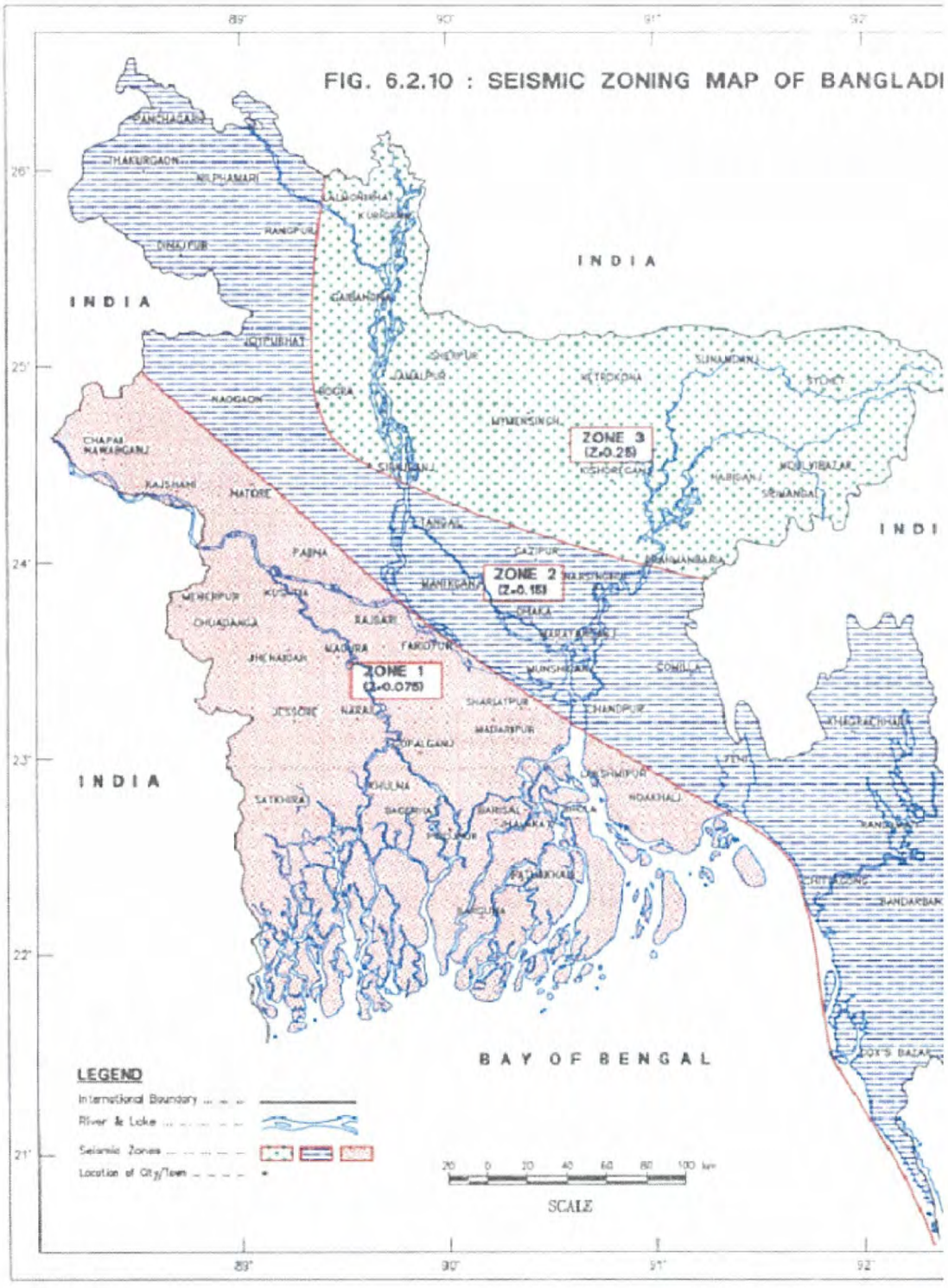
「バ」国建築基準（BNBC 2006）の抜粋（参考）

（１）地震地域地図（地震ゾーニングマップ）

過去の地震の発生状況については、2-1-7 地震　を参照。



（2）「バ」国建築基準（BNBC）のパート6 構造設計、第2章　荷重　の2.5.6 地震荷重

2.5.6 **Equivalent Static Force Method**
This method may be used for calculation of seismic lateral forces for all structures specified in Sec 2.5.5.1(a)

