VOC	751	601	150	1,610	1,302	308
	TTC	78	46	31	196	121	75
	Total	829	647	181	1,806	1,423	383
2-Digit Roads	VOC	127	95	32	410	308	102
	TTC	12	7	4	45	28	17
	Total	138	102	36	455	337	118
Major Provincial Roads	VOC	7	5	3	30	19	10
	TTC	1	0	1	5	2	4
	Total	9	5	3	35	21	14
Total	VOC	885	700	185	2,050	1,630	420
	TTC	90	54	36	247	151	95
	Total	975	754	221	2,297	1,781	515

14.5.2 Improvement of Pavement Conditions

In 2020, when the long-term project has been completed, all of the 1-Digit roads will be constructed of asphalt pavement that is resilient in the rainy season and under heavy vehicle loadings. In addition, all of the provincial capitals will be linked by asphalt pavement or DBST paved national roads. In 2020, 80% of the 3-digit and rural roads will be passable in the rainy season.

Figure 14.5.1 shows the improvements to the pavement structure in the short-term, medium-term and long-term by type of national road.

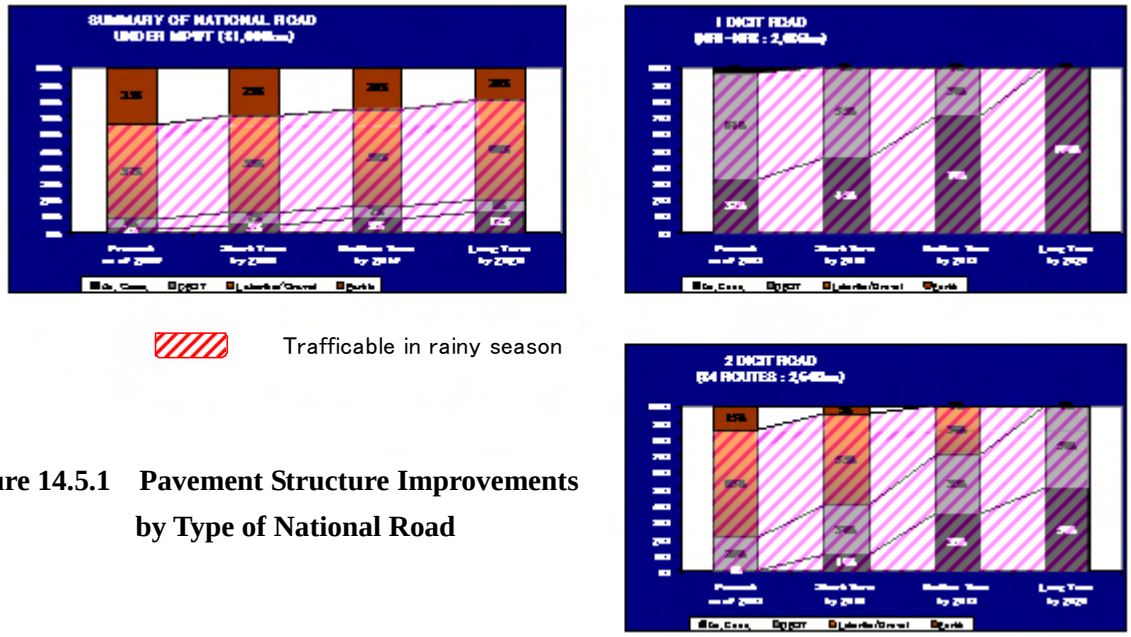


Figure 14.5.1 Pavement Structure Improvements by Type of National Road

14.5.3 Improvement in Travel Times

Out of the 24 provinces in the country of Cambodia, 16 of the provincial capitals are connected to the capital Phnom Penh by paved 1-Digit roads and the remaining eight capitals are connected to Phnom Penh indirectly through 2-Digit roads. However, 2-Digit roads to connect with six provinces of capitals among eight provinces are unpaved roads of a minimum standard that frequently become impassable in the rainy season.

Figure 14.5.2 shows the travel times when these 2-Digit roads have been paved with asphalt or DBST. As seen in the figure, the travel time from the provincial capital of Ratnakiri to Phnom Penh can be shortened from 13 hours to 8 hours in rainy season. This decrease in travel time is expected to have a significant impact on social and economic activities in rural areas.

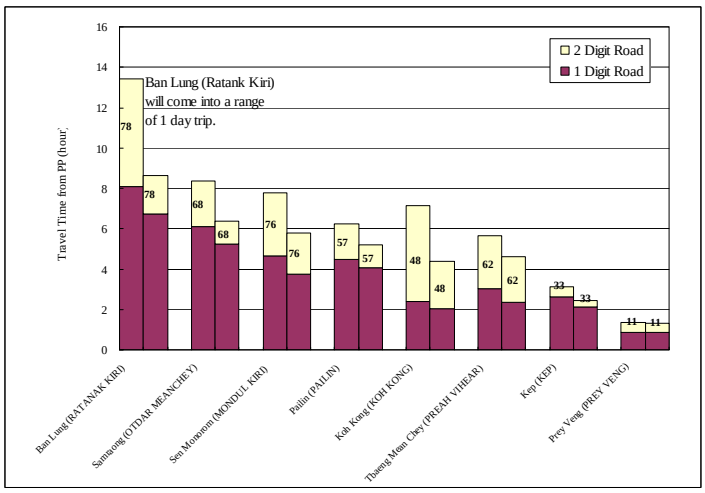


Figure 14.5.2 Improvement in Travel Time from Phnom Penh to Provincial Capitals

CHAPTER A-15 INITIAL ENVIRONMENTAL EXAMINATION

15.1 Review of Existing Environmental and Social Considerations

15.1.1 Legal Framework for the Natural Environment and Social Environment

(1) Environmental Impact Assessments (EIA)

The procedure for Environmental Impact Assessments (EIA) is stipulated in the sub-decree for the environmental impact assessment process. The EIA procedure is shown in the following figure. The project owner (PO) shall submit the Initial Environmental Impact Assessment (IEIA) report to the Ministry of Environment (MOE). MOE examines the report. If MOE requires the PO to revise the report or to prepare a full scale EIA report, the PO has to follow this instruction and re-submit the report. If the requirement is fulfilled, the revised IEIA or EIA report will be approved by MOE.

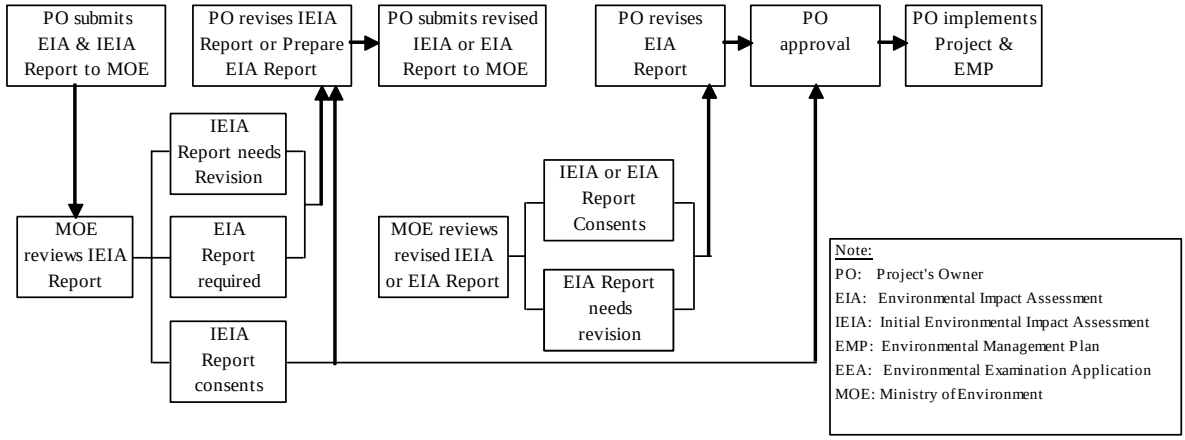


Figure 15.1.1 Flow Chart of the EIA Process

Source: Sub-decree on Environmental Impact Assessment Process, No.72 Council of Minister, August 11 ,1999

When an IEIA/EIA report is submitted to MOE, MOE organizes a review team consisting of experts from the relevant ministries and agencies to examine the report. In the appendix of this report, there is information on 25 projects for which IEIA/EIA reports have been submitted to MOE in the past.

According to the sub-decree on the Environmental Impact Assessment Process, an EIA is required for road projects of more than 100 km in length and bridges of more than 30 tones in weight. The standard for bridges seems to be strange as it does not reflect the scale of the bridge.

The MPWT assigned the IEIA/EIA process to the Department of Planning; however, there was no IEIA/EIA activity as there were insufficient human resources and budget. Road development projects by the MPWT are divided into three (3) types; i) donor projects, ii) national budget projects and iii) military engineering projects. IEIA/EIA reports are prepared only for donor projects. The reports are prepared by consultants funded by donors. There are two types of national budget projects; those with and those without a consultant budget. If a project budget for consultants is approved for IEIA/EIA reports, then the MPWT can conduct IEIA/EIA reports for national budget projects in the future.

The MPWT is attempting to consider environmental impacts through discussions and coordination with relevant ministries and agencies. The MPWT has established a Steering Committee/Inter-Ministerial Committee (ST/IMC) for each project (except for the donor projects) in order to discuss and coordinate with the relevant ministries and agencies. The MPWT has a chairman and invites the relevant parties. The issues of the discussion are, however, focused on the direct issues for project implementation, such as de-mining with the Ministry of Defense (MOD) and security with the Ministry of Interior (MOI).

The implementation of IEIA/EIA examinations is still going through a trial and error process. It is difficult for MOE to examine the IEIA/EIA reports because there are insufficient environmental criteria/guidelines and experience in either MOE or local consultants acting as the PO's. Definite environmental criteria/guidelines only exist for water quality, solid waste, air pollution and noise pollution. According to an interview of MOE, the economic benefits of a project are considered as part of an IEIA/EIA examination. This means that a project that may cause a large environmental impact can be approved if the project provides a large economic benefit. It is also mentioned in the draft Guideline for Conducting Environmental Impact Assessment (EIA) Report that the PO should indicate the benefits of the project compared to the value or cost of the local environmental damage. It can be said that this comparison is a reasonable judgment although there is no such comparison in Japan. If international or developed countries' standards for IEIA/EIA examinations are applied to Cambodia, the mitigation costs could be huge and could place a burden on government finances.

Public inspection is not stipulated in Cambodia; however public inspection for scoping and draft EIA reports is stipulated in Japan. However, 'participation and access to information' is stipulated in the Law on Environmental Protection and Natural Resources Management. MOE is concerned that information disclosure of IEIA/EIA reports may cause social disorder because there are many NGOs in Cambodia. To disclose information to the public may improve the quality of IEIA/EIA reports, however, MOE may not be able to deal with objections or comments from the public, including NGOs, as the current capacity of MOE staff (who examine IEIA/EIA) and local consultants is insufficient, and the legal framework has not yet matured.

(2) Natural Environment

The laws and regulations relating to the natural environment in Cambodia are as follows:

Table 15.1.1 Laws and Regulations relating to the Natural Environment in Cambodia

Title	Date of Enactment	Note
I. Law		
1. Law on Environmental Protection and Natural Resources Management	Dec.24, 1996	
2. Law on Forestry	Sep.30, 2002	
II. Royal Decree		
3. Royal Decree on Creation and Protection of Protected Area	Nov.,1993	
III. Sub-Decree		
4. Sub-Decree on Environmental Impact Assessment Process	Aug.11, 1999	No.72 Council of Ministers
5. Sub-Decree on Water Pollution Control	Apr.6, 1999	No.27 Council of Ministers
6. Sub-Decree on Solid Waste Management	Apr.27, 1999	No.36 Council of Ministers
7. Sub-Decree on Air and Noise Pollution Control	Jul.10, 2000	
IV. Declaration		
8. Declaration on Guideline for Conducting Environmental Impact Assessment Report	Mar.9, 2000	No.49 MOE
9. Declaration No.1033 on Protected Area	Jun.3, 1994	No.1033 MOE

The following items are related to the formulation of the road network M/P and road development projects.

- An IEIA/EIA shall be conducted for a road construction length of more than 100 km
- Standards for air and noise pollution
- Protected areas (MOE)
- Protected forests (MAFF)

There are 23 protected areas in four (4) categories stipulated by MOE and eight (8) protected forests stipulated by the Ministry of Agriculture, Forestry and Fisheries (MAFF) from the viewpoint of conservation of the natural environment and ecosystems. These areas are shown below.

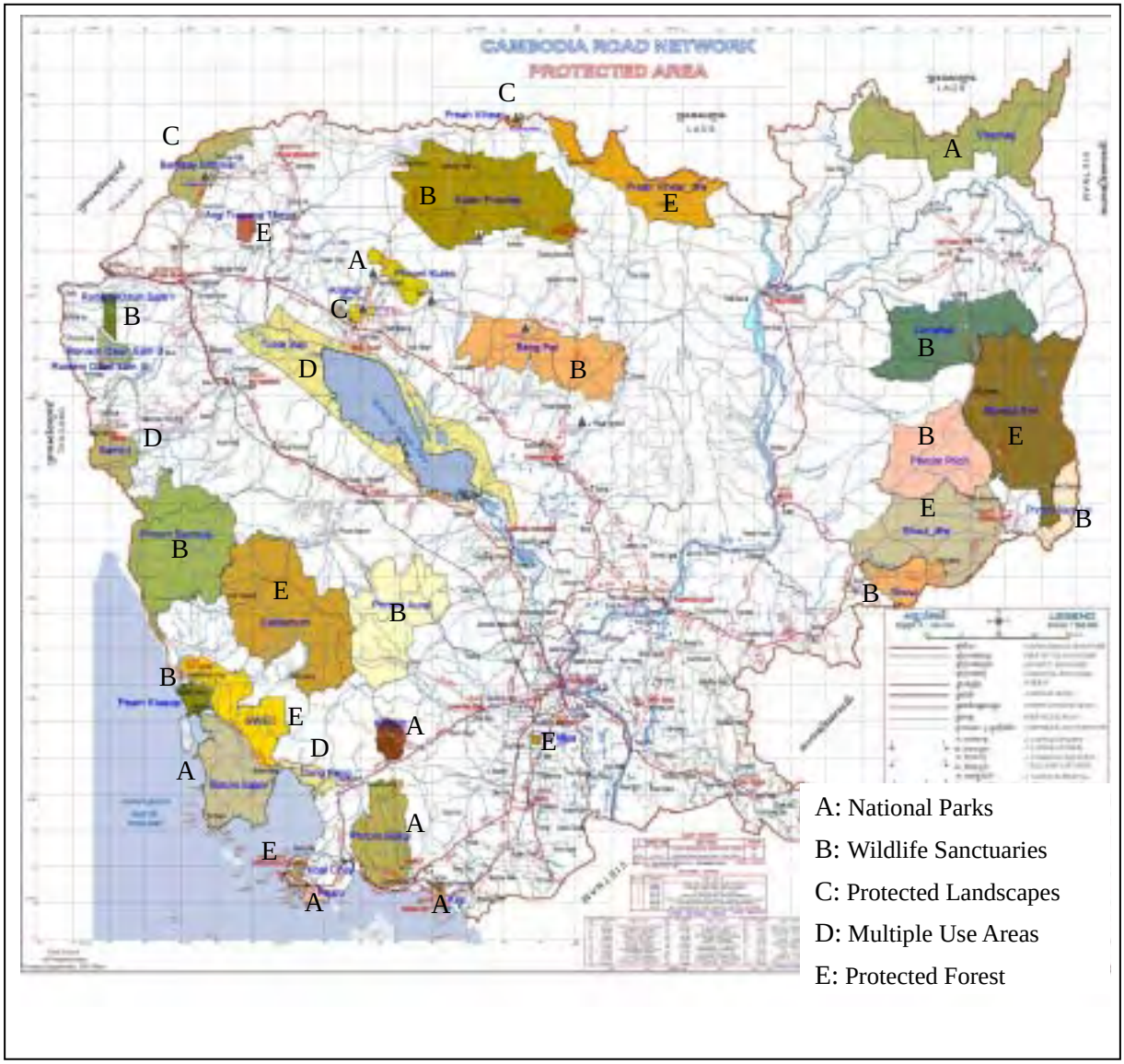


Figure 15.1.2 Protected Areas and Protected Forests

Table 15.1.2 List of Protected Areas and Protected Forests

No.	Names of the Protected Areas/Forests	Land Area Covered (ha)	Provinces Where the Protected Areas/Forests are Located
A. National Parks			
1	KIRIRUM	35,000	Kampong Speu and Koh Kong
2	BOKOR	140,000	Kampot
3	KEP	5,000	Kampot
4	REAM	15,000	Sihanouk Ville
5	BOTUM SAKOR	171,250	Koh Kong
6	PHNOM KOULEN	37,500	Siem Reap
7	VIRAK CHEY	332,500	Stung Treng and Rattanak Kiri
B. Wildlife Sanctuaries			
8	PHNOM ORAL	253,750	Koh Kong, Pursat, Kampong Chhnang
9	PEAM KRASOP	23,750	Koh Kong
10	PHNOM SAMKOS	333,750	Koh Kong
11	RONEAM DONSAM	178,750	Battambang
12	KOULEN PRUM TEP	402,500	Siem Reap and Preah Vihear
13	BENG PER	242,500	Kampong Thom
14	LUMPHAT	250,000	Rattanak Kiri and Mundul Kiri
15	PHNOM PRICH	222,500	Mundul Kiri and Kratie
16	PHNOM NAMLEAR	47,500	Mundul Kiri
17	SNUOL	75,000	Kratie
C. Protected Landscapes			
18	ANGKOR	10,800	Siem Reap
19	BANTEAY	81,200	Banteay Mean Chheay
20	PREAH VIHEAR	5,000	Preah Vihear
D. Multiple Use Areas			
21	DONG PENG	27,700	Koh Kong
22	SAMLOT	60,000	Battambang
23	TONLE SAP	316,250	Kampong Chhnang, Kampong Thom, Siem Reap, Battambang and Pursat
E. Protected Forests			
1	SWEC	144,000	Koh Kong
2	TA MOA	2,400	Kandal
3	CARDAMOM	401,000	Pursat, Koh Kong, Kampong Speu
4	KBAL CHAY	6,350	ShianoukVille
5	SNOUL_dfw	298,000	Mondul Kirri, Kratie
6	PREAH VIHEAR_dfw	190,000	Preah VIhear
7	MONDUL KIRRI	429,000	Mondul Kirri
8	ANG TRAPENG THMOR	13,000	Banteay Meanchey

Source:(I-IV)Royal Decree on the Protection of Protected Areas, November 1, 1993
(V) The Forestry Administration, Ministry of Agriculture, Forestry and Fisheries

Terminology :

1. National Park : Areas reserved for nature and scenic views to be protected for scientific, educational and entertainment purposes.
2. Wildlife Sanctuary : Natural areas preserved in their natural conditions in order to protect the wildlife, vegetation and ecology balance.
3. Protected Landscapes : Areas to be maintained as scenic views for pleasure and tourism.
4. Multiple Use Areas : Areas necessary for the stability of water, forestry, wildlife, and fisheries resources, for pleasure, and for the conservation of nature with a view of assuring economic development.
5. Protected Forests Areas to be maintained primarily for the protection of the forest ecosystems and natural resources therein.

The standards relating to air and noise pollution are shown in the table below.

Table 15.1.3 Effluent standards for pollution sources discharging wastewater to public water areas or sewers

No	Parameters	Unit	Allowable limits for pollutants discharging to	
			Protected public water area	Public water area and sewer
1	Temperature	^{0}C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD5 (5 days at 20^{o}C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO3)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO4)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO4)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0

33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH3)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0
36	Polychlorinated Biphenyl	mg/l	<0.003	<0.003
37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DTT	mg/l	<1.3	<1.3
42	Endrin	mg/l	<0.01	<0.01
43	Dieldrin	mg/l	<0.01	<0.01
44	Aldrin	mg/l	<0.01	<0.01
45	Isodrin	mg/l	<0.01	<0.01
46	Perchloro ethylene	mg/l	<2.5	<2.5
47	Hexachloro butadiene	mg/l	<3	<3
48	Chloroform	mg/l	<1	<1
49	1,2 Dichloro ethylene	mg/l	<2.5	<2.5
50	Trichloro ethylene	mg/l	<1	<1
51	Trichloro benzene	mg/l	<2	<2
52	Hexaxhloro cyclohexene	mg/l	<2	<2

Remark: The Ministry of Environment and the Ministry of Agriculture, Forestry and Fishery shall collaborate to set up the standard of pesticides which discharged from pollution sources.

Source: Annex 2, Sub-decree on Water Pollution Control, MOE, 1999

Table 15.1.4 Ambient Air Quality Standards

No	Parameter	1 Hour Average mg/m^3	8 Hour Average mg/m^3	8 Hour Average mg/m^3	1 Year Average mg/m^3
1	Carbon monoxide (CO)	40	20	-	-
2	Nitrogen dioxide (NO_2)	0.3	-	0.1	-
3	Sulfur dioxide (SO_2)	0.5	-	0.3	0.1
4	O zone (O_2)	0.2	-	-	-
5	Lead (Pb)	-	-	0.005	-
6	Total Suspended Particulate (TSP)	-	-	0.33	0.1

Remarks: This standard applies to the evaluation of ambient air quality and to the monitoring of the air pollution status.

The standard method for analyzing the ambient air quality is specified in the guidelines of the Ministry of Environment.

Source: Annex 1, Sub-decree on Air and Noise Pollution Control, MOE, 2000

Table 15.1.5 Maximum Permitted Noise Levels in Public and Residential Areas (dB(A))

No	Area	Period of time		
		From 0600 hrs to 1800 hrs	From 1800 hrs to 2200 hrs	From 2200 hrs to 0600 hrs
1	Quiet areas	45	40	35
	- Hospitals			
	- Libraries			
	- School			
	- Kindergarten			
2	Residential Area	60	50	45
	- Hotels			
	- Administration office			
	- House			
3	Commercial and service areas and mix	70	65	50
4	Small industrial factories interspersed with residential areas	75	70	50

Remark: This standard is applied to control the noise level of any source of activity that emits noise into public and residential areas.

Source: Annex 6, Sub-decree on Air and Noise Pollution Control, MOE, 2000

(3) Social Environment

One of the major social environment issues relating to road development projects in Cambodia is the issue of resettlement/compensation. The Inter-Ministerial Resettlement Committee (IRC) is in charge of resettlement/compensation. The chairman of the IRC is an officer of MEF. The IRC is organized on a project-by-project basis and members from the relevant ministries are not always the same. The main members are from MEF, the MPWT and the MLMUPC. In addition, there is the Resettlement Unit (RU) in MEF which is under the control of the IRC.

There is no written state policy on resettlements. The IRC, however, has a kind of guideline on resettlement; this includes a procedure, a unit price, and a formula of compensation. The Constitution of Cambodia stipulates a right of expropriation in Article 44. The IRC, however, aims to solve resettlements through fair negotiation because expropriations may cause political and social disorder.

A social environmental impact assessment was undertaken for a previous project. There were

objections from NGOs and some PAPs against the resettlement and compensation offered for the NR.1: C-2 section. Therefore, the ADB is conducting an audit of the resettlement and compensation. In connection with this, the IRC is reconsidering the unit price for compensation. There are several laws and regulations relating to resettlement and compensation as shown below.

Table 15.1.6 Laws and Regulations Relating to Resettlement and Compensation

Title	Date of Enactment	Note
The Constitution of Cambodia (Article 44)	Sep.21,1993	Right of expropriation
Land Law	Sep.20, 2001	Land Ownership
Prakas （Announcement） on Measurement of Illegal Occupant of Land	Sep.27, 1999	Width of ROW

ROW widths for each type of road are stipulated in the Prakas (Announcement) on the Measurement of Illegal Occupants of Land as follows:

Table 15.1.7 Width of ROW

Types of Road		Width of ROW
National Road	NR.1,4,5	60m
	NR.2,3,6,7 (one digit)	50m
	NR.11,22,64,78 (two digit)	50m
Provincial Road		40m
Commune Road		30m

Source: Prakas No.06 on Measurement of Illegal Occupant of Land, Sep.27, 1999

In many areas there are people who live in the ROW's, are using the land, or have property in the ROW. If road projects are implemented in these locations then resettlement/compensation issues will emerge. According to the guidelines of the IRC, the government cannot pay compensation for land in ROW's because the land ownership is illegal. The government can, however, pay compensation for the properties of PAPs, such as houses.

15.2 Trend in Environmental Considerations of Donors

15.2.1 Road Projects funded through Bilateral Assistance

Steering Committees(SC)/Inter-Ministerial Committees(IMC) have been established for basically all of the road projects funded through bilateral assistance, while SC/IMC have not been established for road projects funded through multi-lateral assistance.

Each of the donor countries have different social and environmental considerations and different levels and standards. While IEIA/EIA reports and Resettlement Action Plans (RAPs) have not been prepared for road projects supported by China, Thailand and South Korea, IEIA and draft

RAPs have been prepared for the C-1 section of NR 1 project funded by Japan. Furthermore, the Government of Japan (GoJ) supported the Royal Government of Cambodia (RGC) in the implementation of the project through the use of a critical path and milestones such that both the GoJ and the RGC could monitor and evaluate the project implementation. The Governments of China, Thailand and South Korea did not demonstrate this manner of project implementation although they did place de-mining and resettlement obligations on the RGC before the commencement of the projects.

The following figure shows the bridge construction on NR.7. This project was funded by China. The bridge is planned to cross a river with a width of approximately 800 m. The construction of the piers is carried out by filling, which dams up the river, except for a 60 m wide river channel which is retained to ensure the stream flow. There is concern that this construction method may negatively impact the downstream river environment due to the earth and sand discharges. In response to this situation, the Ministry of Water Resource Management (MWRM) issued a complaint to the MPWT. Consequently, the MPWT removed the earth and sand where the pier construction has been completed, and the river channel has expanded from 60 m to 100 m in width.

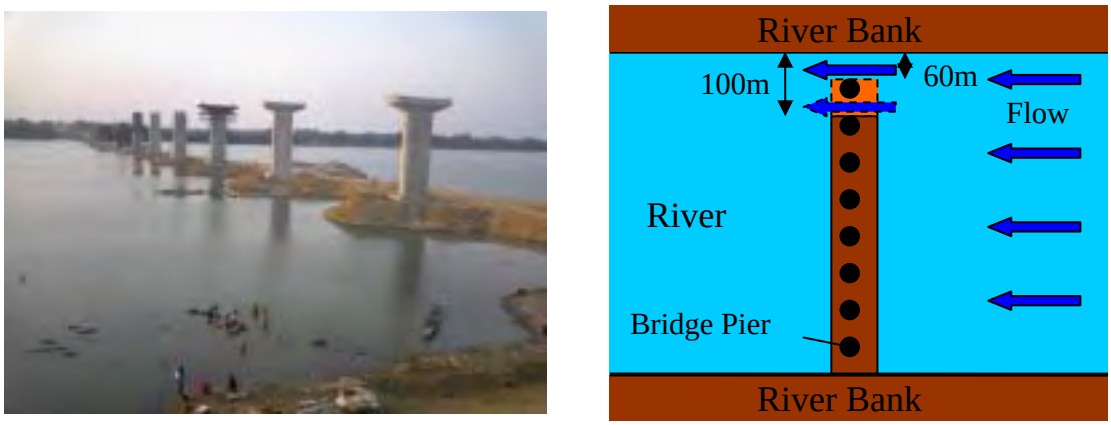


Figure 15.2.1 Bridge Construction on NR.7 (funded by China)

For the NR.3 project funded by South Korea, there are seven out of 117 PAPs who do not agree with the resettlement/compensation offered (as of May, 2005). Meanwhile there are three (3) PAPs who do not agree with the resettlement/compensation offered for the NR.7 project funded by China. Although there are obstacles to these projects, they have been started in the sections for which resettlements has been completed.

15.2.2 Road Projects funded by Multilateral Assistance

The World Bank (WB) and the Asia Development Bank (ADB) have their own policies on social and environmental considerations and their funded projects are implemented based on these policies. Both donor agencies require recipients to submit IEIAs/EIAs and RAPs for loan appraisal.

SC/IMCs are not established for road projects funded through multilateral assistance. It is not necessary for these committees to be established as the donor agencies and Project Management Units (PMUs) have sufficiently high authority.

IEIA or EIA reports and RAPs have been prepared for most of the projects funded through multilateral assistance based on the donor policies. However, an IEIA or EIA report has not been prepared for the NR.51 project funded by the World Bank (WB). Originally, this was a loan funded project for NR.3 and NR.6. Subsequently NR.51 was included in this project. The MPWT decided to use the surplus for NR.51 after fixing the contract amount for NR.3 and NR.6. An IEIA or EIA report was not prepared for the NR.51 project because there was insufficient budget and the WB did not require the report.

The ADB is now conducting an audit of the loan project for NR.1 (C-2 section) because of the resettlement problems that have been reported. It was the first project in which the MPWT applied an international donor policy to a resettlement. Therefore the staff of the IRC did not know how to carry out the resettlement; and it was undertaken by trial and error. In addition to the audit, the ADB is preparing a guideline for resettlement by T/A, and is also planning to conduct a legislation study on resettlement by T/A.

Table 15.2.1 Road Projects funded by Bilateral Assistance

National Road No.	NR.3	NR.67	NR.48	NR.7	NR.1 (C-1 Section)
From	Campot Town	Thai Border	Koh Kong	Kratie	Phom Penh
To	Trapang Ropau	Anlong Veng-Banteay Srey-NR.6	NR.4	Lao Border	Neak Loeng
Length	32.7 km	153 km (18+104+31 km)	152 km	198 km	55.98km
Fund Source	EDCF (Korean Loan)	Thai Grant and Loan	Thai Loan and Grant	Chinese Soft Loan (no credit loan)	Japanese Grant
EIA or IEIA	No	No	No	No	IEIA + additional environmental survey
Compensation	Yes (117 households)	Yes(not yet confirmed)	Yes	Yes (150 households)	Yes
Compensation paid by	MEF	MEF	Governor will prepare relocation site.	MEF	MEF
RAP	No	No	No	No	Yes (not yet finalized)
Pavement(AC/DBST)	DBST	DBST	DBST	DBST	AC
Construction start	May.7,2004	Not yet	Dec.,2004	Nov.18,2004	Not yet started
End	On going (May.6,2007)	-	On going (16% as of May.2005)	On going(Dec.,2008)	-
Steering Committee/ Inter-Ministerial Committee	MPWT, MEF, CM	MPWT, MEF, CM, Govr. MAFF, JBC, APSARA, MOD	MPWT, MEF, CM, Govr. MAFF, JBC, MOD	MPWT, MOE, MINE, MAFF, MRD, MEF, MOD, MOI at both National and Provincial* level	MPWT, MOE, MEF, MWM, Govr.

CM: Council Minister
Govr: Provincial Governor
MBC: Joint Border Committee
MOD: Ministry of Defense
MOI: Ministry of Interior (for police reason)
*: Provincial level including Kratie and Stung Treng Provinces

Table 15.2.2 Road Projects funded by Multilateral Assistance

National Road No.	NR.6	NR.3	NR.51	NR.1 (C-2 Section)
From	236+980*	NR.41	NR.5	Neak Loeung
To	319+645*	Provincial Boarder	NR.4	Bavet(Vietnam Border)
Length	72.4km**	21.5 km	38.0km	105.5km
Fund Source	WB Loan	WB Loan	WB Loan	ADB Loan
EIA or IEIA	EIA	EIA	No	IEE
Compensation	Yes (1210 households+125 households with bypass)	Yes (361 households)	Yes (1095 households)	Yes
Compensation paid by	MEF	MEF	MEF	MEF
RAP	Yes	Yes	Yes	Yes
Pavement(AC/DBST)	DBST	DBST	DBST	DBST (AC for 20km)
Construction start	Mar.14 2001	Nov.30,2001	Mar.24,2003	Jan.,2001
End	May.31 2004	Oct.31.2004	Sep.30,2004	Dec.,2004
Steering Committee/ Inter-Ministerial Committee	No	No	No	No

*: including JICA section
**: excluding JICA section and including to Airport and to Angkor Wat

15.2.3 Social and Environmental Considerations in Major Donor Projects

The major donors (GoJ/JICA, WB and ADB) require certain conditions for project implementation. The RGC is required to secure fair and transparent consensus building with stakeholders, especially PAPs, for the resettlement process.

The following figure shows the procedure and key steps for considering the social and environmental issues in the major donor projects. Simple surveys, public consultation, IEE/IEIA/EIA and RAPs were prepared for the projects supported by these donors. The monitoring of resettlement activities has also been carried out. The monitoring of the projects supported by the WB/ADB was conducted by consultants or NGOs under contract to the MPWT or the IRC, while the monitoring of the JICA project was conducted by a consultant under contract to the JICA Cambodia Office. The WB/ADB may not receive accurate monitoring reports because there is a possibility that the client, such as the MPWT or the IRC, may falsify statements to the donors if the resettlement activities are insufficient. It is difficult for the MPWT and IRC to control the consultant who conducts the monitoring as the JICA Cambodia Office is a client for the consultant. The consultant had to report to JICA Cambodia Office as it is. In connection with the efforts of the donors, the MPWT and IRC are in the process of undertaking more effective resettlement activities by learning and gaining experience of the activities.

Table 15.2.3 Social and Environmental Considerations by the Major Donors

	WB (NR.3 & 6)	ADB (NR.1 C-2 Section)	Japanese Grant (NR.1 C-1 Section)
Type of Aid	Loan	Loan	Grant
Public Consultation	○	○	○
IEIA/EIA	○	○	○
RAP	○	○	○
External Monitoring	Consultant	NGO	Consultant
Client of Monitoring	MPWT	IRC	JICA Cambodia Office

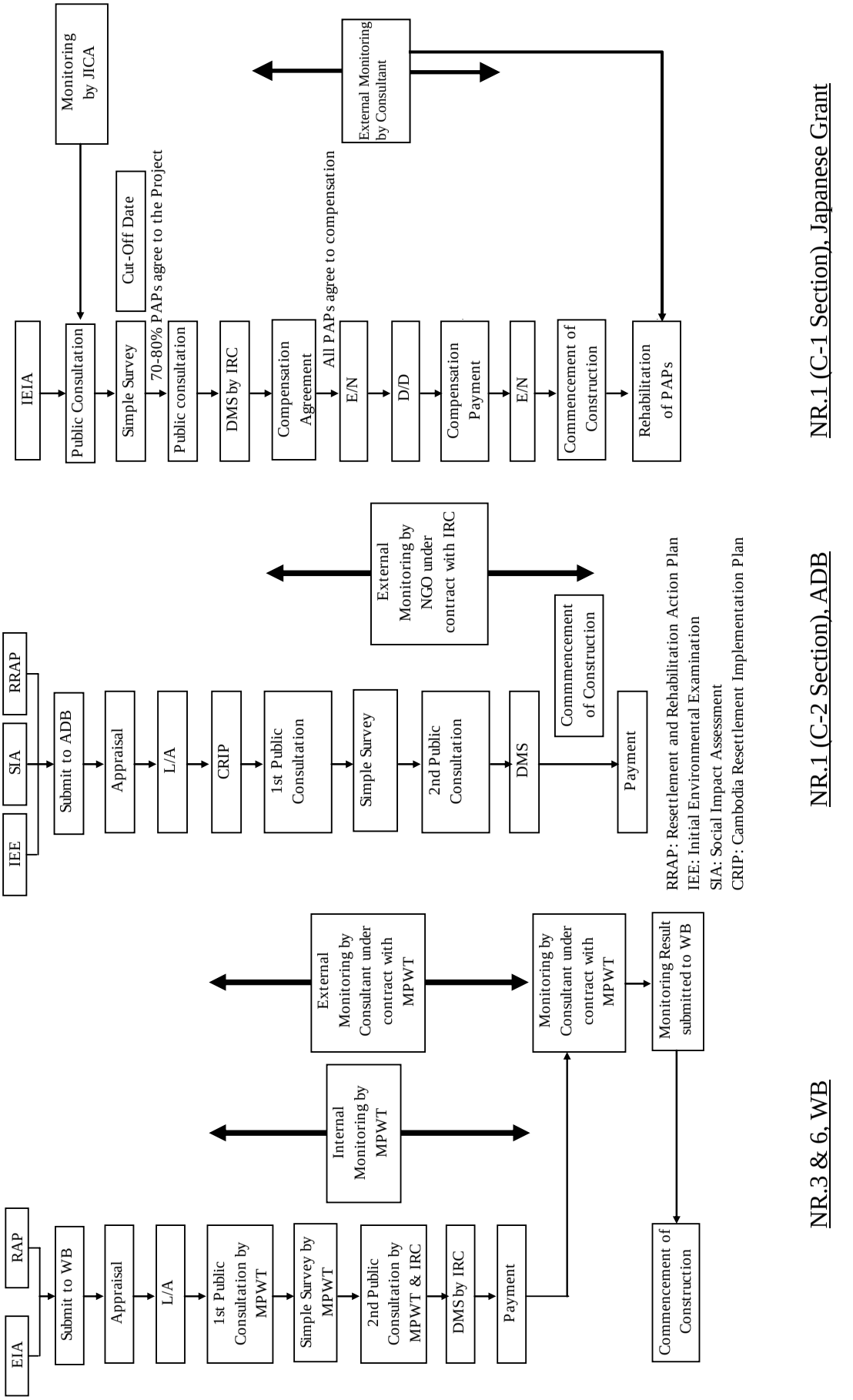


Figure 15.2.2 Key Steps for Social and Environmental Considerations in Major Donor's Projects

15.3 Issues to be considered

The following issues should be considered to ensure the proper implementation of the road project outlined in this M/P.

15.3.1 Particular Issues to be considered

The necessary considerations by particular area are described below.

(1) Agriculture/Forestry Areas

Agricultural areas in Cambodia are mainly divided into paddy fields, land agriculture, newly opened land and forests. The following figure shows the agricultural areas based on the land use in 2003.

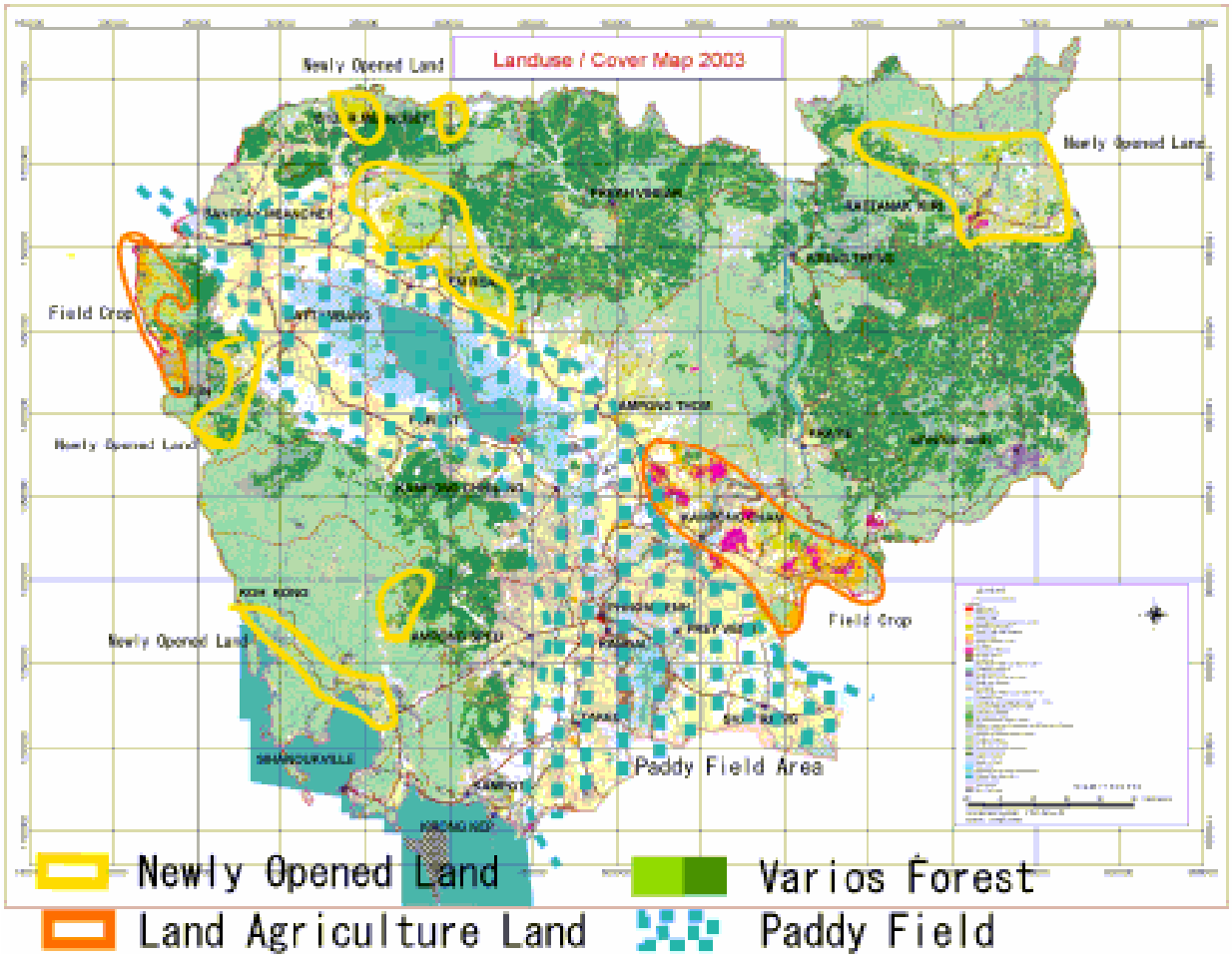


Figure 15.3.1 Agriculture/Forestry Area

Irrigation canals should be considered if the road crosses them in the paddy fields. Colmatage irrigation is a traditional irrigation system utilizing flood water in Cambodia. Such irrigation systems, including colmatage irrigation systems, should be considered to ensure the current

systems continue to function.

