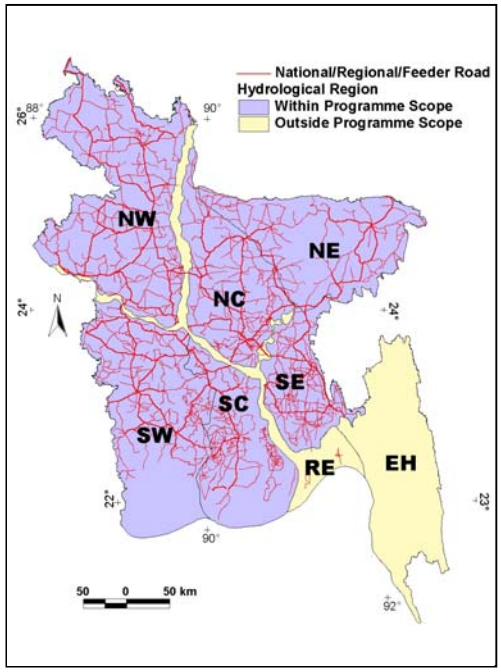
National, Regional and Key Feeder Roads - Flood Proofing Ref: **DM 004**

Basic Data

NWMP Sub-sector **Disaster Management**

Region(s) **All regions except RE and EH**



Relevance to NWPo

Article 4.2(o) requires the Government, through its responsible agencies, to develop flood proofing systems as a response to natural disasters, and Article 4.2(p) requires that appropriate measures are provided, in designated flood risk zones, to protect life, property and vital infrastructure etc. This Article also stipulates that national communications infrastructure such as roads and railways should be constructed (whether new or rehabilitated) above the highest ever-recorded flood and provided with adequate cross-drainage facilities.

Purpose of Programme

A basic theme of the NWPo concerns the desirability of coping with inland flooding rather than managing it. In line with policy therefore this programme is targeted at the flood proofing needs of key portions of Bangladesh's highway network. Specifically, some 170km of national and regional roads and some 1,643km of feeder and rural roads in high risk areas will be raised by 1m and 124km of national and regional roads in low risk area will be raised by 0.5m. Apart from transport benefits, the raised embankments can act as safe havens and facilitate the movement of relief goods during flood emergencies.

Programme Outline

This is a long-term programme with national coverage; but since the costs would be very high if incurred in the context of a stand-alone exercise it has been assumed that embankment raising will be carried out when a particular road is due for major maintenance or re-surfacing, with priority given to high risk areas in the case of national and regional roads. Since the work involves simply the raising of existing roads, environmental impacts would be minimal. The following table shows the Programme's estimated regional distribution. It is intended that all national and regional roads not above flood level at present, and 20% of the feeder and rural roads in high risk areas (only), will have been raised by the end of the Programme.

Road Type	Risk level	Length of road to be raised, by type and region (km)						
		SW	SC	NW	NC	NE	SE	Total
National Highways	High	6.7	15.8	19.4	39.6	0.4	7.3	89.2
" "	Low	10.3	0.6	12.8	12.5	1.4	9.6	47.2
Regional Roads	High	19.9	7.4	16.1	18.6	2.9	14.6	79.5
" "	Low	7.7	4.0	41.1	8.9	5.4	9.9	77.0
Feeder Road Type A	High	17.8	34.8	48.3	94.5	4.2	41.2	240.7
Feeder Road Type B	High	31.9	38.8	62.8	108.8	8.4	26.7	277.5
Rural Roads	High	65.9	271.8	240.0	350.6	37.1	159.6	1124.9

Financing Arrangements

Total Programme cost has been estimated at Tk10,905M, the breakdown over time being: short and medium term Tk2,181M each, and long term Tk6,543M. Incremental road maintenance costs resulting from the raising are assumed to be 4% of capital costs.

The Programme would be funded by GoB, possibly with donor assistance.