2.5.6.1 Design Base Shear : The total design base shear in a given direction shall be determined from the following relation :

$$V = \frac{ZIC}{R}W \qquad (2.5.1)$$

where, Z = Seismic zone coefficient given in Table 6.2.22
I = Structure importance coefficient given in Table 6.2.23
R = Response modification coefficient for structural systems given in Table 6.2.24
W = The total seismic dead load defined in Sec 2.5.5.2
C = Numerical coefficient given by the relation :

$$C = \frac{1.25S}{T^{2/3}} \qquad (2.5.2)$$

S = Site coefficient for soil characteristics as provided in Table 6.2.25
T = Fundamental period of vibration in seconds, of the structure for the direction under consideration as determined by the provisions of Sec 2.5.6.2.

The value of C need not exceed 2.75 and this value may be used for any structure without regard to soil type or structure period. Except for those requirements where Code prescribed forces are scaled up by $0.375R$, the minimum value of the ratio C/R shall be 0.075.

Table 6.2.22
Seismic Zone Coefficients, Z

Seismic Zone (see Fig 6.2.10)	Zone Coefficient
1	0.075
2	0.15
3	0.25

Table 6.2.23
Structure Importance Coefficients *I*, *I′*

Structure Importance Category (see Table 6.1.1 for occupancy)		Structure Importance Coefficient	
		I	I'
I	Essential facilities	1.25	1.50
II	Hazardous facilities	1.25	1.50
III	Special occupancy structures	1.00	1.00
IV	Standard occupancy structures	1.00	1.00
V	Low-risk Structures	1.00	1.00

Table 6.2.25
Site Coefficient, *S* for Seismic Lateral Forces (1)

Site Soil Characteristics		Coefficient, S
Type	Description	
S_1	A soil profile with either : a) A rock-like material characterized by a shear-wave velocity greater than 762 m/s or by other suitable means of classification, or b) Stiff or dense soil condition where the soil depth is less than 61 metres	1.0
S_2	A soil profile with dense or stiff soil conditions, where the soil depth exceeds 61 metres	1.2
S_3	A soil profile 21 metres or more in depth and containing more than 6 metres of soft to medium stiff clay but not more than 12 metres of soft clay	1.5
S_4	A soil profile containing more than 12 metres of soft clay characterized by a shear wave velocity less than 152 m/s	2.0

Note : (1) The site coefficient shall be established from properly substantiated geotechnical data. In locations where the soil properties are not known in sufficient detail to determine the soil profile type, soil profile S_3 shall be used. Soil profile S_4 need not be assumed unless the building official determines that soil profile S_4 may be present at the site, or in the event that soil profile S_4 is established by geotechnical data.