In the same way, hydrological systems should be considered. This also includes ensuring the continuation of fish migratory patterns. Hydrological systems include not only river and canal systems but every type of water flow system. Basically, many types of agriculture in Cambodia utilize natural meteorological mechanisms including Tonle Sap Lake.

Not only roads constructed across rivers and canals, but also roads with raised surface levels, may cause an impact on hydrological systems.

Roads constructed through, or alongside, forested areas should be considered in terms of environmental conservation. Some forests are in the forestry concession area. The concession rights are not for the land but for the use of the forest resources. In this situation, road improvements in the area will support the purpose of the concession and are not deemed to oppose the concession. However, consultation with the concession owner will still be necessary where roads are to be constructed through the area.

On the other hand, it is possible that a road improvement project could aggravate an illegal logging operation. However, illegal logging can be considered as an indirect impact of road development. It is not possible for the illegal logging to be controlled through the road development project. Prevention measures against illegal logging are monitoring and forest management by the relevant agencies.

The wildlife habitat in the forested area is also considered in the planning for a road development project. If a planned road crosses an area inhabited by important wildlife, such as elephants and tigers, the habitat of these animals shall be protected.

(2) Industrial Areas

The following figure shows the developing manufacturing areas. The major areas are Phnom Penh and adjacent areas, Sihanoukville, Koh Kong, and along NR 4 and NR 1 near the Vietnam border.

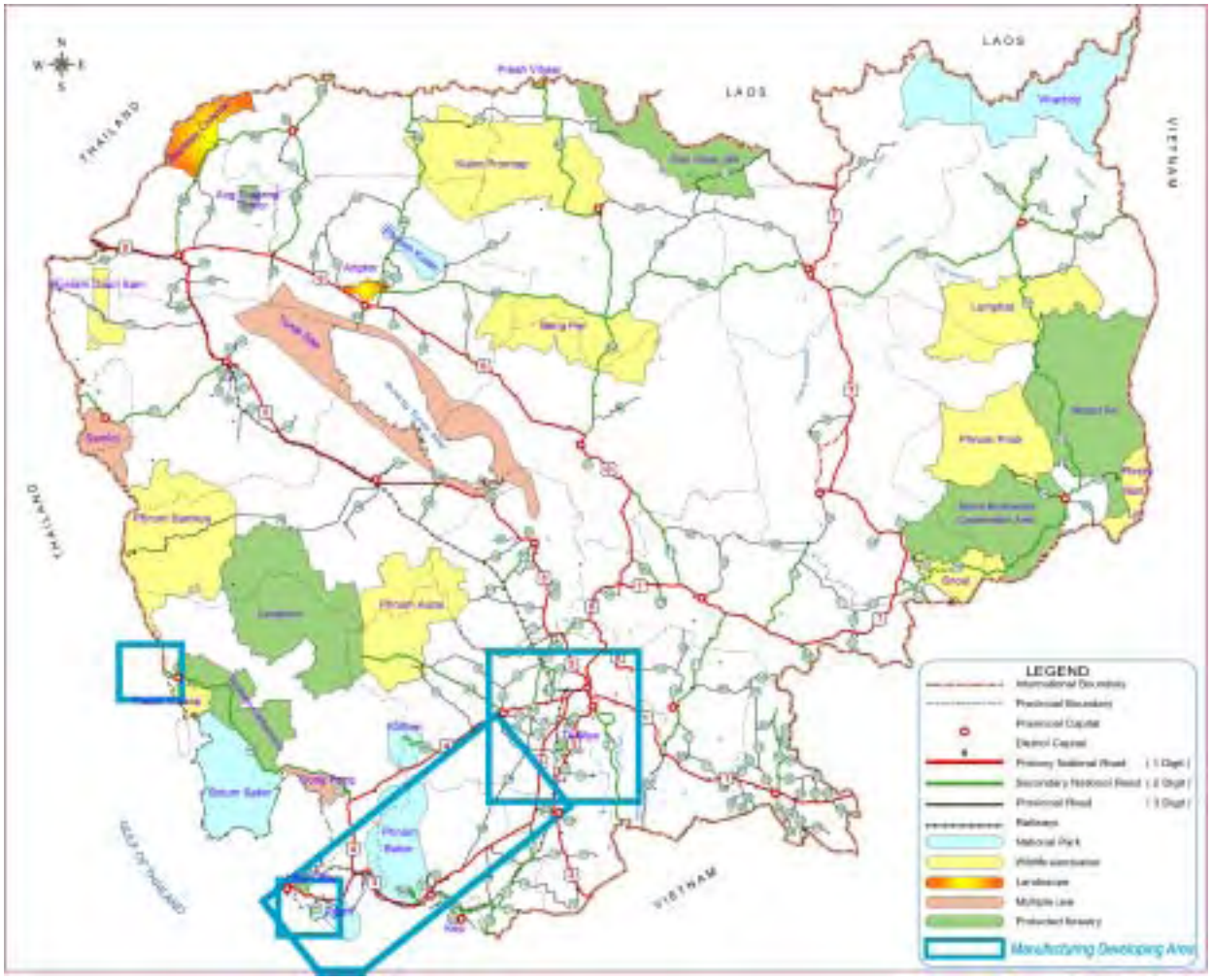


Figure 15.3.2 Manufacturing Developing Area

The special considerations to be taken into account in these areas are traffic safety, noise and vibrations. There are a large number of factory laborers who travel to work and home at the same time. Therefore, many laborers are in the vicinity of the factories in the morning, lunch time and evening time. In addition, there are many shops and small movable restaurants on and along the roads. These factors mean that there is a high risk in terms of traffic safety. Therefore, traffic safety measures should be taken into account, for example, the separation of pedestrians from the road traffic.

There are also many heavy trucks traveling through these areas causing noise and vibrations. Prevention measures against noise and vibrations should be considered, for example noise barrier fences, especially when there are residential areas nearby.

(3) Tourism Areas

The following figure shows tourism development areas. The tourism areas are divided into three (3) zones; Angor ruins zone, eco-tourism zone and coastal zone.

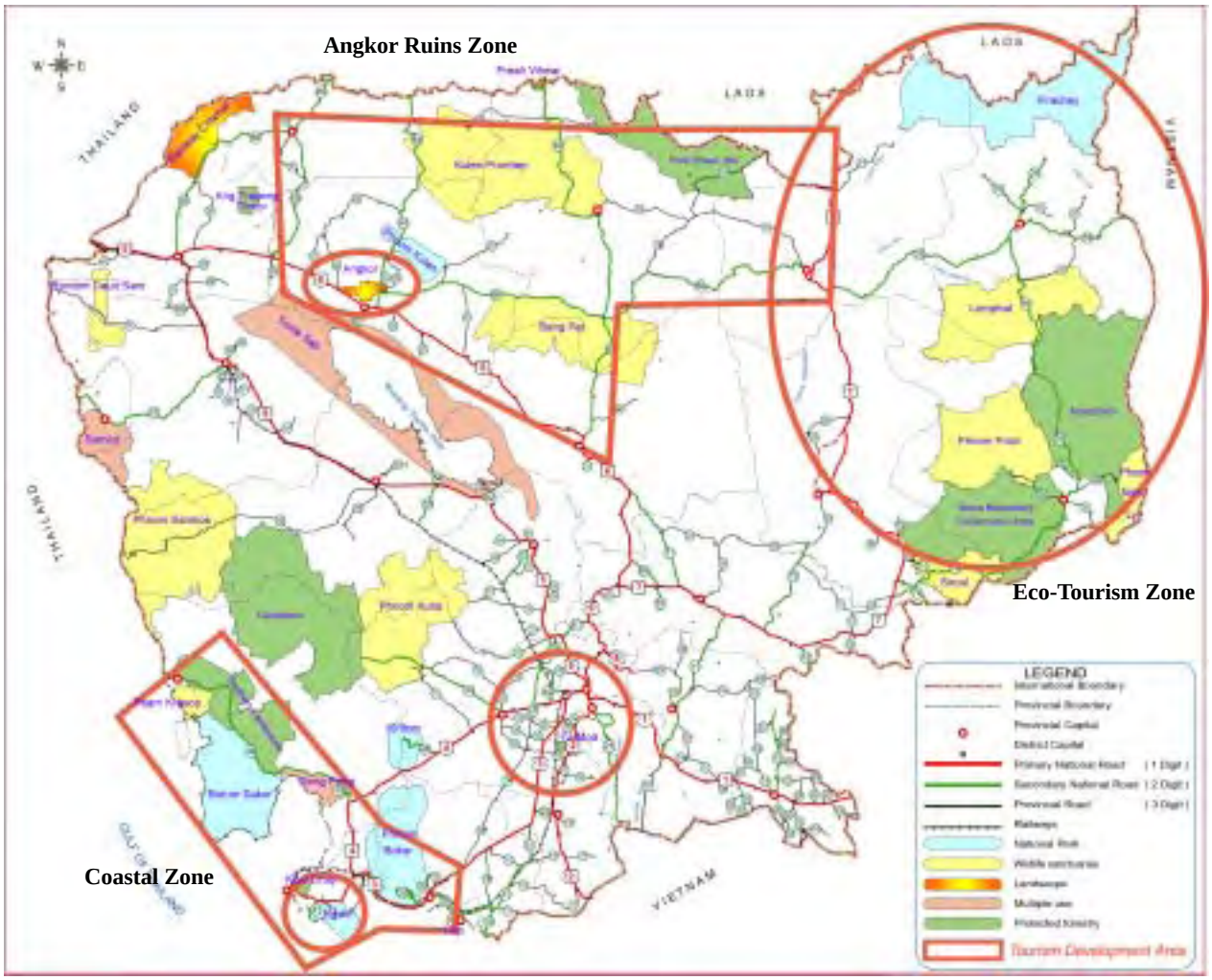


Figure 15.3.3 Tourism Development Area

In the Ankor ruins zone, there are still unrecognized ruins and underground ruins. In the planning of a road development project, the location of such ruins should be confirmed in cooperation with the APSARA Authority and other experts and archeologists. The landscape should also be considered in the area. Road facilities such as guard posts and lighting poles should be designed in harmony with the landscape.

The eco-tourism zone is located in the north-eastern area of the country. In this mountainous and forested area there are four (4) wildlife sanctuaries, one (1) national park and two (2) protected forests. A road development project in the area should take into consideration the conservation of these natural resources and wildlife habitats.

This area is located in the Kratie, Mondul Kiri, Ratanak Kiri and Stung Treng provinces. There are a lot of minority groups in this area and the minority group populations are shown in the following table. Most of Cambodia's minority groups are located in the Kratie, Mondul Kiri and Ratanak Kiri provinces. The ratio of minority groups in the other provinces is less than 0.2%. Almost 80% of the population in the Ratanak Kiri province is made up of minority groups.

Their lives mainly rely on the natural resources. Careful consideration should be paid if a planned road is to cross an area where a minority group lives.

Table 15.3.1 Population of Minority Group

No.	Province	Total Population	Total Minorities	Minority Ratio (%)
1	Banteay Meanchey	678,882	114	0.0
2	Battambang	971,894	264	0.0
3	Kampong Cham	1,655,349	547	0.0
4	Kampong Chhnang	531,516	0	0.0
5	Kampong Speu	676,821	96	0.0
6	Kampong Thom	606,918	209	0.0
7	Kampot	596,199	148	0.0
8	Kandal	1,203,134	250	0.0
9	Koh Kong	118,495	0	0.0
10	Kratie	328,885	48,238	14.7
11	Mondul Kiri	37,048	16,744	45.2
12	Phnom Penh	1,043,669	646	0.1
13	Preah Vihear	150,220	177	0.1
14	Prey Veng	1,013,086	583	0.1
15	Pursat	455,793	267	0.1
16	Ratanak Kiri	100,248	79,657	79.5
17	Siemreab	755,404	103	0.0
18	Sihanoukville	186,762	66	0.0
19	Stung Treng	89,923	115	0.1
20	Svay Rieng	513,616	0	0.0
21	Takeo	880,405	148	0.0
22	Oddar Meanchey	130,491	206	0.2
23	Kep	58,166	0	0.0
24	Pailin	41,247	0	0.0
	Total	12,824,171	14,8578	1.2

Source: Cambodia Inter-census Population Survey 2004, National Institute of Statistics, Ministry of Planning

In the coastal zone there are mangroves and appealing views of the coastal beaches. The mangrove areas should be conserved. Planned roads in the area should be designed in harmony with the coastal landscape.

15.3.2 General Considerations for Road Development

(1) Resettlement

Resettlement is one of the most critical issues on road development. In the previous projects, major issues are summarized into three (3) points of i) inconsistent resettlement and compensation among different donors' projects, ii) insufficient information and improper consensus building, and iii) dispute on ROW.

The first issue of inconsistent resettlement and compensation among different donors' projects is caused by that there have not been established legal regulations regarding resettlement and

compensation yet. Therefore IRC has followed the requirements by different donors in project by project. The legal regulations should be established as soon as possible so that IRC can implement in the common manner even in a national budget project.

The issues of insufficient information and improper consensus building should be settled by public consultation, grievance mechanism and monitoring mechanism. Public consultation can provide sufficient information, understand the opinions and requests of PAPs, and coordinate/ consult with PAS so that proper consensus building can be made.

Grievance mechanism can ensure proper implementation because the mechanism can help the PAPs who have complains and which are not accepted. The mechanism can support the staff of IRC work properly otherwise the PAPs might take objection to the grievance committee.

Monitoring mechanism can ensure not only proper implementation but also the rehabilitation of PAPs' lives after the project implementation. It is recommended that NGO can be a monitor entrusted by the government if the NGO have good communication with people and well understanding of road project and governmental system. It is desirable to establish a good partnership between the government and such qualified NGOs for the future road development.

There was a dispute on ROW in the previous project. The issue of the dispute was caused by insufficient management of ROW. The government insisted that the people live in the ROW are illegal based on the Declaration (Prakas) 1999 on the measure of eliminating illegal land encroachment. While some people, NGOs and the donor insisted that they are not illegal because they have lived before the declaration. The legal judgment seems to be difficult. But as a result, they have been compensated in the previous donors' projects.

(2) Fauna and Flora (Natural Environment)

The following figure shows the road network plan proposed in this master plan covered with the protected areas. The roads across the protected areas are indicated with bold lines.

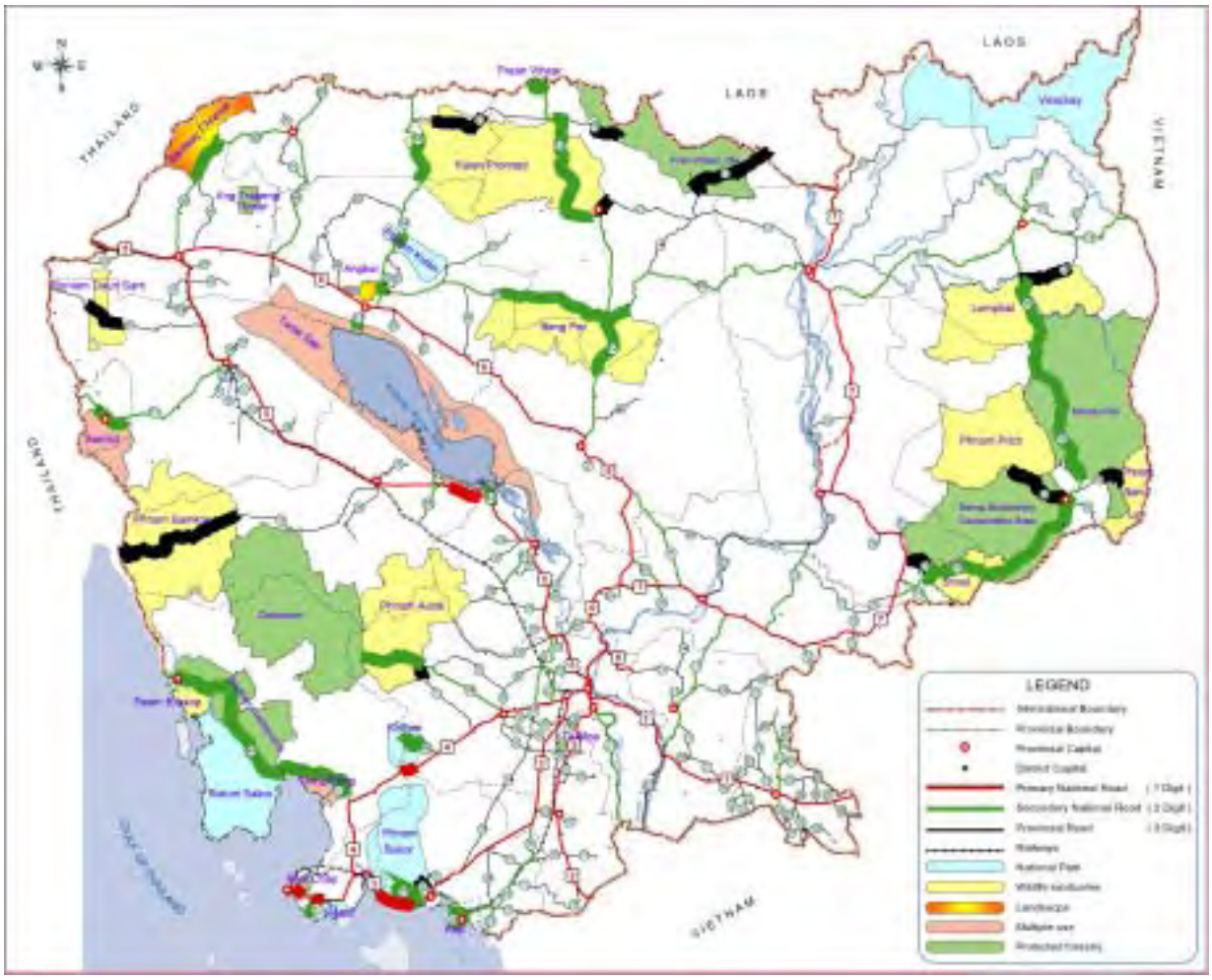


Figure 15.3.4 Road across Protected Areas

The roads that run across the protected areas are listed in the following table.

Table 15.3.2 List of Road across Protected Areas

No.	Names of the Protected Areas/Forest	1 Digit	2 Digit	3 Digit
A. National Parks				
1	Kirirum	4	46	
2	Phnom Bokor	3	32	121
3	Kep		33a	
4	Ream	4	41	
5	Botum Sakor		48	
6	Phnom Koulen		64	
7	Virak Chey			
B. Wildlife Sanctuaries				
8	Phnom Oral		44	131
9	Peam Krasop		48	
10	Phnom Samkos			148
11	Roneam Donsam			157
12	Koulen Prum Tep		62, 64	274
13	Beng Per		62, 66	
14	Lumphat		76	304
15	Phnom Prich			344
16	Phnom Namlear			

17	Snuol		76	310
C. Protected Landscapes				
18	Angkor		64	203
19	Banteay Chhmar		56	
20	Preah Vihear		62	
D. Multiple Use Areas				
21	Dong Peng		48	161
22	Samloat		57	
23	Tonle Sap	5	52, 54, 63	
E. Protected Forest				
1	Southern CardamomsSWEC		48	
2	Ta Moa			
3	Cardamom			
4	Kbal Chay	4		
5	Seima Bilodiversity Conservation Area SNOUL_dfw		76	344
6	Prea Vihear_dfw			212, 213
7	Mondul Kiri		76	343
8	Ang Trapeng Thmor			

It is desirable that roads should not be developed across the protected areas in terms of environmental conservation. In the case that the roads must be developed, mitigation measures should be undertaken and an environmental management plan (EMP) should be required. Before undertaking these measures, a basic survey is necessary to act as a base-line in understanding the fauna and flora, including the rare species and ecosystems.

In addition, the types and characteristics of the protected areas should be confirmed. For example, the Samlaut multiple-use area is categorized as a multiple-use area. The unique characteristics of this area are mentioned in Annex E of the declaration (Prakas) on protected areas as follows;

It is an evergreen forest area within the watershed of the Battambang River. It has been denuded by mining operations causing severe erosion and increased sedimentation of the river which flows in to the Tonle Sap Lake.

This means that there are concerns about the mining project in this area and the resulting erosion and sedimentation. In this respect, special consideration should be paid to bridge construction and slope excavation works, in the case of a road development project in this area. Such considerations and mitigation measures should be suitable for the characteristics of the protected areas.

(3) Air Pollution, Noise and Vibration

The major areas affected by air pollution, noise and vibration are densely population areas and large traffic volume areas.

One of the mitigation measures against these impacts during construction is to apply construction

methods with minimized noise and vibration. Anti-noise measures such as noise barrier fences can be applicable when the construction effects are likely to be higher than the criteria in the sub-decree.

The inspection of vehicle emissions is one of the mitigation measures against air pollution. There are no legal criteria on vibrations. The establishment of legal criteria on vibrations is necessary as a first step.

(4) Other Necessary Measures

The prevention measures against particular impacts are mentioned in the above sections. Even though these measures are important, a baseline survey and monitoring are essential. A baseline survey is necessary to allow for a comparison to be made between and after projects. If the baseline data does not exist, it is impossible to identify the cause of the impacts and it is difficult to undertake the necessary prevention measures.

Monitoring is very important with respect to the supervision of the project implementation and construction, and the inspection of the project at the completion of construction and during operation. Periodical monitoring is necessary to accumulate a database of monitoring results so as to understand the secular changes.

These measures are very basic and can be easily undertaken. A monitoring methodology should be formulated.

15.4 Further Issues

(1) ROW Management

One of the further issues to be tackled in the future is ROW management. There was a dispute on a ROW issue in the project for the C-2 section of NR-1 that was implemented between 2001 and 2004. The point of the dispute was who would be compensated. The 1999 declaration (Prakas) provides a measure for eliminating illegal land encroachment. In terms of the declaration, the government insisted that the people in the ROW were illegal and they could not be compensated. However, the people, NGOs and the donor insisted that they could have the rights to be compensated because they had been living in the ROW before the declaration and they had land titles based on the 1989 law, which stipulated land titles. No one, however, insisted that the people who lived in the ROW after the 1999 declaration had the rights to be compensated because they were clearly illegal. In addition to the declaration, there is a revised Land Law (2001) which, in Article 34, stipulates the illegal occupant as the following:

After this law comes into force, any new occupant without title to an immovable property belonging to public bodies or private persons shall be considered as an illegal occupant and shall be subject to the penalties provided in Article 259 of this law.

As a result, both of them were compensated because there was not evidence of when they started

to live in the ROW. There was only the evidence at the cut-off date, which was set after the declaration, to identify the PAPs to be compensated. Therefore the dispute was caused by the fact that there was no identification of when the residents started to live in the ROW.

In general, the cut-off date is set to identify the people who live legally and will be affected by the project. Therefore some prevention measures against new squatters in the ROW should be taken as soon as possible so that the number of people who have to be compensated and resettled will be reduced and such disputes will be prevented.

The prevention measure would be effective ROW management to identify the people who live in the ROW at this moment, so that new squatters who move into the ROW can be identified. The most desirable method of ROW management is a detailed measurement survey (DMS) to identify and estimate the value of the properties. Various levels of management can be considered depending on the governmental capacity and prioritization. Even though a field measurement survey is difficult, an aerial photo survey or video recording can be considered.

At any level, ROW management and identification of existing PAPs and their properties has to be carried out. Otherwise, the number of PAPs will increase and the compensation costs could be substantial.

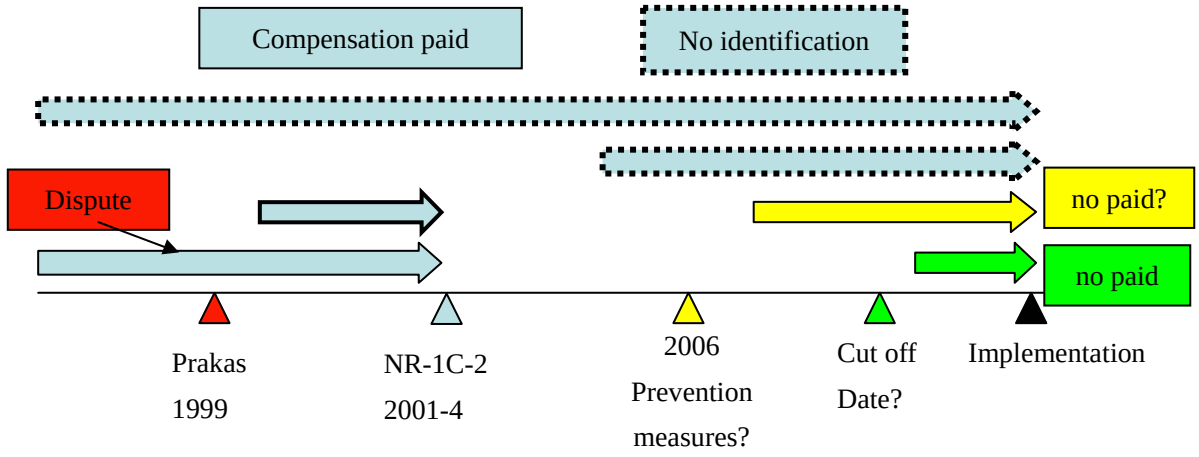


Figure 15.4.1 ROW Management Issues in the past and the future

(2) Indirect Impacts

Existing road improvement projects are unlikely to cause serious direct impacts, such as destruction of forests, except for the aforementioned resettlement problems. However, the projects are more likely to cause indirect impacts. An indirect impact causes another impact, and that impact will cause another impact in a negative spiral chain. The following is an example of a negative spiral chain.

i) The existing road improvement itself does not cause a direct impact on the area.

ii) Disordered population in the area along the improved road.

iii) They cause disordered development, such as slashing and burning, and developing plantations.

iv) Such developments cause the destruction of the forest.

v) The destruction of forest negatively impacts on the minority groups who rely on the forest and natural resources.

vi) Expanding gap between rich and poor.

The development of roads brings benefits and positive impacts, such as improving physical distribution, easy transportation and business opportunities, however, at the same time it can also cause indirect negative impacts such as human trafficking and the spread of infections.

15.5 IEE Conclusions for the M/P

(1) Existing Road Improvements

Almost all of the roads, for which development plans are formulated in this M/P, are existing roads. Therefore, the development of these roads involves undertaking improvements, such as pavements and widening, and does not involve the construction of new roads. The social and environmental impacts caused by these kinds of road improvements are not likely to be huge, except for the resettlement impact.

Therefore, the direct impacts can be avoided or minimized if sufficient measures and considerations are put in place as described above. However, with regard to indirect impacts, it is difficult for the MPWT, the project owner, to undertake measures under the jurisdiction of the MPWT against indirect impacts. In undertaking the measures, it is desirable for the MPWT to cooperate with the relevant governmental agencies and NGOs as both direct and indirect issues may result from the road development.

Land management can be tackled in cooperation with the Ministry of Land Management, Urban Planning and Construction (MLMUPC). If illegal squatting along the developed road can be prevented by land management, the negative spiral chain can be cut off, and the disordered development caused by illegal squatting can be stopped. For this purpose, a measurement survey and the registration of land titles should be made prior to the road development so that it is easy to identify illegal inhabitants.

In addition to the land management plan, a land use plan should also be developed in cooperation with the MLMUPC, the Ministry of Agriculture, Forestry and Fisheries (MAFF), the Ministry of Rural Development (MRD) and MOE. When a road is developed, there is an increase in the potential for development of the land along the road. Therefore the road development can

contribute to regional development based on the land use plan in terms of agriculture development, conservation and sustainable use of forestry, and rural development, although disordered development must be avoided.

In this context, the MPWT is expected to take the initiative in terms of cooperating with the relevant governmental agencies.

(2) New Road Construction and 4-Lane Widening

New road construction and road widening from 2-lanes to 4-lanes has the possibility of causing large impacts, especially the social impacts of resettlement. Adequate mitigation measures and considerations have to be made for not only existing road development but also new road construction and 4-lane widening.

The following figure shows the new road construction and 4-lane widening proposed in this M/P. The 4-lane widening is planned for NR's 1, 4, 5, 6, 7 and the Phnom Penh ring road. The new roads are planned for NR 6 in Siem Reap and NR 5 in Battanbang. Depending on the alignment, there may also be some sections requiring new construction for the Phnom Penh ring road.

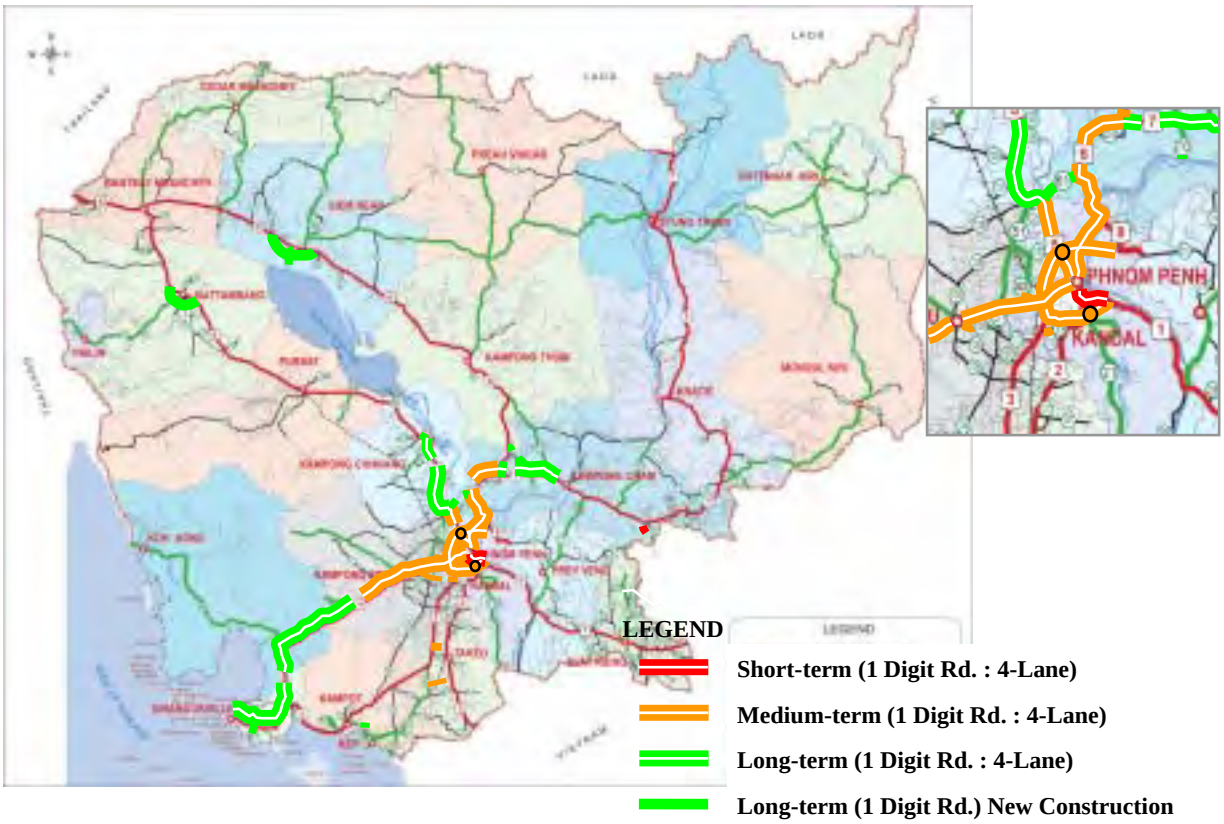


Figure 15.5.1 New Construction and 4-Lane Widening

In addition to the ordinary measures and considerations, careful consideration is necessary for these roads due to the estimated large scale of resettlements that will be required. In such a case, consensus building among the PAPs is essential. For the consensus building, public consultation is necessary in order to explain the project and to understand the opinions and requests of the PAPs.

Careful consideration should be paid to road projects that will cause a large impact, such as the Phnom Penh ring road. In such a case, social consensus building among not only the PAPs, but also the citizens, is necessary because the project may impact both the PAPs who have to be resettled and also the citizens, both directly and indirectly. At the same time, positive impacts and benefits brought by the project should be considered in parallel to the negative impacts.

In this context, such projects should be formulated not only in the individual road project plan but also in terms of urban planning. In the urban plan, the necessity of the project should be examined, assessing both the positive and negative impacts. Mitigation measures, including the resettlement plan, should also be outlined in the urban plan. In relation to social consensus building, various methods can be applied such as public forums inviting citizens, mass communication and consultative committees inviting experts, representatives of various sectors and groups.

15.6 Recommendations

(1) Proper Implementation

Proper implementation of the project is the most important aspect for social and environmental considerations because the proper implementation becomes the direct result of the project. Even though there will be planned mitigation measures and resettlement activities, there may be negative impacts if the implementation is inadequate. Therefore the project must be effectively implemented as planned.

In connection to this, the implementation capacity of both the individual staff and the organization will be fostered so that effective implementation of the project can be ensured. A capacity development program could be considered.

(2) Strengthening Legal Frameworks

Strengthening of the legal frameworks is recommended including the guidelines and technical manuals so that the minimum requirements will be achieved for every project. For example, vibration criteria are not stipulated in Cambodia, and it is desirable that these are formulated by MOE in consultation with the MPWT.

In relation to the proper implementation of the project, strengthening of law enforcement and monitoring are recommended. Monitoring is crucial for law enforcement. It is desirable for the MPWT to conduct periodical monitoring of the social and environmental items such as air

and noise in corroboration with MOE.

The monitoring of resettled people is also important, both during the implementation and after the project. This is possible through comparing with the previous situation to ensure the rehabilitation of their new lives. A monitoring mechanism for resettlements should be established.

(4) Land Issues

The management of land issues is crucial for road development. Strengthening land administration is necessary for the MLMUPC, such as land registrations, land transaction control and squatter control. Land use control is also necessary, such as development permissions and land use plans made by the MLMUPC and other relevant agencies, e.g. MAFF for agricultural development, and the MRD for rural development.

(5) Coordination and Cooperation

Coordination and cooperation with other governmental agencies is important so that joint measures can be taken against the various types of indirect impacts. In addition, cooperation with NGOs can be effective. Some NGOs have projects in the areas where the road projects are to be implemented and they have developed good relationships with the community. In this respect, coordination and cooperation with NGOs is important.

(6) Facilitating Environmental Improvements through Road Development

Social and environmental considerations should be recognized not only in terms of minimizing negative impacts but also for environmental improvement. For example, if drainage or water supply projects are planned in parallel with road development planning, underground pipes can be laid at the same time as the road construction. In this way, road development can facilitate environmental improvement.

In Japan, there is a system of roadside environmental improvement stipulated by law. This system aims for the total and integrated improvement of both the roads and the roadside area through land use control and integrated environmental improvement planning. The land use control encourages the owner of the land along the roadside to build raised buildings that can act as a noise barrier while the rear of the building is retained as a good living environment.

In such a way, road development, together with other improvement planning, can facilitate integrated environmental improvement.

(7) Balanced Development

Although road development itself will not produce effective impacts, economic activities or other development activities together with road development can produce effective impacts. In the same way, if only road development is planned without other related plans, the level of the roads

will become more advanced than the development of the other sectors. As a result, development will be unbalanced.

Due to the weaknesses in the legal frameworks, governmental capacity and law enforcement in every sector and every Ministry, the advantage of road development has impacts to the other sectors or other jurisdictions of other Ministries in terms of both positive and negative views. Thus road development can have positive and/or negative impacts, both directly and indirectly.

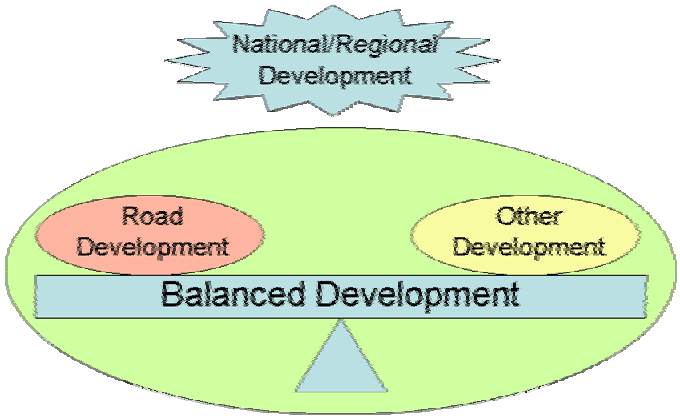


Figure 15.6.1 Balanced Development

Conversely, balanced development, which means road development in conjunction with the development of other sectors, in cooperation with relevant governmental agencies and NGOs, will bring synergy effects and may also mitigate negative impacts.

The development of roads on a national or regional level is crucial in terms of balanced development in order to maximize the benefits and minimize the negative impacts of road development.

APPENDIX FOR CHAPTER MP-A-15 IEIA/EIA Reports of 25 Projects

The following table shows information of 25 projects, which IEIA/EIA reports were submitted to MOE in the past. Some projects or some information items might not be included in the table because the past data for IEIA/EIA examinations and approvals are not fully recorded properly in MOE. In terms of project types, there are various types, such as road, forest concession, private factory, port, water supply, irrigation and so on. Forest concession projects, which are eleven, are dominant over 25 projects. Private projects are dominant with 18 projects as well.

There was no project, which IEIA/EIA report was not approved though there were projects, which IEIA/EIA reports were required some revision. The most of the revisions were related to a quality of reports. There was one project, which plan was required to be revised by MOE, because the project was recreation facilities planned in the national park of Phnom Koulen, where locates north of Siem Reap and near Angkor Wat, and which is one of the protected area stipulated by MOE. The project owner has not revised IEIA/EIA report yet so far.

Projects Submitted IEIA /EIA Report (1/2)

No	Project Name	Location	Project Type	IEIA /EIA	Project Owner	Submitted Date	Approved Date	Fund Source	Remarks
1	Ho Chi Minh City to Phnom Penh Highway Improvement Project	Ho Chi Minh and Phnom Penh city	Road	IEE	MPWT	1998		ADB	MOE supported
2	Technical Assistance for Transport Network Improvement Project	National Road 5, 6 and 7 in Cambodia	Road	IEIA	MPWT	1999	1999	ADB	MOE supported
3	The Thailand-Cambodia Transmission System project		Transmission system	IEIA	EGCO	2001	Not yet	Project Owner	Not submited the 2nd report, after MOE gave some comments
4	Rehabilitation of Kirrirom 1 hydropower	Kampong Speu and Koh Kong, about 210 km	Hydropower	IEIA	CETIC International	2001	01, 2002	Project Owner	
5	Land fill construction for industrial wastes	Angsnoul District, Kandal Province	Land fill	EIA	Sarom Trading Co., Ltd	2001	04, 2002	Project Owner	-Transportation - Location is near the villages
6	The improvement of NR 1 from Phnom Penh to Neak Luong	Phnom Penh and Neak Luong, Kadal Province	Road	IEIA	MPWT	2002	12, 2002	Japan	There are some issues should be considered concerning to social economy
7	Cambodia Beverage Coca Cola Production	Reusey Keov District, Phnom Penh	Factory	EIA	Cambodia Beverage Company	2002	2002	Project Owner	-The location is in a town. It may impact people around it. - Difficult to monitor
8	Planning and Management for Forest Concession	Siem Reap and Oddor Meanchey province, Cambodia	Forest Concession	SEIA	Samrong Vout Private Company		03, 2002	Project Owner	
9	Planning and Management for Forest Concession	Stung Treng province, Cambodia	Forest Concession	SEIA	Phear Phea Meach Chhag Food Cambodia Ltd		05, 2002	Project Owner	
10	Planning and Management for Forest Concession	Kampong Thom and Kratie province, Cambodia	Forest Concession	SEIA	Phear Phea Meach Chhag Food Cambodia Ltd		05, 2002	Project Owner	
11	Planning and Management for Forest Concession	Pursat and Battambang province, Cambodia	Forest Concession	SEIA	You Rysaco Co., Ltd		07, 2002	Project Owner	
12	Planning and Management for Forest Concession	Kampong Tom province, Cambodia	Forest Concession	SEIA	Colag Sim Company		07, 2002	Project Owner	
13	Planning and Management for Forest Concession	Kratie and Stung Treng province	Forest Concession	SEIA	Everbright CIG Wood Co., Ltd		08, 2002	Project Owner	

Projects Submitted IEIA /EIA Report (2/2)

No	Project Name	Location	Project Type	IEIA /EIA	Project Owner	Submitted Date	Approved Date	Fund Source	Remarks
14	Planning and Management for Forest Concession	Preah Vihear province, Cambodia	Forest concession	SEIA	Cambodia Cherndar Plywood Mfg Co., Ltd		08, 2002	Project Owner	
15	Planning and Management for Forest Concession	Kampong Cham, Kampong Thom and Preah Vihear province	Forest concession	SEIA	.Meng Ly heng Investment Co., Ltd		08, 2002	Project Owner	
16	Planning and Management for Forest Concession	Koh Kong and Pursat province	Forest concession	SEIA	Silveroad Wood Products Co., Ltd		08, 2002	Project Owner	
17	Planning and Management for Forest Concession	Pursat province	Forest concession	SEIA	Supper Wood I.P.E.P, Limited		09, 2002	Project Owner	
18	Planning and Management for Forest Concession	Kratie, Stung Treng and Mondoulkiri province	Forest concession	SEIA	Kingwood Industry PTE., Ltd		09,2002	Project Owner	
19	Rehabilitation of Sihanoukville Authority Port	Sihanoukville	Port	IEIA	Sihanoukville Authority Port	2002	01, 2003	Sihanoukville Authority Port with loan from Japan	
20	Petroleum Study and research Block A	Cambodia Sea, Sihanoukville and koh Kong	Petroleum	EIA	Cambodia petroleum Authority and Chvron Overseas petroleum-Cambodia., ltd	2002	01, 2003	Chvron Overseas petroleum-Cambodia., ltd	
21	Phnom Penh Solid waste Management. Land fill Construction	Dong Kor District, Phnom Penh	Land fill	EIA	Department of PWT Phnom Penh		2004	(JICA)	
22	Small Rural Water Supply Development	Peam Chikang District, Kampong Cham Province	Water Supply	IEIA	Private Company. Cambodia- Singapore	2005	04, 2005		
23	Rehabilitation of West Baray Irrigation System	Baray Commune, Siem Reap Province	Irrigation	IEIA	Ministry of Water Resource and Metheology (MOWRAM)	2005	04, 2005	Government (MOWRAM)	
24	The Ecotourism Development in Ream National Park	Ream National Park Sihanoukville	Ecotourism	EIA	Yeejia development Company Ltd	2005	not yet approve (waiting)	Project Owner	Not submit all required documents
25	Rehabilitation of National Road No 64	Kampong Thom and Preavihear Province	Road	IEE	MPWT	2005	not yet approve (waiting)	World Band	Not completed documents, request to conduct EIA report

CHAPTER A-16 CONCLUSIONS AND RECOMMENDATIONS

16.1 Conclusions

16.1.1 Role of Master Plan

The Study Team recommends that the Cambodian government use the findings of the road network master plan as the basis for the long-term national development program and anticipates that the projects proposed in the study will be successfully completed by 2020.

