CHAPTER 2 COUNTRY SETTING

2.1 Natural Conditions

2.1.1 Physiography

Situated on both sides of the Tropic of Cancer, Bangladesh lies within north latitudes 20º34' and 26º38' and east longitudes 88º01' and 92º41', with a total land area of 147,540 km^2.
Although the country is generally termed as a flat alluvial plain, the physiography presents a considerable geographical divergence with about half of its area below 25ft (7.62m) contour line. Geologically the land is classified under three broad physiographic regions: the Tertiary Hills 12% (Chittagong Hill Tracts), the Pleistocene Uplands 8% (Madhupur Tract, Lalmai Hills and the Barind) and the Recent Plains 80% (areas other than those mentioned).

The Recent Plain is the floodplain that has the following physiographic sub-units.

Piedmont Plains: The piedmont (foothills) areas have the characteristics of gently sloping lands on the Terai zone at the foot of the Himalayas and adjoin the eastern and northern hills of Bangladesh.

Active river flood plains: The new alluvial land (chars) within the major rivers is known as active river floodplain. They are seasonally flooded from 2m to 5m depths.

River meander flood plains: The older alluvial land - formed by former river courses comprising of ridges, ox-bows, back-swamps and relic channels - is known as the river meander floodplain. These lands are seasonally flooded on ridges and to a much greater depths in the low lying areas.

Major floodplain basins: The extensive depressions whose centers are never dried up throughout the dry season are known as the major floodplain basins.

Estuarine floodplains: Estuarine floodplains are almost level relief on deep silty alluvial soil with few thorough watercourses.

Tidal floodplains: Tidal floodplains are almost flat and have principally clay alluvium soils. Tidal creeks drain most of the floodplains. They experience shallow flooding in the rainy season and also at high tide in the dry season.

Within these physiographic units, flooding is not uniform and generally occurs from May to September from several different sources. The marshes (haors) are occupying a considerable area in the floodplain having their major concentration in the SE region of the country. General gradients on the floodplain are gentle with average gradient from north-western part of the country to the southern coast being 20 cm/km. Near to the coast the gradients average 1.6 cm/km.

2.1.2 Climate

The climate of Bangladesh is governed by two major weather regimes: the wet south-west monsoon that begins in May and continues through out September, and the dry northeast wind that

begins in November and continues through mid-March. The southwest monsoon originates over the Indian Ocean and carries warm moist air that produces some of the highest rainfalls of the world over Bangladesh and the upstream catchments of the major rivers, particularly in the Indian states of Meghalaya and Assam. Up to 85% of the annual rainfall occurs between June and September. Mean annual rainfall ranges from about 1,200 mm in the west to almost 6,000 mm in the northeast. The average annual rainfall in the Himalayas and in the Meghalaya hills to the north of Bangladesh reaches about 10,000 mm. Tropical cyclones can occur in the pre- and post-monsoon seasons. These affect the coastal areas and are sometimes accompanied by storm surges. Severe weather conditions can occur during the reversals of the weather regimes. The spring reversal can produce nor'westers, which often cause tornadoes, hailstorms and flash floods, especially in the northeast.

2.1.3 The Major River System

Rivers are the most commonplace in Bangladesh and present a very significant feature of the physical landscape. Excepting the ones in the south-eastern districts of greater Chittagong and the Hill Tracts, all rivers in the country belong to three major river systems - the Padma, the Brahmaputra-Jamuna and the Meghna - having their origins in the neighboring upper riparian countries. The drainage area of these three river systems totals about 1.56 million km^2, which accounts for some 11 times as large as the country area. It means that the basin areas of the three rivers within Bangladesh account for only 7.5% of the total catchment and the remaining 92.5% lie outside in the neighboring countries.