（3）サイクロン基準風速地図（単位：km/h）

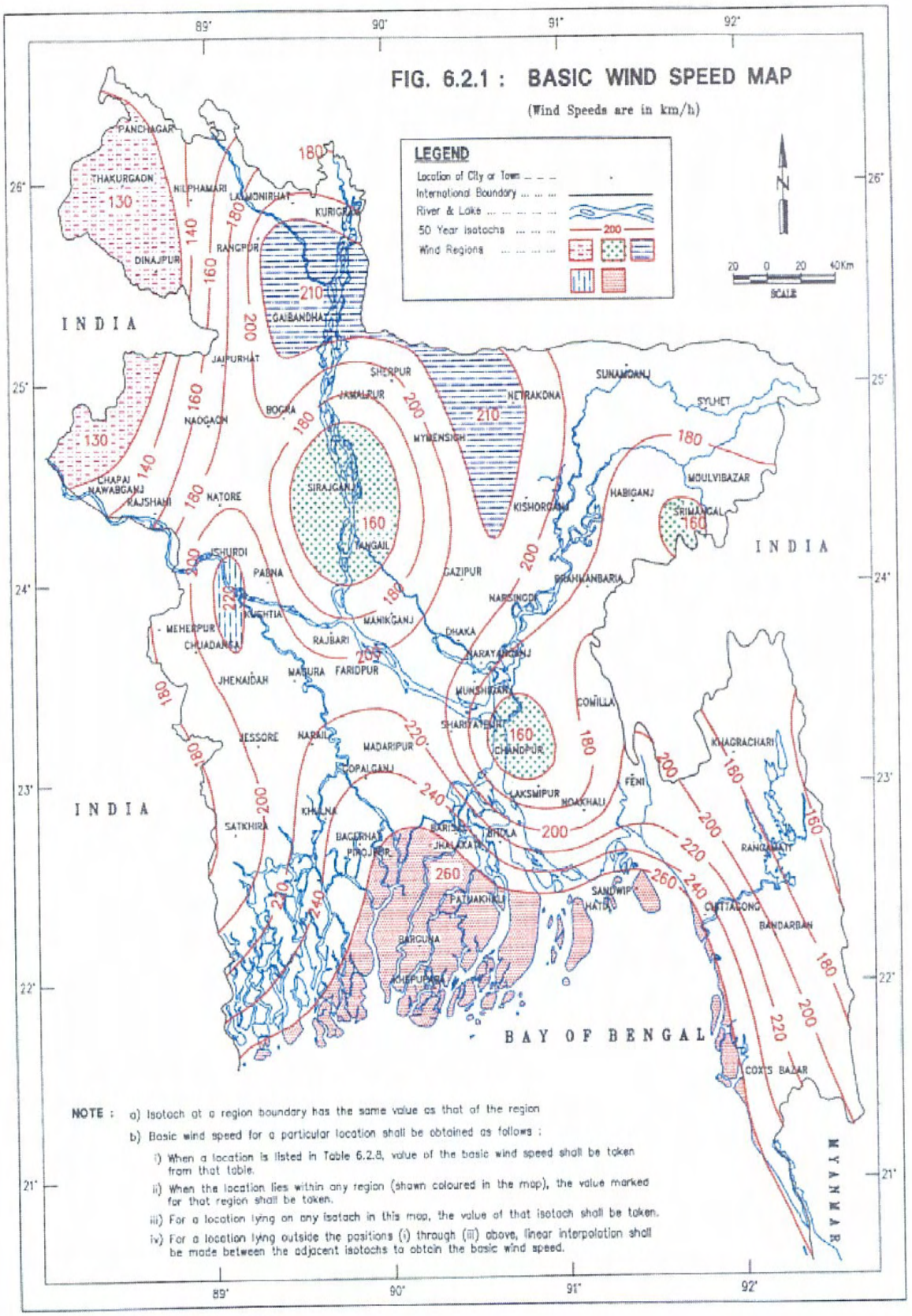
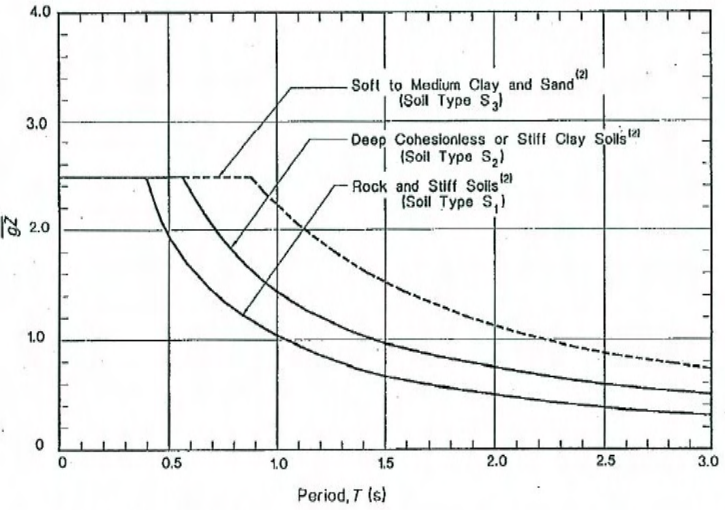