The Study Team also recommends that the members of IRITWG utilize the results of the master plan study in order to avoid repetition of support efforts and discrepancies between the opinions of different supporting groups regarding project implementation.

16.1.2 Coordination between the Road Development Plan and the Road Management Plan

The Study Team examined the proposed improvement measures for 1-Digit, 2-Digit and major provincial roads under Part A (Road Network Development Plan) and for minor provincial roads and rural roads with small traffic volumes under Part B (Road Maintenance Plan).

Both of these plans complement the proposed master plan, and the implementation of the road network improvement measures and road maintenance should be progressed in parallel with the timing targets in the master plan.

16.1.3 Road Network System in the Year 2020

The master plan target improvement works by the year 2020 are presented below.

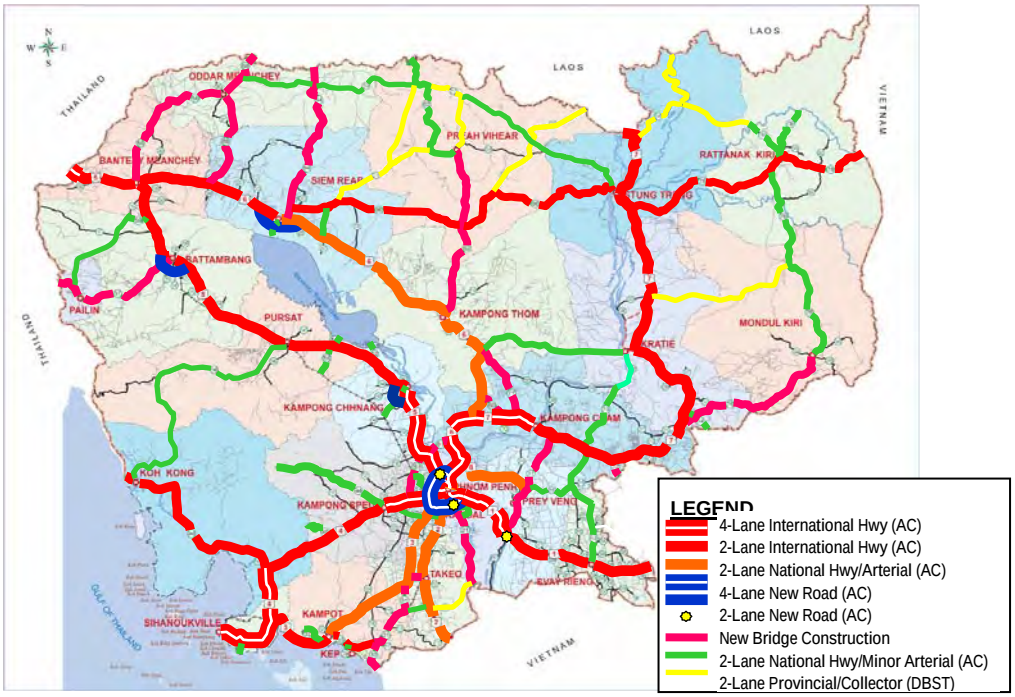


Figure 16.1.1 Road Network in the Year 2020

16.1.4 Total Project Cost Proposed in the Master Plan

The total cost of improvement measures and maintenance costs are as shown below:

Table 16.1.1 Total Project Costs

Road Classification		Total Road Length (km)	Civil Works Improvement Cost (US$ million)	Maintenance Cost (US$ million)	Total Cost (US$ million)
1-Digit National Road	Existing	2,052	901	92	993
	New	133	256	-	256
2-Digit National Road		2,643	676	87	763
Provincial Road		6,615	202	280	482
Rural Road		18,948	-	22	22
Total		30,391	2,035	481	2,516

16.1.5 Expected Economic Effect derived from the Implementation of the Master Plan

The economic benefit, based on the VOC and TTC, derived from the implementation of the master plan is expected to be between $3,800 million and $4,200 million in total over 15 years and the B/C ratio based on a project cost of $2,516 million will be 1.62, which indicates that the project is feasible and viable.

Total project costs : US$ 2,516 million
Accumulated benefit (Period: 25 years from the year 2010) : US$ 15,952
B/C Ratio (Discount Factor 12 %) : 1.62

16.1.6 Implementation Program (Short-term, Medium-term and Long-term)

The upgrading and widening works are divided into the short-term, medium-term and long-term plans as shown below:

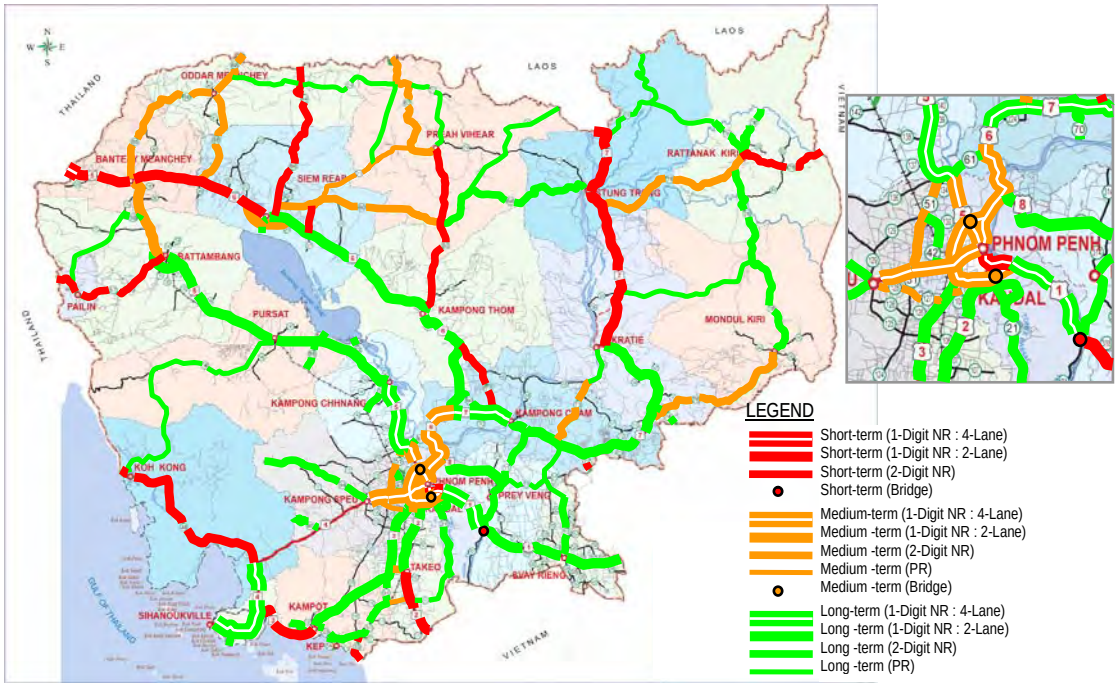


Figure 16.1.2 Implementation Program (Short-term, Medium-term and Long-term)

16.1.7 Investment Plan

The following is a summary of the investment allocation plan for the short-term, medium-term and long-term objectives in the master plan study.

Table 16.1.2 Investment Plan

Description	Total Amount ($ million)	Short-term 2006 - 2010	Medium-term 2011 - 2015	Long-term 2016 - 2020	Remarks
A. Required Cost					
(1) Road Improvement/Rehabilitation Project					
1-Digit Roads	1,157	207	337	613	NR1, 2nd Mekong Bridge, NR2, NR3, NR4, NR5, NR6, NR7, NR8
2-Digit Roads	676	196	231	249	NR11, NR21, NR33, NR48, NR57, NR62, NR64, NR68, NR78, and other 28 routes
3-Digit Roads	202	0	15	187	PR104, PR114 and other 16 routes
Urgent Bridge Rehabilitation Program	(40)	(20)	(20)	(0)	Short-term: Phase I (South-east BL) and Phase II (North-west BL) Medium-term: Phase III (South-west BL) and Phase IV (North-east BL)
Total (1)	**2,035**	**403**	**583**	**1,049**	
(2) Road Maintenance Works					
1 digit, 2 digit, 3 digit and rural roads	481	113	169	199	daily and routine maintenance only
Total (2)	**481**	**113**	**169**	**199**	
Total (B)=(1)+(2)	**2,516**	**516**	**752**	**1,248**	
B. Fund to be Procured					Financial procurement plan of Case 2
International fun Total (3)	1,284	428	428	428	Support by International Banks, Bilateral Loans, Grant Aids
Domestic fund Total (4)	982	135	288	559	Allocation of Added Tax and Road Use Tax to Road Sector
Total (B)=(3)+(4)	2,266	563	716	987	
Difference (surplus/▲shortage)	▲ 250	47	▲ 36	▲ 261	Surplus in the short-term shall be transferred to medium-term.
Additional fund required	**250**	**0**	**0**	**250**	To be procured by introduction of BOT system or 3rd private sector

16.1.8 High Priority Projects in the Short-term Plan

The projects proposed in the short-term plan (2006 -2010) are listed below:

Table 16.1.3 Projects proposed in the Short-term Plan

Projects Proposed in the Short Term		Length (km)	Improvement Measures	Project Status (as of July, 2006)	Project Cost (US$ M)
1-Digit NR	NR.1 (1-1, PP-Neak Leuong)	60.0	Road upgrading	Under construction	65.0
	NR.1 (1-2, Neak Leuong Bridge)	2.0	New bridge construction	F/S completed by Japan	70.0
	NR.2 (2-2, Takeo-VN Border)	57.0	Road upgrading	Completed in 2006	12.0
	NR.3 (3-2, Kampot-Veal Rinh)	54.0	Road upgrading	Under construction	17.5
	NR.5 (5-5, Sisophon -Thai Border)	47.0	Road upgrading	Under construction	11.6
	NR.6 (6-4, Siem Reap - Sisophone)	48.0	Road upgrading	Under construction	30.4
	NR.7 (7-3,4 Kratie-Laos Border)	193.0	Road upgrading	Under construction	50.0
2-Digit NR	NR.33 (33-1, Kampong Trach-Lork)	17.0	Road upgrading	Committed by ADB	5.0
	NR.48 (Chamker Loung-Thai Border)	161.0	Road upgrading	Under construction	29.7
	NR.57 (Battambang-Pailin-Thai Border)	103.0	Road upgrading	Pre-F/S completed by Japan	45.0
	NR.62 (62-1, Thanal Baek - Tbeng Meanchey)	243.0	Road upgrading	Under construction	37.0
	NR.64 (Svay Thom - Dang Rek)	134.0	Road upgrading	Committed by Thai	27.8
	NR.65 (Dam Deck - Trapeang Prey)	21.0	Road upgrading	Under construction	4.0
	NR.71 (Treung -Kompong Thmar	58.0	Road upgrading	Under construction	17.0
	NR.72 (Kreat Tboung - Smach)	14.0	Road upgrading	Completed by DPWT	4.0
	NR.78 (78-2, Bang Lung - Vietnam Border)	70.0	Road upgrading	Committed by Vietnam Gov.	26.0
Urgent Bridge Rehabilitation Program					
	Phase I: South-east Block	-	Bridge rehabilitation	Requested to Japanese Gov.	12.0
	Phase II: North-west Block	-	Bridge rehabilitation	Undecided	12.0

Note) Marked Projects are not yet executed nor committed.

16.2 Recommendations

16.2.1 Investment Allocation Plan

At present, the financial status of the Cambodian government is very tight and there are many problems and issues to be resolved in order to secure the necessary funds planned in the Study. The following improvement measures are recommended by the Study Team:

(i) The allocation of full amount of added tax (2 cents/liter on gasoline and 4 cents/liter on diesel) to funds for road construction and maintenance works and to use the fund that does not accept multipurpose diversion, only limited to road maintenance.

(ii) To correct the yield of taxes that are currently lost due to the smuggling of petrol products.

(iii) To use private funds from a third sector or introduce BOT.

16.2.2 Follow-up on the Master Plan Study

(1) Periodic Review of the Master Plan (every five years)

The master plan has been formulated by the Study Team taking into consideration the socio-economy and technical requirements. Therefore, it is expected that the government of Cambodia will use the findings of the master plan study as a base for the long-term national development program. However, at the same time, the MPWT is advised that projects suggested in the study should be monitored and reviewed in relation to changes in domestic and international affairs at an interval of every five years.

(2) Nationwide Traffic Surveys (at three to five year intervals)

The first national level traffic investigation in Cambodia was conducted by the Study Team and the traffic data obtained through this survey will be important basic data for the development plan for this country in the future. The Study Team recommends that the MPWT continue with the traffic surveys using the same methods and the same locations at the following intervals:

(i) Traffic count survey at roadside : every three years

(ii) OD survey : every five years (at the same time as the master plan review)

At present, no departments are responsible for the implementation of the traffic surveys and data management. It is recommended that the Public Works Research Center (PWRC) of the MPWT is made responsible for all of the traffic surveys and data management. The recommended organization chart is shown below:

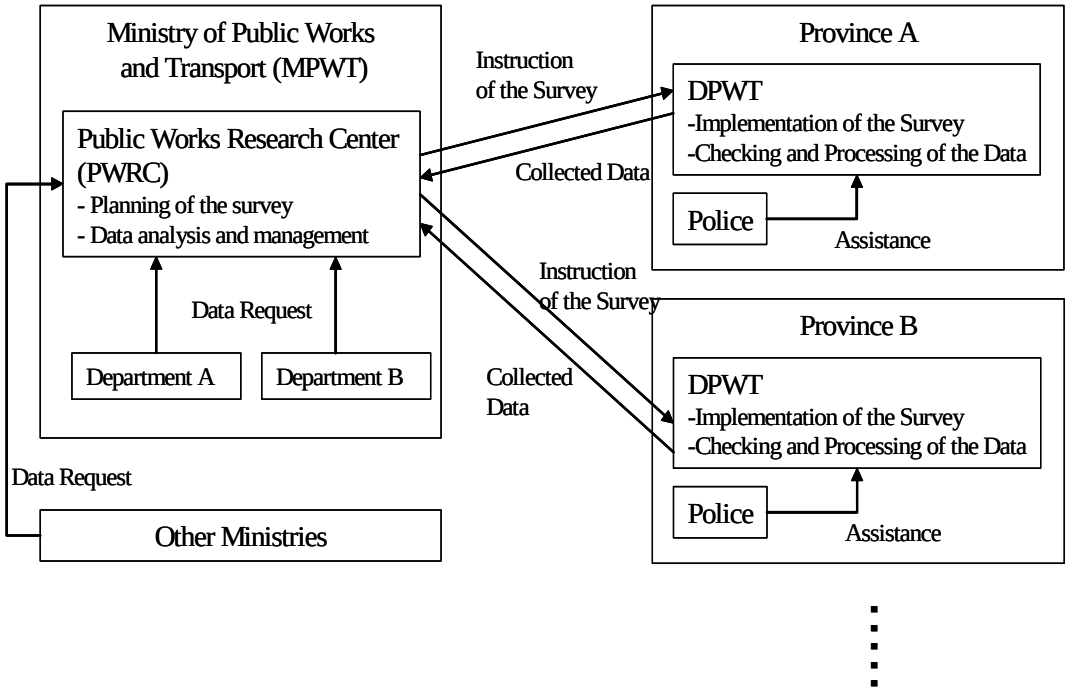


Figure 16.2.1 Proposed System for Traffic Surveys

(3) Updating of Road Inventory (Annually)

A road inventory is indispensable for the annual budget planning process of the MPWT. This data must be reviewed and updated at the end of every financial year for future planning. It is necessary to undertake the following measures to effectively update the inventory effectively.

(i) Installation of distance posts at one km intervals on the 1-Digit, 2-Digit and major provincial roads.

(ii) Installation of markings, showing the road number and distance (km), on the 1-Digit, 2-Digit and major provincial roads, at both ends of each route.

(iii) Establishment of a destination mark at the main crossings.

(4) Cooperation with NGOs

NGOs could become monitoring bodies entrusted by the government if the NGOs have good communication skills with the public and an adequate understanding of road projects and governmental systems. It is desirable to establish a good partnership between the government and such qualified NGOs for future road development.

(5) Continuous training for CP

It is desirable that the staff of the MPWT or other relevant ministries receive continual training from the viewpoint of effective technology transfer.

PART B

INSTITUTIONAL DEVELOPMENT OF ROAD MAINTENANCE

CHAPTER B-1 ROAD ADMINISTRATION AND ORGANIZATION

1.1 Road Administration

As the most basic social infrastructure, road development supports the lives of citizens and their socio-economic activities. Particularly in developing countries, roads are indispensable for ensuring the growth and security of society. Existing roads and future roads must be well maintained and managed as a vital asset to be utilized.

The target of maintenance and management of roads is to secure the safe, smooth and comfortable flow of road traffic and to enhance the various functions of roads. To achieve a well-managed state, an increase in spending for road maintenance will be unavoidable. In the future, it will be necessary to perform a sustainable level of maintenance and management within the limitations of budget and human resources.

In Cambodia, there are various road authorities maintaining and managing the road network.
The Ministry of Public Works and Transport (MPWT) governs the roads throughout the country and also develops policies to guide the orderly and integrated planning for the optimum development, utilization and protection of the country.

In its capacity as a road authority, the MPWT manages and maintains direct responsibility for national roads in 1-Digit and 2-Digit, provincial roads in 3 and 4-Digit and tertiary roads which are considered by the MPWT, acting in consultation with the Ministry of Rural Development (MRD), to be deemed classified as a part of provincial roads. In compliance with a joint declaration by the MPWT and the MRD in June 2000, the MPWT is also responsible for the management of rural roads that have a traffic flow of more than 50 vehicles per day.

The MRD as a road authority is responsible for the development and implementation of rural roads. The functional categorization of rural roads is necessary to enable ownership, responsibilities, resources and management to be assigned. The following criteria have been adopted for the general categorization:

- Tertiary : District to district
- Sub-Tertiary 1 : District to Commune
- Sub-Tertiary 2 : Commune to Commune
- Sub-Tertiary 3 : Commune to Village, Village to Village

The City Governor, as a road authority in respect to a city, manages and maintains roads within an area that has been proclaimed as a city.

The Provincial Governor, as a road authority in respect to a province, manages and maintains roads within towns in the province.

The Ministry of Water Resources and Meteorology (MOWRAM) also manages and maintains roads that form part of a dike.

1.2 Organization and Role of the MPWT

Good governance that improves the organization and development of human resources is critical for Cambodia's future. In this sense, this chapter describes the organization relevant to the activities of road development and maintenance. The function and responsibility of the MPWT is shown here and some problems have been identified, especially concerning the capacity of staff and the collection of data.

1.2.1 Organization of the MPWT

Figure 1.2.1 shows the present organization of the MPWT. The central office consists of three (3) General Directorates, one (1) General Inspectorate, twenty-four (24) City-Provincial Public Works and Transport Departments and several Autonomous Sections.

The Minister is the head of the Ministry and five (5) Secretary of States and five (5) Under Secretary of States oversee the function of each department.

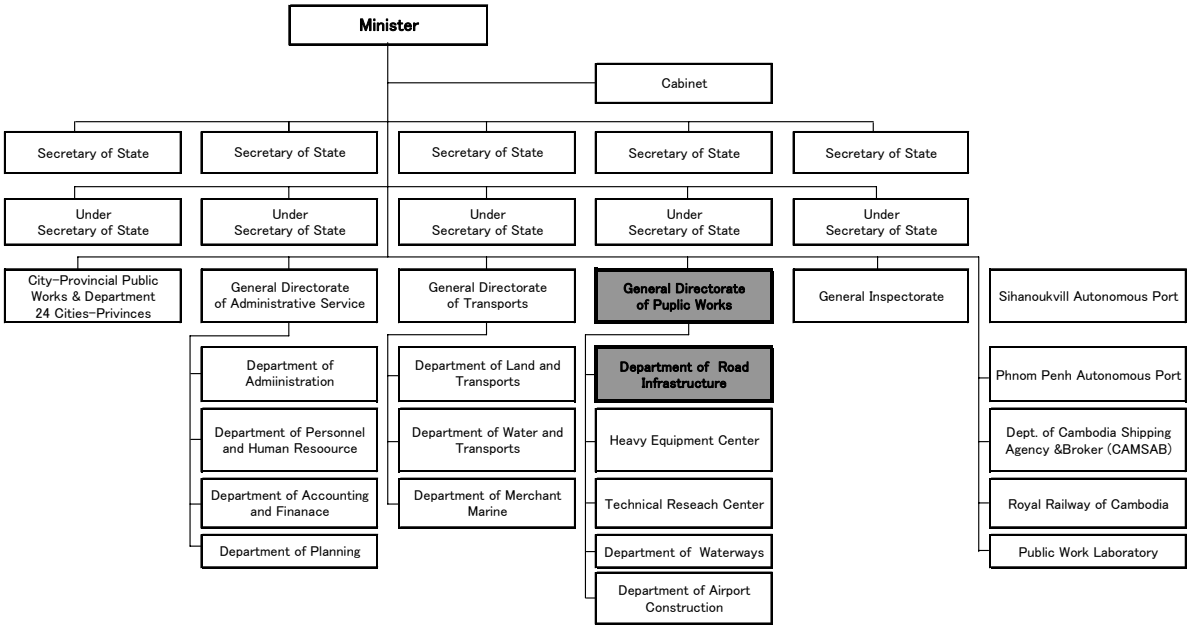


Figure 1.2.1 Organization Chart of the MPWT

The MPWT has the following mandates and functions assigned:

1) Manage the execution of national policy concerning all public works construction by establishing the principles of law and cooperate with the diverse organizations to develop the country,

2) Build, maintain and manage all the infrastructure of roads, bridges, ports, railways, waterways and buildings,

3) Establish the regulations for the development of the roads, ports, railways and waterways infrastructure,

4) Participate and cooperate to establish laws, regulations and diverse standards concerning the construction, and

5) Cooperate with the Secretariat of Civil Aviation concerning all airport construction works.

In respect to road development and maintenance, the General Directorate of Public Works is in charge of the orientation, advice, planning, follow-up and control of the construction and maintenance of the road and bridge infrastructure.

There are five (5) departments in the General Directorate of Public Works. For each department the responsibilities and human resources are shown in **Table 1.2.1**. **Figure 1.2.2** shows the organization of the Department of Road Infrastructure.

Table 1.2.1 Function of the General Directorate of Public Works

Department of Road Infrastructure		
Responsibilities	No. of Staffs	
1) Develop the maintenance program and manage roads and bridges: i) Collect data and use essential data to understand the road network. ii) Manage the technical documentation for roads, bridges and tunnels and all other information concerning the road network. iii) Develop the budget, allocate funds, plan and control all the maintenance works. iv) Manage public properties, roads, waterways and railways. 2) Manage the site construction of roads and bridges: i) Study, manage and carry out the maintenance program for roads and bridges. ii) Develop the budget, allocate funds, follow-up and control all site construction of roads and bridges. iii) Evaluate the completed site construction. iv) Manage the ferry and barges. 3) Manage and control the Bridge Construction Unit (BCU). * Function in detail is shown in Chapter B-2	Master Jr. Engineer Staff Total	107 270 578 955
Heavy Equipment Center		
Responsibilities	No. of Staffs	
1) Study, research and evaluate the heavy vehicle requirements for new construction projects. 2) Manage and control the equipment and mechanical vehicles under the Heavy Equipment Center. 3) Study and organize personnel training on mechanical vehicles 4) Manage and control the Road Construction Center (RCC). i) Expedite emergency road recovery programs ii) Make the first step towards medium and long-term reconstruction programs for roads and bridges. * Function in detail is shown in Chapter B-2	Master and Sr. Engineer Technician Training Skills Skill Labor Total	63 68 222 50 403

Technical Research Center (Public Works Research Center)		
Responsibilities	No. of Staffs	
1) Detail and prepare, for execution, the technical standards. 2) Study, research and plan public construction projects. 3) Evaluate the construction, quality of materials and new technology for the MPWT.	Master Sr. Engineer Jr. Engineer Staff Total	17 30 6 11 64
Department of Waterways		
Responsibilities	No. of Staffs	
1) Study and execute works concerning waterways and the navigation of natural waterways. 2) Arrange signs and buoys for the navigation in rivers. 3) Take all measures to prevent any action that will affect navigation and water movement. 4) Circulate the news to sailors concerning any new obstacles that appear. 5) Examine requests for construction in rivers, under rivers and in the air space over rivers. 6) Study, research and construct works to prevent bank subsidence. 7) Propose measures and dredge the river to have an adequate depth to serve transport. 8) Build local ports in co-operation with the local authority. 9) Examine requests, which may affect the water depth, to pump water from the river and to discharge water into the river. 10) Regulate transport vehicles that use the navigable waterways. 11) Register the water level of all the rivers in the country that are used for the water navigation.	P.H.D Master Sr. Engineer Jr. Engineer Administrator Secretary Staff Total	1 1 15 6 2 4 15 44
Department of Airport Construction		
Responsibilities	No. of Staffs	
1) Study, control and monitor all airport construction projects in the country, including construction done by the government and construction done by the private sector for a government interest like B.O.T. 2) Study, choose and control all the airport construction sites. 3) Prepare, execute and maintain technical standards concerning airport construction.	Master Sr. Engineer Jr. Engineer Administrator Staff Total	9 12 17 1 1 40

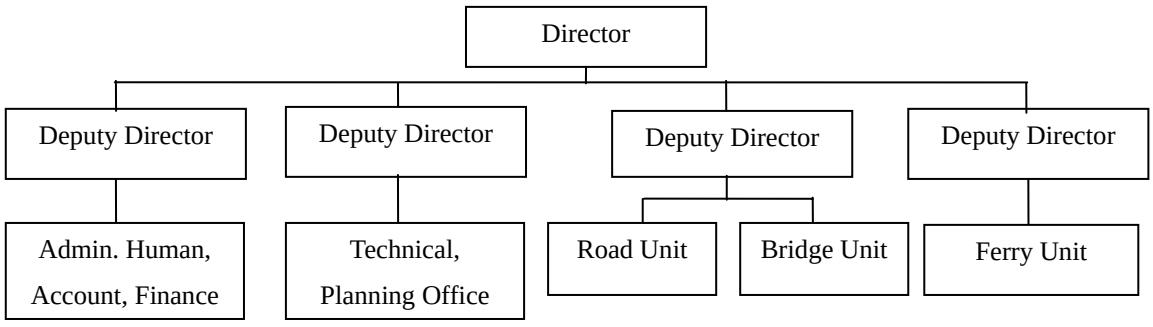


Figure 1.2.2 Organization Chart of the Department of Road Infrastructure

The Department of Road Infrastructure mainly covers the management of the roads and has enough human resources. Despite the good skill level of many of the staff, a lack of accountability and an unsuitable management structure means that their potential is not fully realized in the current institutional environment.

1.2.2 Organization of the Provincial Department of Public Works and Transport (DPWT)

Figure 1.2.3 shows a typical organization chart of the DPWT.

The DPWT undertakes to:

1) Construct and maintain national roads, provincial roads, bridges and other infrastructures within the jurisdiction of the district and carried out by the public works office,
2) Registration of vehicles in the provincial station is carried out by the transport office, and
3) Administration and accounting for the DPWT budget and receiving the national government financial allocation is carried out by the administration and financial & planning offices.

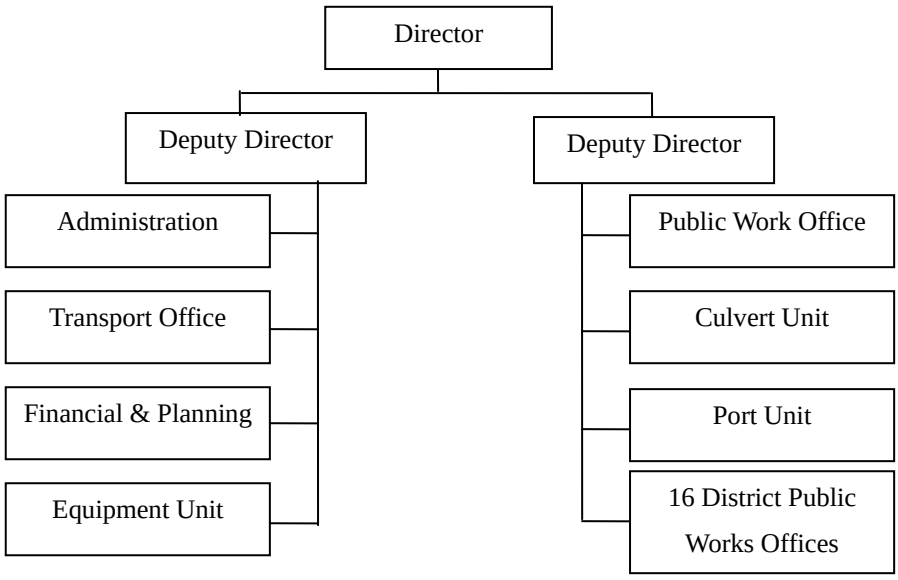


Figure 1.2.3 Organization Chart of DPWT (Kampong Cham)

There are twenty-four(24) city-province DPWTs and **Table 1.2.2** shows the human resources in each DPWT. Limited equipment and resources are available to each DPWT resulting in wide variations between provinces.

Table 1.2.2 Human Resource in DPWT

No.	Provinces	Master, Bachelors	Technicians	Skill Labors	Other Skills	Total
1	Banteay Meanchey	2	27	11	48	88
2	Battambang	5	29	25	110	169
3	Kampong Cham	3	49	24	60	136
4	Kampong Chhnang	1	24	10	58	93
5	Kampong Speu	3	22	5	84	114
6	Kampong Thom	3	30	16	47	96
7	Kampot	3	33	18	119	173
8	Kandal	15	55	60	96	226
9	Koh Kong	2	10	7	11	30
10	Kraite	3	13	10	22	48
11	Mondul Kiri	1	14	2	19	36
12	Phnom Penh	48	90	65	205	408
13	Preah Vihear	1	14	5	17	37
14	Prey Veng	2	40	53	170	265
15	Pursat	6	26	20	72	124
16	Ratanak Kiri	1	22	4	5	32
17	Siemreap	4	35	11	26	76
18	Sihanoukville	2	27	9	34	72
19	Stung Treng	2	11	3	24	40
20	Svay Rieng	2	32	13	61	108
21	Takeo	4	30	21	40	95
22	Oddar Meanchey	3	13	2	13	31
23	Kep	3	5	0	2	10
24	Pailin	2	12	2	8	24
	Total	121	663	396	1,351	2,531

As of May 2005

1.3 Organization of the Ministry of Economy and Finance (MEF)

1.3.1 Organization

MEF is delegated by the government to perform the mission of guidance and administration of the economy and finance of Cambodia in order to support economic development to improve the living standards of Cambodian people based on the principals of a free market economy and social equality. The organization chart of MEF is shown in **Figure 1.3.1**.

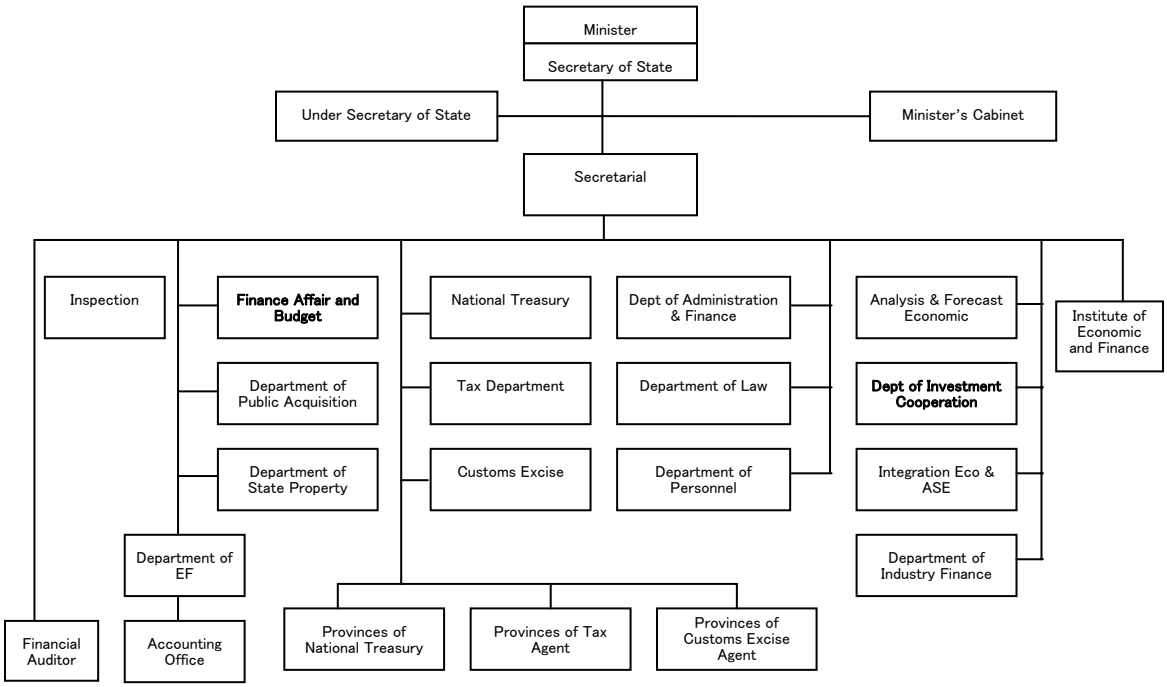
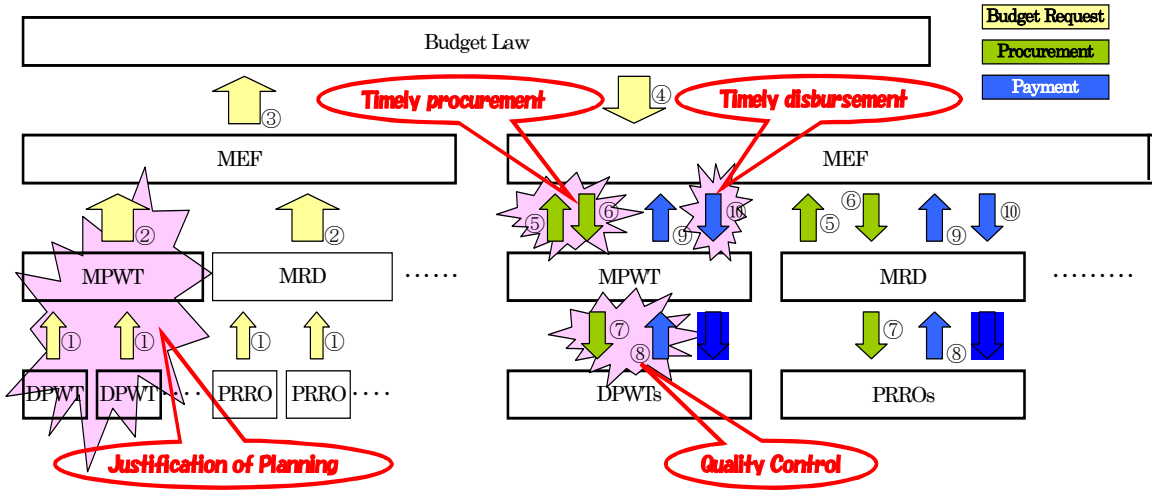


Figure 1.3.1 Organization Chart of MEF

The Department of Investment and Cooperation is in charge of the management of public investments and setting priorities for annual investments in order to budget in cooperation with the relevant ministries.

1.3.2 Disbursement Procedure for the Road Maintenance Budget

The budget codes for maintenance of the roads are Chapter 30 for the MPWT in the charge of the Department of Investment and Cooperation and Chapter 13 for the MRD in the charge of Finance Affair and Budget. These capital expenditures, which are different from the annual ministry budgets, have been negotiated between MEF and ministries concerned. The MPWT and MRD require budgets for road maintenance every year based on the planned annual maintenance programs. MEF is supposed to allocate budgets to the ministries at the beginning of January after negotiations are completed. **Figure 1.3.2** shows the current disbursement procedure for the maintenance budget. However, the final determination of the annual maintenance budget is usually delayed due to a lack of budget inputs and various other reasons.



① Provincial offices request ministry of next year's budget
② Line miniseries request MEF of next year's budget which are coordinated by the ministries
③ MEF drafts the budget law and get the approval of NA
④ Management of the budget
⑤ Request of procurement, making contract (Contract by contract)
⑥ Approval for contract
⑦ Making contract and instruction of works
⑧ Request of Payment (Payment by payment)
⑨ Request of Payment with clearance
⑩ Payment

Figure 1.3.2 Current Disbursement Procedure and Problems

The decision is very late because of issues, mainly at the preparation stage of the application for maintenance budgets, as follows:

1) An inadequate maintenance program in the areas of the cost control scheme, implementation plan, capacity development program and monitoring system.

2) Insufficient documentation concerning evidence of unit prices for maintenance activities, classification of maintenance and current road conditions.

3) Insufficient collection of data from previous projects.

4) The time taken to prepare and evaluate the annual road maintenance program.

Therefore, the functional and smooth maintenance mechanism is needed to prepare in this study.

1.4 Legislation

For the purpose of road administration, there are generally three (4) essential matters to be stipulated by law or similar rule.

1) Responsibilities, obligations, rights and interests of the state related to roads.

2) Definition of roads to be constructed, rehabilitated and maintained by the road authorities.

3) Application and enforcement of Traffic Rules

4) Compliance the law in terms of Road User Special Tax

1.4.1 Road Law

Usually, essential matters are stipulated in the basic laws covering roads, such as "Road Law". In the case of Cambodia, the appropriate legal instruments have not been enacted. Current responsibilities for each organization concerning the management of roads are decreed by the Government under Anukret (sub-decree).

The draft of road law has been completed by the MPWT and final approval is under process.

1) Anukret No.14/ANK/BK of March 3, 1998 on the Organization and Functioning of the MPWT

This Anukret describes the function and responsibility of the MPWT.

2) Anukret No.78/ANK/BK of December 1, 1997 on the Organization and Functioning of the MRD

3) Prakas of July, 2002 on the Organization and functioning of the DRR

The above Anukret describes the function and responsibility of the MRD. The Prakas describes the responsibility and role of the Department of Rural Roads.

4) New Road Law

This draft law is based on statements of policy concerning the road sector, as well as current practice and processes. It is also drawn from various sources, "Provincial and Rural Infrastructure Project by IDA in 2003", "Transport Sector Strategic Study by ADB in 2002", other international laws and discussions with key donors.

The objectives of this law are to provide a legal framework for planning improvements and extensions to existing road networks, to classify public roads, to facilitate the development and management of such networks at appropriate levels and to regulate the activities of road transport carriers so as to facilitate the provision of efficient and economically viable transport services.

The content of new Road Law is shown in **Table 1.4.1**.

