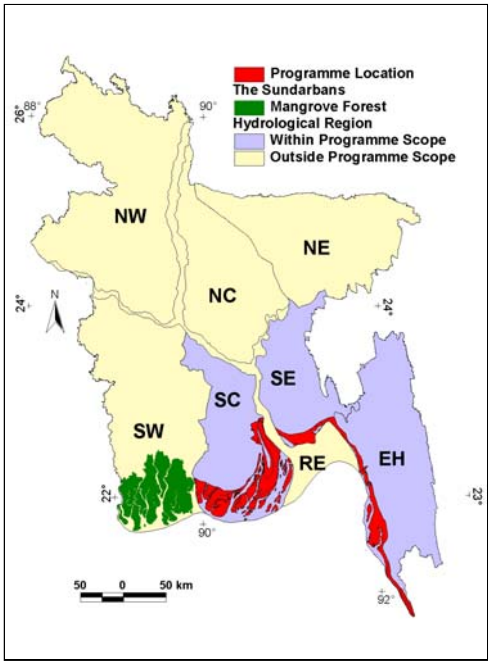
Cyclone Shelters and Killas

Ref: **DM 001**

Basic Data

NWMP Sub-sector **Disaster Management**

Region(s) **South Central, South East and Eastern Hills**



Relevance to NWPo

This programme is relevant to the NWPo and the National Goals in that it "takes into account the particular needs of women and children" while providing a means by which the people may "be motivated to develop different flood proofing measures". The latter is relevant to the broader objectives of institutional reform and the enabling environment, and in this regard is complemented by the considerable opportunities for decentralised implementation that the programme provides.

Purpose of Programme

Almost six million people live or subsist in areas exposed to significant risk of destruction and loss of life due to cyclone surge (see below). The Programme is intended to provide safe havens in the form of proven infrastructure comprising cyclone shelters which can also function as school buildings, and killas (raised earth mounds) where both humans and livestock can take refuge. Both shelters and killas will be equipped with water and gender-specific sanitation facilities and, in addition, the shelters will have generators. In some cases the shelters and killas will be constructed on adjacent sites.

Programme Outline

A major cyclone hit Bangladesh in 1991, killing some 140,000 people. Following the completion of the Multi-Purpose Cyclone Shelter Programme Study by BUET and BIDS in the following year, the EC-funded Cyclone Shelter Preparatory Study (CSPS) Stage I (1996–1998) undertook a detailed mouza-by-mouza assessment of the present and likely future population at Risk and High Risk from cyclone surges. At present, some 4.8M people are estimated to be at High Risk. Addition of a further 1.1M at Risk results in a total at-risk population of 5.9M, of which 3.6M (61%) are inside coastal embankments and 2.3M are outside. With the anticipated falling off in the rural population growth rate the at-risk population in 2025 would be only slightly higher, at 6.3M.

Almost the whole at-risk population is located in three regions, SC Region, the Chittagong Coastal Plain of EH Region and SE Region. Few people are at risk in the extensive coastal zone of the SW, because of the protection provided by the Sundarbans mangrove forest.

Cyclone shelters are substantial concrete and brick buildings set on columns above cyclone surge level. Maintenance of the shelters has been a major problem. Experience has shown that the best way to overcome this is for shelters to be used also as schools. The main purpose of killas is for the protection of livestock and, outside the coastal embankments, also the human population. They can be either linked with shelters or be on their own.

According to the CSPS Final Report, in 1996 there were 1,816 purpose built-cyclone shelters. There are probably few more than 2,000 at present. Since many shelters are located outside the risk area, the effective shelter provision is less than this total would suggest. CSPS estimates indicate that, based on the projected 2001 population, the existing shelter capacity inside the embankment in 1996 was sufficient to accommodate only 27% of the people at risk from a 1 in 20 year cyclone event.