Objectives and Indicators

Objective	Suffix	Indicators/Means of Verification	Due
• Quantitative needs assessment	I1	• Needs assessment reports	2003
• Programme documents prepared	I2	• Programme documents	2003
• Programmes underway	I3	• Signed contracts/work orders	2004
• 100% of all national and feeder roads raised by 1m in high and .5m in low risk areas; 20% of feeder and rural roads raised by 1m in high risk areas	K	• Construction records • Site visits	2025
• Lives and national infrastructure protected against inundation damage	D	• Risk of loss of life (human and livestock) as estimated actuarially • Risk of income disruption as estimated actuarially • Risk of damage as estimated actuarially	2025

Institutional Arrangements

In line with current arrangements, GoB's Roads and Highways Department will be responsible for the works on the National Highways, Regional Roads and Type A Feeder Roads. Type B Feeder Roads and Rural Roads will be the responsibility of LGED.

Existing Documentation

NWMP DSR Section 9.8, the National Water Resources Database (NWRD). Documentation is available with respect to the raising of Dhaka-Comilla-Chittagong road which was carried out after the 1988 flood. More recent documentation is expected to emanate from the raising of the Dhaka-Tangail Road which is currently in progress.

Linkages

During implementation it will be advantageous if the implementing agencies maintain coordination with BWDB, especially with respect to cross-drainage issues (NWPO Article 4.2(p.iii) refers). An operational linkage should also be established with the Department of Fisheries, as the many borrow-pits which will result from the Programme represent potential

aquaculture sites. Forest Department involvement will be required if tree planting along the raised roads is included.

Risks and Assumptions

To keep costs down it has been assumed that the raising will be carried out when roads are due for major maintenance and resurfacing. There is a risk that not all of the target stretches of road will receive major maintenance and resurfacing. Since, however, the overall percentages of each road type that require raising are low, it is reasonable to assume that all target lengths will be scheduled for such works at some point at least in the 25 years allowed for the Programme in the NWMP. There is also a risk that increased cross drainage needs caused by raising the embankments will be ignored.

National, Regional and Key Feeder Roads - Flood Proofing

Ref : **DM 004**

Cluster :	**Disaster Management**	Region(s) :	**NW, NC, NE, SE, SC,SW**
Focus/Foci :	**Flood Proofing**	Location :	**Regions NW, NC, NE, SE, SC,SW**
Start Year[1] :	**2001** Duration[2] : **25 year(s)**	Agency(s) Responsible :	**RHD (Lead)** LGED (Supporting)
Short Description :	In line with Policy's call for coping with floods in relation to vital infrastructure (NWPo §4.2.p.ii), this programme targets the flood proofing needs of key portions of Bangladesh's highway network. As with current practice, the National Highways, Regional Roads and Type A Feeder Roads will be raised by the central Roads and Highways Department (RHD). Type B Feeder Roads and Rural Roads will be raised by the Local Government Engineering Departments (LGEDs). The programme also has collateral benefits since the raised embankments comprise safe havens while facilitating the movement of relief goods during flood emergencies. This is a long term programme with national coverage, however it has been assumed that embankment raising will be carried out when a particular road is due for major maintenance or re-surfacing, with priority given to high risk areas in the case of national and regional roads..		

MIS Links

Cost Calculation :	DM Programme costing.xls	Map :	DM 004 Map.jpg
Disb't Schedule :	DM Programme costing.xls	Description :	DM 004 PgP.doc

Finance

	Costs		Private	Funding (%) GoB	Beneficiaries	Expected by Programme Year
Total Capital[3]	**10,904.80**	MTk	**0%**	**100%**	**0%**	**25**
Ultimate Recurring	**436.20**	MTk/yr	**n/a**	**100%**	**0%**	**26**

Date of Data : **31** (dd) **07** (mm) **01** (yy)