Table 1.4.1 Content of New Road Law

Chapter 1	General Provisions (Article 1 - Article 4)
Chapter 2	Road Management (Article 5 - Article 10)
Chapter 3	Road Infrastructure Financing (Article 11 – Article 13)
Chapter 4	Role of the Private Sector (Article 14)
Chapter 5	The Road Fund (Article 15)
Chapter 6	Road Works Activities (Article 16 – Article 23)
Chapter 7	Road Traffic (Article 24)
Chapter 8	Road Transport (Article 25 – Article 26)
Chapter 9	Penalties (Article 27 – Article 29)
Chapter 10	Implementing Provisions (Article 30 – Article 31)

1.4.2 The Fund for Road Maintenance and Repair (FRMR)

1) Inter-Ministries Prakas of June 28, 2000 on Formation of the FRMR

2) Sub-Decree of May 6, 2002 on Transferring of the Management of Budgetary Credit

3) Circular of October 2, 2003 on Procedure and Law of Using the FRMR

The FRMR shall be used for the routine and periodic maintenance and repair of national, provincial and rural roads that are under the management of the MPWT, MRD and other road authorities. Do not allow using this FRMR for a subject of mission out of repairing and maintenance road. (Inter-Ministries Prakas of June 28, 2000)

The management of the FRMR shall be transferred under the direction of the Prime Minister and MEF. (Sub-Decree of May 6, 2002)

The government established an order to collect road user tax on fuel at US$0.02/litre and diesel at US$0.04/litre to fund the routine maintenance and periodic repair of rural, provincial and national roads that are stipulated by Financial Law Management in 1999. The Road Authorities have to make application for budgets for implementing maintenance works each year. The Inter-Ministerial committee will review and evaluate the results of each project. (Circular of October 2, 2003)

1.4.3 Law on Road Traffic

(1) Law on Road Traffic, 1991

The current law was enacted in 1991. The Traffic law is aimed at:

1) Raising the profile and the effectiveness in traffic safety,

2) Maintaining public security and social order,

3) Protecting public property, lives and legal interests of citizens,

4) Educating citizens to respect the law, and

5) Policing traffic rules and taking action against traffic offenders.

A revision of traffic law was initiated in 2005. The objectives of this revision are to keep roads safe for road users and improve traffic flow throughout the country. All road users have to obey the regulations mentioned in this law. The differences between the current law and the revision are as follows:

1) The revised law is more detailed concerning the definition of traffic and roads,

2) Chapters 2, 4, 6 and 8 have added clauses with more details, and

3) The revised law has clear criminal regulations added (Chapter 9).

The content of revision traffic law is shown in **Table 1.4.2**.

Table 1.4.2 Content of Traffic Law

	Revision Traffic Law	Current Traffic Law
Chapter 1	General Provision (Article 1 - Article 5)	General Provision
Chapter 2	Traffic Signs & Directed by Traffic Police (Article 6 - Article 8)	Pedestrians and Animals Riders
Chapter 3	Drivers (Article 9 – Article 27)	Drivers
Chapter 4	Use of Vehicle Light and Horn (Article 28 – Article 31)	Vehicle Technical Checkup
Chapter 5	Pedestrians and Animals Riders (Article 32 – Article 34)	Traffic Offenses and Traffic Order
Chapter 6	Traffic Accident (Article 35)	Penalty
Chapter 7	Vehicle control and Transportation (Article 36 – Article 39)	Final Provision
Chapter 8	Responsibility of Traffic Police (Article 40 – Article 50)	
Chapter 9	Penalty (Article 51 – Article 68)	
Chapter 10	Inter-Provisional (Article 69 – Article 70)	
Chapter 11	Final Provision	

As part of the current law, “Maximum Load Limit of Transport Vehicles Using the Road Network in Cambodia” was agreed by Council of Ministers, sub-decree No.744 on September 1999. This sub-decree details the load limits and sets penalties for overloading.

(2) <u>Sub-decree of November, 2003 on the issue of the Vehicle Plate Number</u>

With rapid expansion of the number of vehicles, the government couldn’t control vehicle registration under the existing system.

This sub-decree plans:

1) To implement the international numbering system followed by ASEAN,
2) To manage a larger number of vehicles in future,
3) To conveniently manage all types of vehicles in Cambodia,
4) To clearly identify the owner and automobile type,
5) To identify and issue the legal ownership, and
6) To ensure security and social order.

The Government has announced that it will be compulsory for vehicle holders to change to the new number plates within two years.

1.5 Discussion on Present Issues in Road Maintenance in Cambodia

1.5.1 Organization/Executive/Institutional Issues

(1) Inadequate job descriptions within department and provincial offices

The processes and job descriptions within the MPWT and DPWT are inadequate. Functionally, staff duties have not even fulfilled mandates described in the sub-decree. There are several categories of data collected that are essential for planning of roads and analysis of functioning roads but the relevant information and data is not disseminated. This leads to a situation where information is not available and proper planning of implementation is hampered.

(2) Insufficient accumulation of data/information and usage of computerized systems

Traffic volume data, road inventory data and maintenance records are collected but there is no centralized accumulation and up-dating of the data available in the MPWT. Data and information must not be kept by separate departments or individuals A centralized computerized database system would enhance job efficiency.

(3) Insufficient Capability of the MPWT and DPWT

Capable higher education engineers work in the MPWT, but it surfaced that there is insufficient instruction to technicians on how to manage and maintain the works. The MPWT has not evaluated the individual capabilities of their engineers. Various donors have provided Technical Transfer, which consists of planning procedure and monitoring of activities. Unfortunately, those programs are not improving the effectiveness and sustainability of the present performance.

(4) Unsatisfactory of Maintenance Program

A meeting on the Road Maintenance Program for the year 2005 was held between MEF and the

MPWT on July, 2005. MEF pointed out the following issues and lack of systems:

1) Conceptually the cycle of program organization and actual implementation for consistent road maintenance should consist of Planning, Budgeting, Implementation and Monitoring,

2) Need for implementation of the Force Account procedure, and

3) Need to assure transparency and availability of a follow-up evaluation.

(5) Institutional Reform for Road Maintenance

The current disbursement procedure is that, based on information prepared by the Provincial DPWT, the MPWT proposes the annual budget requirement for maintenance to MEF. However, even though a lot of time is taken to prepare the proposal, the final determination of allocation is much lower than the proposed amount. In this regard, institutional reform is needed to develop the capacity for individuals and the organization in the MPWT to disburse, in a timely manner, through a more accountable and transparent implemention mechanism and to periodically monitor the usage of the Maintenance Fund.

1.5.2 Legislative Issues

(1) Establishment of Road Law

The draft road law should be approved by the government and brought into effect as early as possible so that the authority's responsibility and ownership in road infrastructure will be clearer.

(2) Management of Maintenance Fund

The usage of the maintenance fund in the past has not been fully appropriate. It has been recommended that there needs to be measures to ensure only justifiable use of the maintenance fund. Before an appropriate implementation is started, a new organization has to be established to prepare the maintenance program through the MPWT and to train staff in the MPWT and DPWT to be skilled engineers in accordance with the guideline or specification.

(3) Role of Private Sector

With a lack of funding, road authorities may reasonably seek sources of financing from the private sector. The proposed road law describes clearly a project arrangement that includes a concession agreement, a system of toll roads and Build-Operate-Transfer. It is not so easy for road authorities to manage which location is allocated to the private sector in the road network. The principal standards must be formulated and be transparent to all concerned parties.

CHAPTER B-2 EXISTING ROAD MAINTENANCE AND OPERATION

2.1 Review of Current Maintenance Practice

2.1.1 Type of Maintenance Works

In Cambodia, from a budget point of view, maintenance work is classified as the following three types:

1) Routine maintenance

2) Periodic maintenance

3) Other maintenance

Table 2.1.1 shows work typical of the three types of maintenance.

Table 2.1.1 Typical Work Items for Maintenance

Type of Maintenance	
Routine Maintenance	- Cleaning of road surfaces, side ditches, culverts, etc. - Trimming and cutting of trees/grass. - Checking and replacing defective traffic signs, guard posts/rails including minor repairs based on a daily patrol. - Preparing the road inventory based on a daily patrol
Periodic Maintenance	- Patching and overlaying defective road surface. - Replacing damaged culverts. - Replacing defective bridge joints, bearing shoes etc. - Repainting steel bridge.
Emergency Maintenance	- Repairing roads damaged by natural disaster.

Note: road rehabilitation is not involved in maintenance work

2.1.2 Length of Roads Maintained

Table 2.1.2 shows the total length of classified roads maintained by the MPWT, MRD and other road authorities. Together they are currently maintaining 2,052km of 1-Digit National Roads, 2,643km of 2-Digits roads, 3,271km of 3-Digits roads and 3,344km of 4-Digits roads and the MRD is maintaining 18,948km of rural roads. **Table 2.1.3** shows the total length by surface of roads maintained by the MPWT. **Figure 2.1.1** to **2.1.4** shows the present condition of road surface maintained by the MPWT. According to the figures, 85% of 1-Digit road surface is treated, however, 62% of the total is by DBST. For 2-Digit roads, 20% of the surface is treated and 1.5% is treated for 3-Digit roads. Although the MPWT has adopted a new road numbering system recently, the blank columns hereunder shows that the Consultant still cannot identify the total length of each classified road.

Table 2.1.2 Total Length of Roads

(Unit: km)

Province/Municipality	1-Digit	2-Digit	3-Digit	4-Digit	Rural Road	Total
1. Banteay Meanchey	122.9	67.5	210.8	232.4	2103.0	633.7
2. Battambang	111.7	81.7	133.5	277.3	1067.1	604.2
3. Kampong Cham	218.8	174.9	207.4	541.9	1605.2	1,143.0
4. Kampong Chhnang	93.3	35.9	138.1	29.0	868.9	296.3
5. Kampong Speu	104.3	159.1	330.3	25.2	354.4	618.9
6. Kampong Thom	142.8	52.3	34.2	379.5	1462.5	608.8
7. Kampot	84.1	122.4	150.2	204.4	232.8	561.0
8. Kandal	178.6	116.4	60.9	244.7	1879.0	600.7
9. Koh Kong	49.5	165.8	5.4	0.0	250.5	220.7
10. Kratie	210.3	79.9	149.3	0.0	213.2	439.6
11. Mondul Kiri	0.0	182.5	102.8	0.0	521.7	285.3
12. Phnom Penh	63.0	0.0	0.0	0.0	181.1	63.0
13. Preah Vihear	0.0	347.6	273.9	70.4	231.7	691.9
14. Prey Veng	82.3	69.1	174.8	289.0	500.1	615.2
15. Pursat	88.0	27.6	247.1	270.3	1396.4	633.0
16. Rattanak Kiri	0.0	291.4	94.9	76.9	823.7	463.2
17. Siemreap	130.4	220.1	252.3	283.4	615.9	886.1
18. Sihanoukville	90.4	9.4	0.0	0.0	339.6	99.8
19. Stung Treng	84.2	128.6	112.3	0.0	917.5	325.0
20. Svay Rieng	64.6	46.3	323.3	155.0	514.3	589.2
21. Takeo	132.5	14.7	169.5	130.0	1332.6	446.7
22. Oddar Meanchey	0	174.7	100.5	98.7	1058.9	373.8
23. Kep	0	35.4	0.0	18.0	99.8	53.4
24. Pailin	0	39.8	0.0	17.8	378.3	57.6
Total	2,052.0	2,643.0	3,271.3	3,343.8	18948.1	30258.1

Source: LRCS, 2004 and As-built Drawing

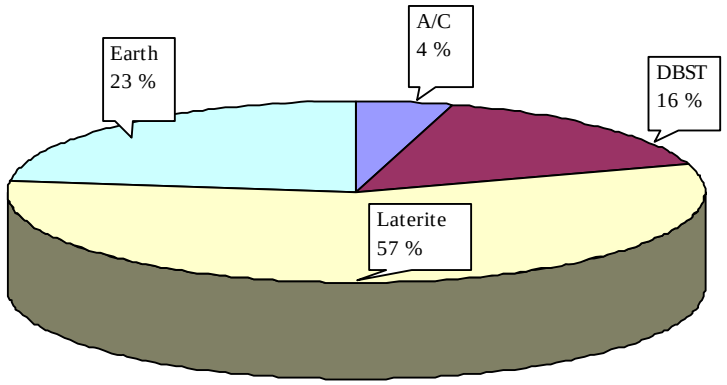


Figure 2.1.1 Percentage by Surface (MPWT)

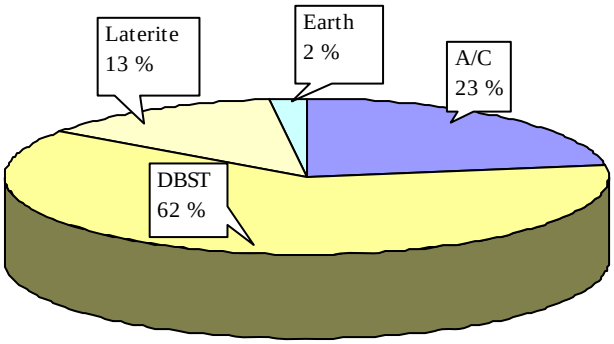


Figure 2.1.2 Percentage by Surface of 1-Digit NR (MPWT)

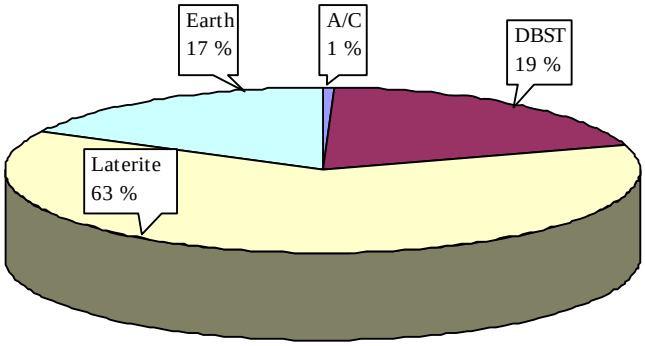


Figure 2.1.3 Percentage by Surface of 2-Digit NR (MPWT)

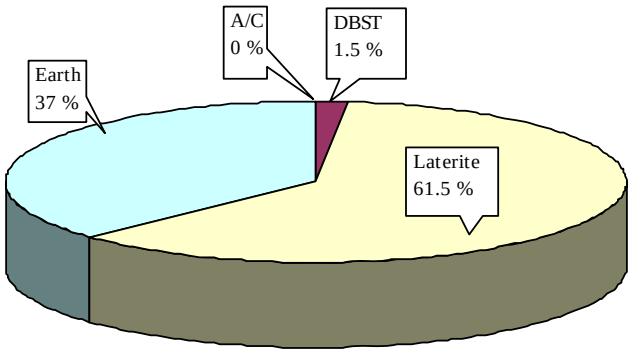


Figure 2.1.4 Percentage by Surface of 3 & 4-Digit PR (MPWT)

Table 2.1.3 Total Length of Roads by Surface, 1 to 4-Digit Roads (MPWT)

(Unit: km)

Province/Municipality	Asphalt Concrete	DBST	Laterite	Earth
1. Banteay Meanchey	0	27.4	542.7	65.1
2. Battambang	0	111.7	459.6	30.1
3. Kampong Cham	136.5	180.2	646.6	176.5
4. Kampong Chhnang	0	100.6	133.9	61.1
5. Kampong Speu	77.4	86.8	327.7	97.2
6. Kampong Thom	0	142.5	333.1	131.6
7. Kampot	0	138.9	346.6	73.0
8. Kandal	48.5	194.5	231.8	109.9
9. Koh Kong	49.5	20.8	145.5	0
10. Kratie	0	115.4	268.7	55.3
11. Mondul Kiri	0	1.0	148.2	144.3
12. Phnom Penh	48.2	14.3	4.7	0
13. Preah Vihear	0	0	407.6	289.6
14. Prey Veng	0	109.0	236.8	282.9
15. Pursat	0	90.7	417.6	124.6
16. Rattanak Kiri	0	1.9	313.9	143.1
17. Siemreap	19.3	136.1	452.3	295.9
18. Sihanoukville	68.2	31.5	0	0
19. Stung Treng	0	0	212.4	110.5
20. Svay Rieng	0	65.9	181.3	340.0
21. Takeo	52.0	123.0	244.0	54.2
22. Oddar Meanchey	0	0	339.9	31.1
23. Kep	0	30.6	22.2	0
24. Pailin	0	16.1	38.2	2.9
Total	499.6	1736.2	6455.3	2618.9

Source: LRCS, 2004

2.1.3 Procurement of Maintenance Works

The MPWT has basically adopted two kinds of procurement methods, one is out-sourcing (contract out) and the other is force account. In addition the Army corps also helps with the maintenance works. The demarcation in the procurement procedure for those agencies is not transparent. After obtaining budgetary approval, the MPWT allocates the budget to DPWT.

2.1.4 Identification of Problems

(1) Road Improvement Policy

Table 2.1.3 shows that many of the National Roads are paved with DBST. The advantage of applying DBST is that the initial cost is cheaper than that of asphalt concrete. However, this method requires frequent maintenance and the service life is generally five years. Therefore, when a road is improved with DBST, it must be upgraded to an asphalt concrete surface as soon as possible otherwise the maintenance/rehabilitation cost increases due to the acceleration of road deterioration.

(2) Transparency on Procurement

Comparing the force account method and the contract-out method, the transparency of the former expenditure is inferior to the latter. As for quality assurance, it is pointed out that when monitoring work is carried out on the force account achievement, the MPWT officials have a tendency to hesitate in fulfilling their obligations because they belong to the same Ministry. Therefore, it is suggested that the purchase system must be shifted from a force account to a contract-out system gradually to guarantee quality. Finally, the goal for maintenance is, "*Carry out field maintenance works using local contractors with the DPWT supervising those field works*"

(3) Data Management System

The Study Team met difficulties in obtaining general information on the roads, such as the total length of managed road in province by digit or by surface. None of the DPWTs obtains the data. The Study Team strongly recommends that each DPWT shall prepare such data for their jurisdiction and send it to Road and Infrastructure Department every year.

2.2 Maintenance Operation Agency

2.2.1 Department of Public Works and Transport

This is the maintenance agency under the management of the MPWT. The MPWT has 24 Cities-Provinces Department of Public Works and Transports. The DPWTs are responsible for 1-Digit and 2-Digit national roads, and provincial roads. They are responsible for:

1) Preparing the annual maintenance plan based on the road patrol and community consultation and submitting it to the MPWT.

2) Planning and budgeting for maintenance and rehabilitation.

3) Procurement

4) Maintenance implementation, work management, supervision and quality control

5) Examination of contractor's claim

6) Progress monitoring and reporting.

2.2.2 Road Construction Center

This agency belongs to the Heavy Equipment Center of the MPWT. There are 147 staff, 82 items of heavy equipment and 21 of light equipment belonging to the agency. In 1995, the aim was established of combining the tender and rehabilitating of National Road financed by international/domestic funds. The Government of Japan had supported this agency from the beginning by providing facilities and equipment and sent JICA experts to train RCC staff, in order that the agency might obtain enough capability to carry out road rehabilitation projects. However, the RCC has not joined international tenders as earlier expected. The advantage of the RCC is that the staff has enough skill to carry out road and bridge rehabilitation, and the equipment is in good condition, thanks to the training provided by JICA.

The RCC is currently responsible for:

1) Assisting with small scale road maintenance and rehabilitation

2) Joining projects as a sub-contractor under the management of main contractor

3) Centralized management of staff/equipment at the main office in Phnom Penh

The organization of the Road Construction Center is shown in the following **Figure 2.2.1.**

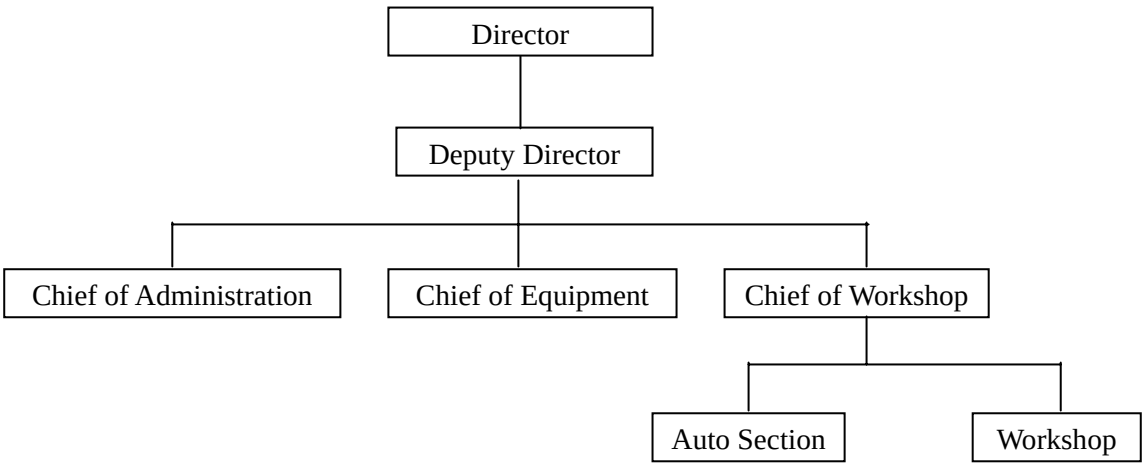


Figure 2.2.1 Organization of Road Construction Center

2.2.3 Bridge Construction Unit

The agency belongs to the Road Infrastructure Department. This was established in 1970's as a bridge rehabilitation agency and has a history of thirty years. However, there has been no budget allocated to the agency since 2001. There are 274 staff, one old crane and one dump truck belonging to the agency. In order that they might be able to continue in bridge construction service, the agency has been requesting new equipment. On the other hand, the RCC has supplied a new crane and equipment to the Army corps.

2.2.4 Department of Rural Development

The Department of Rural Development has the same responsibility as the DPWT, which is described **2.2.1 Department of Public Works and Transport**. However, the activity is limited to only rural roads in the provinces. Based on the Policy for Rural Roads the agency prepares annual road improvement and maintenance plans. However, the demarcation of responsibility for roads between the MPWT and the MRD is not clear. The MRD sometimes maintains 2-Digit national roads or provincial roads, based on its own work specification and standards which differ from that of the MPWT. At this moment the MRD receives financial and technical support from the ILO, World Bank and Seila Program.

2.2.5 Private Sector

A toll collecting system started in January 2005, based on the Concession Agreement between RCC and AZ Distribution Co., Ltd. In accordance with the Agreement AZ had carried out road maintenance on NR.4 and he has been entitled to collect a charge from road users. The toll charge as of May 2005, at the toll gate is as follows:

1) Sedan 0.69 USD/one way
2) Dump Truck 8.00 USD/way
3) Bus 5.50 USD/way
4) Motorcycle Free
5) Neighbor's car Free

2.2.6 Identification of Problems

(1) DPWT

The Provincial DPWTs are categorized into the following two groups in accordance with the Study Team survey results.

One is where the activity is lively and morale of staff is high although the allocation of budget is insufficient but stable. The other is where they are not able to carry out the activity due to having a small or no budget allocation. As no personal computer or office phone is provided the

morale is naturally very low. The staff's capability is not sufficient either to prepare the estimation of maintenance costs necessary to make a request for an annual budget or to supervise the fieldwork in accordance with the specification.

(2) RCC

According to the organization of the MPWT, the jurisdiction for maintaining National Roads belongs to the Provincial DPWT and the RCC cannot develop it's own maintenance program. On the other hand, the equipment belonging to the DPWT is old and no longer capable. Therefore, we suggest that the human resources and equipment are moved from the RCC to the DPWT to establish a combined maintenance organization.

(3) BCU

To utilize the BCU experience in bridge technology, it is suggested that the staff be moved to the Provincial DPWT and engaged in maintenance or rehabilitation service. As a result, this agency will be naturally absorbed into the DPWT.

2.3 Budget Request and Allocation and Maintenance

2.3.1 Ministry of Public Works and Transport

Analysis and flow of maintenance budget

A single year budget system is applied in Cambodia. The fiscal year starts January and closes in December. Each Ministry has to prepare the request for the next year budget in July and negotiate with the MEF. The items and percentage are shown as follows:

Table 2.3.1 Breakdown of the MPWT Budget

Chapter	Description	Percentage
Chapter 10	Salaries and Allowance	4%
Chapter 11	Administrative Expenses	4%
Chapter 30	Economic Activity Support Expense	33%
Chapter 31	Social Welfare and Culture Expenses	1%
Chapter 32	International Activity Expenses	0%
Chapter 50	Investment by Internal Fund	58%

Source: MPWT as of 2004

There are three components in Chapter 30, Expense for ESCAP Committee, Road Maintenance Fund and Compensation for the Loss Arising from Governmental Companies. In order to obtain the road maintenance budget, the MPWT prepares the Routine Maintenance Program, showing the requested amount of maintenance cost and it's breakdown and then negotiates with the MEF.

In accordance with the Routine Maintenance Program for Year 2005, the planned total length is 2,844.75 km and the requested amount is 24,095 million Riel, which is equivalent to 6 million USD approximately. The breakdown of the estimation based on road classification is shown hereunder:

Table 2.3.2 Breakdown of MPWT Maintenance Cost

(Unit: USD/km)

Road Classification	Range	Average
1-Digit National Roads	1,800 – 2,500	1,900
2-Digit National Roads	1,600 – 1,900	2,100
Provincial Roads	1,800 – 5,000	2,300

The reason why the average cost for 2-Digit is higher than that of 1-Digit is assumed to be as follows:

The indicated cost includes both routine and periodic maintenance cost. All 1-Digit roads have already been substantially improved or are under improvement, therefore the required periodic cost is less than that for 2-Digit road. Likewise, the average cost for provincial roads is more expensive than for 2-Digit roads.

The allocated budget amount for the Ministry from 2000 - 2004 (expenditure based) is shown in **Table 2.3.3**.

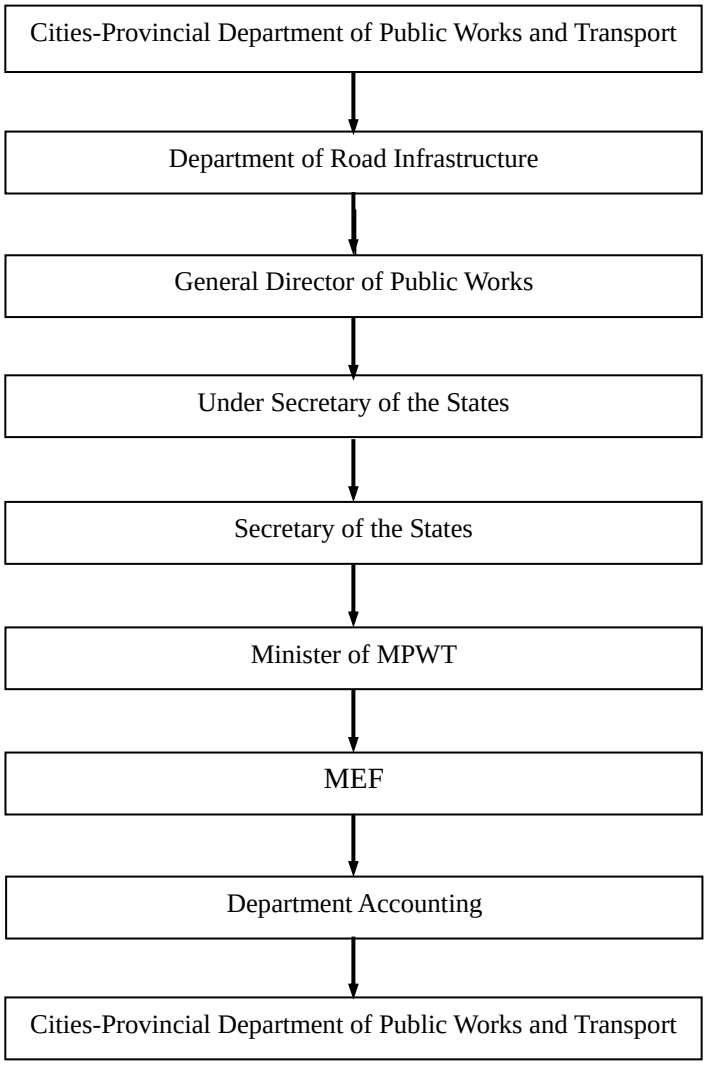
Table 2.3.3 Budget for the MPWT (based on expenditure)

(Unit: million Riel)

Year	2000	2001	2002	2003	2004
Total	20,317	21,271	12,994	23,000	To be obtained
Maintenance	10,185	8,531	7,703	7,989	18,549

Source: Total Budget by the MEF, Maintenance by the MPWT

The following is the flow chart for the Maintenance Budget in the MPWT.



2.3.2 Identification of Problems

The MPWT always faces an inadequate of budget. The maintenance activity is slow and as a result deterioration in the roads accelerates. To break this cycle, the Ministry carried out some studies, however the situation is far from being resolved. On needs to be mindful of the fact that 85% or 95% of the allocated budget expressed in Chapter 50, which occupies almost 50 % of total budget, goes to the Army corps. The activity of the Army corps illustrated by the improvement project of NR.76 from Saen Monorom to Ban Lung is necessary, because the access is very difficult for the civilians due to malaria and remaining landmines. Except for such environmentally or geographically difficult projects or natural disasters, all improvement and maintenance works must be carried out in accordance with the present jurisdiction.

However, when we study documents; *Routine Maintenance Program for Year 2005 and Minutes of Meeting on Road Maintenance Program for 2005 between the MPWT and the MEF*, the following are pointed out to the MPWT:

1) The request for budget was prepared in 2004 and approved partially in July 2005.

2) The justification for each road repair requested is not clearly mentioned.

3) The terms routine maintenance and periodic maintenance are mixed together in the estimation.

4) The reason for proposing different repair methods is not clarified.

5) The estimated unit price needs to be clarified

CHAPTER B-3 CONCEPT FOR ROAD MAINTENANCE MANAGEMENT

3.1 Establishment of a Sustainable Road Maintenance System

Chapter B-1 and B-2 described the present organization, road conditions and related issues. Damage to roads may hinder users from efficiently traveling and transporting their goods. All donors who are developing and improving most of the roads in Cambodia recommend establishing a standard guideline for the maintenance system. However, there is notable damage that is rapidly deteriorating day by day.

In usual practice, maintenance management can be assumed to have specific aims; 1) to use a systematic approach to decision making, 2) to assess budget needs and resource requirements, 3) to adopt consistent standards for maintenance, 4) to allocate resources effectively, 5) to review policies, guidelines and the effectiveness of programs. The MPWT needs to put the review of Cambodia's original framework for maintenance management before everything else.

This chapter proposes a concept for Road Maintenance Management, principally for an institutional situation, as shown in **Table 3.1.1**. The MPWT is moving to establish the National Road Maintenance Committee (NRMC), a new organization, for road maintenance management and the preparation of a guideline for road maintenance, which is intended essentially to introduce basic road maintenance standards to road maintenance personnel. This is the most important key for the MPWT in establishing a sustainable new system and the implementation of a guideline.

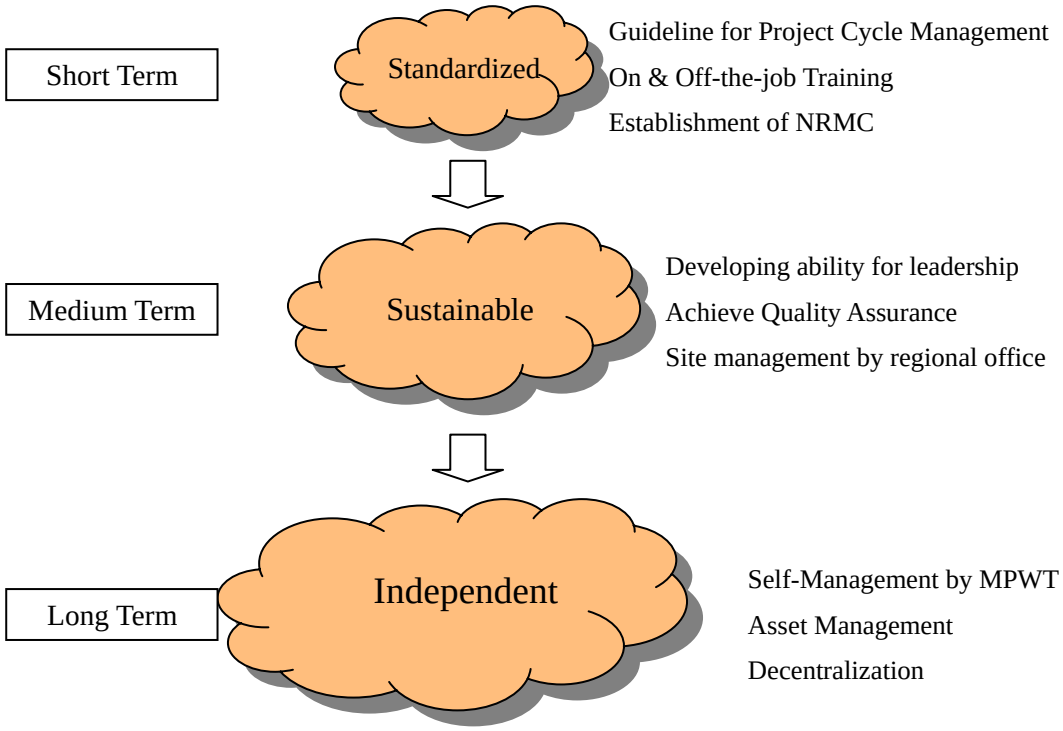


Figure 3.1.1 Improvement of the Maintenance System

The summarized improvement of the system is illustrated as shown in **Figure 3.1.1**. The MPWT needs to tackle the difficult tasks associated with strengthening the administrative structure, step by step.

3.1.1 Vision and Goal

1) Short Term: "Development of a Standardized System Framework"

The MPWT has started to prepare a standard guideline for maintenance activities, which consist of budget planning, procurement, payment request, accounting, preparation of maintenance works and quality control. The object of the guideline is to give the MPWT/DPWT a sound understanding of the project cycle and road management. Once this guideline is authorized by the MPWT it will annually set goals for road maintenance, following the guideline, to keep all digit national roads trafficable in all weather.

A budget has been secured for road maintenance and repair by the enacted Inter-Ministries Prakas since year 2000. However, disbursement for the maintenance budget has been delayed due to a poor and unclear annual maintenance program being prepared by the MPWT based on DPWT planning. As a result, the establishment of the NRMC is required for the institutional management of road maintenance. The benefits will be; timely budget disbursement, simplification of procedure at the planning stage, equitable and transparent maintenance works at the implementation stage and a higher level of quality assurance when completed. There have been many guidelines or manuals for maintenance works prepared by donors during the implementation of the road development and improvement project. Unfortunately, each one has only been applied by an individual or one department in the MPWT. The MPWT will, in the short term, need to unify all to one standard guideline and to train staff either on-the-job or off-the-job. With the implementation of the NRMC, the MPWT will centrally manage these activities so that maintenance works can be started at beginning of the year, which in Cambodia is the dry season

2) Medium Term: "Establishment of a Sustainable System "

This guideline, textbook for capacity development program in MPWT, may be improved in order at short term. It is necessary that there should be feed back from the field, especially from DPWT staff. Then the MPWT should prepare a sustainable maintenance management framework covering items such as the following:

i) Training program (Transfer from MPWT to DPWT)

- Identification of maintenance works (on and off site)
- Annual maintenance planning
- Courses for developing the ability of leaders
- Training of trainers

ii) Quality management system

- Identification of the quality management cycle for programming (Aim→ Assess Needs→ Determine Actions→ Costs & Priorities→ Implementation→ Monitoring→ …)
- Quality control for construction works, materials and equipments
- Evaluation on maintenance works

iii) Implementation management by regional office

- Mobilization of human resources and equipment
- Maintaining investment balance with each province

The sustainable framework may be applied to maintenance works so as to rapidly improve roads to a good or fair condition; the MPWT will need to shift the procurement procedure from force account to the out-sourcing method so it will be necessary for private contractors to be trained at the same time. All of maintenance works may be implemented by use of earmarked funds through NRMC management. Most of the maintenance works must be carried out by local contactors guaranteed regular annual contracts. Growth in the performance capability will be needed to prevent road conditions from relapsing into the previous state of deterioration. The growth of the construction industries will make a large contribution towards economic growth.

3) Long Term: "Independent Road Maintenance System"

The MPWT's Independent Road Maintenance management framework should be established and be performing effectively by 2020. The condition of national roads should then be maintained in a fair condition and mostly trafficable so the MPWT will be able to take over the NRMC functions completely. Therefore, the NRMC can be re-organized to manage future domestically funded road development and improvement projects, with the same functions, which consist of planning, budgeting and fund allocation.

The Technical Research Center in the MPWT may concentrate on implementing the Quality Control System in the short and medium term. Road maintenance management shall be improved to take a different approach using an asset management method. The current management is based on visible judgment of damage as a ratio of the amount in the previous year. The infrastructure of asset management is to build a database, make estimates based on current status, consider countermeasure costs, analyze life cycle minimizing costs, prepare work requirements and decide on the maintenance investment plan, which consists of optimum timing, scale for maintenance and alternative maintenance plans for after the road development and improvement has been implemented. By 2020 maintenance works should be implemented effectively with appropriate costs.

Table 3.1.1 Concept for Road Maintenance Management

		Short Term	Medium Term	Long Term
Vision		Development of Standardized System Framework	Establishment of Sustainable System	Independent Road Maintenance System
Goal		・ Trafficable 100% (1-Digit National) 60% (2-Digit National) 40% (Provincial) ・ Application of guideline for Project Cycle management ・ Establishment of NRMC	・ Trafficable 100% (1-Digit National) 80% (2-Digit National) 60% (Provincial) ・ Mobilization of Human Resources (Establishment of Regional Center) ・ Train to Local Contractor	・ Trafficable 100% (1-Digit National) 100% (2-Digit National) 80% (Provincial) ・ Decentralization
Institutional Management		・ Introduction of management by NRMC ・ Application of Road Law	・ Sustainable System Management by NRMC ・ Achieve Quality Assurance (QA)	・ Establishment of Management by MPWT ・ NRMC transfer management to Road Development & Improvement Planning
Organization	Planning	MPWT DOR, PWRC/DPWT	MPWT DOR, PWRC/DPWT	MPWT DOR, PWRC/DPWT
	Implementation	DPWT Force Account/Contract Out	DPWT Force Account/Contract Out	Contract Out
	Assessment	NRMC/MPWT DOR, PWRC	MPWT DOR, PWRC/NRMC	DPWT/MPWT DOR, PWRC
Finance		Earmarked Fund (Added Tax)/Foreign Assistance	Earmarked Fund (Added Tax)	Earmarked Fund (Added Tax)
Human & Organization Development		・ Formulation of National Program ・ Improving individual ability using guideline	・ Developing ability for leaders course ・ Quality Management System ・ Strengthening of Private sector	・ Method of Asset Management

3.2 Strengthening of Maintenance Structure

How can the MPWT strengthen maintenance activities to achieve the goals? Strengthening of the Maintenance Structure consists of 4 (four) factors as shown in **Figure 3.2.1**. It is easy for the MPWT to monitor the progress using the evaluation system and indicators shown in **Table 3.2.1**. The study team has conveniently described the goals for the short, medium and long terms. However, the MPWT should start to improve the maintenance activities as soon as it can. When the MPWT manages to adopt the evaluation and indicator system, it will be easier for all donors to invest in road development and improvement. The road network in Cambodia should be expected to improve gradually.

The following functions should be developed step by step so that the road maintenance system moves forward along with the new development and improvement for road construction. These explanations in detail describe in Chapter B-4, B-5 and B-6.

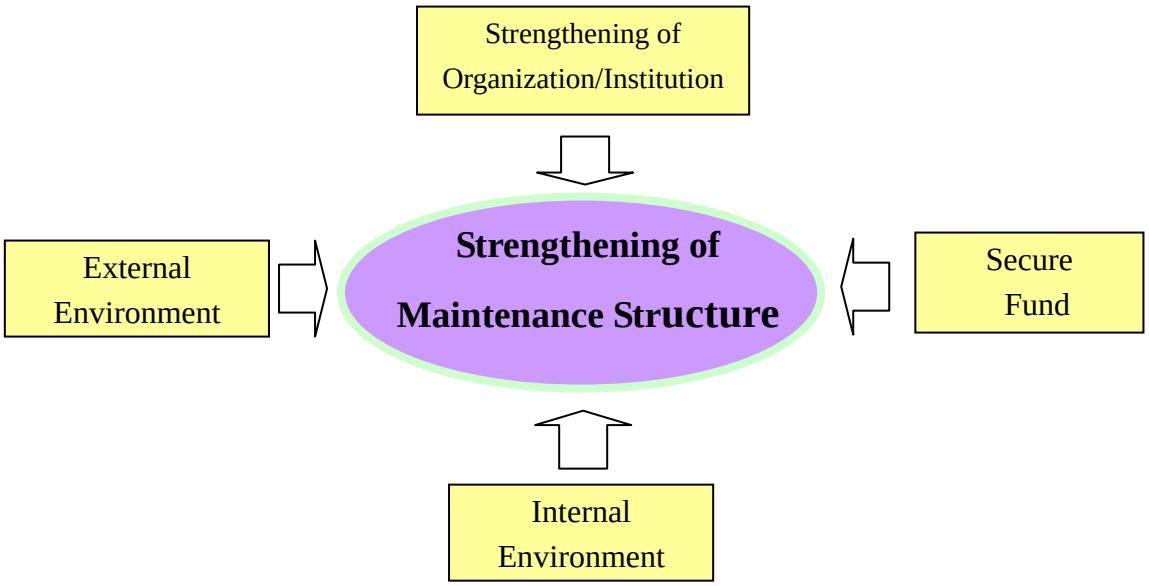


Figure 3.2.1 Strengthening of Maintenance Structure

(1) Strengthening of Organization and Institution

A key aim for strengthening the organization should be to increase the effectiveness and efficiency to meet appropriate operational objectives.