The need for more safe havens is widely recognised. The CSPS Final Report (1998) recommended that some 1,500-2,000 new multi-purpose shelters (ie incorporating schools), each catering for 2,000 people or their equivalent, should be the target. However, follow-up to these proposals has been limited and the present rate of expansion of safe haven provision is modest. Current activities include a KfW – funded cyclone shelter programme which is just finishing, the Japanese aid – funded construction of about 100 shelters, of which the majority have been completed, and a small USAID – funded shelter construction programme to be executed by World Vision, an NGO. The Comprehensive Disaster Management Programme recently prepared with UNDP assistance is concerned primarily with institutional aspects rather than physical infrastructure like cyclone shelters. Clearly, a major acceleration in new safe haven construction is required for the adequate protection of the 5.9M population in the areas at risk.

The Government's safe haven provision strategy is based on protection against the 1 in 30 year cyclone surge event in the medium term, with provision improving to the 1 in 100 year level in the long term. Population served would be typically 2,000 per shelter and 900 per killa. For the medium term the breakdown of new safe haven provision by population is provisionally estimated as being 47% shelters, 33% killas and 20% the bari-level shelters covered by Programme DM 002; these proportions would change to 33% each in the long term. The population to be sheltered would be 2.15M in the medium term and another 1.59M in the long term. At a cost per head of Tk4,660 for shelters and Tk2,170 for killas, the total capital cost will be Tk9,895M, comprising Tk7,221M for 775 multi-purpose shelters and Tk2,673M for 1,369 killas. At 3% and 6% respectively of capital costs, annual maintenance costs would eventually reach Tk377M. Most of this cost would, however, be borne by the Education budget, in the case of shelters and, in the case of killas, by the local community, in the form of manual earthwork.

Social benefits of the Programme will be high and there will be no substantial adverse environmental impacts. In terms of safe haven provision the net cost of multi-purpose shelters is much less than the Tk4,660/head cost quoted above, because of their normal-time use as schools. Apart from the reduction in human loss of life and injury, killas produce significant agricultural benefits in the form of reduced livestock losses.

Notional regional distribution of the facilities is as follows:

Region	Shelters (including shelters with killas)			Killas only		
	Short term	Medium Term	Long term	Short term	Medium Term	Long term
South Central	109	165	143	117	176	200
South East	37	55	48	77	115	131
Eastern Hills	58	86	74	118	177	202
Total	204	306	265	312	468	533

Financing Arrangements

The Programme will be funded by GoB, probably with donor assistance. Recurrent funding will be by GoB, through the Education budget (for the schools-cum-shelters), with killa maintenance being the responsibility of the local communities.

Objectives and Indicators

Objective	Suffix	Indicators/Means of Verification	Due
• Pilot programme in progress	I1	• Signed contracts/work orders • Progress reports	2003
• Pilot programme evaluated	I2	• Evaluation reports	2005
• Modalities accepted	I3	• Signed agreements	2005
• 775 multi-purpose shelters and 1369 killas constructed in cyclone prone areas	K	• Actual numbers of shelters and killas	2016
• 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	2026

Institutional Arrangements

The programme will be implemented by LGED, in close coordination with local government and with the Directorate of Primary Education, because the normal use of cyclone shelters will be as school buildings. NGOs will be involved for participatory site selection and other community-based activities.

Existing Documentation

NWMP DSR Sections 9.3 and 9.8, and the National Water Resources Database (NWRD). The whole subject of cyclone risk and protection is described in considerable detail in the CSPS reports of June 1998.

Linkages

There will be obvious links with the Integrated Coastal Zone Management Programme, as well as with NWMP programmes DM 002: Bari-level Cyclone Shelters, ID 001: Local Government Capacity Building for Water Management and ID 007: Disaster Management Bureau Capacity Building.

Risks and Assumptions

Risks fall into three categories: social, physical and financial. The social risks involve poor locations, lack of access for particular social groups, inadequate social ownership and inadequate maintenance. It is assumed that these risks can be mitigated by the enforcement of strict site selection criteria, the involvement of experienced social facilitators and the adoption of designs that are consistent with easy maintenance (which itself assumes a participatory approach). Physical risks mainly concern cyclone damage during construction and unexpected ground conditions on site. It is assumed that it will be possible to concentrate all construction activities in non-cyclone seasons and that competent pre-qualification of contractors along with thorough site investigations will be possible. Financial risks concern the possibility that adequate operation and maintenance provision will not be forthcoming.