There exist about 300 rivers and channels of different sizes in the country. All the three major rivers and 47 others originate in the neighboring countries and carry their drainage flows through Bangladesh territory. The yearly normal floods – including the severe ones occurring every 7 to 10 years – carry the monsoon drainage waters of the total catchment areas. The flood situation in Bangladesh worsens when the waters outside are supplemented by the local rainfall. The flood goes to catastrophic proportions when the major rivers are in spate simultaneously combining widespread intense rainfall in the catchment areas during a spring tide.

2.2 Socio-Economic Conditions

2.2.1 Social Conditions

(1) Domestic Politics

There are more than 75 political parties in Bangladesh with different views and ideologies. Major ones include BNP, Awami League (AL), Jatio Party and Jamati-Islami. The relationship between these parties is not pleasant at all. As a result political violence are always prevailing in the country and losses several lives and properties. In the regime of last government of AL, all the BNP parliament members were absent from parliament session for four years. BNP and other opposition

political parties called strikes (hartal) and demonstrations days after days on different issues, which affects the economy of the country tremendously. These types of political unrest in the country losses the interest of the foreign investor to invest in the country.

(2) International Relations

Bangladeshi and Indian policy makers had dialogue, and both sides agreed to increase efforts to settle bilateral issues, such as Ganges water share, and improve regional co-operation. The South Asian Association of Regional Co-operation (SAARC) has not been very successful over the years in this respect, as India, the largest partner, has been less willing to liberalise trade on a multilateral basis. Relations with Pakistan will remain difficult following the withdraw of Pakistan's deputy high commissioner from Dhaka, Irfan ur Rahman Raja, after his derogatory remarks about the 1971 liberation war triggered angry protests throughout the country. But, in principle, Bangladesh maintains friendship relation with all countries.

(3) Policy Trends

There is unlikely to be any shift in the direction of economic policy after the election, as both the AL and the BNP are officially committed to free-market policies. Although a segment of the AL leadership is still wedded to the socialist principles that the party espoused in the early 1970s, it will continue in its attempts to liberalise the economy, not least because of pressure from donors. Bangladesh currently has a liberalised trade regime, introduced by the BNP while it was in power during 1991-96. Both parties welcome foreign investment. The fiscal situation has deteriorated in recent years. The government's tax collection has been below target for the last couple of years and, in fiscal year 1999/2000, the government's current expenditure target was overshot. This trend is expected to continue in the run-up to the election, owing to higher-than-expected interest payments on domestic debt, and expenditure involved in the implementation of the recommendations of the new national wage commission, which has raised the minimum wage by around 70%. In addition, the government continues to subsidise or provide public guarantees to loss-making state-owned enterprises (SOEs), including nationalised commercial banks (NCBs), which have high levels of non-performing loans.

(4) Total National Population and its Growth

With a present population of about 139 million, Bangladesh is the most densely populated country in the world. In December 1971, when Bangladesh gained Independence, its population was about 72 million and the rate of annual population growth was at least 2.5%. Important population parameters including total fertility rate (TFR), crude birth rate (CBR) and crude death rate (CDR) were high and contraceptive prevalence rate (CPR), on the other hand, was low.

During the last quarter century, however, the country has in spite of the low literacy rate, low social status of women and low per capita income, achieved spectacular success in the field of population control owing to the successful efforts of family planning as well as multi-sectoral programs. TFR

has declined from 6.3 in 1975 to 3.4 in 1996, CBR from 49.9 persons per thousand to 25.5 persons, and CDR from 19.4 persons per thousand to 8 persons. On the other hand, CPR has increased from 8.5% in 1975 to 48% in 1995 (Table 2.1).