Table 6.2.24
Response Modification Coefficient for Structural Systems, *R*

Basic Structural System[1]	Description of Lateral Force Resisting System	*R* [2]
a. Bearing Wall System	1. Light framed walls with shear panels	
	i) Plywood walls for structures, 3 storeys or less	8
	ii) All other light framed walls	6
	2. Shear walls	
	i) Concrete	6
	ii) Masonry	6
	3. Light steel framed bearing walls with tension only bracing	4
	4. Braced frames where bracing carries gravity loads	
	i) Steel	6
	ii) Concrete [3]	4
	iii) Heavy timber	4
b. Building Frame System	1. Steel eccentric braced frame (EBF)	10
	2. Light framed walls with shear panels	
	i) Plywood walls for structures 3-storeys or less	9
	ii) All other light framed walls	7
	3. Shear walls	
	i) Concrete	8
	ii) Masonry	8
	4. Concentric braced frames (CBF)	
	i) Steel	8
	ii) Concrete [3]	8
	iii) Heavy timber	8
c. Moment Resisting Frame System	1. Special moment resisting frames (SMRF)	
	i) Steel	12
	ii) Concrete	12
	2. Intermediate moment resisting frames (IMRF), concrete[4]	8
	3. Ordinary moment resisting frames (OMRF)	
	i) Steel	6
	ii) Concrete [5]	5
d. Dual System	1. Shear walls	
	i) Concrete with steel or concrete SMRF	12
	ii) Concrete with steel OMRF	6
	iii) Concrete with concrete IMRF [4]	9
	iv) Masonry with steel or concrete SMRF	8
	v) Masonry with steel OMRF	6
	vi) Masonry with concrete IMRF [3]	7
	2. Steel EBF	
	i) With steel SMRF	12
	ii) With steel OMRF	6
	3. Concentric braced frame (CBF)	
	i) Steel with steel SMRF	10
	ii) Steel with steel OMRF	6
	iii) Concrete with concrete SMRF [3]	9
	iv) Concrete with concrete IMRF [3]	6
e. Special Structural Systems	See Sec 1.3.2, 1.3.3, 1.3.5	

Notes : (1) Basic Structural Systems are defined in Sec 1.3.2, Chapter 1.
(2) See Sec 2.5.6.6 for combination of structural systems, and Sec 1.3.5 for system limitations.
(3) Prohibited in Seismic Zone 3.
(4) Prohibited in Seismic Zone 3 except as permitted in Sec 2.5.9.3.
(5) Prohibited in Seismic Zones 2 and 3. Sec 1.7.2.6.

動的応答法による、応答スペクトルは、fig. 6.2.11 に示されている。中低層の周期が短い建築構造の応答倍率は、2.5 であり、静的等価法の 2.75 より少し低い値が用いられている。