1) Establishment of the National Road Maintenance Committee (NRMC) as described Chapter B-6

2) Standardize the project cycle management, which consists of planning, procurement, implementation and assessment

3) Development of a department responsible for road maintenance within the MPWT

4) Mobilization of human resources to the DPWT for maintenance management

5) Support for the move to privatization (Road sector Reform)

(2) Secure Maintenance Fund

Effective management of road network requires that budget levels are at least sufficient to keep the core road assets in stable condition in the long term.

1) Clear the legal status for existing earmarked fund (Road Development Special Tax),
2) Efficient management of earmarked fund by NRMC,
3) Seek to have the earmarked fund excepted of Added Tax
4) Introduction possibility of funding from the private sector for execution

(3) Tackling of Internal Environment

Internal factors within the control of the road management can be split into technical and institutional:

1) Capacity development
   i) Formulation of a training program
   ii) Improving individual ability using the guideline for the MPWT/DPWT
   iii) Developing ability for leadership and an administrative structure
   iv) Application of the asset management method
   v) Strengthening of the capacity for participation by the private sector
2) Availability of management information
   i) Road inventory: Network/location, Geometry, Facilities
   ii) Traffic: Volume, Loadings, Accidents
   iii) Pavement: Pavement structure and condition
   iv) Structure: Structure inventory and condition
   v) Cost: Unit cost, Budget
   vi) Resource: Personnel, Materials, Equipment
3) Preparation of a guideline for a quality management system

(4) Expected External Environment

External factors are those, over which the organization itself has no direct control, but which constrain the way that the organization can operate.

1) Growth of the Macro Economy
2) Growth of the private construction sector
3) Substantial physical assets (ex. Plant, equipment, facility and etc.)
4) Removal of land mine and UXO

It is too difficult for these factors to be evaluated and developed immediately. The road authorities first need to set up the overall program from short term to long term to achieve the final goal, which is the establishment of a sustainable road maintenance system. It is also necessary for all of concerned parties to unify to tackle the present issues so as to achieve this future goal.

Table 3.2.1 Improvement Assessment and Indicator

Strengthening Factor	Organization & Institution	Secure Fund	Internal Environment	External Environment
Expected Outcome	* Establishment of NRMC * Standardized project cycle * Responsible section in MPWT * Mobilization of human resources * Decentralization	* Identification of earmarked fund * Management of earmarked fund * Seeking the other fund allocation * Contractual framework for Private sector fund	* Capacity Development - Training program - Individual ability - Leadership ability * Availability of management information * Legal framework * Quality management system	* Growth of macro economy * Growth of private construction sector * Substantial physical assets * Removal of land mine & UXO
Viewpoint of Assessment or Indicator	* Justification of maintenance budget * Transparency of procurement procedure * Identification of maintenance works * Size & degree of decentralization	* Timely disbursement * Analysis of fund balance sheet * Settlement of complex task for participant private sector	* Preparation of Sustainable program * Trainee's understanding (Registry system) * Assessment of database * Identification of quality management system	* Evaluation of local contractors (Registry system) * Verifiable indicator (Plant, Economic & Environment) * Inventory map for land mine & UXO

3.3 Target of Road Maintenance Plan

Considering a present condition, capability of executing agency and applicable maintenance fund, the Study Team suggest the following maintenance goal as shown in **Figure 3.3.1**, **Table 3.3.1** and **Table 3.3.2**.

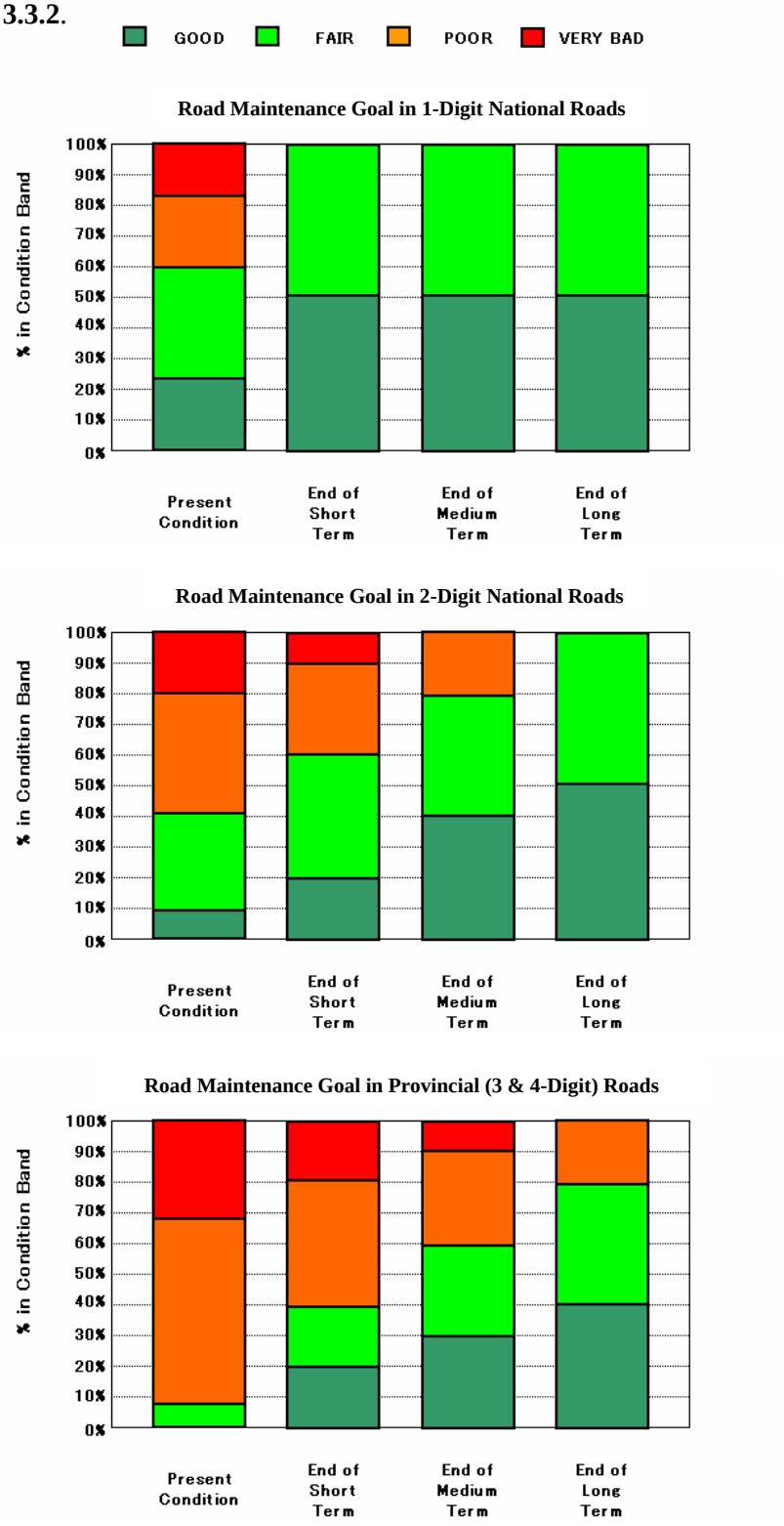


Figure 3.3.1 Target of Maintenance by Whole View

Table 3.3.1 Road Maintenance Goal by Road Condition

(Unit: %)

	1-Digit Roads				2-Digit Roads				Provincial (3 & 4-Digit) Roads			
Road Condition	Present 2006	Short 2010	Medium 2015	Long 2020	Present 2006	Short 2010	Medium 2015	Long 2020	Present 2006	Short 2010	Medium 2015	Long 2020
Good	25.0	50.0	50.0	50.0	10.0	20.0	40.0	50.0	0.0	20..0	30.0	40.0
Fair	35.0	50.0	50.0	50.0	30.0	40.0	40.0	50.0	7.5	20.0	30.0	40.0
Poor	25.0	0.0	0.0	0.0	40.0	30.0	20.0	0.0	62.5	40.0	30.0	20.0
Very Poor	15.0	0.0	0.0	0.0	20.0	10.0	0.0	0.0	30.0	20.0	10.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.3.2 Road Maintenance Goal by Road Surface

(Unit: %)

	1-Digit Roads				2-Digit Roads				Provincial (3 & 4-Digit) Roads			
Road Surface	Present 2006	Short 2010	Medium 2015	Long 2020	Present 2006	Short 2010	Medium 2015	Long 2020	Present 2006	Short 2010	Medium 2015	Long 2020
Paved	75.0	80.0	90.0	100.0	20.0	40.0	60.0	100.0	2.0	8..0	14.0	20.0
Unpaved	25.0	20.0	10.0	0.0	80.0	60.0	40.0	0.0	98.0	92.0	86.0	80.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total km	2,052				2,643				6,615			

3.4 Estimation of Road Maintenance Cost

(1) Methodology

Future road maintenance costs are estimated on the basis of the target of road improvement set out in **Figure 3.3.1** and **Table 3.4.1**. The required road maintenance costs were estimated applying item-wise unit costs of road maintenance activities as shown in **Table 3.4.1** and **Table 3.4.2**.

The frequency of the specific maintenance works to be undertaken is assumed one time a month for the basic maintenance activity and one time a year for such work as Patching, sealing and grading.

Table 3.4.1 Unit Road Maintenance Cost

Maintenance Activities	Road Class	Unit Cost ($/km)
Patching under Force Account	1-Digit	866
Patching under Contract-out	1-Digit	4,330
Patching under Force Account	2-Digit	775
Patching under Contract-out	2-Digit	4,330
Patching under Force Account	3 & 4-Digit	304
Patching under Contract-out	3 & 4-Digit	1,520
Grading under Force Account	2, 3 & 4-Digit	2,516
Grading under Contract-out	2, 3 & 4-Digit	6,116

* Force Account; In case of good road surface

** Contract-out; In case of fair, poor and very poor road surface

Table 3.4.2 Unit Road Maintenance Cost (Basic Daily Activity)

(Unit: $/km)

Road Class	Activity 1	Activity 2	Total
1-Digit	15.4	16.6	32
2-Digit	15.4	16.6	32
3 &4-Digit	15.4	16.6	32

Basic Daily Activities; Patrol, Preparation of Inventory, Clean-up, Grass cutting & etc
Activity 1: Patrol and Preparation of Inventory
Activity 2: Clean-up, Grass cutting
** The above activities are assumed undertaken under Force Account Basis

(2) Results

As the results of above calculation, future road maintenance costs are estimated to be $ 113.0 mill for 2006-2010 (Short-term), $168.9 for 2011-2015 (Medium-term) and $198.6 for 2016-2020 (Long-term) as shown in **Table 3.4.3**. These figures are under the revenue from Road User Special Tax as shown in **Table 3.4.4**.

Table 3.4.3 Estimation of Road Maintenance Cost

Road Class	Work Contents	Maintenance Cost ($mil/5 year)		
		Short	Medium	Long
1-Digit NR.	Patrol/Clean up	3.9	3.9	3.9
	Patching under Force Account	4.4	4.4	4.4
	Patching under Contract-out	22.2	22.2	22.2
	Grading under Force Account	0.0	0.0	0.0
	Grading under Contract-out	0.0	0.0	0.0
	Total	30.6	30.6	30.6
2-Digit NR.	Patrol/Clean up	1.3	2.5	3.8
	Patching under Force Account	0.5	2.0	3.8
	Patching under Contract-out	11.4	17.2	21.5
	Grading under Force Account	1.0	2.7	0.0
	Grading under Contract-out	9.7	9.7	0.0
	Total	23.9	34.1	29.1
3 &4-Digit PR.	Patrol/Clean up	3.2	6.4	9.5
	Patching under Force Account	0.5	1.5	3.0
	Patching under Contract-out	10.1	17.6	22.6
	Grading under Force Account	3.7	10.8	20.0
	Grading under Contract-out	37.4	60.7	72.8
	Total	54.9	97.0	128.0
Rural Roads		3.6	7.2	10.9
Total		113.0	168.9	198.6

Table 3.4.4 Road Maintenance Expenditure and Road User Special Fund

(Unit: $ mil)

	2006-2010	2011-2015	2016-2020
(1) Expected Expenditure for Road Maintenance	113.0	168.9	198.6
Annual Average Expenditure during the above period	22.6	33.8	39.7
(2) Estimated Revenue from Road User Special Tax (Present Pattern, Gasoline 2 cent, Diesel 4 cent)	133.7	183.6	264.1
Annual Average Tax Revenue during the above period	26.7	36.7	52.8
(3) (=(2)/(1)) Share of Expenditure in the Tax Revenue	84.5%	92.0%	75.2%

CHAPTER B-4 FINANCIAL PROCUREMENT FOR ROAD MAINTENANCE

4.1 Road Financing

4.1.1 National Budget

According to the budget report, current expenditure in Cambodia in 2005 is expected to be 3,169 billon Riel ($790 million) and revenue from domestic resources is 2283 billion Riel ($564 mil). The budget in Cambodia in terms of expenditure is on the increase at an annual rate of 6.1 % per annum since 2000.

Table 4.1.1 Budget in Cambodia 2005

Expenditure			Resources		
Classification	Budget (Bil. R)	Share (%)	Classification	Budget (Bil. R)	Share (%)
Current	1,984 (490M$)	100.0	Domestic/Current	2,283 (564M$)	72.0
Ch10 Salary/Allowance	728	36.7	Tax	1,742	55.0
Civilian Service	417	21.0	Direct	Na	
Defence	311	15.7	Indirect	Na	
Ch11 Operation	588	29.6	Customs	Na	
Civilian Service	463	23.4			
Defence	125	6.3	Revenue at Customs	1,322	75.9
Ch12 Transfer to Local Govern.	128	6.4	Revenue at Tax Bureau	420	24.1
Ch13 High Priority Plan	180	9.1	Total Tax Revenue	1,742	100.0
Ch 20Interest Paymant	50	2.5			
Ch30 Economic Operation Cost	18	0.9	Non-Tax Revenue	541 (135M$)	17.1
Ch31 Social Cost	137	6.9			
Civilian Service	120	6.0	Domestic Capital	16 (4M$)	0.5
Defence	17	0.9			
Ch32 WB, ADB Reserve	9	0.5			
Ch40 Others	126	6.3	Total Domestic Revenue	2,299 (568M$)	72.5
Ch41Contingency	20	1.0	Other Procured Fund	870 (215M$)	27.5
Capital Expenditure	1,185 (293 M$)	100.0	International Assistance	870	27.5
Domestic Capital Fund	345	29.1	Project Assistance	750	23.7
Project	145	12.2	Int. Financial Assistance	120	3.8
C/P Fund	80	6.8			
Nonproject K/R	120	10.1			
International Assistance	750	63.3			
International Repayment	90	7.6			
Total	3,169 (782M$, 82.1BYen)	100.0	Total	3,169 (782M$, 82.1BYen)	100.0

Source: MEF

Table 4.1.2 National Budget after 2000

(Unit: $ mil)

Year	Expenditure
2000	588.8
2001	619.2
2002	659.0
2003	532.5
2004	752.8
2005	782.0
Annual Growth Rate	5.8%

In the total expenditure of 3,169 billion Riel ($790 mil), 1,316 billion Riel ($325 mil) is used for salary/allowance and operation of government under the classification of Chapter 10 and 11 of the Cambodia budget system. The government operation share is about 41% of the total expenditure. In the total government operation budget, defense related expenditure is 436 billion Riel ($108 mil), that is, about 33.2% of the total.

As to the revenue side, 1,742 billion ($431mil) of the total domestic revenue of 2,283 billion Riel ($564 mil) is from tax revenue, where revenues at the tax bureau and customs are 420 billion Riel (24.1%) and 1,322 billion Riel (75.9%) of the total, respectively. Domestic non-tax revenue is about 541billion Riel ($134 mil), which is about 24% of the total domestic revenue.

The deficit in revenue, which amounts to about 870 billion Riel ($215mil) is balanced by external assistance of which 750 billion Riel ($186 mil) is for project assistance and the rest of 120 billion Riel ($29mil) is for financial assistance. World Bank, Asian Development Bank and Japanese Government are the major donors providing assistance.

The characteristics of the current budget in Cambodia are described below:

- Deficit in the national budget,
- High portion of expenditure for government operation,
- Large portion of expenditure for defense and national security,
- Small share of tax revenue collected at the tax bureau against that at customs, and
- Large amount of external assistance.

4.1.2 Road Sector Budget

(1) Outline of Current Budget

The MPWT and MRD are two of the ministries that administer road development/maintenance in Cambodia. The historic annual data on the budget for each ministry in terms of expenditure is as shown in **Table 4.1.3**, where the expenditures by ministry and province are listed separately during the period 2001-2004.

The total expenditure of the MPWT in 2003 was 149,956 million Riels ($37.5 million), whilst that of the MRD was 77,873 million Riels ($19.5 mil). The budget is classified, in terms of the category of expense, as defined below:

Chapter 10-: Administration items (Salary, allowance and operation of ministry)

Chapter 30-: Economic/Social/Cultural Intervention including road maintenance

Chapter 50-: Investment including road development

Table 4.1.3 (a) Budget of the MPWT

MPWT (Unit: million Riel)

Budget in Terms	Chapter		2001	2002	2003	2004
Credit Consent	10	Salaries and Allowance	4,365	4,400	5,975	6,880
	11	Administrative Expense	6,480	6,785	7,300	6,360
	30	Economic Intervention	11,830	11,400	1,415	1,750
	30.03	Road Maintenance Fund				
	31	Social/Cultural Intervention	335	315	300	260
	32	International Intervention	40	40	40	40
	50	Invest by Internal Financing				
	50.01	Construction Credit				
	50.02	Counterpart on Externally Financed				
	50.03	Investment by Externally Financing				
	Total		23,050	22,940	15,030	15,290
Implement	10	Salaries and Allowance	4,207	6,858	7,308	7,239
	11	Administrative Expense	5,692	5,249	5,837	5,042
	30	Economic Intervention	8,599	654	673	121
	30.03	Road Maintenance Fund		14,374	42,142	41,987
	31	Social/Cultural Intervention	293	170	212	219
	32	International Intervention	8	12		
	50	Invest by Internal Financing				
	50.01	Construction Credit	55,129	113,956	59,290	40,114
	50.02	Counterpart on Externally Financed	12,269	25,767	23,600	32,694
	50.03	Investment by Externally Financing		1,267	10,894	23,853
	Total		86,197	168,307	149,956	151,269

MPWT (Unit: $ million)

	Chapter		2001	2002	2003	2004
Credit Consent	10	Salaries and Allowance	1.09	1.10	1.49	1.72
	11	Administrative Expense	1.62	1.70	1.83	1.59
	30	Economic Intervention	2.96	2.85	0.35	0.44
	30.03	Road Maintenance Fund	0.00	0.00	0.00	0.00
	31	Social/Cultural Intervention	0.08	0.08	0.08	0.07
	32	International Intervention	0.01	0.01	0.01	0.01
	50	Invest by Internal Financing	0.00	0.00	0.00	0.00
	50.01	Construction Credit	0.00	0.00	0.00	0.00
	50.02	Counterpart on Externally Financed	0.00	0.00	0.00	0.00
	50.03	Investment by Externally Financing	0.00	0.00	0.00	0.00
	Total		5.76	5.74	3.76	3.82
Implement	10	Salaries and Allowance	1.05	1.71	1.83	1.81
	11	Administrative Expense	1.42	1.31	1.46	1.26
	30	Economic Intervention	2.15	0.16	0.17	0.03
	30.03	Road Maintenance Fund	0.00	3.59	10.54	10.50
	31	Social/Cultural Intervention	0.07	0.04	0.05	0.05
	32	International Intervention	0.00	0.00	0.00	0.00
	50	Invest by Internal Financing	0.00	0.00	0.00	0.00
	50.01	Construction Credit	13.78	28.49	14.82	10.03
	50.02	Counterpart on Externally Financed	3.07	6.44	5.90	8.17
	50.03	Investment by Externally Financing	0.00	0.32	2.72	5.96
	Total		21.55	42.08	37.49	37.82

Table 4.1.3(b) Budget of the MRD

MRD (Unit: million Riel)

Budget in Terms	Chapter		2001	2002	2003	2004
Credit Consent	10	Salaries and Allowance	1,610	1,855	2,740	2,935
	11	Administrative Expense	9,670	12,185	11,985	12,395
	30	Economic Intervention				
	30.03	Road Maintenance Fund				
	31	Social/Cultural Intervention	250	360	275	270
	32	International Intervention				
	50	Invest by Internal Financing				
	50.01	Construction Credit				
	50.02	Counterpart on Externally Financed				
	50.03	Investment by Externally Financing				
	Total		11,530	14,400	15,000	15,600
Implement	10	Salaries and Allowance	1,412	2,476	2,658	2,710
	11	Administrative Expense	8,706	10,239	8,835	8,251
	30	Economic Intervention				
	30.03					
	31	Social/Cultural Intervention	134	181	153	148
	32	International Intervention				
	50	Invest by Internal Financing				
	50.01	Construction Credit	21,609	5,065	62,839	60,618
	50.02	Counterpart on Externally Financed	1,380	2,611	3,330	1,933
	50.03	Investment by Externally Financing		90	58	1,893
	Total		33,241	20,662	77,873	75,553

MRD (Unit: $, million)

	Chapter		2001	2002	2003	2004
Credit Consent	10	Salaries and Allowance	0.40	0.46	0.69	0.73
	11	Administrative Expense	2.42	3.05	3.00	3.10
	30	Economic Intervention	0.00	0.00	0.00	0.00
	30.03	Road Maintenance Fund	0.00	0.00	0.00	0.00
	31	Social/Cultural Intervention	0.06	0.09	0.07	0.07
	32	International Intervention	0.00	0.00	0.00	0.00
	50	Invest by Internal Financing	0.00	0.00	0.00	0.00
	50.01	Construction Credit	0.00	0.00	0.00	0.00
	50.02	Counterpart on Externally Financed	0.00	0.00	0.00	0.00
	50.03	Investment by Externally Financing	0.00	0.00	0.00	0.00
	Total		2.88	3.60	3.75	3.90
Implement	10	Salaries and Allowance	0.35	0.62	0.66	0.68
	11	Administrative Expense	2.18	2.56	2.21	2.06
	30	Economic Intervention	0.00	0.00	0.00	0.00
	30.03	Road Maintenance Fund	0.00	0.00	0.00	0.00
	31	Social/Cultural Intervention	0.03	0.05	0.04	0.04
	32	International Intervention	0.00	0.00	0.00	0.00
	50	Invest by Internal Financing	0.00	0.00	0.00	0.00
	50.01	Construction Credit	5.40	1.27	15.71	15.15
	50.02	Counterpart on Externally Financed	0.35	0.65	0.83	0.48
	50.03	Investment by Externally Financing	0.00	0.02	0.01	0.47
	Total		8.31	5.17	19.47	18.89

It is one of the characteristics of the budgetary system that there is a great discrepancy between the budget on a credit consent basis and that on an implementation basis. This imbalance is due mainly to the institutional background of the Cambodia budget and the administration systems for controlling the expenses of daily activities. As far as year 2004 is concerned, the MPWT budget on a credit consent basis was $3.82 million, whilst that on implementation was $37.82 million. The same is true of the MRD budget, where the budget on an implementation basis was $18.89

million as against that on a credit basis of $3.90 million, in the same year. The following are some reasons for this discrepancy in the accounting:

- Road maintenance, which is usually implemented from the road maintenance fund from added tax, is not accounted for in the credit consent based budget for the executing ministries. The budget is under the control of the MEF and is disbursed on a request basis before the implementation,
- The same is true for road development, which is undertaken both internally and by external assistance. Especially, the amount of funds extended externally are under the control of the MEF and they are not accounted for in the credit consent base or revenue base account of the ministries, and
- Reallocation of the budget and requests for new items of expenditure are commonly done in the course of same fiscal year, which results in large differences between the two accountings of the budget.

The above major causes of "inefficiency" in road financing in Cambodia are detailed in the following Sections of this Chapter.

The budget allocated to the road administrating ministries at the beginning of the financial year is not sufficient to undertake year-long activities, with an increasing tendency for this in the last couples of years. The budgets provided to the MPWT and the MRD on a credit consent basis at the beginning of the fiscal year of 2004 are as small as $3.82 million for the MPWT and $3.90 for the MRD, respectively.

4.2 Road Financing Issues

4.2.1 National Budget Issues

(1) Institutional Factors

The financial year in Cambodia starts on 1st January and ends on 31st of December. The outline of the budgetary procedure in Cambodia is as the follow:

- July; Request of budget for the next fiscal year prepared by each ministry
- September; Negotiation with the MEF
- November; Draft budget report by the MEF
- November; Approval by the cabinet committee
- December; Approval by the national assembly

The budgetary system of Cambodia originates from a French prototype, former suzerain state, in which each one of the audits administers the revenue and expenditure sides, respectively. In principle, disbursement of the budget is carried out on the basis of the pre-audit.

However, the above budget system is not functioning well enough to satisfy the actual financial

requests by each ministry for the reasons described below:

- Delays in the actual disbursement of the budget. It is not rare for the actual disbursement to be conducted after a 6-month delay
- The amount of budget allocated annually to each ministry at the beginning of the fiscal year is different from what is requested. The MEF provides a credit consent to each ministry that is only a portion of the total budget requested by each executing ministry,
- Disbursement to each ministry is conducted on an application basis that is a redundant procedure with the resubmission of a budget request, lengthy negotiation with the MEF and executing ministries and a long period of time before final approvals are received,
- Lack of transparency in the total availability of budget.
- The budgetary system in Cambodia is of non-allocation basis (program system) and the allocation of budget is executed in the order of clearance of pre-audits, which sometimes results in unscheduled or emergency expenditure for other purposes by other ministries. As a result, there is a difference between the amount initially requested and that actually disbursed.

(2) Administrative & Operational Factors

The following are two of the critical administrative/operational issues in national financing:

- Alteration of items of expenditure often takes place as a result of unscheduled expenditure and pressure from higher authorities, and
- Delays in depositing of tax revenue to the national treasury

One of the compounding factors is that revenue collected at the tax bureau and/or customs offices are not promptly transmitted to the national treasury. This is partially due to the out-dated banking system in Cambodia but mainly due to unnecessary bureaucracy by revenue authorities. It is not rare for earmarked funds to be unavailable to the authority at a critical payment time.

(3) Tax System Issues

With reference to the tax system in Cambodia the following are pointed out:

(i) The revenue from the tax office is small compared to that from customs.

In the total tax revenue the share of tax levied at the tax bureau is only 25% and the rest is from the customs office. This low share of revenue at the tax bureau is mainly due to there being fewer types of taxes enacted compared to other countries in the world,

(ii) A loss of potential tax revenue, including tax evasion, due to imperfections in the levying system,

(iii) Lack of transparency in revenue and expenditure

One of the problems is that the exact amounts of certain revenue from tax and their expenditure are not accessible to the public. This is due to out-dated levying and administration in the tax and accounting system that is entrenched in Cambodia. This lack in transparency or public accountability is greatly hampering the efficient management of national funds.

4.2.2 Road Sector Budget Issues

(1) Current Road Financing

1) Introduction

As discussed in the previous Chapters the MPWT, MRD and Provincial/City Governor's Office are three major participants in road maintenance in Cambodia. At present, the MEF coordinates their activities, but it has long been pointed out that there are two of inherent obstacles to "road financing" in Cambodia as described below:

2) Current Methods of Financing for the Road Sector

At present, the road funds procured domestically are limited to that for road maintenance, except for the portion of cost borne by the Cambodia Government for externally assisted road development projects. With recognition of this, the procurement of funds is focused mainly on the requirements for road maintenance purposes.

Because of the nature of road maintenance works, most of the activities are carried out by regional offices such as those of the DPWT, PRRO and Provincial/City Engineering. The MPWT and MRD are in charge of the associated planning, administration and procurement.

At present, the majority of road maintenance works are undertaken by force account and very few of them are contracted out.

Funds for the works are procured by application to the MEF, which is responsible for providing these funds. The MEF disburses the required funds from the road development fund, which is under the joint control of the Prime Minister's Office and the MEF. At present, the source for the road maintenance fund is the Added Tax on gasoline (Road User Special Tax) as prescribed in a PRAKAS, sub-decree in Cambodia, in 2002, but the fund is inadequately managed despite of the prescription in the aforementioned decree.

3) Resources for Road Financing

(a) Road User Special Tax (Added Tax)

This is a special fund introduced in 2002 as Added Tax aiming at the promotion of road maintenance. The taxes on purchasing fuel; 2 cent/liter for gasoline and 4 cent/liter for diesel, are charged to fuel importers. This fund is under the administration of the MEF and the Prime

Minister's Office. The total amount of the revenue from this tax is estimated as shown in **Table 4.2.1**.

(b) Road User Tax

The tax was introduced in 2002. 100,000 Riel ($25) is being charged per annum. This tax is not a special fund for road maintenance at present but it is directly related to road users. As a result, it is most likely that the revenue from the tax will be earmarked for road maintenance purposes in the near future. The total amount of revenue from this tax is also shown in **Table 4.2.1**.

Table 4.2.1 Road Sector related Tax Revenue

(Unit: mil. $)

Item	2002	2003	2004	2005
Revenue by Fuel Tax (Gasoline: 2cent/litter, Diesel: 4cent/litter)		15.00	17.50	24.99
Revenue by Vehicle Registering Tax and Vehicle Holding Tax	0.15	0.16	0.26	0.18
Total	0.15	15.16	17.76	25.17

(c) Others

Besides the above, a portion of the funds from the special tax (33.3 % of CIF plus import tax) and traffic fines are possible sources for the road sector. However, at present most of the revenue is being appropriated for other purposes such as redemption of external assistance and domestic expenditure.

At present, a portion of revenue from traffic fines is entrusted to the National Treasury and most of it is transferred to the army's engineering corps for road maintenance purposes in the mountain regions. Currently, the details of the expenditure of this revenue are not made public.

4) Road Maintenance Fund Requirements and Revenue/Expenditure Balance

According to the PRAKAS in 2002, the application of the Road User Special Tax (Added Tax) is limited to the "soft" types of road maintenance works. The MPWT and MRD and their regional offices, DPWT and PRRO, are the major implementing agencies and potential users of the fund. Expenditure for road maintenance by the MPWT and MRD in 2004 was 23,645 million Riel ($5.9 million), which is about 24 % of the revenue from the Road User Special Tax.

Expenditure for road maintenance after 2000 is shown in **Table 4.2.2**.

Table 4.2.2 Road Maintenance Expenditure

(Unit: Mil. Riel)

	2000	2001	2002	2003	2004
MPWT	10,185	7,863	7,703	7,989	18,428
MRD	199	2,191	5,000	5,100	5,217
Total	10,384	10,054	12,703	13,089	23,645

(2) Present Financial Issues in Road Maintenance

Presently, issues in financing for road maintenance are caused not only by individual factors but also by the very inefficient and fragmented road maintenance system. As seen in the previous section, the financial issues related to road maintenance are not a result of an absolute shortage of funds but lie in a series of faults in the budgeting system at every phase of the project cycle for road maintenance. The present issues can be described in the categories below:

(a) Institutional Factors
- Lack of standard rules for application of the budget,
- The system is not impartial,
- Lack in cooperation and consensus between the agencies carrying out road maintenance and the financing agency,
- Lack of budget management in the executing agencies,
- Lack in consistency among agencies responsible for road administration,
- Interference by the financial agency in the technical matters of executing agencies,
- Sectionalism in departments of executing agencies, and
- Lack in financial auditing.

(b) Administrative & Operational Factors
- Incompetence in budget management by executing agencies, and
- 'Red tape' in the agencies involved.

(c) Technical Factors
- Fragmented application for budget allocation,
- Lack of an authorized implementation program,
- Lack in technical capability, and
- Sporadic performance of technical auditing.

4.3 Proposals for Improving Road Maintenance Financing

4.3.1 Expected Revenue and Expenditure for Road Maintenance

As far as Cambodia's road maintenance is concerned, the fundamental procurement method for funding the budget has been established with the enactment of Road User Special Fund, fed by the revenue from the added tax on gasoline and diesel. Estimates for the expected future magnitude of the revenue are shown in **Table 4.3.1**. On the other hand, the expected expenditure for road maintenance is as shown in **Table 4.3.2**, on the basis of the road maintenance plan discussed in Chapter B.6. From these it is concluded that the issues in financing road maintenance lie not in the absolute shortage of fund, but in inefficient practices in the application, usage and accounting of the fund.

Table 4.3.1 Future Amount of Road User Special Fund

Source	Cases	Remark	2010	2015	2020
Road Special Tax	Road User Special Fund (Added Tax)	Gasoline 2 cent/litter, Diesel 4cent/litter (2004-2014) Gasoline 3 cent/litter, Diesel 6cent/litter (2015-2020)	30.0	62.7	91.8
	Levying Evaded Special Fund due to Smuggling	Gasoline 2 cent/litter, Diesel 4cent/litter (2004-2014) Gasoline 3 cent/litter, Diesel 6cent/litter (2015-2020)		24.9	24.3
	Sub Total		30.0	87.6	116.1
Vehicle User Tax	Vehicle User Tax	$25 per annum (2004-2020)	0.4	0.5	0.8
Total			30.4	88.1	116.9

Table 4.3.2 Road Maintenance Expenditure and Road User Special Fund

(Unit: $ mil.)

	2006-2010	2011-2015	2016-2020
(1) Expenditure for Road Maintenance	113.0	168.4	198.6
(2 Estimated Road User Special Fund (Present Pattern; Gasoline 2 cent, Diesel 4 cent)	133.7	183.6	264.1
(3) (=(1)/(2)) Share in Road User Special Fund	84.5%	92.0%	75.2%

4.3.2 Proposal for the Improvement of Road Maintenance Financing

The present issues in road maintenance financing lie mostly in its inefficient administration and operation due to a lack of experience, management capability, inherited bureaucracy, outdated office equipment, lack of tools for planning and a financing procedure resulting from the prolonged turmoil of the nation.

Improvement measures and expected effects, corresponding to the present issues along with targets for improvement are set out as shown in **Table 4.3.3**. Excerpts from the Table are as the follow:

<Institutional Reform>

1) Necessity for coordination and concerted effort among ministries

Lack of coordination among concerned ministries, organizations and government agencies is one of the major causes for the delay in the execution of road financing. Prompt disbursement of the fund and a smooth cash flow are prevented mainly by this default in coordination. Lack of mutual understanding or distrust among the ministries concerned has greatly denigrated procurement procedures.

2) Introduction of streamlined procedure in financing

Financial procedures are not conducted in an efficient manner. It is not rare for the final disbursement to be completed half a year after the submission of the application form. Apart from capability issues within the ministries most of the inefficiency, time delays and redundancy of procedure originate from the institutional and customary practices in the existing financing system.

3) Disclosure and transparency

It is sometimes difficult to trace actual amounts or flow of funds for even such a basic matter as the total amount of added tax levied and expended. This partially originates from a substandard accounting system for tax revenue but most of the problem comes from the lack of disclosure of financial records and statistics. One of the reasons for a low level of disclosure in the accounting lies in the prevalence of exceptional application and interference from outside. This has resulted in an imperfect application of the fund compared to that envisioned initially.

<Operational Reform>

4) Strengthening the financial management capability of road maintenance executing ministries

Substandard management of the budget and expenditure is preventing cost-effective road maintenance and amplifying the mutual distrust between executing agencies and the financing agency. It is inevitable that sound financial procurement circumstances are required to improve the quality of the road maintenance activities carried out by the executing agencies..

5) Strengthening of the technical capability of road maintenance executing ministries

Substandard performance of road maintenance works by executing agencies is another reason hampering the appropriate and timely disbursement of the funds. The preparation of a methodical road maintenance program, submission of budget applications with consistent content and form, reporting of work progress and quality control should all help in obtaining better funding

Table 4.3.3 Improvement Measures for Road Financing

Category of Issues		Present Issues	Target of Improvement	Responsible Bodies	Procedure for Improvement	Effect on Improved Procurement of Road Maintenance Fund
Institutional	(1)	Non-transparency in Flow of Special Tax & Road Maintenance Fund	Publicity/Accountability of Budget	Financing Agency	Publicity in Tax Revenue/Disbursement	Concerted Management of Fund among Agencies involved
	(2)	Imperfect Utilazation of Special Tax as against Regulation Subscribed in Decree	Exclusive Application of Revenues from Special Tax for Rd. Maintenance Purpose	Financing Agency	Conformity to Legal Subscription (Decree)	Expansion of Available Fund for Rd. Maintenance
	(3)	Excessive Administration of Road Maintenance Budget/Fund by MEF	Distribution of Administration Partially to MEF, MRD and P/C Gvnr. Offices	All the ministries in Charge of Rd. Maint.	Demarcation of Responsibilities among MEF and Rd. Maint. Ministries	Streamlined Cash Flow
	(4)	Complicated Procedure/ Long Process in Budgeting	Streamlined Budgeting System	Financing Agency	Revision of Budget Law & Road Law	Prompt Disbursement of Fund
	(5)	Indirect Control of Road Fund by Executing Ministries/Agencies of Rd. Maintenance	Distribution of Administration Partially to MEF, MRD and P/C Gvnr. Offices	All the Ministries in Charge of Rd. Maint.	Establishment of Self-reliant Rd. Maint. Activities with Self-accounting	Procurement of Fund for Consistent Implementation of Rd. Maintenance
Operational	(1)	Substandard Project Management	Improve in Management of Revenue, Expenditu ,Tendering/Progress Monitor System	Rd. Maint.Executing Ministries/ Agencies	-Introduction of Management Guideline -Capacity Building	Promotion of Mutual Trust between Financing body and Executing Bodies
	(2)	Substandard Budget/Cost/Revenue/ Expenditure Management	Establishment of Standardized Accounting System	Rd. Maint.Executing Ministries/ Agencies	-Introduction of Accounting Guideline -Capacity Building	Streamlined Cash Flow due to Enhanced Accountability
	(3)	Lack in Communication among Ministries /Office Responsible for Road Maintenance	Establishment of Concerted Body for Rd. maint	All the Ministries in Charge of Rd. Maint.	Establishment of Road Board	Efficient Fund Management due to Easy Consensus among Ministries in Charge
	(4)	Less Strict Inspection and Auditing on Accounting/Engineering Output	Strengthening of Auditing Function	National Audit RB to be established	-Establishment of Road Board and Endowment of Inspecting Obligation	Cost Effective Financing
	(5)	Functional Disintegration among Sections in Rd. Maintenance Executing Ministries	Improvement of Fragmental Management of Rd in a series of Maintenance Activities	Rd. Maint.Executing Ministries/ Agencies	Restructuring of Existing Function withi Executing Ministries	Efficient Fund Management due to Easy Consensus among Parties(Sections) in Charge
	(6)	Fragile Function of Financial/Accounting Sections of Rd. Maint. Executing Ministries	Strengthening of Financing/Accounting Function	Rd. Maint.Executing Ministries/ Agencies	-Recruitment/ Capacity Building of Financial Expert	Sound Revenue/Expenditure Planning
Technical	(1)	Lack in Standard on Document Necessary for Application of Rd. Maintenance Fund	To improve the content/requisite of items in Budget Application Form.	Rd. Maint.Executing Ministries/ Agencies	Introduction of Technical Guideline	Prompt Disbursement of Fund due to Enhanced Accountability of Rd. Maint. Activities
	(2)	Lack in Base Data for Preparation of reasonab Maintenance Program/Budget Document	Submission of Scientifically Persuasive Budget Application Form	Rd. Maint.Executing Ministries/ Agencies	-Capacity Building -Set out of Guide Line	Prompt Disbursement of Fund due to Submission of Self-sufficient Fund Application Form
	(3)	Deficit in Planning/Execution/Follow Up standing on PCM/PDM	Formulation of Rd. Maintenance Program with Consistency and Sustainable	All the Ministries in Charge of Rd. Maint.	-Recruitment/ Capacity Building of Planners	Cost Effective Financing with Long-term View on Project Cycle
	(4)	Loose Quality Control on Output	-Strengthening of Auditing Function -Introduction of Quality Standard	All the Ministries in Charge of Rd. Maint.	-Introduction of Quality Standard	Cost Effective Financing

4.4 Prospects for Road Financing

The financing issues in the present road maintenance activities in Cambodia are not the result of a shortage of funds but the overall institutional, administrative, technical and management incapability of the agencies concerned.