Cyclone Shelters and Killas

Ref : **DM 001**

Cluster :	**Disaster Management**	Region(s) :	**SC, SE, EH**
Focus/Foci :	**Cyclone Protection**	Location :	**SC, SE and EH Regions**
Start Year[1] :	**2002** Duration[2] : **15 year(s)**	Agency(s) Responsible :	**LGED** **(Lead)** None (Supporting)

Short Description :

This programme is for the cyclone risk areas and is relevant to the NWPo as it provides "flood proofing systems to manage natural disasters: (NWPo §4.2.o) and takes special account the particular needs of women and children (NWPo §3.b) while motivating the people themselves to develop different flood proofing measures. The programme will provide safe havens in the form of proven infrastructure comprising raised and covered cyclone shelters and killas (raised mounds) where both humans and livestock can take refuge. Short to medium term beneficiaries of the programme will comprise some 1.72 million people estimated to be at a risk of serious cyclone threat at least once every 30 years or less. In the long term the programme will be extended to cover lower risk areas corresponding to a maximum return return periods of 1:100 years and will be closely linked with programme DM 002 "Bari-level Cyclone Shelter".

MIS Links

Cost Calculation :	DM Programme costing.xls	Map :	DM 001 Map.jpg
Disb't Schedule :	DM Programme costing.xls	Description :	DM 001 PgP.doc

Finance

	Costs		Private	Funding (%) GoB	Beneficiaries	Expected by Programme Year
Total Capital[3]	**9,894.60**	MTk	**0%**	**100%**	**0%**	**15**
Ultimate Recurring	**350.30**	MTk/yr	**n/a**	**85%**	**15%**	**16**

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

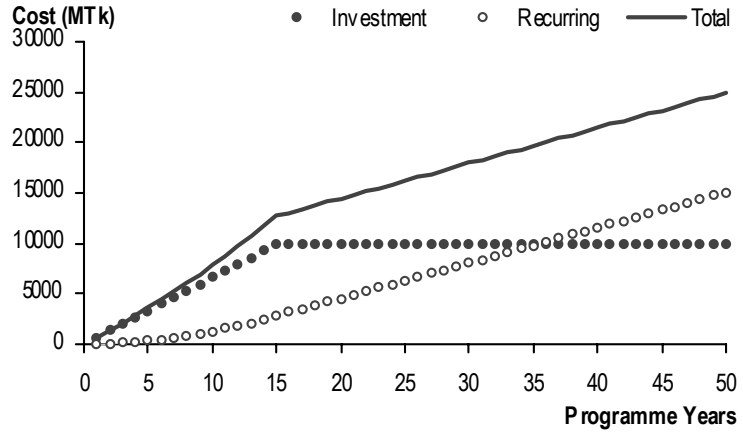
Status : **Identified**

Financial Base Year: **mid-2000**

Planned Expenditure (to date) : **0** MTk

Actual Expenditure[4] (to date) : **0** MTk

Stacked Cumulative Cash Flow Chart



Monitoring

Objective	Indicator	Present Status[5]
• Pilot programme in progress	• Signed contracts/work orders • Progress reports	NYD
• Pilot programme evaluated	• Evaluation reports	NYD
• Modalities accepted	• Signed agreements	NYD
• 775 multi-purpose shelters and 1369 killas constructed in cyclone prone areas	• Actual numbers of shelters and killas	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 001**
Title	**Cyclone Shelters and Killas**

Assumptions:

Taka/US$ 51.000 | TA duration 0.0 years | Investment duration 15.0 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		-	*0.0%*	-
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. Shelters and Killas					7,221.1	*3.0%*	216.6
2. Killas only					2,673.4	*5.0%*	133.7
3.					-	*0.0%*	-
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					9,894.6		350.3
Overall Programme Costs					**9,894.6**		**350.3**

		Short-term	Med Term	Long Term	Total
DM 001	**Shelters + Killas**				
	People	407,840	611,760	530,000	1,549,600
	Shelters	204	306	265	775
	Cost (TkM)	1,900.5	2,850.8	2,469.8	7,221.1
DM 001	**Killas only**				
	People	280,800	421,200	530,000	1,232,000
	Shelters	312	468	589	1,369
	Cost (TkM)	609.3	914.0	1,150.1	2,673.4