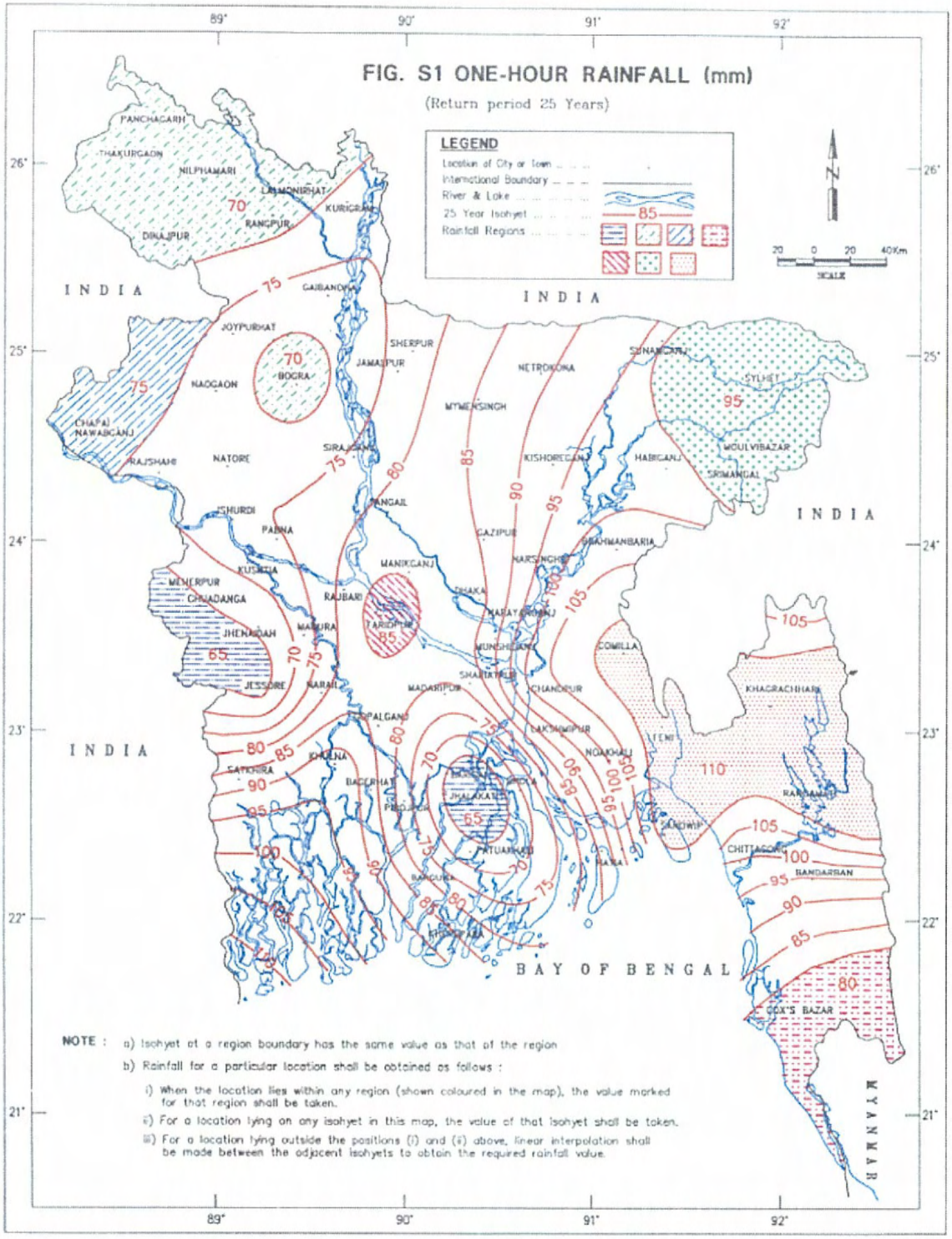


Note: (1) S_a: Spectral acceleration
g: Acceleration due to gravity
Z: Seismic zone coefficient.
(2) For structures on Soil Type S_4, refer to Sec 2.5.7.1(c).

Fig. 6.2.11 Normalized Response Spectra for 5% Damping Ratio

（4）雨量地図

建築基準（BNBC）に記載されているものは、建築物の雨水排水等の設計・施工に用いられる雨量データ（再現期間 20 年の単位時間当たり雨量）であり、洪水対策で直接利用できるデータではないが参考に示す。