Table 2.1 Basic Population Parameters

Population Parameters	Source	1972	1996
Population size (in million)	BBS	72.0	122.1
Male-Female ratio	BBS	108.0	105.0
Annual growth rate	FFYP	3.1	1.7
TFR	BFS, 1975	6.3	3.4
CBR per 1,000 population	BBS	49.9	25.6
CDR per 1,000 population	BBS	19.4	8.1
CPR	DHS 1995	8.5	48
Urban Population (%)	BBS 1995	8.8	21.9
Density per sq.km	BBS	505	828.0

Notes: (1) BBS; Bangladesh Bureau of Statistics; (2) FFYP; Fifth Five Year Plan document;
(3) Male-female ratio and urban population are based on the 1974 and 1991 Population Censuses;
(4) TFR and CPR are calculated for 1975; (5) BFS; Bangladesh Fertility Survey; and
(6) DHS; Demographic and Health Survey
Source: Population Census and BBS

The result of the changes in these vital parameters has been a marked decline in the rate of population growth, from 2.5% or more at Independence to 2.17% between the 1981 and 1991 censuses, as shown in Table 2.2. The population growth rate in 1998 is estimated at between 1.65% and 1.7%. Given the widespread acceptance of family planning, the increasing adult literacy rate and the recognition of the adverse effects of increasing population pressure by most Bangladeshi, there is little doubt that this decline in population growth rate will continue in the future.

Table 2.2 Average Annual Growth Rates of Population, 1941-1996

Year and Month	Population size in millions	Average Annual Growth Rate (%)
1941 March	42.0	1.70
1951 March	44.2	0.50
1961 February	55.2	2.26
1974 March	76.4	2.48
1981 March	89.9	2.35
1991 March	111.5	2.17
1996 January	122.1	1.83

Source: Population Census and BBS

2.2.2 Economic Conditions

(1) Historical Perspective

Evolution of the Bangladesh economy's structure since Independence in 1972 has followed the

path typical of developing countries, with a progressive reduction in the agriculture's share of GDP from 50% in 1972-73 to 29% in 1997-98, an increase from 38% to 54% in the services sector share and a modest growth in the industrial sector's share, from 13% to 17.5%, as shown in Table 2.3.

Table 2.3 Structure of GDP, 1972-73 to 1997-1998 (%)

Sector	1972-73	1980-81	1984-85	1989-90	1994-95	1997-98
Primary Sector:						
Agriculture*	49.6	41.2	41.8	36.8	30.9	28.9
Industry:	12.6	16.2	16.0	13.7	17.5	17.5
Manufacturing	7.9	11.2	9.9	7.5	9.6	9.4
Construction	4.4	4.7	5.5	5.3	5.9	6.0
Public Utilities	0.3	0.3	0.6	0.9	2.0	2.1
Services:	37.8	42.6	42.2	49.5	51.6	53.6
Transport	10.5	11.6	11.2	9.7	11.7	11.2
Trade services	8.0	9.8	9.5	7.5	8.6	8.9
Housing services	9.4	8.9	8.0	8.1	9.1	9.5
Public administration	2.3	2.8	3.3	4.0	5.3	5.9
Banking and insurance	1.0	1.6	1.7	1.8	2.0	2.0
Professions and miscellaneous	6.6	7.8	8.6	11.3	14.6	16.0

Note: *: The contribution of the other primary sector activity, mining and quarrying, is negligible

Source: Bangladesh Bureau of Statistics

For most of this 26 year period the rate of economic growth has also been modest, at around 4%, as shown in Table 2.4, greater than the rate of population growth but not sufficient to effect the radical economic transformation which is necessary to raise living standards to more acceptable levels. Reported agriculture growth rates have been substantially lower, averaging only slightly over 2% per annum during the 1990's.