The analysis of future expenditure for road maintenance and available funds suggests that the expected expenditure will be far below the available amount of funds; 84.5% of the Road User Special Fund during 2006-2010, 92.0% during 2011-2015 and 75.2% during 2016-2020 as shown in **Table 4.3.2**. This projection suggests that the fund should be used, not only for maintenance purposes but also, for overall road development in Cambodia.

To the improve road maintenance, it is important to establish a Road Board (RB) or National Road Maintenance Committee (NRMC) to administer all the road maintenance activities under the concerted efforts of the MEF, MPWT, MRD and Provincial/City Government.

This type of reform conforms to the vision of the structural adjustment policies advocated by the World Bank and IMF. The World Bank and other international organizations are now conducting road maintenance reform in many developing countries in the world, especially in LLDCs.

The advantages in the setting up of the RB or NRMC to administer all road development within a nation are:

- Comprehensive road administration with a nationwide scope of view,
- Fostering of a self-reliant road development capability, which is not limited to only road maintenance.

CHAPTER B-5 IMPROVEMENT OF ROAD MANAGEMENT/MAINTENANCE

5.1 Content and Classification of Works

In Cambodia, maintenance works are classified as the following three types from a budgetary point of view:

- Routine maintenance
- Periodic maintenance
- Other maintenance

Table 5.1.1 shows the typical work items for those three types of maintenance.

Table 5.1.1 Typical Work Items for Maintenance

Type of Maintenance	
Routine Maintenance	- Cleaning of road surface, side ditches, culverts, patching pot-hole, sealing of cracks etc - Trimming and cutting the trees/grasses - Checking and replacing deflective traffic signs, guard posts/rails etc. - Preparing the road inventory based on a daily patrol.
Periodic Maintenance	- Patching and overlaying defective road surface. - Replacing damaged culverts. - Replacing defective bridge joints, bearing shoes etc. - Repainting steel bridge.
Other Maintenance	- Repairing roads damaged by natural disaster.

Note: road rehabilitation is not involved in maintenance work

On the other hand from an implementation point of view, maintenance work consist of three elements:

- Checking the road condition and preparing the inventory based on the daily patrol
- Keeping roads in good condition by providing daily cleaning, trimming and cutting, small scale of repair such as patching etc.
- Medium or large scale repair work described above including renovation and damage due to disasters.

5.2 Current Situations Hampering Road Maintenance Activity

5.2.1 The Roles of Concerned Authorities at the Planning Stage

- The DPWT acts as an executing agency responsible for the following activities at the planning stage:
  - Carrying out road patrols within its jurisdiction and recording road conditions.
  - Collecting records on road conditions as the road inventory.
  - Preparing the "Request for Maintenance Budget" and its submission to the MPWT.
- The MPWT as a road authority is responsible for the following:
  - Collecting the budget requests from each DPWT and prioritizing maintenance projects.
  - Submitting the prioritized plan to the MEF then discussing and negotiating on the scale of the budget.
- The MEF acting as the financial authority considering the whole revenue and expenditure, looks closely at the appropriateness of requested projects and negotiates with the MPWT. Once a consensus has been reached the verified budget plan is submitted to the National Assembly.

5.2.2 The Roles of Concerned Authorities at the Implementation Stage

- The DPWT is responsible for the following:
  - Carrying out the preparation/tender/contract/payment for each project on a contract out basis:
  - Requesting payment from the MPWT.
  - Paying the contractor in accordance with the contract.
  - Paying staff wages.
  - Managing and supervising the project.
- The MPWT is responsible for the following:
  - Carrying out the preparation/tender/contract/payment for both contract out and force account based projects.
  - Requesting payment from the MEF.
  - Paying the contactor/DPWT in accordance with the contract.
  - Managing and supervising the project.

- The MEF pays out the budget to the MPWT.

This is a common administrative system broadly applied in every country. However, it is not working properly in Cambodia due to the following reasons.

5.2.3 Issues hampering Maintenance Activity by the MPWT and DPWT

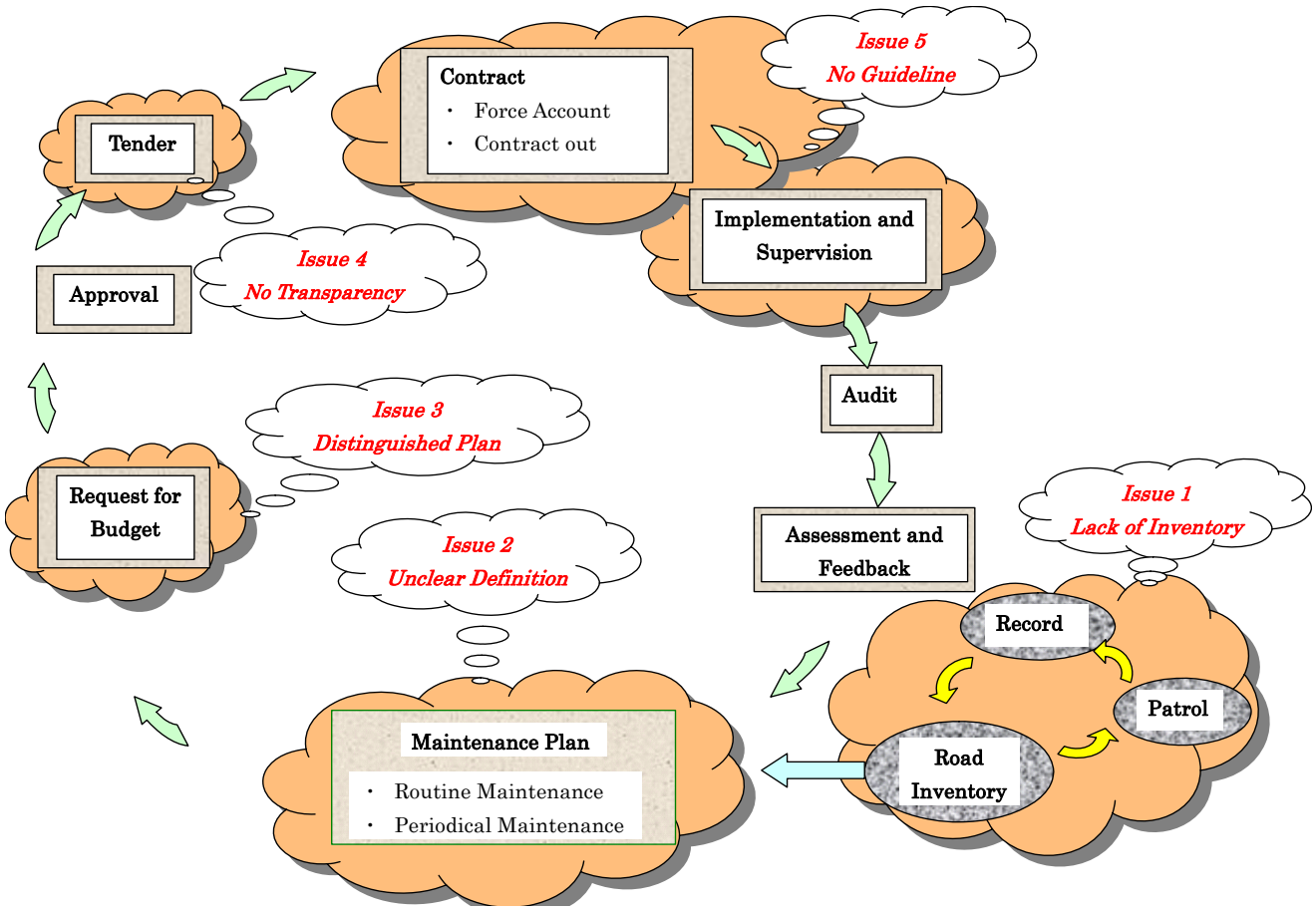


Figure 5.2.1 Flow of Project Cycle

The above figure shows the project cycle from the beginning of the planning stage to the end of implementation stage. Details of the issues, within the responsibility of the MPWT and DPWT that are hampering maintenance activity, are as follows:

- Issue 1: There has not been a road inventory prepared by each provincial DPWT because there hasn't been a periodic road patrol or the form for recording the road conditions has not been available. Therefore, the officials serving the DPWTs do not know exactly what items are involved in the inventory and how the inventory should be carried out and recorded.

- Issue 2: The Department of Road Infrastructure, which belongs to the General Directorate of Public Works, should collect the information from the provincial DPWTs and prepare the next year's maintenance plan, which it then submits to the MEF. However, the

MPWT cannot convince MEF officials that the requested projects are justified in terms of the reason for each project, priority, method of repair and accuracy of the cost estimate. The budgetary regulation requests that road authorities separate the routine maintenance from the periodic maintenance. However, the "Request for Routine Maintenance in 2005" was not prepared in such a manner.

- Issue 3: The approval of the budget is always delayed because "The request for budget," which is prepared as above-mentioned, does not satisfy MEF officials. For example, the "Request for Routine Maintenance in 2005" was actually submitted to MEF in September 2004, and partially approved in July 2006.
- Issue 4: At present most maintenance activities are carried out by force account and it is not possible to secure transparency considering the influence that can be brought to bear on officials/employees of the DPWT. This is a kind of family contract, which the MPWT contracts to the DPWT who also supervise and inspect the work done.
- Issue 5: MPWT obtains guidelines or manuals in every field such as how to carry out the routine maintenance/periodic maintenance, quality control, schedule management, request for payment, preparation of contract etc in the different Departments. However, those are not unified or shared among MPWT/DPWT officials.

5.2.4 Issues hampering the Maintenance Activity by the MEF

- Issue 1: The budgets that have been approved by the National Assembly are not accordingly disbursed to each Ministry.
- Issue 2: Disbursement of the budget for annual operation/administrative expenses for each Ministry is supposed to be done in a periodic manner, however in terms of maintenance/rehabilitation expenses are supposed by contract basis that would cause the delay of project implementation.
- Issue 3: The funds for road maintenance were meant to be under the joint administration of the MEF and MPWT, however the MEF now has sole control of the funds.
- Issue 4: The MEF requires a strict execution of budget by each Ministry. Neither small modification nor alteration of content is allowed.

5.2.5 Chain of Negative Ring between the MEF, MPWT and DPWT

As a result of above introduced issues, the maintenance activity is inappropriate and poor because of the following negative rings expressed hereunder.

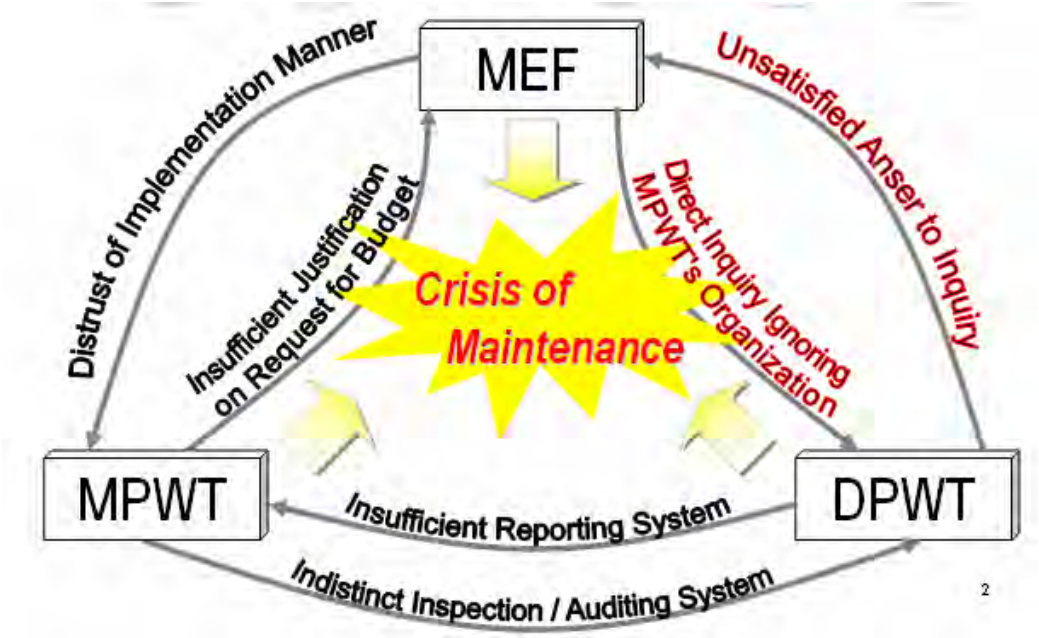


Figure 5.2.2 Chain of Negative Rings

5.3 The Worst Case Scenario (No Maintenance Activity)

The following figures are prepared showing the pavement condition in 2005 and predicted condition in 2010, 2015 and 2020. The predictions are based on the assumption that no maintenance activity will be taken from now on and the life of asphalt concrete might be 10 years and DBST might be 5 years. If no action were taken all national roads would deteriorate back to the same conditions as of 1991.

Two countermeasures are suggested to prevent such a negative scenario.

- **One: Development of the capability of MPWT and DPWT officials.**
- **Two: Timely budget disbursement by the MEF.**

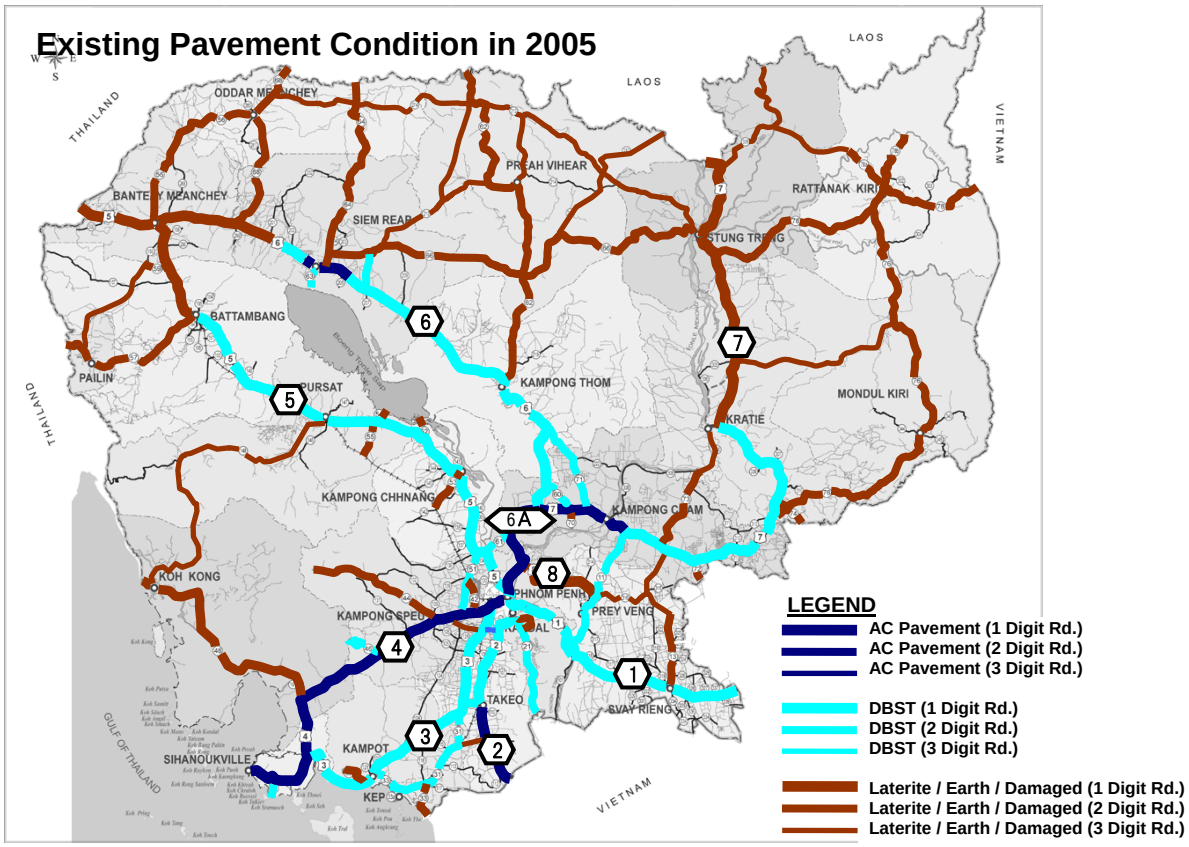


Figure 5.3.1 Present Condition in 2005

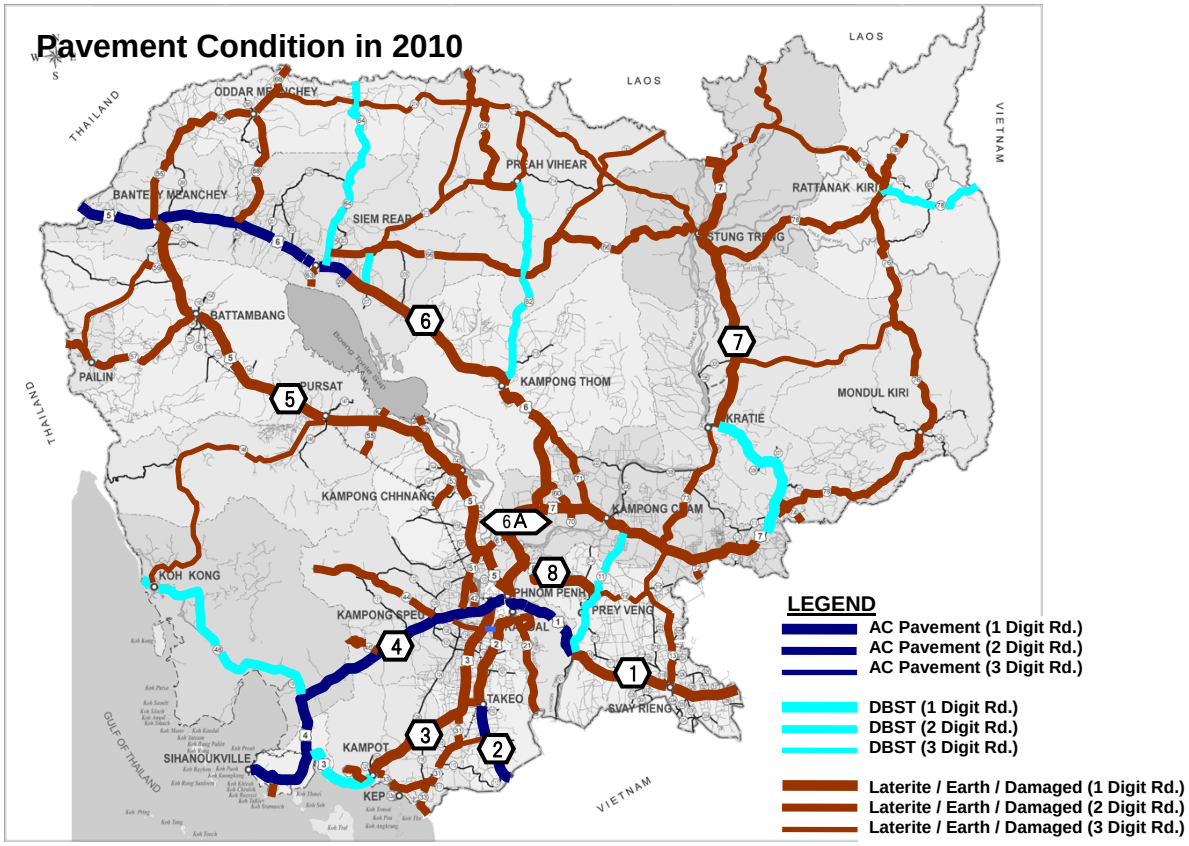


Figure 5.3.2 Predicted Condition in 2010

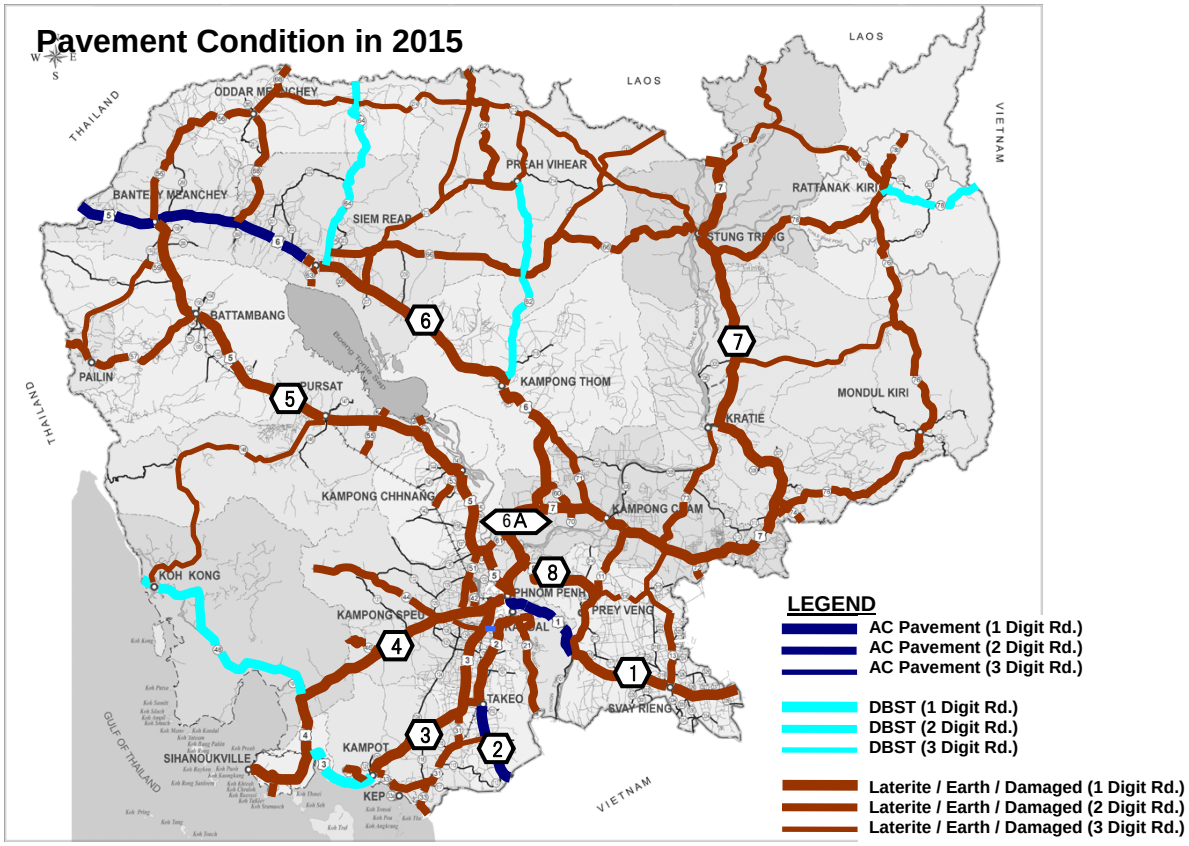


Figure 5.3.3 Predicted Condition in 2015

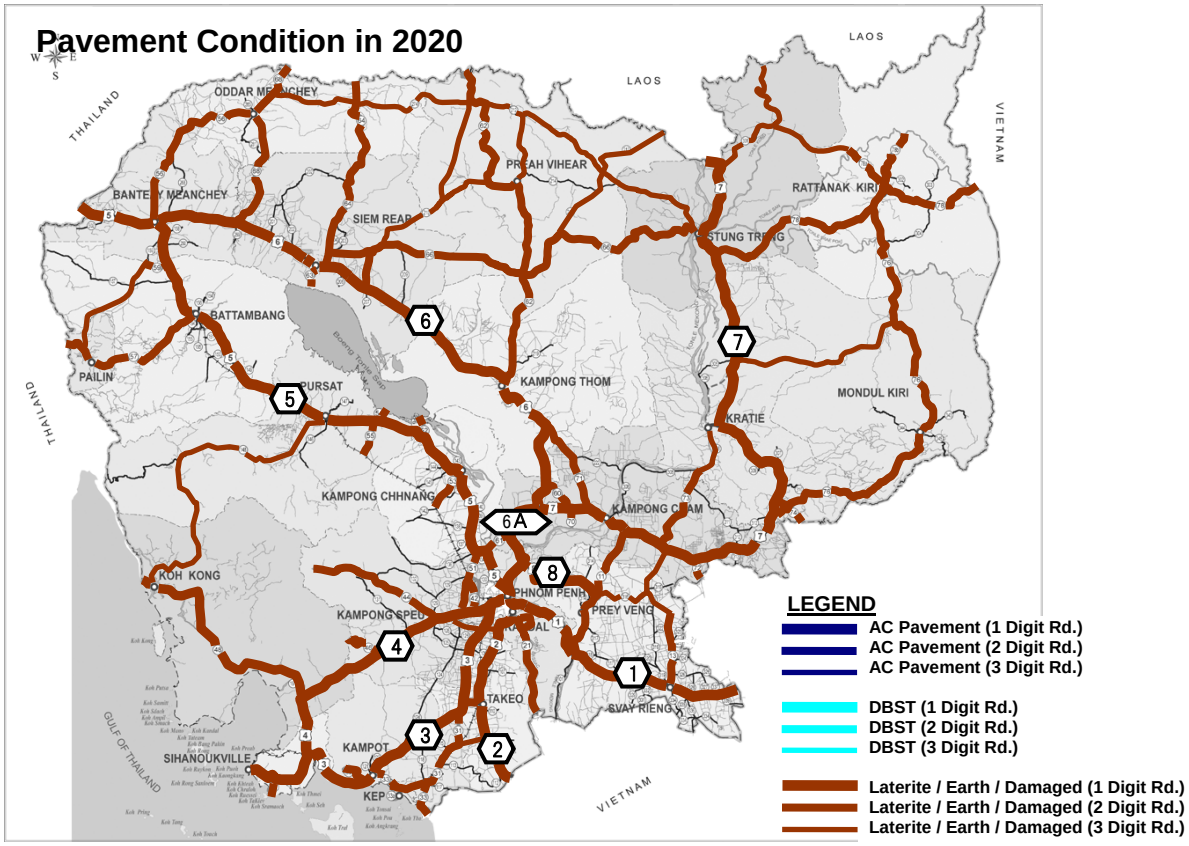


Figure 5.3.4 Predicted Condition in 2020

5.4 Capacity Development in the MPWT and DPWT

5.4.1 Introduction

The lack of standardized form of activities both in each planning stage and implementation stage are discussed in 5.2.3. the MPWT is already provided with necessary information for the improvement of maintenance works by the studies ever done by the foreign donors, the World Bank, the Asian Development Bank and studies made by itself. However, those information had neither unified nor properly utilized in their daily activities in road maintenance. The Study Team recommends MPWT to commence the preparation/coordination of Guidelines for the enhancement the level of road maintenance works for the following subjects, which are deemed most essential for the execution of the works. The compilation of Guidelines should be proceeded so as to overcome the critical issues which lie in present system taking into account the existing regulations, capability, organization, contract system and constraints.

- **Guideline for Budget Planning**
- **Guideline for Procurement**
- **Guideline for Request and Disbursement**
- **Guideline for Accounting**
- **Guideline for Preparation of Maintenance Works**
- **Guideline for Quality Control**

The Guidelines are to be furnished by the end of 2006 along the proposed schedule shown in **Figure 5.4.1**. The training by both MPTW and DPWT staffs must be accompanied.

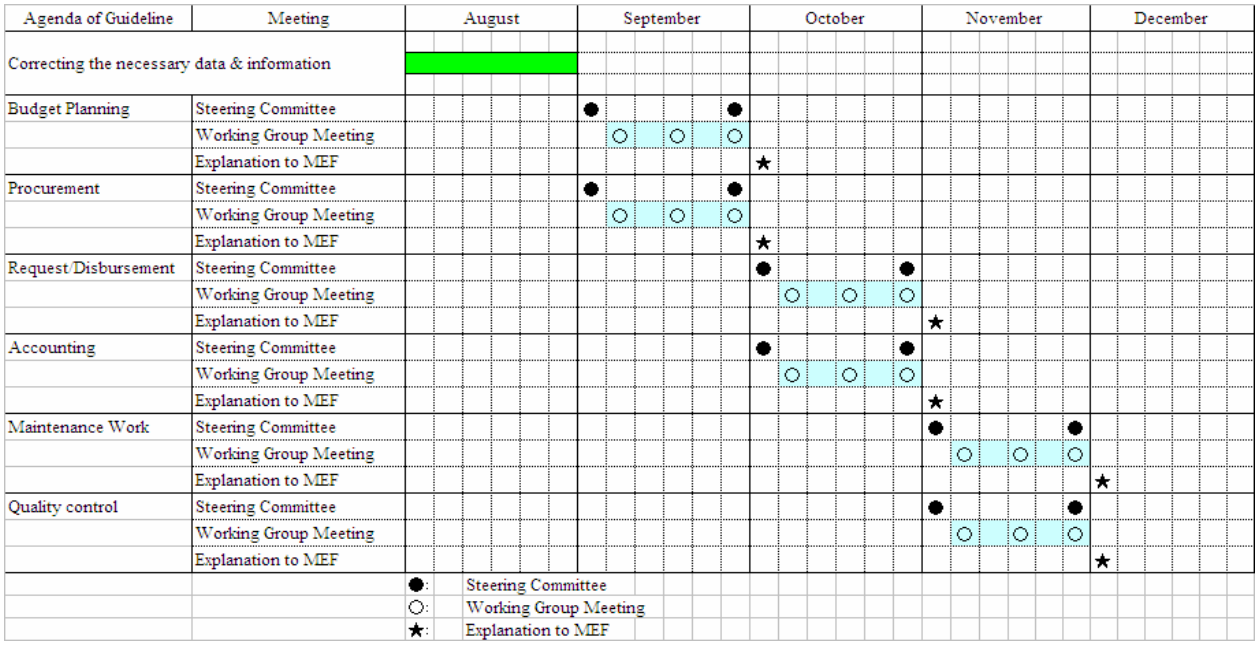


Figure 5.4.1 Schedule of Preparation of Road Maintenance Guideline

The recommended long-term target for the strengthening of capability of road maintenance by DPWT and MPWT is proposed as shown in **Table 5.4.1**and **5.4.2**.

Table 5.4.1 Program for DPWT

Aspect	Item	Short Term (by 2010)	Medium Term (2011-2015)	Long Term (2016-2020)
Technical	Road Inventory	Establish the methodology. On the job training through implementation.	Modify the data based on survey carried out once in every year	Modify the data based on survey carried out once in every year
Technical	Planning	Classify the maintenance into routine and periodic.	Unify the routine and periodic as whole maintenance	Proceed with the planning as maintenance work
Technical	Quality Control	Establish the methodology and acquire the knowledge through on the job training	Proceed with supervision based on the guideline.	Proceed with supervision based on the guideline.
Financial	Procurement	Establish the methodology. Most of the works are carried out by force account.	Most of the works are carried out by contract out.	All field maintenance works are carried out by contract out.
Financial	Budget request and Accounting	Methodology and unified forms must be established and proceed with the request and accounting	Proceed with the request and accounting	Proceed with the request and accounting

Table 5.4.2 Program for MPWT

Aspect	Item	Short Term (by 2010)	Medium Term (2011-2015)	Long Term (2016-2020)
Technical	Road Inventory	Establish the methodology, and train DPWT staffs. Prepare data-base system at MPWT	Collect and edit the data and allow MPWT/DPWT staffs to access.	Collect and edit the data and allow MPWT/DPWT staffs to access.
Technical	Planning	Establish both methodology on prioritization and forms of requesting for budget.	Improve the prioritization and requesting forms.	Improve the prioritization and requesting forms.
Technical	Quality Control	Establish the methodology, train DPWT staffs through on the job training.	Proceed with inspection on the site. Modify the guideline based on the physical condition on the site.	Proceed with inspection on the site.
Financial	Procurement	Establish the methodology. Most of the works are carried out by force account. Prepare the contract out system for the next stage.	Most of the works are carried out by contract out.	All field maintenance works are carried out by contract out.
Financial	Budget request and accounting	Methodology and unified forms must be established. Accounting method to secure the transparency must be established.	Improve the guideline. Keep the request and accounting information in the data-base.	Proceed with the request and accounting.

The Guideline should be prepared in line with the flowchart of the optimal road maintenance activities shown in **Figure 5.4.2**, that had been formulated with the close discussion among MPWT, JICA experts and the staff from the JICA Study Team.

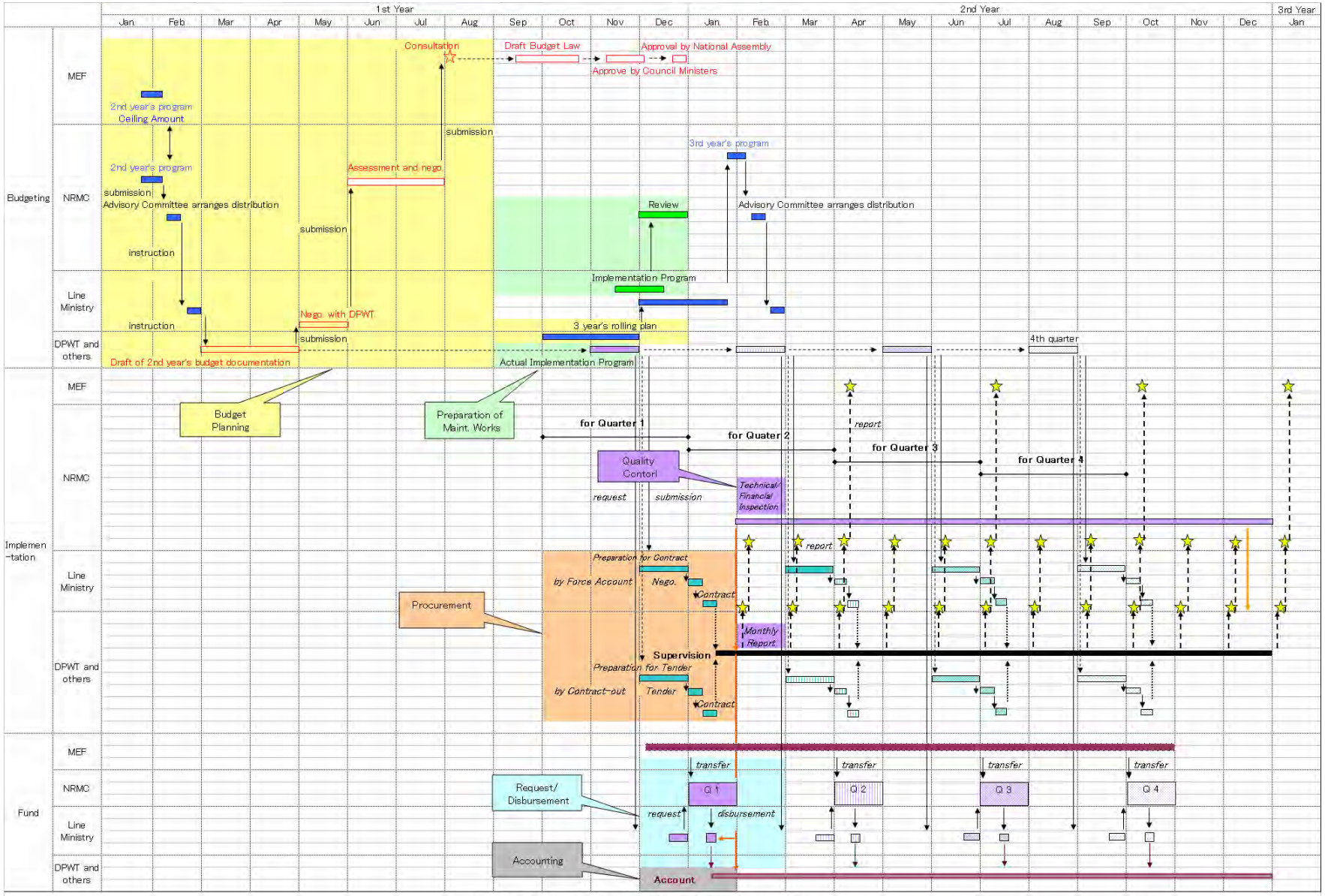


Figure 5.4.2 Necessity of Guideline in the Maintenance Activities

5.4.2 Policy for the Preparation of Each Guideline

The Guidelines are to be prepared with the initiative of experts from MPWT and DPWT with the advices from JICA experts and the JICA Study Team. Excerpts of advices, points of emphasizing, and basic policies proposed by JICA are described in the following section;

Guideline for Budget Planning

(a) Background

It is convenient to consider the road maintenance management process in terms of following primary functions: 1) Planning, 2) Programming 3) Preparation, 4) Operation.

Planning involves the first step for road maintenance activities. Road authorities shall undertake how to prepare, when and where to submit and what to implement for the planning exercise under limited fund. However, MPWT couldn't obtain the required annual maintenance budget for past year due to unclarity maintenance management so that standard budget preparation is necessary to respond to the road maintenance demand through out the country.

(b) Present Issue

The present issues arise from following manners;

- unclear responsible in charge and preparation cycle of maintenance program,
- content of maintenance program,
- no substantial engineers attend the meeting with MEF negotiation for budget request,
- how to satisfy the MEF requirement and
- insufficient data management like work item, unit price and method of work.

(c) Proposal

The guideline for budget management shall consist of

1) Preparation of data base which manages on road inventory, unit cost and etc.
2) Establishment of standard application procedure from DPWT request through to approval.
3) Preparation of standard maintenance program form for MPWT/MEF understanding.
4) Justification method of activities either routine or periodic works.
5) Description of engineering aspects of undertaking for selection of priority project.
6) Description of management aspects of undertaking with allocation of budget, human & equipments to provinces.
7) Description of implementation plan

Particularly, DPWT shall manage the road inventory data with standard format. This is a convincing for explanation of transition of road condition during negotiation with MEF.

(d) Recommendation

Under moving to prepare of budget planning for next year, it is good opportunity to establish of guideline for budget planning. The first draft of guideline must be arisen some discrepancy at beginning stage so that MPWT shall set up milestone for budget procedure as early as possible and carry out try and error method for preparing program.

And also MPWT should clarify to MEF concern of pavement life, road deterioration mechanism and other engineering aspects for their understanding.

Guideline for Procurement

(a) Background

MPWT has implemented the procurement system for national road maintenance in this year. Routine maintenance works has been carried out by DPWT force account and periodic maintenance works has been carried out by contract out. In consideration of present allocation of human and equipment resources, this implementation policy shall be necessarily practical method in short term.

It is important to implement maintenance works with transparency, fairly and timely procurement so that guideline shall be established in this part.

(b) Present Issues

The present issues arise from following manners;

- unclear implementing procedure and content of contract document,
- implementing mechanism could not assure real transparency,
- delay for making a contract,
- not establishment of bidding procedure to outsource,
- insufficient contract management for following year procurement.

(c) Proposal

The guideline for procurement shall consist of

1) Establishment of standard procurement procedure including bidding schedule.
2) Preparation of standard procurement document including approval of drawings.
3) Establishment of selection criteria of contractor.
4) Establishment of contract condition which consist of general condition and specific condition.
5) Establishment of standard negotiation procedure.
6) Contract which is various options, like force account, performance based contract, management contract and design & builds contract, Management.

(d) Recommendation

MPWT has started routine maintenance works by force account method in this year. Contract for routine works has been implemented between Director of DOR and Director of DPWT. The standard contract for force account shall be modified based on these current contract documents for future practice.

Periodical maintenance works has been yet implemented by standard procurement procedure so that MPWT shall need to prepare guideline for easy understanding of contract aspect.

Guideline for Request and Disbursement

(a) Background

Lack in prompt and timely disbursement of fund is one of the most hampering factors in the road maintenance activities in Cambodia. It is not exaggeration to say that this type of outdated financing system has resulted in poor performance in the execution of the road maintenance works in the nation. It is sometimes pointed out that the awkward relation between MPWT and MEF is the major cause of the present issues, but there are many factors other than this lie on the side of MPWT in their daily activities of road maintenance.

The excerpt of discussion revolving around NRMC was to endow financial managing function to MPWT so that the latter can exert prompt and timely disbursement/payment of fund necessary for the road maintenance activities. However, there are many issues to be improved in the road financing of MPWT itself, explicitly and implicitly, before demanding absolute transition of financial management function from MEF to MPWT.

(b) Present Issues

The following are major issues of request/disbursement which lie on the side MPWT;

- Lack in preparation of persuasive fund request form, standing on scientific planning
- No justification of the necessity of the captioned projects,
- No criteria in the selection of priority projects, and
- Unreliable cost estimate.

(c) Proposal

As far as foreseeable future is concerned, establishment of the basic methods to improve the above issues is the most fundamental and urgent tasks to be undertaken.

(d) Recommendation

JICA is responsible for assisting MPWT to prepare improved budget request form with international standard with the provision of relevant information. In parallel, performance of road financing between MPWT, executing agency and MEF, financing agency, has to be monitored.

Guideline for Accounting

(a) Background

The level of accounting in MPWT is deemed substandard with non-standard or non- uniformity among agencies in charge. Besides, the fact that there is no officially admitted document form including attendant record of workers, payment record, purchasing record and log sheets, has lead t chaotic and unreliable accounting system in the road maintenance undertakings in Cambodia.

(b) Present Issues

The above backwardness has made it very difficult to identify the item-wise proper cost and to assess expenditure statement as to daily activities of road maintenance work.

(c) Proposal

First of all, it is inevitable and urgent to set out standard document forms so that it may promote smooth disbursement of fund from MEF, financing agency, as well as efficient execution of road maintenance works by MPWT and other executing agencies..