他ドナーの支援状況

1．水災害分野

課題 (「バ」国開発計画(PRSP等)を基に設定)	「バ」国政府及び他ドナーの政策	現在実施中のプロジェクト/プログラム	2009	2010	2011	2012	2013	2014	事業概算 (JPY billion)	他ドナー・スキームとの連携	備考
Protecting from flood, improving drainage and reducing vulnerability to water related disasters including sea erosion and cyclonic surges	[GOB] ・To take initiative to implement the Ganges barrage project to expand irrigation facilities, prevent salinity, and to solve the problem of scarcity of sweet water in the south-west region ・To undertake flood protection and storm water drainage measures with the rehabilitaion and maintenance of existing FCD and FDC/I systems in a participatory manner ・To undertake dredging of rivers for flood control, navigation, drainage and irrigation facilities [WB] ・To improve national water resources management by involving the local communities to play an expnaded role in all stages of the participatory scheme cycle management ・To enhance institutional performence of the borrower;s principal water institutions i.e. BWDB and WARPO [ADB] ・To facilitat water for production and sustainable rural livelihoods, including pro-poor irrigation and ecosystem management ・To prevent and mitigate water related disasters in rural areas [Netherland] ・To prepare for and to protect against impacts of river floods, erosion and climate change	[ADB]									
		Participatory Small Scale Water Resource Sector Project(Phase 2)						→	55.6 million US$		Start from 2008
		South west area Integrated water resource planning and management	→						20 million US$	Netherland	Start from 2008
		[ADB/WB]									
		2007 Flood Damage Rehabilitation	→	→					3.6		Start from 2008
		[WB]									
		Water Management and Improvement project						→	1.35	Netherland	Start from 2005
		Emergency Cyclone Recovery and Restoration Project	→	→	→	→	→		10		Start from 2009
		[Netherland]									
		Integrated planning for Sustainable Water Management Project	→	→					EUR 9.9 mil.		Start from 2003
		South west area Integrated water resource planning & Management project	→	→	→	→	→		EUR 8.5 mil	ADB	Start from 2006
		Small Scale Water resource development sector Project- 2	→						EUR 16.5 mil	ADB	Start from 2002
		Participatory Small Scale Water resource development sector Project	→	→	→	→	→	→	EUR 13 mil.	ADB, IFAD	Start from 2009
		Estuary Development Program	→	→					EUR 6.5 mil.		Start from 2005
		[GOB]									
		Feasibility Study on the Ganges Barrage Project	→	→	→	→	→		4 million US$		GoB funded
Managing erosion of major rivers and protect large and small towns	[GOB] ・To implement Integrated Coastal Zone Mamagement Plan ・To protect vulnerable areas from erosion, especially saving places of economic importance and densely populated areas ・To undertake major river erosion mitigation projects and river bank protection projects [WB] ・To protect coastal zone and pro-poor economy [Netherland] ・To provide support to river erosion management, flood damage rehabilitation and reconstruction rfforts [ADB] ・To reduce hazard through non-structural measures such as strategic retirement of infrustructure and re-settlement of affected habitation and developing low cost measures for erosion control	[ADB]									
		Jamuna Meghna river Erosion mitigation project	→	→	→	→	→		0.53		Start from 2005
		Secondery Towns Integrated flood protection project - Phase II	→	→					0.9		Start from 2005
		[WB]									
		River bank protection Project	→						192 million US$		Start from 2001
		[Netherland]									
		Emergency Disaster Damage Rehablitation project	→	→	→				EUR 16.3 million	ADB, JICA, CIDA	Start from 2008
		[UNDP]									
		River Erosion Prediction Modeling and Land Reclamation							2.3 million US$		Start 2004 , End 2006
Supporting revival, extention and maintenance of safe navigation routes	[GOB] ・To implement river channel stabilization through capital dredging in the major rivers of the country ・To undertake Gorai River Restoration Project ・To continue survey of potential navigation routes [WB] ・To upgrade the hydrological network, restoration of gorai river mouth and support to institutional water resource development	[WB]									
		Bangladesh Rivers information and conservation (BRIC) Program -	→	→	→				Not decided		Pipeline
		[GOB]									
		Gorai River Restration Project	→	→	→	→	→	→	18		Start from 2009
Monitoring of hydrological, climate and maritime data and ensuring environmental management	[GOB] ・To ensure protection of the natural environment and aquatic resources with monitering and controlling water polution ・To undertake climate/flood forecast application for water related disaster mitigation ・To update and maintain the National Water Resource Database ・To establish haor/wetland database [WB] ・To modernize the data transmission system ・To upgrade data transmission procedures and establishment of dispatching centers ・To enhance the data storage , processing and retreival capacity [DANIDA] ・To develop the institutional capacity of FFWC ・To strenghthen the existing forecasting system	[WB]									
		Upgrading national water resource Database (Bangladesh Rivers information and conservation (BRIC) Program - Pipeline)	→	→	→	→			15 million US$		
		[DANIDA]									
		Upgrading flood forecasting system	→						3 million US$		Start from 2007
Developing human resource for BWDB, WARPO and specialised Trusts	[GOB] ・To implement better disaster management through advanced technology and people's participation ・To provide training to update skills of peronnel engaged in water development and management [WB] ・Capacity building of WARPO and BWDB [ADB] ・To promote effective policies and institutional framework, management system, and capacities of the Government agencies i.e. BWDB, WARPO in the sector to implement the NWP and the NWMP [Netherland] ・To support the reform efforts of relevant Bangladeshi government institutions: MoWR, BWDB and WARPO	[ADB]									
		Regional Technical Assistance Program (RETA)	→	→	→	→			30 million US$		Start from 2007
		[Netherland]									
		Twinning mission - Phase - 3	→	→	→						Start from 2008
		[WB]									
		Water management improvement project-component- 3 Institutional improvement	→	→	→	→	→	→			Start from 2005