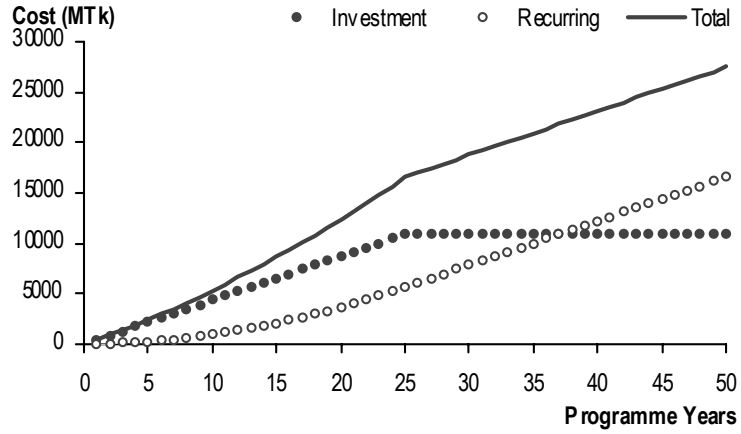
Status : **Identified**

Financial Base Year: **mid-2000**

Planned Expenditure (to date) : **428** MTk

Actual Expenditure[4] (to date) : MTk

Stacked Cumulative Cash Flow Chart



Monitoring

Objective	Indicator	Present Status[5]
• Quantitative needs assessment	• Needs assessment reports	NYD
• Programme documents prepared	• Programme documents	NYD
• Programmes underway	• Signed contracts/work orders	NYD
• 100% of all national and feeder roads raised by 1m in high and .5m in low risk areas; 20% of feeder and rural roads raised by 1m in high risk areas	• Construction records • Site visits	NYD

Notes : 1. Indicative 2. Until commissioning 3. Inclusive of planning, design _supervision 4. For future monitoring purposes and NWMP updates
5. Present Status keys: NYD- Not yet due, IP- In progress, D- Done

National Water Management Plan

Programme Costing Sheet

Programme Ref	**DM 004**
Title	**National, Regional and Key Feeder Roads - Flood Proofing**

Assumptions:

Taka/US$ 51.000 | TA duration 0.0 years | Investment duration 25.0 years | All prices in mid-2000 values

Item	Unit	Quantity	Rate US$	Rate Tk'000	Amount TkM	O&M %	O&M/yr TkM
Technical Assistance							
Expatriate consultants (all-in rate)	p-m	-	20,000		-		
Senior National consultants (all-in rate)	p-m	-		150	-	*0.0%*	-
Mid-level National consultants (all-in rate)	p-m	-		90	-	*0.0%*	-
Sub-totals					-		-
Other general TA programme costs		*25%*			-		-
Specific other TA programme costs					-	*0.0%*	-
Total TA Costs					**-**		**-**
Other Programme Costs							
1. National and Regional Roads in high risk areas					1,653.0	*4.0%*	66.1
2. National and Regional Roads in low risk areas					1,209.0	*4.0%*	48.4
3. Feeder Roads in high risk areas, allow 20% of total length					8,042.8	*4.0%*	321.7
4.					-	*0.0%*	-
5.					-	*0.0%*	-
6.					-	*0.0%*	-
7.					-	*0.0%*	-
8.					-	*0.0%*	-
9.					-	*0.0%*	-
10.					-	*0.0%*	-
Total Other Programme Costs					10,904.8		436.2
Overall Programme Costs					**10,904.8**		**436.2**

Costs of Raising Roads	Length Km	Protected in 2000	Protected in 2025	Rate TkM/km	Total TkM	Allow for	Net Total TkM
Railways, National and Regional Roads							
In high flood risk Thanas							
Class 1 R&H Roads - National Highway	892	90%	100%	10.00	892	100%	892
Class 2 R&H Roads – Regional Roads	398	80%	100%	9.57	761	100%	761
Sub-totals	1,290	1,121	1,290	9.79	1,653		**1,653**
In low flood risk Thanas							
Class 1 R&H Roads - National Highway	472	90%	100%	10.00	472	100%	472
Class 2 R&H Roads – Regional Roads	385	80%	100%	9.57	737	100%	737
Sub-totals	857	733	857	9.73	1,209		**1,209**
Feeder and Rural Roads							
In high flood risk Thanas	25,535	9,820	18,035	4.89	40,214	20%	8,043
In low flood risk Thanas	21,621	8,415	15,328	4.91	33,938	0%	-
Total	47,156	18,235	33,364	4.90	74,152		**8,043**
Grand Totals	**49,303**	**20,089**	**35,511**	**4.99**	**77,014**		**10,905**