Standard accounting documents required, among other things, are;

-Accounting books,

-Attendant list of workers,

-Working record, and

-Purchasing records of equipment, material necessary for the execution of maintenance works.

(d) Recommendation

JICA, as the largest supporting organization of road development in Cambodia, should advise, monitor and provide information for the attainment of "scientific accounting" of MPWT, MRD and relevant road maintenance agencies.

Guideline for Preparation of Maintenance Works

(a) Background

MPWT obtain Guidelines, Specification, Drawings or Manuals in various fields such as how to carry out the routine/periodic maintenance; however, those are not unified nor shared among MPWT/DPWT staffs. As a result, standards are obscure those managed by MPWT or supervised by DPWT.

(b) Present Issue

Contemporary, the life of achieved maintenance work is very short. For example, patching of potholes is carried out every year, however, the repaired pavement damaged again after the next rainy season comes to an end. In this case it requires the correct engineering judgment how deep the damaged section must be removed; repair surface only or repair base, sub-base, or sub-grade repair must be examined by MPWT/DPWT staff. The lack of standardized knowledge and information causes the short life of achieved works.

(c) Proposal

To enhance convenience of road users and long life of the road;

1) Actual Implementation Program prepared
2) Typical Specifications and Drawings
3) Typical Working Method Statement
4) Monthly Report (DPWT/Contractor - MPWT - MEF)

(d) Recommendation

Based on the road patrol and bridge inspection result, DPWT/MPWT prepare three years rolling plan/actual implementation program, prioritize the projects and estimate the cost required. MPWT/DPWT can supervise the maintenance works if the work is complied with the working method statement or not. And prepared monthly progress report then submitted to MPWT

through DPWT.

Guideline for Quality Control

(a) Background

74.9 km long NR.21 which runs from Ta Khmau to Chrey Thum has improved one year ago. When the Study Team visits it in June 2006, the serious road deterioration is observed in specific section. DWST is provided on road surface, in accordance with the AASHTO the standard life of DBST is five years. The same design policy is considered to be applied for the project road and there is not specific difference of geographic or traffic conditions. Why specific section differs from others?

(b) Present Issue

MPWT had published CONSTRUCTION SPECIFICATION 2003 which edited based on Australian Standards. The level of the specification is very high like other advanced nation's one. However, this specification has not been spread far and wide among the DPWT/local contractor. One of the reasons is considered that this book has not translated into Khmer yet. To provide a guideline which shows sampling and testing frequency, construction tolerance etc is urgent.
In addition to the above methodology for financial inspection system is obscure.

(c) Proposal

To establish a fair and square expenditure on budget and assure the quality of work the following five vital points shall be involved in the Guideline:

1) Supervision System
2) Inspection System
3) Form of Technical Inspection
4) Form of Financial Inspection
5) Form of Quality Control Report

(d) Recommendation

When MPWT/DPWT staff supervises the field work, he will carry out the technical inspection in accordance with the designated inspection method and confirm whether achieved work will comply with the designated tolerance or not. Such a result of inspection/progress schedule shall be reported attaching to the Monthly Report. Form of Financial Inspection will be prepared in every project and the book must be kept for the purpose of the audit.

5.5 Improvement of Executing Capability

5.5.1 Measures to Improve the DPWT

Followings are pointed out to enhance the improvement in concrete terms.

- **Provide data storage and transmission equipment, such as computers, and allow free access to a database within the MPWT.**

Such tools are still not provided in some DPWTs. At least 2 (two) sets of computers, printers and transmission lines must be furnished at all DPWT by year 2007.

- **Appoint a qualified director who obtain diploma in civil engineer and available to use computer and his age is younger than 40 years.**

The DPWT plays a leading part in the recommended maintenance program, however, some directors in provinces can not prepare the documents necessary to make requests for budget and many of them are aged. An aggressive policy on rejuvenation and personnel exchange between the MPWT and DPWT must be considered to accelerate the implementation.

- **The director should be responsible for training his staffs regarding the Guidelines.**

The reason is described here-above.

- **It is recommended that the Japan side, in collaboration with the MPWT provide a technical assistance program covering areas such as planning and supervision to enhance their capability for at least 3 (three) years.**

- **It is recommended that the Japan side provides maintenance equipment such as a motor grader, wheel-type back hoe, vibration roller, asphalt sprayer and a 4-tons truck with a crane to the 24-city and provinces, and to carry out "on the job maintenance training".**

One of effective measures to break through the internal hazard is to supply the maintenance equipment and carry out the long termed flexible training. This program makes available the assessment on effectiveness of supplied equipment and achievement of training results. Based on the perusal of achievement, the program would be modified, extended or newly proposed. The required amount of cost is estimated as twelve (12) million US Dollar.

5.5.2 Measures to Improve the MPWT

- **Establish a Road Maintenance Unit (tentative name) in the Road Department, which shall be solely responsible for the road maintenance.**

At present, many high-rank officials are involved in maintenance obligations making the responsibility complicated and indistinct.

- **Establish an intra-net system in the MPWT and allow the staff free access.**

Due to the lack of coordination, data on maintenance is kept separately at different departments or units. For example, we met difficulty initially in obtaining the road length of every digit road running within the jurisdiction of each DPWT. One of our recommendations is to establish a database system at the Technical Research Center in the MPWT.

- **Absorb the Road Construction Center into the Heavy Equipment Center.**

Both bodies are functioning for similar roles and RCC is a subordinate organization of HEC. It is recommended to unify them to avoid duplicated function. And, available equipment and staffs in RCC are recommended to use for new construction and rehabilitation works.

- **Abolish the Bridge Construction Unit and mobilize the surplus work force to each DPWT.**

In order to utilize the experienced bridge technology, it is suggested to move the staffs to Provincial DPWT and engage in maintenance or rehabilitation service. Thus this agency will be naturally soaked up to the DPWT.

- **Accelerate the privatization.**

Due to the small scale of budget allocation to the private sector and attaching more importance to the force account system, local contractors have little opportunity to participate in rehabilitation and maintenance projects. To enhance the mobilization of the MPWT/DPWT staff to the private sector, there must be consideration given to having a policy that makes it compulsory to involve local contractors, or in joint cooperation with international contractors, in projects.

5.5.3 Training Plan in short term

In order to fully realize and sustain the effects of the capacity development, training is an important component to improve MPWT/DPWT capacity to manage its maintenance operations and has followed **Table 5.5.1** system to manage, implement and evaluate the training plan.

Table 5.5.1(1) Training Plan (1)

Target Year	Every end of the year
Prerequisite Condition	1. Guideline for maintenance management is applicable. 2. Annual maintenance budget is approved by national assembly. 3. Road inventory data and other information are distributed to provinces.
Restriction Condition	1. Budget for maintenance is limited. 2. Human/Equipments resources are limited.
Objective Organization/Person	MPWT, all parties concerned in the maintenance activities DPWT
Overall Goal	Overall goal is to develop of Sustainable Maintenance Mechanism Framework. As usual practice, maintenance management can be assumed to have detailed aims; 1) the use of a systematic approach to decision making, 2) to assess budget needs and resource requirement, 3) to adopt consistent standards, 4) to allocate resources effectively, 5) to review policies, guidelines and effectiveness of programs.
Training Purpose	1. Preparing appropriate annual maintenance plan for applying to Ministry. 2. Implementing transparent and timely procurement for maintenance activities. 3. Achieving quality management. 4. Achieving timely disbursement of Budget. 5. Improving Capacity Development for MPWT/DPWT staffs and organization.

Table 5.5.1(2) Training Plan (2)

	Technical staff	Management staff
Outcome	1. Annual Maintenance Planning 2. Rolling Plan for 3 years 3. Inspection Note 4. Renewal of Road Inventory Data 5. Manual for Maintenance Works 6. Specification of Maint. Works 7. Measurement of Monitoring Indicators	1. Annual Maintenance Planning 2. Rolling Plan for 3 years 3. Allocation of Human/ Equipment Resources Plan 4. Procurement Document 5. Management of Accounting 6. Feature Training Module
Training Plan	1. Daily Inspection 2. Management Information (Inventory Data & etc.) 3. Preparation of Maintenance Planning 4. Treatment Selection 5. Prioritization 6. Construction Plan/ Supervision 7. Management of Materials/ Equipment	1. Preparation of Maintenance Planning 2. Finance 3. Allocation of Human/ Equipment Resources 4. Procurement & Contract 5. Accounting
Evaluation A Level	To prepare annual maintenance plan To assess preliminary, interim and post evaluation To instruct how to manage maintenance activities	To obtain annual budget from Ministry To negotiate Contract To instruct how to manage maintenance activities
B Level	To define cost estimating techniques To measure of monitoring indicators	To select procurement method To manage operational cost/workers hours
C Level	To keep data correction To define maintenance guideline	To prepare account book To prepare contract document To define maintenance guideline

Study team proposes the urgent training plan for capacity development of MPWT/DPWT in short term as shown in **Figure 5.5.1**. It is different from other approach for parties concerned to be characterized on the job training at site to obtain something out of live activity.

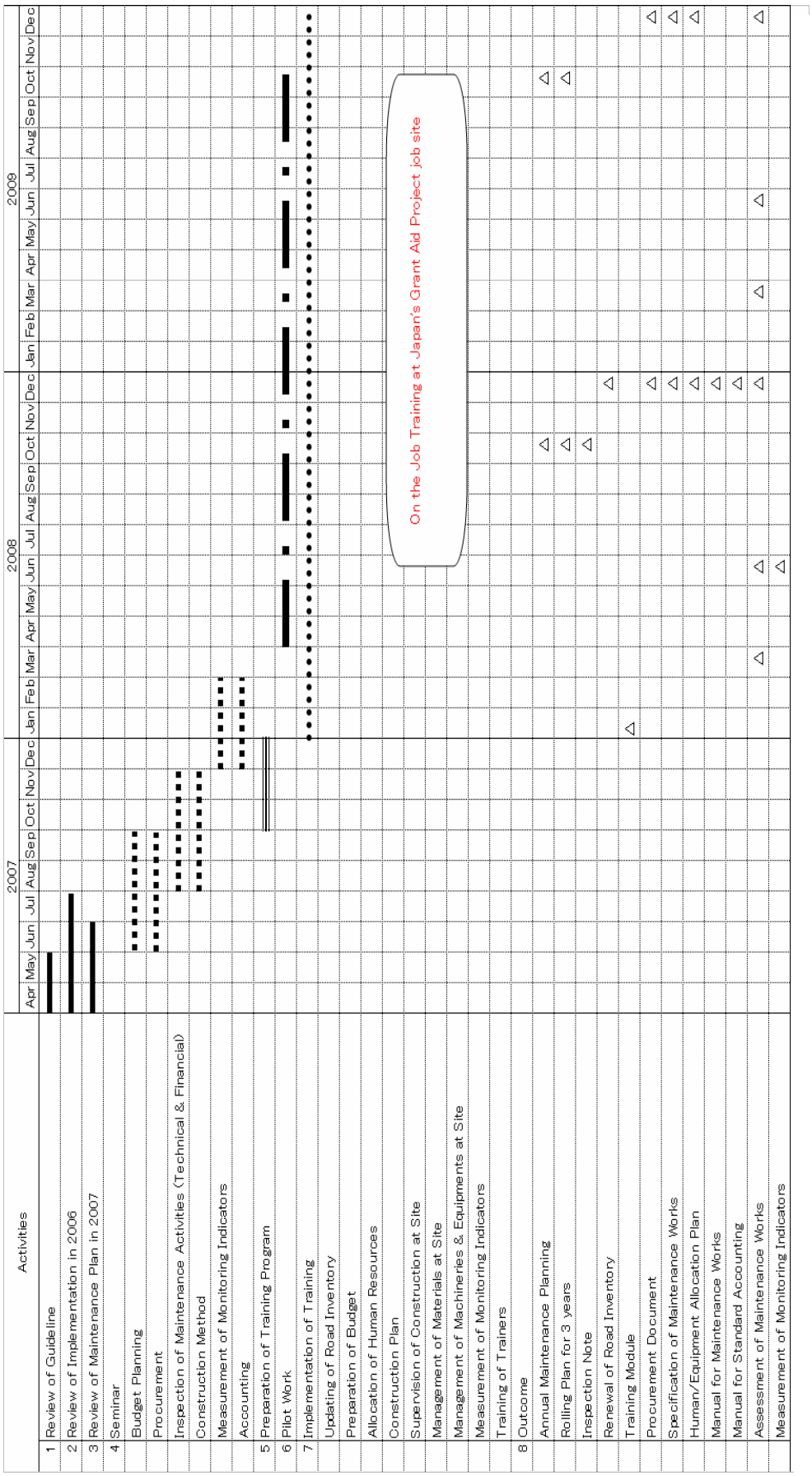


Figure 5.5.1 Training Plan for Road Maintenance Management

CHAPTER B-6 PROPOSAL FOR THE ESTABLISHMENT OF A NATIONAL ROAD MAINTENANCE COMMITTEE

6.1 Establishment of a NRMC (National Road Maintenance Committee)

Although donors have been supporting the road improvements, there has been slow progress in the road maintenance activities due to the reasons described in 5.2.3 Issues Hampering the Maintenance Activities of the MPWT and DPWT and 5.2.4 Issues Hampering the Maintenance Activities of MEF. In order to sever this negative chain, the Study Team strongly recommends the establishment of a National Road Maintenance Committee to improve both the capacity of the MPWT and DPWT officials and the timely disbursement of budgets by the MEF.

6.2 Role and Executive/Institutional Aspects of the NRMC

Both the MPWT and MEF shall delegate one of their staff to the NRMC. The officials from the Ministries work together for the purpose of road maintenance, however the NRMC will act as an intermediary between the MPWT and MEF. The role and executive/institutional aspects of the NRMC in terms of the budgeting process, implementation stage and payment stage are described below.

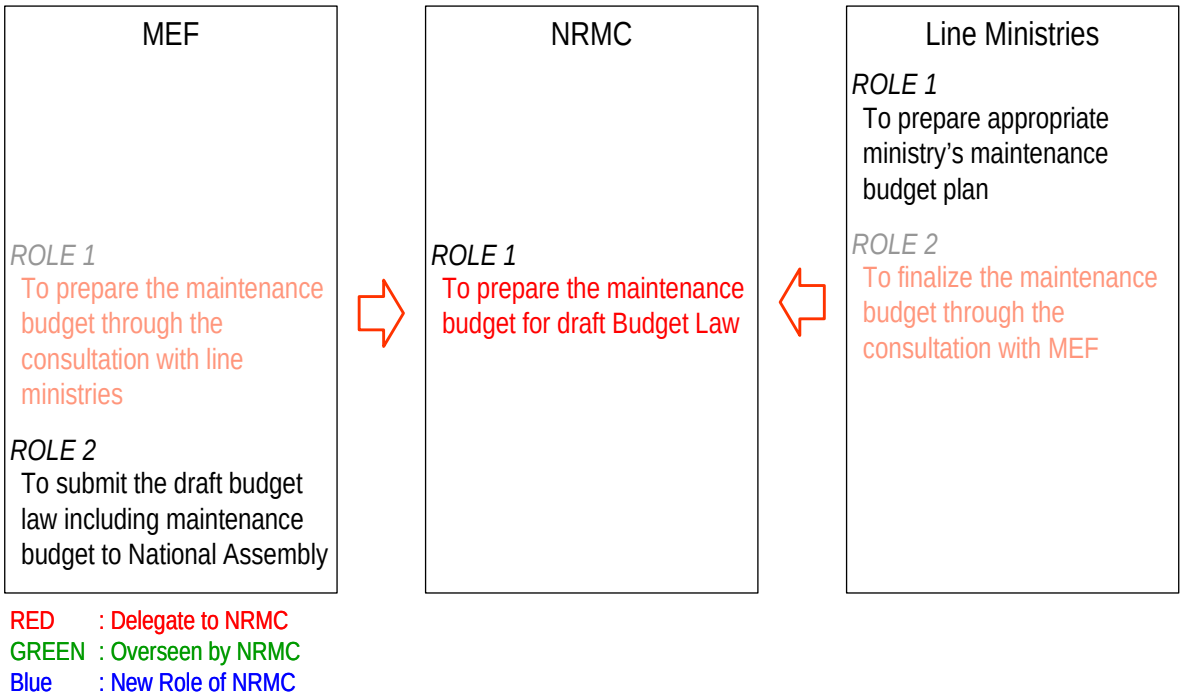


Figure 6.2.1 Role of the NRMC in the Budgeting Process

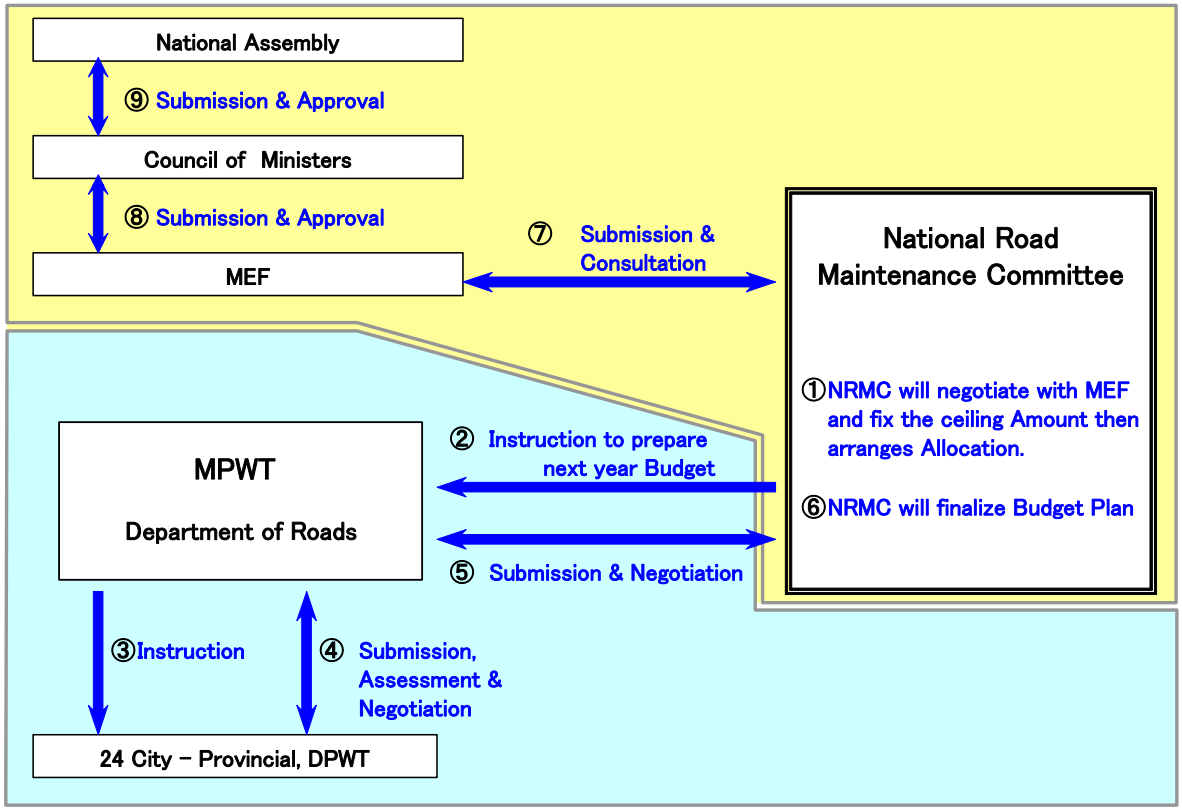


Figure 6.2.2 Executive/Institutional Aspect

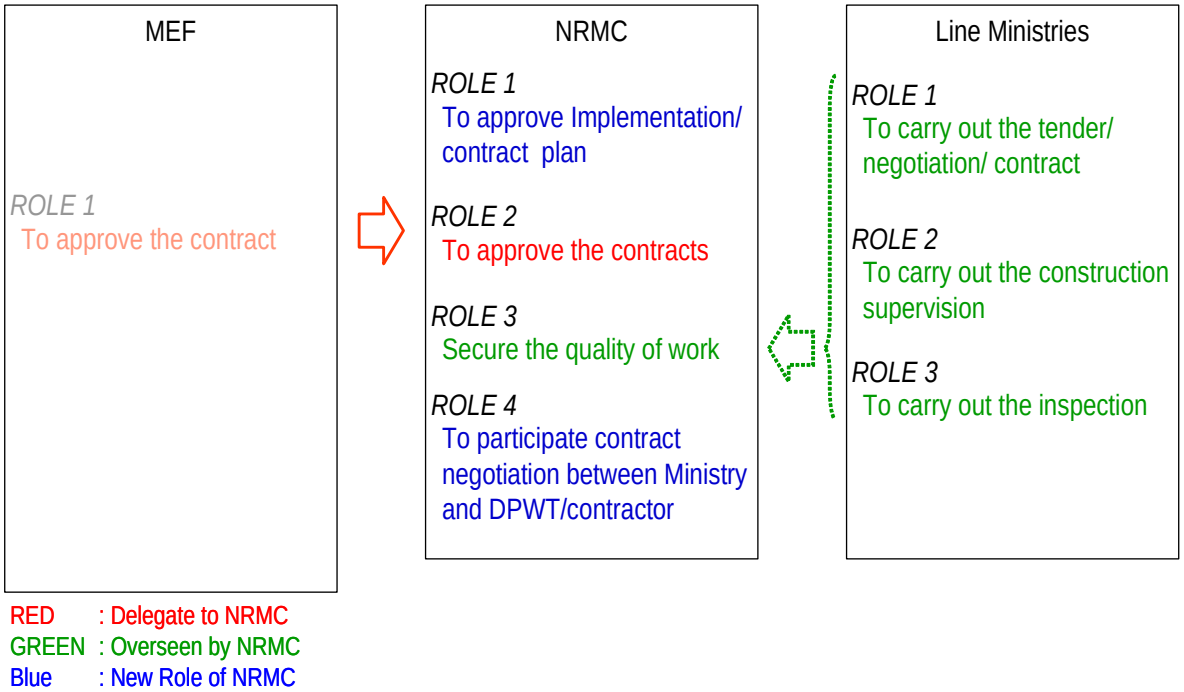
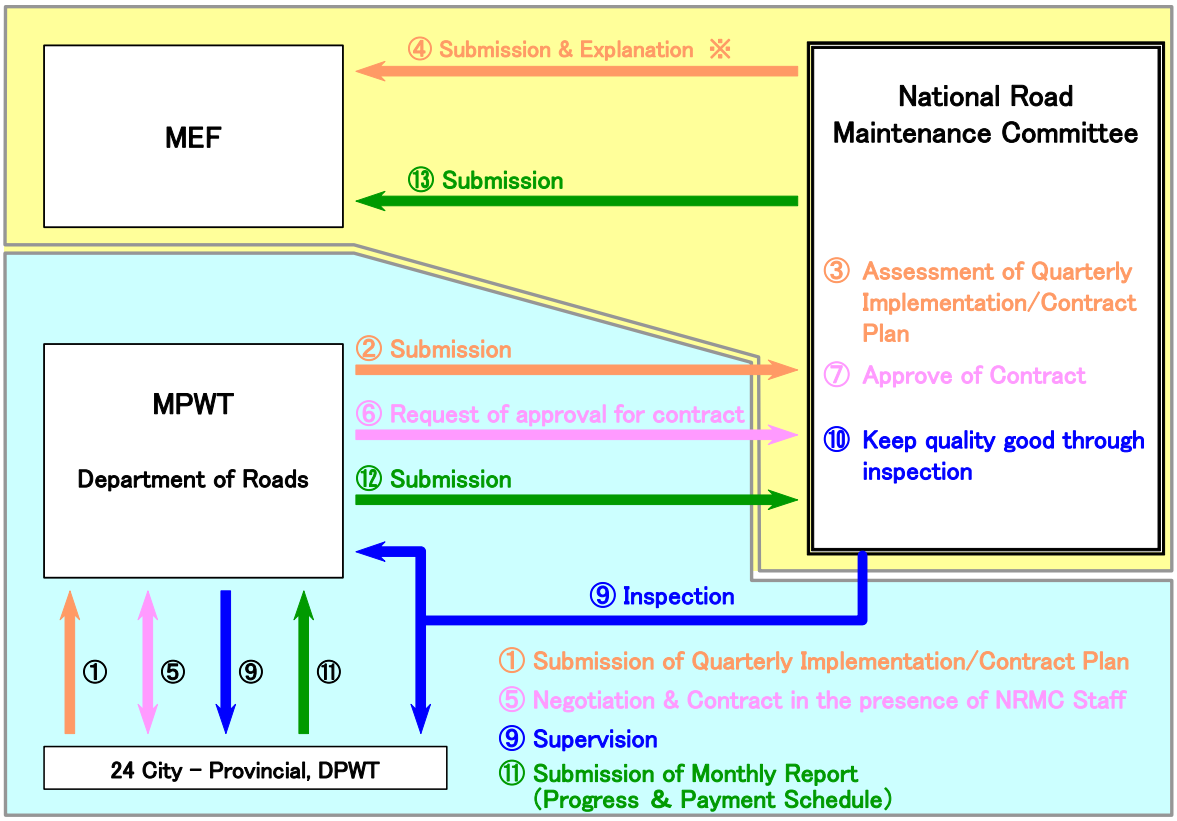


Figure 6.2.3 Role of the NRMC in the Implementation Stage



※After procedure ④, MPWT can commence contract activities and NRMC gets a Power to Approve Contract

Figure 6.2.4 Executive/Institutional Aspects by Force account

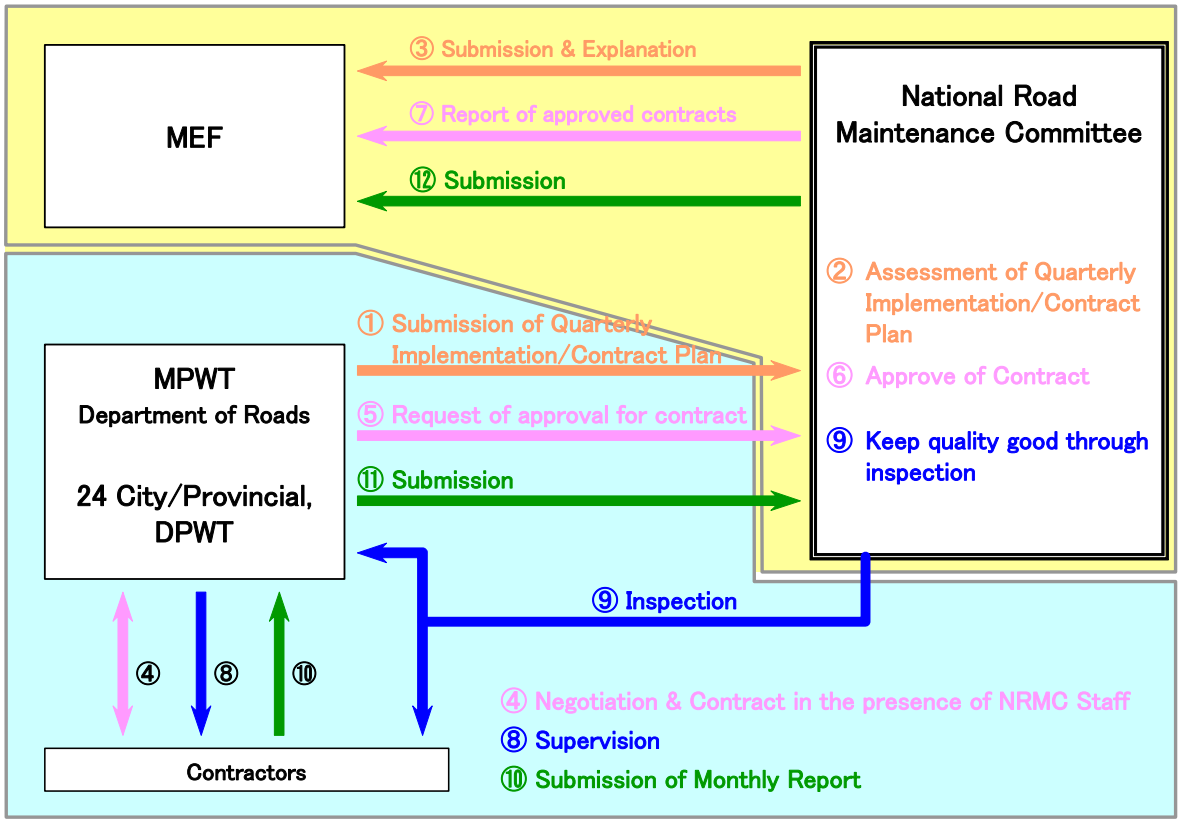


Figure 6.2.5 Executive/Institutional Aspects by Contract Out

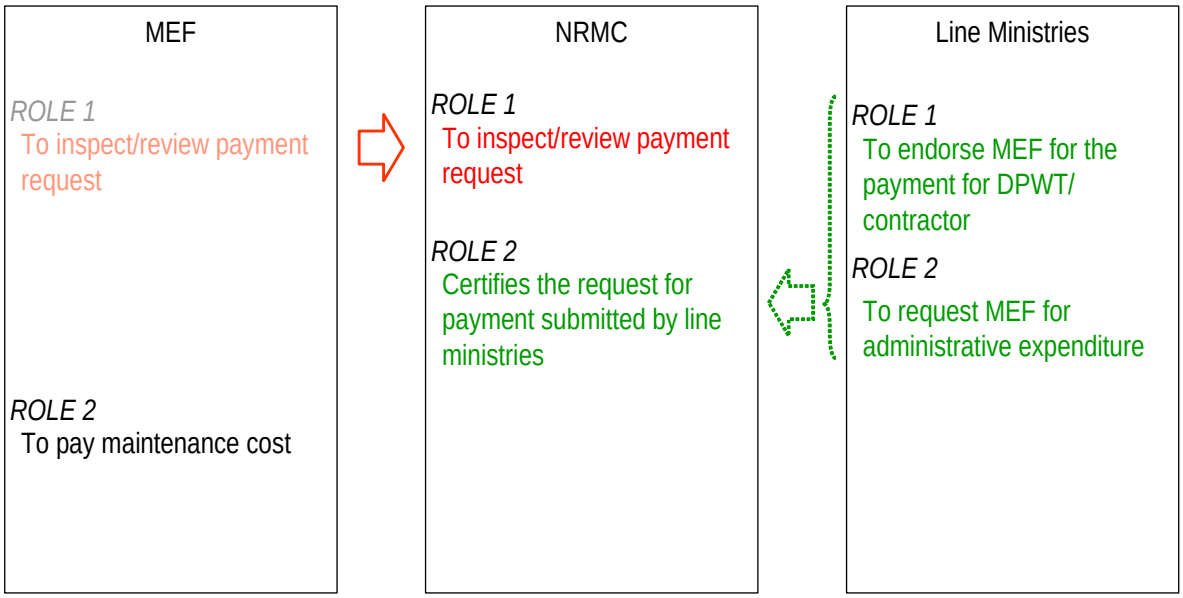


Figure 6.2.6 Role of the NRMC in the Payment Stage

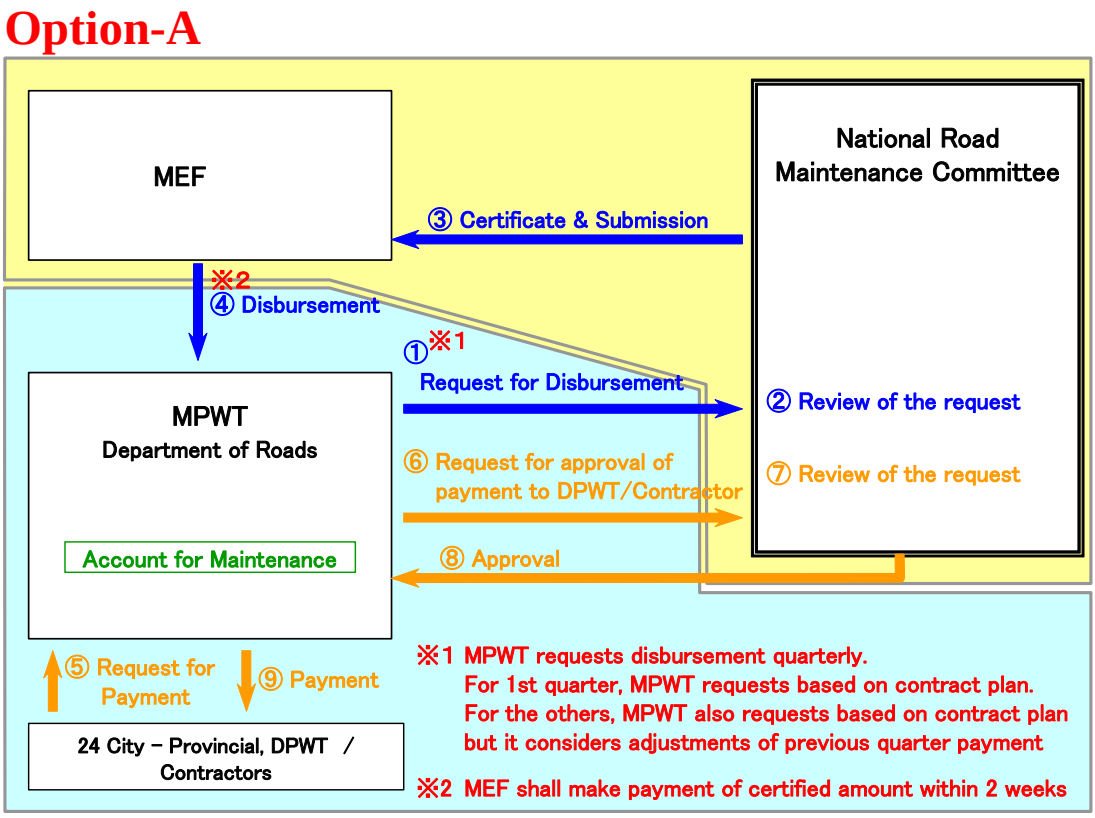


Figure 6.2.7 Executive/Institutional Aspects for Payment (1)

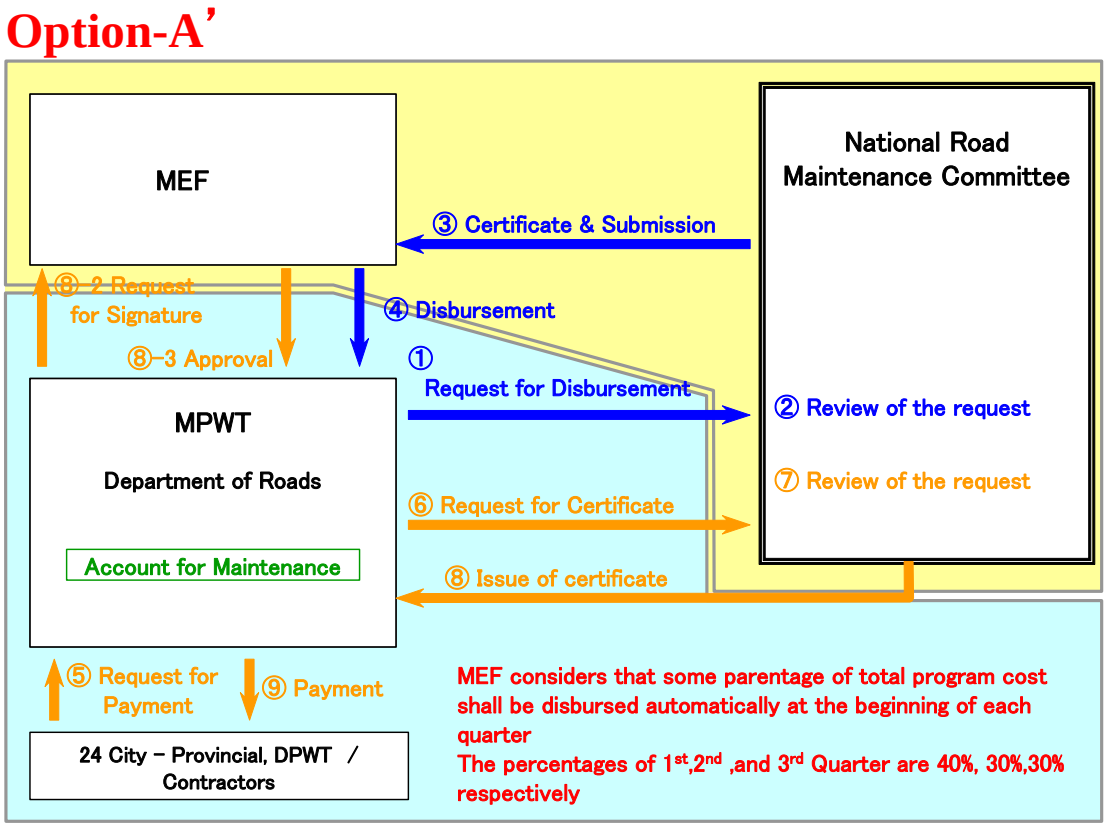


Figure 6.2.8 Executive/Institutional Aspects for Payment (2)

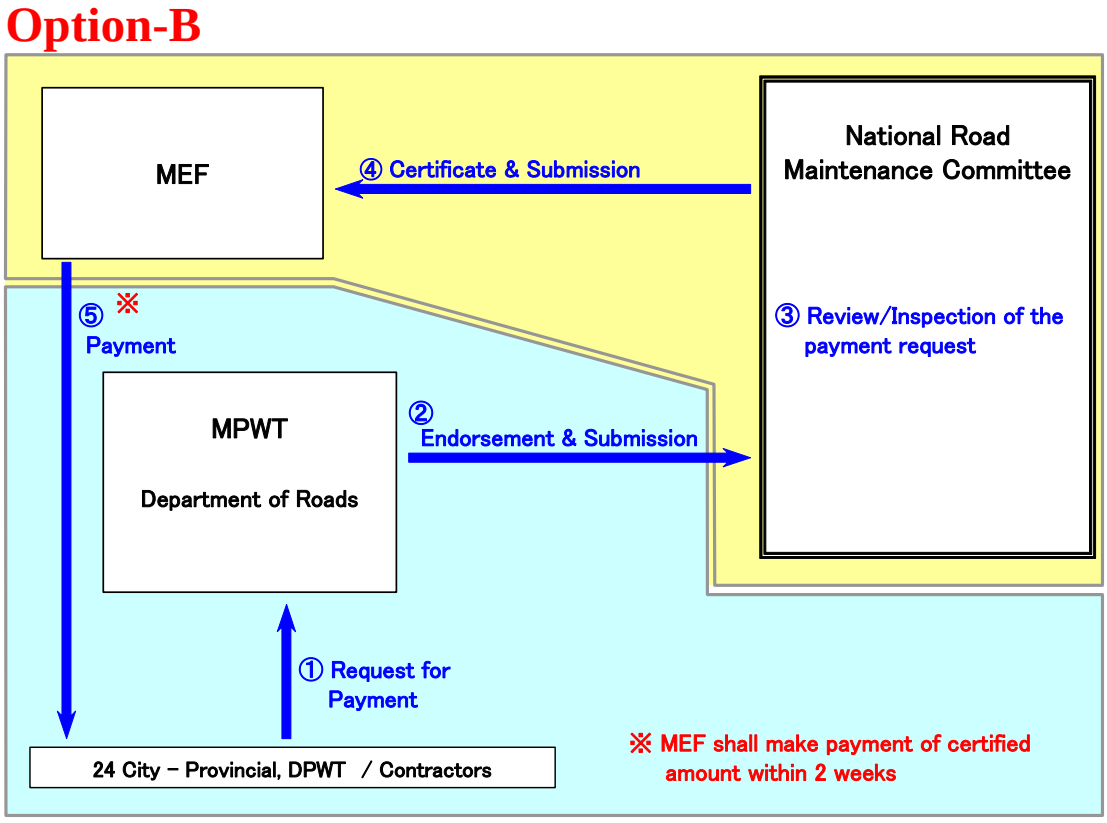


Figure 6.2.9 Executive/Institutional Aspects for Payment (3)

The Routine Operation Program which involves the NRMC, MEF, Line Ministry and DPWT, and describes the overall budgeting, implementation, and fund schedule based on a time axis, is shown in Appendix-1. The NRMC will be dissolved when the capacity of the MPWT/DPWT staff has improved and direct negotiation with MEF is possible.

6.3 Organizational Structure of the NRMC

The NRMC consists of the MPWT, MRD, MOWRAM, Ministry of Interior and MEF. The Regulation and Law No.3567 for Using the Fund for Road Repair and Maintenance announced by MEF on 24 July 2002 defines the usage of the road maintenance fund between the four (4) authorities. In this regulation, the MRD is responsible for rural roads, the MOWRAM for dike roads and the Ministry of Interior is responsible for the streets on behalf of 24 cities and provinces.

The present lack of maintenance activity occurs not only in the MPWT but is also progressing in other line ministries due to the reasons described in Chapters 5.2.3 and 5.2.4. The Study Team recommends that all relevant authorities work together to determine how to improve the capabilities of each line ministry. The proposed organization is illustrated as follows. In relation to the key roles within the national road management committee, the Chairman of the Board will be from the MPWT and the Vice Chairman from the MEF.