Table 2.4 Annual GDP Growth Rates at constant prices 1972-73 to 1997-98 (%)

Sector	1972-73	1980-81	1984-85	1989-90	1994-95	1997-98
Primary Sector:						
Agriculture*	**1.9**	**2.4**	**2.2**	**1.0**	**4.4**	**2.2**
Industry:	**5.6**	**4.9**	**5.1**	**6.8**	**5.4**	**5.6**
Manufacturing	7.0	2.8	4.5	6.5	5.6	5.0
Construction	2.0	7.9	5.4	5.4	5.0	5.4
Public Utilities	7.6	18.8	14.4	15.1	5.8	13.2
Services:						**5.3**
Transport	4.1	4.9	4.5	4.7	6.1	4.8
Trade services	8.0	3.0	5.0	5.4	7.8	5.4
Housing services	3.0	3.2	3.1	3.7	3.8	3.3
Public administration	6.6	8.4	7.7	8.7	8.9	8.0
Banking and insurance	11.4	6.4	8.4	3.2	3.8	6.8
Professions and miscellaneous	5.0	6.9	6.1	6.8	6.9	6.3
Total GDP	**3.7**	**3.9**	**3.8**	**4.1**	**5.6**	**4.1**

Note: *: The contribution of the other primary sector activity, mining and quarrying, is negligible

Source: Bangladesh Bureau of Statistics

In the past few years, economic growth has accelerated and a basic momentum of around 5-6% per annum growth seems now to have become established. The annual growth rates in two years up to June 1997 were 5.4% and 5.9% respectively, and a rate of 5.2% was achieved in financial year (July to June) 1997-98. Although the 1998-99 growth rate was reduced by the impacts of the 1998 flood, the effects were less severe than was previous feared, and a reported growth rate of 4.9% was achieved in 1998-99.

This improved economic performance is reflected in the significant decline in poverty, which has been achieved in the 1990s. As Table 2.5 shows, in 1995-96, 36% of Bangladesh's population was very poor and 53% was poor, compared with 43% and 59% respectively in 1991-92.

Table 2.5 Poverty Indices with the Cost of Basic Needs Method, 1983-84 to 1995-96 (% of population below the poverty line)

		1983-84	1985-86	1988-89	1991-92	1995-96
1	Very Poor (lower poverty line)					
	National	40.9	33.8	41.3	42.7	35.5
	Rural	42.6	36.0	44.3	45.9	39.8
	Urban	28.0	19.9	22.0	23.3	14.3
2	Poor (upper poverty line)					
	National	58.5	51.7	57.1	58.8	53.1
	Rural	59.6	53.1	59.2	61.2	56.6
	Urban	50.1	42.9	43.9	44.9	35.0

Source: "Bangladesh: From Counting the Poor to Making the Poor Count," World Bank, April 1998

Apart from a temporary improvement in the mid-1980s, stagnation prevailed in that decade, with no substantial poverty reduction. Other evidence supports the view that poverty has fallen in the 1990s. The real wages increased by about 7% between 1991-92 and 1996, especially in the agriculture and manufacturing sectors.

Apart from the overall decrease in poverty, the most striking feature of these statistics is the much lower poverty incidence in the urban sector and the more rapid rate of improvement achieved there. Even during the period of overall stagnation in the 1980s urban poverty rates were coming down.

Official statistics show total GDP in 1996-97 as being some Tk.1,400 billion (US$ 32.9 billion) at current market prices, equivalent to some US$265 per head. Despite the recent acceleration in growth rate, per capita incomes and standards of living still remain low.

In addition to the increase in the economic growth rate during the 1990s, considerable success has been achieved in controlling inflation. Between 1991-92 and 1997-98 annual inflation rates, based on the Dhaka Middle Class Consumer Price Index, have been brought down to an average of 5% (range 3% to 9%) from an average of 10 to 11% in the previous decade (however, the inflation rate in 1998-99 rose to 8.8%, due primarily to the effects of the 1998 flood on food prices).

A major success in the 1990s has been the expansion in exports, principally of ready-made garments (RMG) (although these have a high import content) and shrimps. Total merchandise

exports increased from US$1.7 billion in 1990-91 to US$5.2 billion in 1997-98. A significant reduction in the debt service ratio, from 20.9% in 1990-91 to 9.5% in 1997-98, has also been achieved. On the other hand, the value of the Taka has declined significantly, from Tk.35.7/$ in 1990-91 to around Tk.50/$ in mid-1999.