2. 地震災害分野及び防災全般

課題	「バ」国政府及び他ドナーの政策	実施中のプロジェクト/プログラム	2009	2010	2011	2012	2013	2014	事業概算（JPY billion）	他ドナー・スキームとの連携	備考
Mainstreaming disaster management and risk reduction into national policies, institutions and development process, and Strengthning disaster management and risk reduction capacity	[GOB] ・To take steps for building up institutional capacity from national to union levels for effective and systematic disaster management ・To implement the National Plan for Disaster Management (2009-2015) ・To establish working committee to identify the sectoral intervention for mainstreaming risk reduction ・To include disaster risk reduction, including climate change impacts, in all sectoral policies, plans and projects ・To prioritising pro-growth infrastructure (submersible road, ghats, growth centres, hats, women's market section, union parishad complex and cyclone shelters) [UNDP] ・To srenghthen the disaster management capacity at all levels to reduce and mitigate the impact of disasters across sectors against all hazards ・To mainstream the risk reduction by aligning national policies and plans with the priciples of risk reduction [SDC] ・To Coordinate and harnmonize with other DP's and GoB in developing program based on the approach for Disaster management [WB] ・To imporve disaster risk reduction capacity in local level ・To promote assistances in disaster management se - Agriculture risk - Climate change adaptation - Rural risk reduction [EC] ・To integrate risk reduction into development planni [DFID] ・To make cooperation for DRR among the DP's, GoI	[UNDP]									
		Comprehensive Disaster Management Project-CDMP- II		→	→	→	→		6 mil. $		
		[SDC]									
		Comprehensive Disaster Management Project-CDMP- II		→	→	→	→		7 mil. $		
		[EC]									
		Comprehensive Disaster Management Project-CDMP- II		→	→	→	→		17 mil. $		
		[DFID]									
		Comprehensive Disaster Management Project-CDMP- II		→	→	→	→		20 mil. $		
		[WB]									
		Emergency Cyclone Recovery and restoration Project	→	→	→	→	→		109 mil. $		
Strengthening disaster management and risk reduction capacity	[GOB] ・To build the capacity of BMD, and improve the cyclone signal system to make it clear to common people and improve flood forecasting to be able to make 6-7 days ahead instead of 3-4 days as currently made ・To strengthening coordination among the government agencies, NGOs and civil society institutions ・To creat disaster relief funds to support victims of natural disaster ・To conduct earthquake and tunami risk assessment for big cities and coastal districts [ADB] ・To support for public policies aimed at better preparedness ・To improve regional practices for planning, risk mitiation capacity and warning sysytem [UNDP] ・To develop early warning systems and protocols for disaster preparation and management [World Bank] ・ [SDC] ・To coordinate the community and GoB agencies for partcipatory flood risk reduction [EC] ・To enhance the capacity of local community for disaster risk reduction and climate change adaptation [DFID] ・To establish effective and efficient disaster management system for the grass root people	[UNDP]									
		Community Risk Assessent - CDMP Phase - I							Not specific		Start - 2005 , end 2007
		[DFID]									
		Char livelihood Project	→	→							Start from 2004
		[SDC]									
		Flood risk reduction in Sunamgonj	→	→					12 mil. $		Start from 2006
		[ADB]									
		National disaster risk Management Technical Assistance			→	→	→		15 mil. $		Pipeleine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