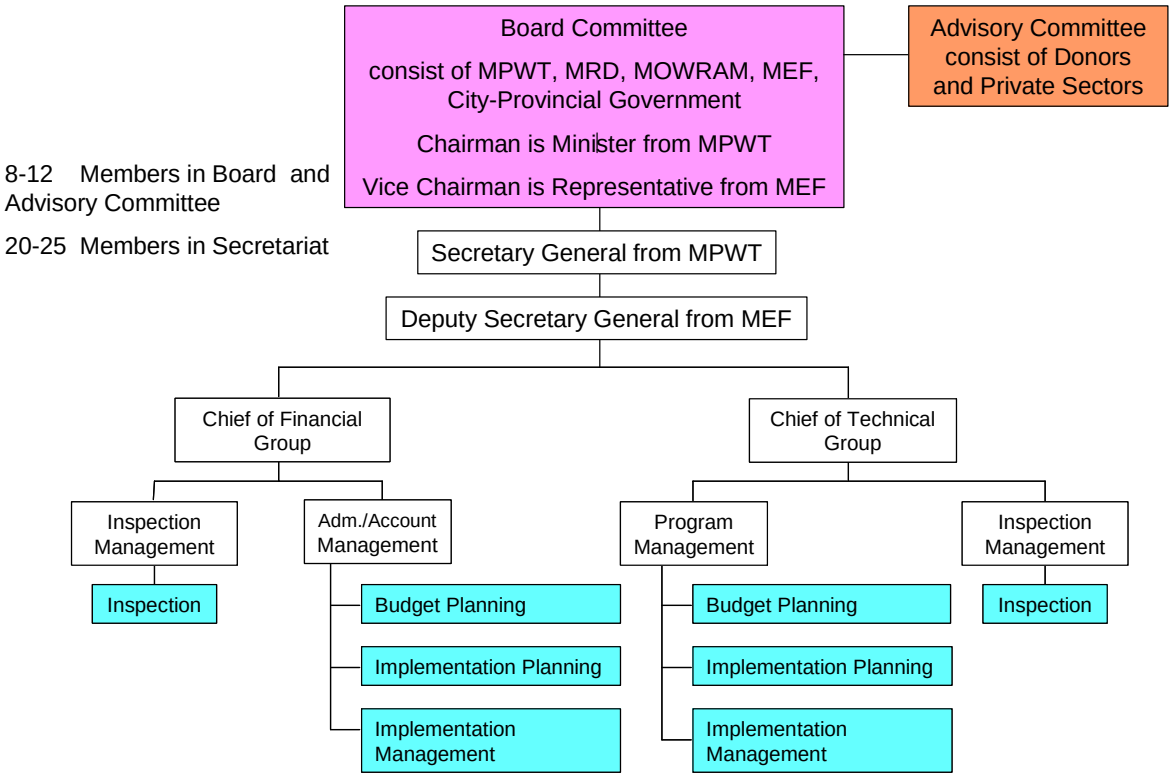


Figure 6.3.1 Organization of NRMC (draft)

The Advisory Committee consists of donors, a public accountant, an ISO qualified auditor and representatives of oil importers/others.

6.4 Legislative Background

When the recommended NRMC has been agreed between the donors and the ministries concerned, the NRMC shall be officially stated in the new Road Act which is being prepared by the MPWT. By the time NRMC obtain the legal status based on both the "Sub-Decree on opening the Special Account in MEF (Draft)" and the "Sub-Decree on Establishing the National Road Maintenance Committee" prepared by the Study Team would be available to operate the NRMC.

Both Sub-Decrees are attached in Appendix-2.

6.5 Financial Background

The Added Tax shall be used for the operation of the NRMC and the annual operating costs are estimated at approximately $300,000. The cost estimation is attached in Appendix-3.

6.6 Technical Background

The key staff for the Financial Group will be temporarily transferred from the MPWT, and other officials will be transferred from the MPWT, DPWT and MOWRAM. For the Technical Group, key staff will be transferred from the MPWT, and other engineers will be transferred from the DPWT and MOWRAM. Their terms of service will be a maximum of three to five years, and they will return to their home ministries when their terms are over. This personnel exchange must be carried out gradually in order not to interfere with the service of the NRMC.

6.7 Opposition from the MEF

The MEF has opposed to the establishment of National Road Maintenance Committee (NRMC) as NRMC has to manage and disburse the fund for road maintenance revolving around added tax. The MEF also pointed out that NRMC is more complicated organization which is composed various parties and will be spent the additional cost. Meanwhile, the MEF proposes to establish the Inter-Ministerial Committee (IMC) for evaluation of maintenance program and smooth maintenance activities. The point of emphasis by NRMC and IMC are shown in **Table 6.7.1**.

Road authorities will adopt the maintenance management in either organization, it is necessary to promote the common understanding among concerned Ministries for the early realization of sustainable maintenance management mechanism.

Table 6.7.1 Comparison between NRMC and IMC

<table>
<tr><th></th><th>NRMC (Proposed by Study Team)</th><th colspan="2">IMC (Proposed by MEF)</th></tr>
<tr><td>Personnel Organization</td><td>Road authorities, MEF, MOI (on behalf of provinces), and private sector</td><td colspan="2">MPWT and MEF</td></tr>
<tr><td>Management of Maintenance Fund</td><td>By MEF</td><td colspan="2">By MEF</td></tr>
<tr><td>Role at Budgeting Process</td><td>To prepare the annual maintenance program including cost which is based on budget plan prepared by MPWT/DPWT</td><td colspan="2">To discuss and agree consensus on annual maintenance program which is submitted by MPWT.
(Decision of budget will be committed by minutes of discussions between MPWT and MEF)</td></tr>
<tr><td>Role in Implementation Stage</td><td>To approve the implementation plan
To participate contract negotiation
To approve the contract
To secure the quality control</td><td colspan="2">To response for random inspection
(To approve the contract by procurement committee)</td></tr>
<tr><td>Role in Payment Stage</td><td>To certify and submit for disbursement to MEF
To inspect/review payment request
To certify the request for payment submitted by MPWT</td><td colspan="2">No activities for IMC
(To evaluate progress by MEF)
(Direct payment from MEF to DPWT/contractors)</td></tr>
<tr><td rowspan="3">*Time Frame for Disbursement*</td><td rowspan="3">4 trenches of disbursement both routine and periodical works</td><td colspan="2">MEF policy
(Routine works)
3 trenches of disbursement
(Periodical works)</td></tr>
<tr><td>Force account</td><td>Contract out</td></tr>
<tr><td>Advance payment
Progress payment
Retained till warrantee period</td><td>Subject to prior evaluation</td></tr>
</table>

Disadvantage of financial procedure by IMC has been pointed out the below;-

1) Piece meal approval of disbursement request.

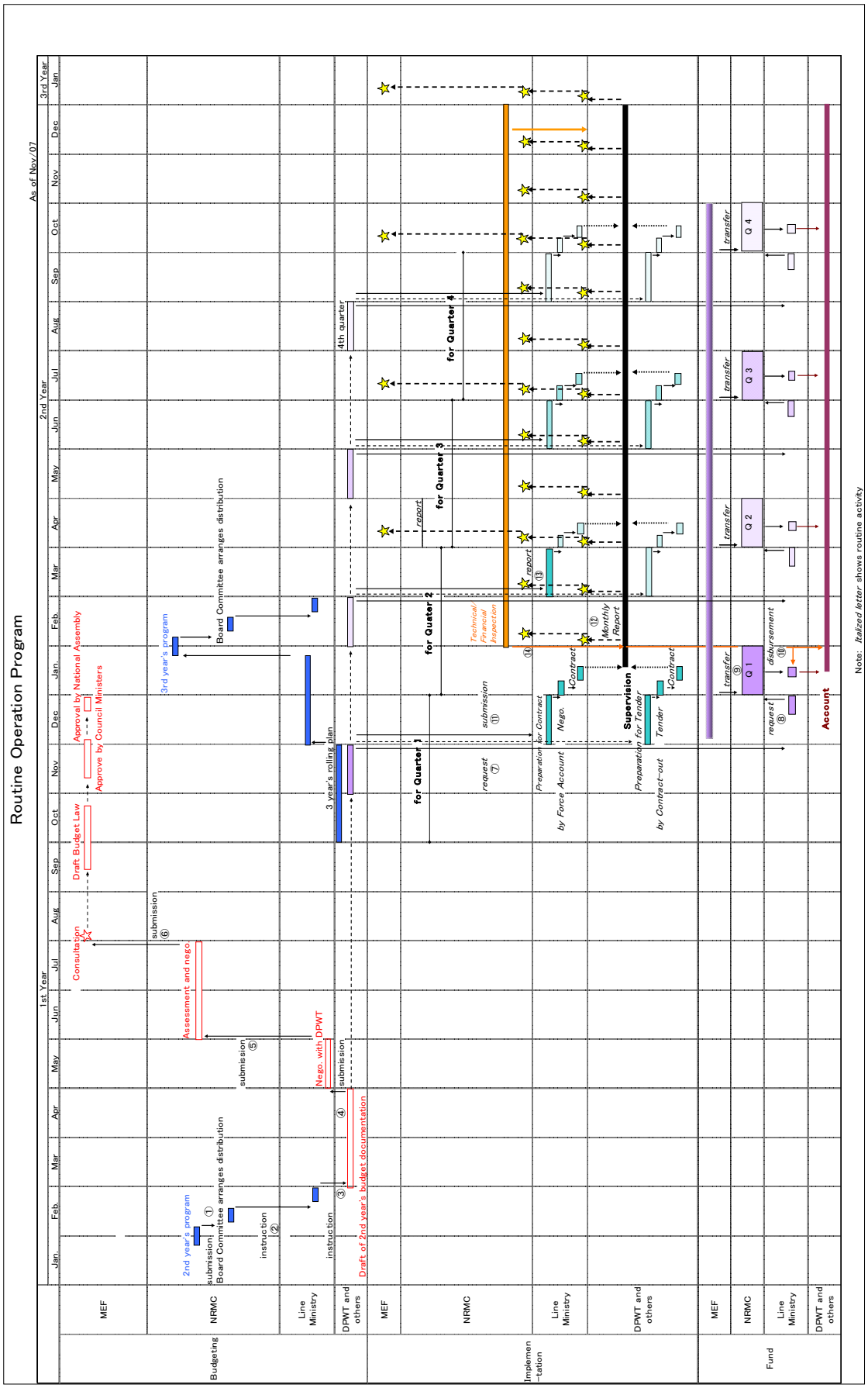
2) Length negotiation until finalization of disbursement and length procedure until obtaining approval of ever-conducted understanding.

3) Insufficient flow of fund originated from general account

4) Double negotiation as to determination of program and to disbursement request.

APPENDIX FOR CHAPTER MP-B-6 REFERENCE FOR ESTABLISHMENT OF NRMC

Appendix-1



Appendix-2 Sub-Decree on the Special Account (Draft)

As of 17/Dec./'05

(Purpose)

1. The Special Account shall be opened to secure the Road Maintenance Fund for the smooth and effective implementation of road maintenance activities by the National Road Maintenance Committee (NRMC).

(Application)

2. The Special Account shall be opened in the National Treasury separately from the present General Account,
3. MEF is responsible for the administration of both revenue and expenditure procedures of the Special Account,
4. The revenue from gasoline/diesel is earmarked as the Road Maintenance Fund and its application is limited to road maintenance purpose in principle.
5. MEF shall consult with NRMC in the case when the Fund shall be applied to other purposes,
6. The surplus of Fund generated in previous fiscal year shall be carried over to the next fiscal year, should initiation/implementation of certain undertakings in road maintenance work in captioned fiscal year be delayed or postponed to the next fiscal year,
7. MEF can appropriate certain portion of surplus of fund in previous fiscal year for the operation in the first quarter of the next financial year, when the stock of the special fund is expected to be insufficient due to shortage of accumulated tax revenue in this period,
8. Should the balance of budget result in surplus beyond certain amount at the end of fiscal year, certain amount of the surplus is reserved as the contingency for next year's operation, and;
9. Should the balance of budget result in deficit, MEF shall arrange supplement of the deficit from other sources, including the available contingency fund prescribed in Article 8, after the consultation with NRMC.

(Fiscal Years)

10. The fiscal year of the Special Account commences 1st of January and ends 31st of December.

(Operation)

11. MEF has to disburse the fund within 2 weeks after the receipt of disburse/payment from NRMC.

Sub-Decree on Establishing the National Road Maintenance Committee (Draft)

As of 17/Dec./'05

(Purpose)

1. The National Road Maintenance Committee (NRMC) shall be established to secure the implementation of the road maintenance activities effectively, smoothly and properly.

(Organization)

2. NRMC consists of the Board Committee, the Advisory Committee and Secretariats,
3. The Board Committee is represented by MEF, MPWT, MRD, MOWRAM and MOI as representative of Provincial/Municipality Governments, and;
4. The Advisory Committee is represented by key donors and private sector.

(Board Committee)

5. The Board Committee is the supreme body for decision-making relative to road maintenance planning, budgeting and activities with the advice from the Advisory Committee, and;
6. The Chairman of Board Committee shall be the Minister of MPWT and vice Chairman shall be the Minister of MEF.

(Secretariats)

7. Secretariats are representatives from MEF, MPWT, MRD, MWRAM and Provincial/Municipality Government staffs,
8. Secretariats consist of Financial and Technical groups; Financial group is responsible for all the financial aspects of budgeting, implementation and management of daily road maintenance activities, whilst Technical group is responsible for engineering aspects of budgeting, implementation and management of daily road maintenance undertakings.

(Function)

9. NRMC is responsible for ;
    1) Formulation of road maintenance policies and strategies and plan,
    2) Coordination, examination and review of programs submitted by MPWT, MRD, MOWRAM and Provincial/Municipality Governments,
    3) Preparation of the National Road Maintenance Program, negotiation of annual budget with MEF and allocation of maintenance budget to MPWT, MRD, MOWRAM and Provincial/Municipality Governments,
    4) Preparation of road maintenance implementation master plan based on plans to be submitted by MPWT, MRD, MOWRAM and Provincial/Municipality Governments,
    5) Certification of the payment requests to be submitted by MPWT, MRD, MOWRAM and Provincial/Municipality Governments,
    6) Overseeing daily activities of road maintenance by MPWT, MRD, MOWRAM and

Provincial/Municipality Governments, and;

7) Conduction of financial and technical inspections.

(Supervision and Inspection)

10. When NRMC identifies the defaults in proposals and implementation process in terms of Article 9.4) and 5), NRMC shall instruct MPWT, MRD, MOWRAM and Provincial/Municipality Governments to modify/correct his plan or activities in implementation.

Appendix-3

Estimated Operation Annual Cost on NRMC (draft)

No.1

Item		Quantity	Unit	Unit Price ($)	Amount ($)	Remarks
1 Remuneration						
Board Member	10mans x 12months	120	M.M	400	48,000	
Senior Staff	4mans x 12months	48	M.M	350	16,800	
Junior Staff	18mans x 12months	216	M.M	300	64,800	
Office Boy	1man x 12months	12	M.M	100	1,200	
Sub-total 1					129,600	
2 Out-of-Pocket Expenses						
1.Periodical Meeting	2times x 12months	24	Time	50	1,200	
2.Implementation Inspection at initial stage (once)						
Air Ticket	P.P～Siem Reap	4	man	122	488	
	P.P～Ratannak Kiri	4	man	121	484	
Rent Car	4WD	160	day	60	9,600	
Per Diem	4mans x 80daysx 1time	320	day	15	4,800	
Accommodation	4mans x 80daysx 1time	320	day	25	8,000	
3.Implementation Inspection at mid-term stage (twice)						
Air Ticket	P.P～Siem Reap	8	man	122	976	
	P.P～Ratannak Kiri	8	man	121	968	
Rent Car	4WD	320	day	60	19,200	
Per Diem	4mans x 80daysx 2times	640	day	15	9,600	
Accommodation	4mans x 80daysx 2times	640	day	25	16,000	
4.Handing Over Inspection (once)						
Air Ticket	P.P～Siem Reap	4	man	122	488	
	P.P～Ratannak Kiri	4	man	121	484	
Rent Car	4WD	160	day	60	9,600	
Per Diem	4mans x 80daysx 1time	320	day	15	4,800	
Accommodation	4mans x 80daysx 1time	320	day	25	8,000	
5. Office Car						
Sedan	Rental 2nos x 12months	24	month	660	15,840	
Sub-total 2					110,528	
3 Office Rental Expense						
Office Rental	250m2 x 6.0$/m2	12	month	1,500	18,000	
Safety Guard		12	month	300	3,600	
Sub-total 3					21,600	

Item		Quantity	Unit	Unit Price ($)	Amount ($)	Remarks
4 Auditing Expense						
By Authority		2	time	0	0	Free of Charge
Sub-total 4					0	
5 Other Expenses						20 % of depreciation in a year
Office Furniture						
Desk, Chair		22	no.	40	880	$200 x 0.2
Computer		15	no.	180	2,700	$900 x 0.2
Printer		3	no.	100	300	$500 x 0.2
Photocopy machine		2	no.	360	720	$1800 x 0.2
Cabinet		10	no.	30	300	$150 x 0.2
Reception Set		1	set	100	100	$500 x 0.2
Meeting Table		1	set	160	160	$800 x 0.2
Refrigerator		1	no.	80	80	$400 x 0.2
Air Conditioner		6	no.	120	720	$600 x 0.2
TEL/FAX		2	no.	50	100	$250 x 0.2
Kitchen, Cabinet		1	L.S.	40	40	$200 x 0.2
Miscellaneous		1	L.S.	160	160	$800 x 0.2
Sub-sub-total				.	6,260	
Office Equipment		12	month	200	2,400	
Telephone Charge		12	month	300	3,600	
Electricity Charge		12	month	300	3,600	
Water Charge		12	month	40	480	
Miscellaneous Charge		12	month	300	3,600	
Printing Charge		12	month	60	720	
Sub-total 5					20,660	
Contiengency		1	L.S		10,000	
Total					**292,388**	

CHAPTER B-7 PROPOSAL FOR THE IMPROVEMENT OF ROAD MAINTENANCE BY THE MRD

7.1 Existing Road Maintenance

7.1.1 Rural Road Management

The Ministry of Rural Development (MRD) has been established with an immediate task of meeting the basic needs of all impoverished Cambodians and to safeguard the rights of the rural population to participate in plans affecting their future. The implementation of actions, projects and investments has been aimed at building institutional capacity and these projects, for example Rural Infrastructure, Community Assets Improvement Programs, Agricultural Development and Micro-economic Development, have been supporting social economic growth in the overall context of the development of the socio-economy in the rural area.

Figure 7.1.1 shows the organizational chart for the MRD. The MRD is one of the road authorities and is responsible for managing and maintaining the rural roads. One of core functions of the MRD is to carry out infrastructure development and road maintenance. The rural road network is an extensive, expensive and fragile asset vital for rural development and the economic and social well-being of the rural communities. Without active and appropriate management and maintenance the roads will rapidly deteriorate, reversing the recent rehabilitation benefits and severely constraining all rural activities and initiatives.

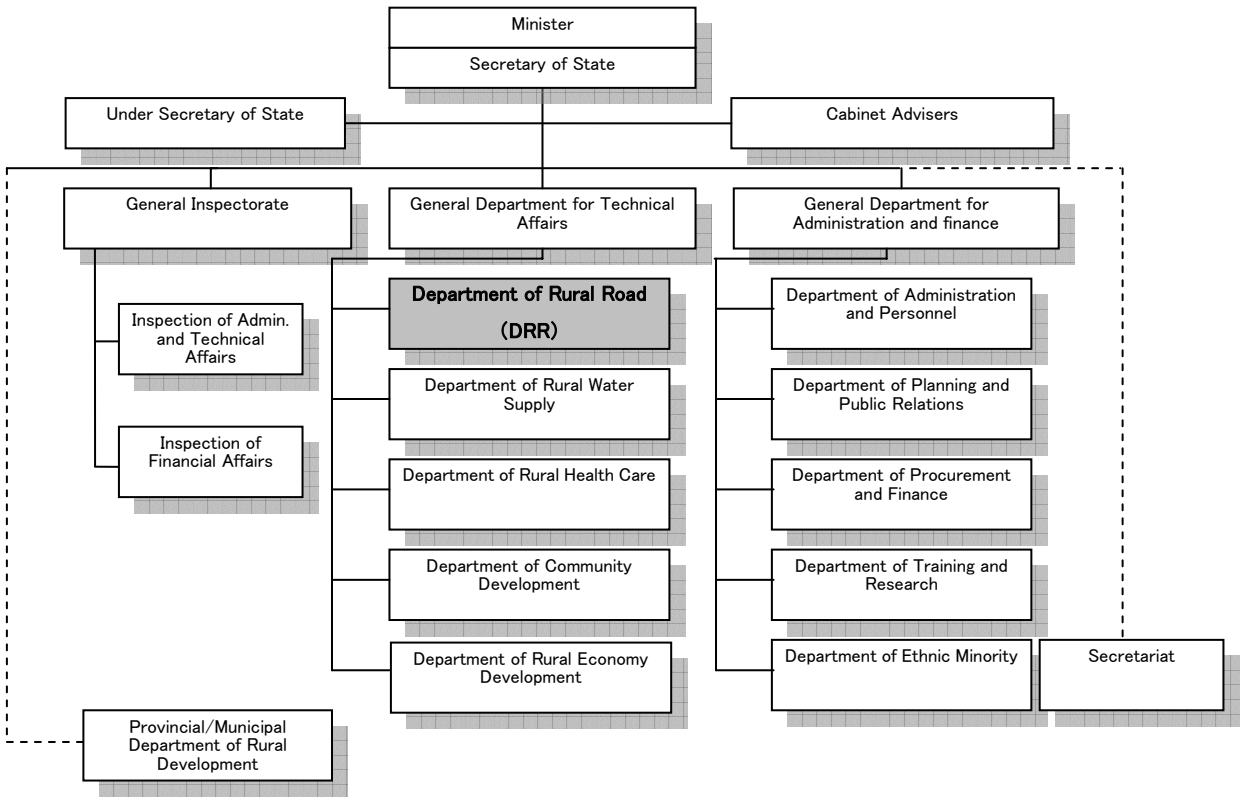


Figure 7.1.1 Organization Chart for the Ministry of Rural Development

The Department of Rural Roads (DRR) is assigned to carry out its duties for the management of the rural roads in compliance with the Rural Road Policy.

Figure 7.1.2 shows the organization chart for the DRR. The department consists of one (1) director and forty six (46) staff. The staff are divided between five (5) offices; 1) General Affairs Office, 2) Planning and Statistics Office, 3) Maintenance Management Office, 4) Monitoring and Evaluation Office, and 5) Research and Development Office. Based on the mandate the following duties are performed by the DRR:

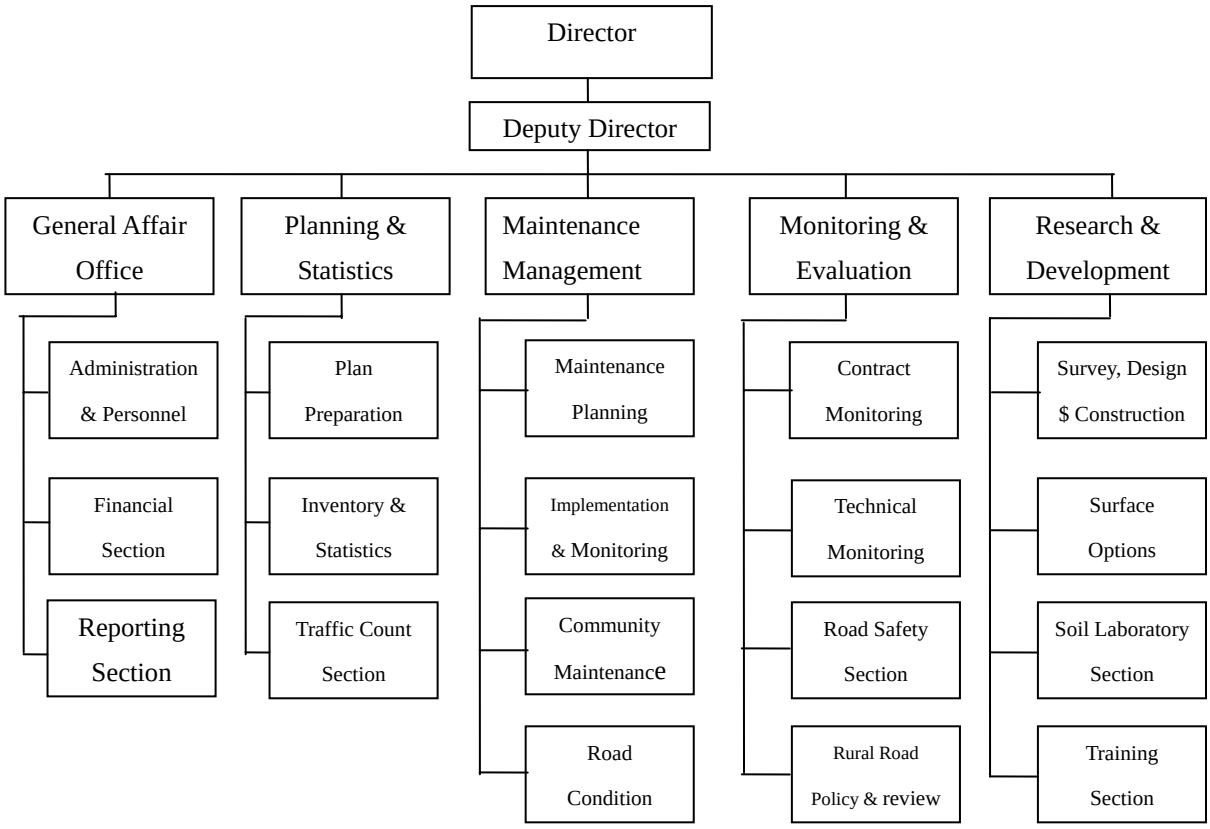


Figure 7.1.2 Organization Chart for Department of Rural Road

(1) General Affairs Office:

1) To organize and retain the documents for the department such as laws, sub-decrees, policies and other forms relating to the department;

2) To manage the departmental staff;

3) To manage the revenue and expenditure budget for the department;

4) To make monthly, quarterly, semester, nine monthly and annual reports.

(2) Planning and Statistics Office:

1) To implement and assist the PDRD(PRRO) to carry out;

- traffic counting and analysis
- inventory of all rural roads
- socio-economic survey of rural roads by IRAP planning

2) To manage the rural road data, statistics and short, medium and long term development plans;

3) To follow up and evaluate the implementation plan for the rural road development.

(3) Maintenance Management Office:

1) To identify, study, make research and prioritize the rural roads that need to be maintained through out the country,

2) To follow-up and ensure the rural road maintenance works are implemented according to the implementation plan;

3) To organize a procedure for and encourage the establishment of rural road maintenance committees by the rural community.

(4) Monitoring and Evaluation Office:

1) To monitor and evaluate the rehabilitation and construction contracts for the rural roads and road structures;

2) To monitor and evaluate the technical supervision implemented by PDRD (PRRO),

3) To organize and upgrade the policy on rural roads;

4) To ensure that the most suitable technology is used to ensure sustainable rural development;

5) To monitor and analyze road safety reports from the PRRO and to advise, where relevant, on measures to mitigate accidents.

(5) Research and Development Office:

1) To carry out and assist the PDRD (PRRO) in the implementation of the surveying, design and construction of rural roads and road structures;

2) To undertake soil tests for rural roads and the foundations for road structures;

3) To undertake research and experiments on the selection of pavement materials;

4) To develop the skills of the PDRD (PRRO) staff and the private sector (where relevant), through training, in relation to the development of the rural roads.

The formulated Policy of Rural Roads has been implemented since 1999. The objective of this policy is that the MRD is responsible for facilitating the improvement of the rural social and economic conditions. The mission statement is “DRR will contribute to this goal by increasing

rural access through cost-effective investment in the maintenance and development of rural roads, routes and transport infrastructure". The policy consists of financing road maintenance, setting specifications, technology, human resources development, prioritizing criteria and performance monitoring with setting out the rationale.

7.1.2 Present Rural Road Network

The existing rural road network under the MRD is approximately 28,000 km in length (18,948.08 km completed construction, as shown in **Table 7.1.1**). The MRD is responsible for the rural tertiary and sub-tertiary roads. Only a small portion of the existing network is in a good or fair condition (i.e. accessible and maintainable). The remaining roads have mainly reverted to earth and are in a poor or bad condition. These latter routes are awaiting rehabilitation and are mostly inaccessible and un-maintainable at this time.

Table 7.1.1 Total Length of Roads under MRD

(Unit: km)

Province/Municipality	Total Length	T	ST1	ST2	ST3
1. Banteay Meanchey	2,102.95	280.10	289.65	97.01	1,436.19
2. Battambang	1,067.12	173.40	163.60	283.51	446.61
3. Kampong Cham	1,605.24	300.98	467.76	181.83	654.67
4. Kampong Chhnang	868.85	86.37	129.25	399.52	253.71
5. Kampong Speu	354.45	156.05	28.50	96.70	73.20
6. Kampong Thom	1,462.49	64.04	38.70	398.12	961.63
7. Kampot	232.78	116.72	24.60	81.66	9.80
8. Kandal	1,879.02	42.00	70.40	369.87	1,396.75
9. Koh Kong	250.50	0.00	83.00	39.00	128.50
10. Kratie	213.19	144.04	45.00	19.35	4.80
11. Mondul Kiri	521.70	0.00	0.00	59.00	462.70
12. Phnom Penh	181.07	0.00	0.00	181.07	0.00
13. Peah Vihear	231.70	8.00	223.70	0.00	0.00
14. Prey Veng	500.13	107.80	34.50	197.72	160.11
15. Pursat	1,396.35	136.91	152.45	150.30	956.69
16. Rattanak Kiri	823.73	0.00	387.57	205.16	231.00
17. Siem Reap	615.91	78.15	75.60	188.90	273.26
18. Sihanoukville	339.60	70.50	0.00	44.70	224.40
19. Stung Treng	917.50	69.00	344.00	105.00	399.50
20. Svay Rieng	514.28	182.57	117.07	137.93	76.71
21. Takeo	1,332.62	0.00	185.23	111.18	1,036.21
22. Oddar Meanchey	1,058.85	216.00	31.23	85.03	726.59
23. Kep	99.80	0.00	15.00	63.60	21.20
24. Pailin	378.25	68.90	257.00	27.79	24.56
Total	18,948.08	2,301.53	3,163.81	3,523.95	9,958.79

Source: DRD, 2005

T(Tertiary) : District to District

ST1(Sub-Tertiary1): District to Commune

ST2(Sub-Tertiary2): Commune to Commune

ST3(Sub-Tertiary3): Commune to Village, and Village to Village

7.1.3 Procurement, Budget Request and Allocation of Maintenance Works

The current procedure for maintenance budgeting is shown in **Figure 7.1.3**. This procedure appears to follow the bottom-up method, but this is the only preparation of a request from the provincial areas. MEF has been disbursing the annual maintenance budget to the MRD on a one-sided basis. The amount requested from the PDRD is much larger than the actual disbursements. However, the maintenance budget has not been increasing, and the trafficable rural roads have not been extended even though the rural areas are developing rapidly. This problem is due to not only the system for budget requests, but also in the management of the road inventory. The NRMC shall instruct and assist in the preparation of the budgeting plan for rural roads. At same time, it is necessary for the MRD to develop capacity for the management of road inventory data and evolution of maintenance activities.

Figure 7.1.3 Current Flow of Maintenance Budget

The maintenance works have been implemented in two ways. The MRD contracts out most of the road maintenance works, with the remaining works being by force account based on the policy described below.

- *Labor-based appropriate technology*

The MRD officials advised that the works completed by force account do not achieve the required quality. Therefore, the MRD has modified the policy such that most of the procurement will soon be undertaken by the contract out method.

The road maintenance budget expressed in Chapter 13 is under the national budget code. The requested budget amount for the year 2005 was 7,000 million Riel. The breakdown of this budget is;

1) Routine maintenance : 609 km

2) Periodic maintenance : 235.5 km

The assumed unit cost is;

1) Routine maintenance : 615 USD/km

2) Periodic maintenance : 3,000 USD/km (required once in three years)

Source: Hearing at MRD

The budget allocated to the MRD for the period from 2000 to 2005 is shown in **Table 7.1.2**.

Table 7.1.2 Maintenance Budget for the MRD

(Unit: million Riel)

Year	2000	2001	2002	2003	2004	2005
Budget Package	200	2,200	5,600	6,000	8,000	7,000
Actual expenditure	199	2,191	5,000	5,100	5,217	6,990
Routine Maint. (km)	-	-	-	297.3	998.8	609.0
Periodic Maint. (km)	8.0	45.0	81.3	151.5	124.0	235.5

Source: Hearing by the Study Team

7.1.4 Identification of Problems

(1) Allocation of Maintenance Budget

The MRD prepares a detailed five-year maintenance target in terms of figures. Although the allocated budget is insufficient however, in case the allocation will develop twice or three times, this agency would accelerate contract-out system to secure the quality and smooth management except road inventory and other data collecting system. At present, MEF implements and controls the annual maintenance budget. A maintenance system should not be generated that would hinder the growth of the MRD efforts.

(2) No inventory system for rural roads

The Study Team attempted to determine the current surface conditions of the rural roads, however there is no data available in the MRD. The MRD has to manage a huge network of rural roads in Cambodia. It is too difficult to develop such a substantial inventory as well as other data for this rural road network. The MRD shall develop a simple and appropriate data collection system as soon as possible.

(3) Insufficient knowledge to undertake maintenance works

The MRD was established to manage the rural road network approximately 10 years ago. Since then, the MRD has always relied on donors for funding and for sending expatriate experts. Therefore, the MRD cannot improve the management systems and staff abilities in relation to the rural road network without assistance.

7.2 Improvement of Road Maintenance

There is a limited number of staff involved in the management of rural roads in the MRD in comparison with the MPWT, and the functional roles are clear in their policy. Unfortunately, all of the management to date has been undertaken by donors so the current operations in the MRD are insufficient and not effective.

The MRD should be capable of managing the rural road network within the national budget so that they are self sufficient should they run out of funds from the donors. The NRMC should be involved in helping the MRD in the budget planning. At the same time, the MRD should approach each issue from every angle in relation to rural development. Therefore, the MRD should plan for the development of the organizational capacity and should create a sustainable indicator to be evaluated. **Table 7.2.1** gives example improvement measures on a stage–by-stage basis.

Table 7.2.1 Improvement Measures for the MRD

Phase	I	II	III
Activity	* Identification of maintenance work * Comprehension of donors' report * Data collection * Reporting system	* Selection of priority of work * Timely planning of budget * Preparation of human resources development plan * Quality control system	* Training System from DRR to PDRD * Implementation & evaluation of training for leaders
Expected Outcome	* List of required works * Visual inspection sheet * Traffic data * Base road inventory * Daily road condition report * Monthly & quarterly reports * Original text or guideline for DRR & PDRD	* List of treatment selection * List of actual working costs * Budget for routine maintenance work * Budget for periodic maintenance work * Annual maintenance program * Training program & modules for DRR & PDRD * Training program for contractors improvement	* Course for training of trainers * Simple format for guideline of maintenance work
Transfer from	Foreign Expert	Foreign Expert/NRMC	DRR
Transfer to	DRR	DRR/PDRD	PDRD
Viewpoint of Assessment	* How fast to update road inventory data * Individual understanding of maintenance work	* Reduced cost & km of maintenance roads * Capable of planning for maintenance work (gap of plan stage & actual work)	* Transparency procurement of maintenance work * Speedy implementation (observation of schedule)

Description of Phase 1 and 2 are described to quote all from mandate of five (5) offices in MRD. The MRD is responsible for the development and implementation of effective codes, standards and reasonable guidelines which have been created by foreign donors. It is important for the MRD to understand how to modify these applications for their own use. It is proposed that staff should be able to meet with, and make recommendations to DRR executives if they find pertinent ideas of merit. This is the turning point for self management by the MRD.

One of the significant issues in the establishment of the NRMC is to identify the project cycle which consists of maintenance preparation, implementation, operations and evaluation. Each component is essential for the appropriate and efficient development of rural roads. The MRD should make the most of NRMC functions for maintenance implementation with small human resources.

Moreover, collaboration with MPWT/DPWT in technical and physical aspects of road maintenance is recommended. By this method, all authorities responsible for managing the road network in Cambodia can work together with common recognition. This will promote the realization of smooth domestic transportation and contribute to rural development.

CHAPTER B-8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Establishment and Role for NRMC

If the MPWT continues to manage maintenance works under the current system, it will be impossible to ensure the timely disbursement of maintenance activities at a low cost and commencing in the appropriate season. Under these circumstances, damage on the roads hinders users from efficiently traveling and transporting their goods. This problem of rapid deterioration of the roads may be attributed to poor planning, improper construction work, poor maintenance and insufficient quality control systems. These conditions lead to low road performance resulting in diminished benefits to road users which adversely affects the countries development program. Also, the significant and frequent rehabilitation of the existing roads defers the implementation of new road projects and further encumbers socio-economic growth. To eliminate these problems in the MPWT, it is important to establish a NRMC to identify all standards, design methods and quality control for road construction and maintenance activities.

8.2 Preparation of Guidelines for Maintenance Works

The MPWT shall publish and distribute road maintenance guidelines to all staff. These guidelines are listed below together with a description of the objectives of the guidelines. The objective is to achieve consistency in the planning, implementation and reporting of road maintenance activities. These guidelines are part of a suite of guidelines and resources available to the MPWT in relation to the implementation of the maintenance management framework. The MPWT is responsible for ensuring that the road maintenance budget is developed and implemented.

Table 8.2.1 Guidelines for Road Maintenance

(1) Budget Planning	1) Road Inventory
	2) Assessment
	3) Treatment Selection
	4) Unit Cost
	5) Implementation Plam
(2) Procurement	1) Selection of Contractor
	2) Negotiation /Tender Method
	3) Document
	4) Form of Contract
(3) Request/Disbursement	1) Linkage of NRMC
	2) Form of Payment Request/Disbursement
(4) Accounting	1) Open the Special Account
	2) Accounting Slip
	3) Accounting Book
	4) Form of Financial Inspection
(5) Preparation of Maintenance Work	1) Specifications/Drawing
	2) Method Statement
(6) Quality Control	1) Supervising System
	2) Inspection System
	3) Form of Technical Inspection

8.3 Maintenance Management by Project Cycle

There is an operations and maintenance plan for networks under the jurisdiction of the MPWT. In addition, the MRD has been developing a rural road policy. They should take an active part in the maintenance works and identify the project cycle. Project identification is the process of determining the potential road maintenance works and is the first stage in turning strategies or policies into actions and production. They should prepare the original project cycle which consists of the project preparation, project implementation and project evaluation.

8.4 Capacity Development for Local Contractors

To achieve growth in the construction industry, Cambodia should be constantly working to stimulate and expand the construction industry to improve its efficiency, productivity and competitiveness. With the objective of developing the construction industry to become one of the major contributing sectors in the national economy, the Study Team proposes the establishment of a registration system for local contractors. Contractors will be able to register for construction and maintenance works in Cambodia so that it will become easy for road authorities to manage and evaluate performance.

8.5 Provincial Capacity Development and Decentralization

A majority of the road maintenance activities are owned by the DPWT and it is important to determine how to recover their job-processing abilities from an administrative point of view and how to improve their capabilities from a technical point of view. The Study Team recommends that the following two items are targeted for improvement.

1. Transparency in the process of prioritizing projects.
2. Settlement on the project implementation capabilities of officials which differ in each province

The detailed program and measures are described in 5.3 Capacity Development of the MPWT and the DPWT, and 5.4 Improvement of Executing Capability.

The Study Team also recommends long-term technical assistance and equipment supply aimed at immediately enhancing the maintenance activities, on the premise that the Cambodian side is requested to not only wait for the technical/financial aid but also to take the necessary action to carry out the preparation of the guidelines and commence the capacity development program recommended by the Study Team.

For the reference, assumed capability of each province is attached in Appendix for the consideration to proceed in the training and personnel exchange and Equipment Supply.

APPENDIX FOR CHAPTER MP-B-8

CONSIDERATION TO PROCEED IN THE TRAINING, PERSONNEL EXCHANGE AND EQUIPMENT SUPPLY

Group by Region	Group by Dependence	Priority	Involved Province	Remarks
Central	1	First	Phnom Penh	
	2	Second	Kandal	Group Leader
			Kampong Speu	Follower
			Takeo	
North	1	First	Stung Treng	Group Leader
			Ratanak Kiri	Follower
	2	Second	Kratie	Group Leader
			Mondul Kiri	Follower
East	1	First	Kampong Cham	Group Leader
			Prey Veng	Follower
	2	Second	Svay Rieng	
South	1	First	Kampot	Group Leader
			Kep	Follower
	2	Second	Sihanoukville	Group Leader
			Koh Kong	Follower
West	1	First	Battambang	Group Leader
			Banteay Meanchey	Follower
			Pailin	
	2	Second	Kampong Chhnang	Group Leader
			Pursat	Follower
West-North	1	First	Siem Reap	Group Leader
			Oddar Meanchey	Follower
	2	Second	Kampong Thom	Group Leader
			Preah Vihear	Follower