2.3 Current Institutional Framework

2.3.1 Central Government Institutions

Bangladesh has a unitary form of government. The President is the Head of State and the Prime Minister is the Head of Government. The Prime Minister is assisted by a Council of Ministers. The permanent officer-in-charge of the Ministries/Divisions is designated as Secretary who belongs to the Civil Service. There are now 35 Ministries as shown in Figure 2.1.

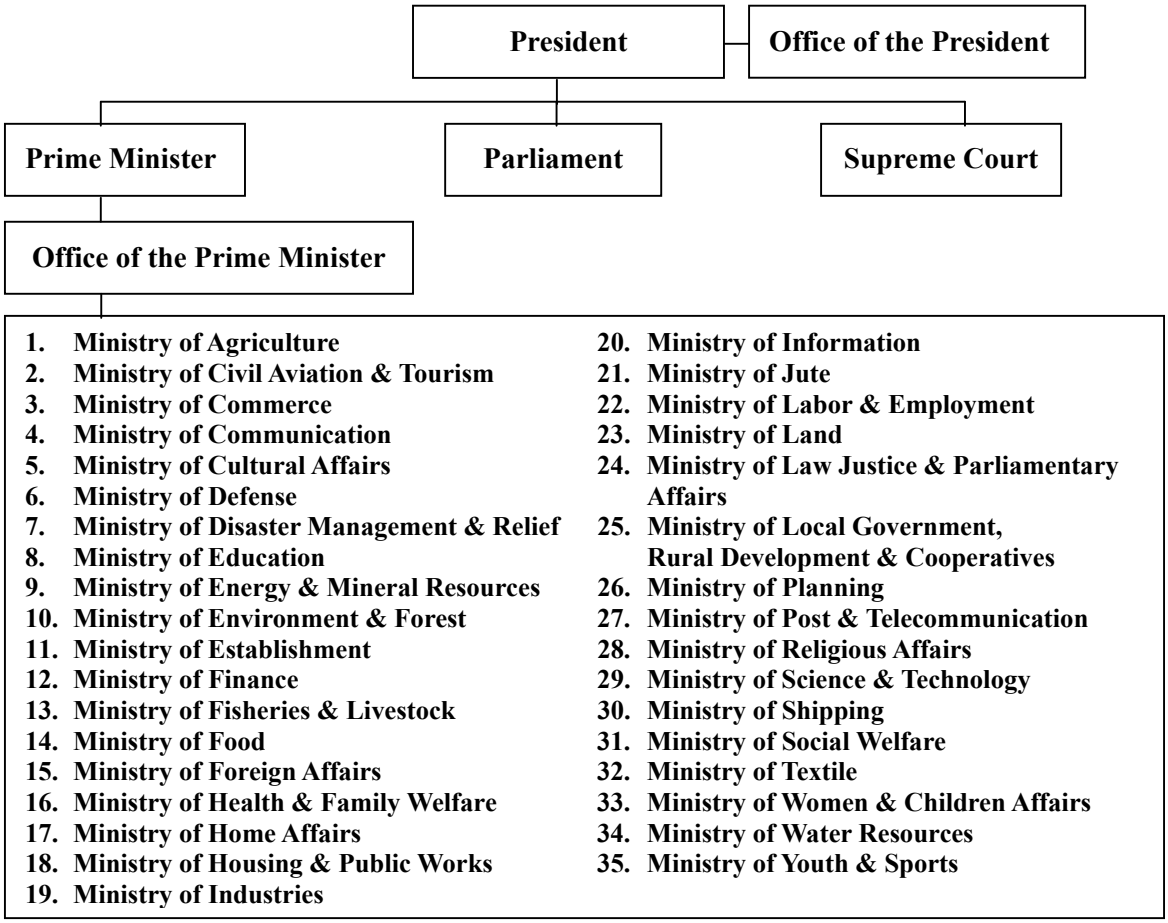


Figure 2.1 Organizations of the Bangladesh Government

Altogether 37 central Government organizations, affiliated with 10 different Ministries, have been identified with functions relevant to the flood-proofing and rural development sector. The main agencies are listed below and their main areas of responsibility are shown in Table 2.6.

Table 2.6 Institutions Relevant to the Flood proofing and Rural Development

Ministry	Organization	Local area development Planning	Rural village water supply and sanitation	Management of small water bodies	Minor irrigation	Maintenance of local drainage	Flood proofing	Management of small FCD	Access to Credit	Promotion/Education/Awareness raising
MoWR	Bangladesh Water Development Board				▨	▨	▨	▨		
MoA	Bangladesh Agricultural Development Corporation				▨	▨				
	Department of Agricultural Extension				▨					▨
MLGRD&C	Local Government Division	▨								
	Local Government Engineering Dept	▨				▨	▨	▨		
	Dept of Public Health Engineering	▨	▨							▨
	Bangladesh Rural Development Board	▨							▨	▨
MoE	Primary and Mass Education Division									▨
MoEF	Forestry Department	##								##
Communication	Dept of Roads and Highways							##		
MoFL	Dept of Fisheries	▨		▨		▨				
MoL	Ministry of Lands			▨						
MoI	Ministry of Industry	▨								
MRDM	Disaster Management Bureau						▨			
Other Organization										
	LGI: Paurashava	▨								
	LGI: Parishads	▨	▨	▨		▨	▨			▨
	Community Based Organizations		▨	▨	▨	▨	▨	▨		
	Non-Government Organization		▨	▨	▨		▨	▨	▨	▨
	Co-operatives		▨		▨					
	Private Sector*		▨		▨					▨

Notes: *; Excluding consultants and contractors, ##; indirectly related to rural development activities

Source: JICA Study Team

- The Ministry of Water Resources (MoWR); is responsible for most aspects of the water sector including flood control, irrigation, water conservation, surface and groundwater use, and river management.

- Bangladesh Water Development Board (BWDB); is responsible for the planning and execution of medium and large-scale water resource development projects, river dredging and training, flood forecasting, surveys, data collection and sundry activities. BWDB has recently been re-organized under a new Act (July 2000) that establishes a Board of Directors responsible for overall strategic decisions and a Director General responsible for operations.

- Ministry of Agriculture (MoA); is responsible for agricultural development, including minor irrigation; the Department of Agricultural Extension (DAE) provides advice through 13,000 block supervisors on agriculture and irrigation, etc.

- Bangladesh Agricultural Development Corporation (BADC); under MoA pioneered the introduction of mechanized minor irrigation, laying the foundation for the rapid expansion that has since occurred through the private sector. It was withdrawn from minor irrigation in 1993 and is in the process of being restructured.

- The Ministry of Local Government, Rural Development and Cooperatives (MoLGRDC); sets policies for rural development and overseas the functions of local government at all levels through its two divisions, the Local Government Division (LGD) and Rural Development and Cooperatives Division (RDCD).

- The Local Government Engineering Department (LGED); under LGD, is responsible for planning implementing executing rural infrastructure along with some social activities. Now LGED also has some project of urban sector. LGED, in water sector, has mainly focused on small scale schemes up to about 1,000ha. (Detailed explanation is described in the section of 2.3.3, LGED)

- The Department of Public Health Engineering (DPHE); under LGD, is responsible for the installation of water supply and sanitation systems in rural areas and in urban outside Dhaka and Chittagong. These schemes are turned over to the communities served.

- Bangladesh Rural Development Board (BRDB); The agriculture cooperatives promoted by BRDB worked well in the beginning (mid- 1970s to mid- 1980s) when scale of the program was small; supervision intensive; and group cohesion strong. The main mission of BRDB is “Poverty alleviation and employment generation”. Actual activities of BRDB at present are as follows: mobilization of the rural people, training for awareness raising, skill development, leadership, management capability, i.e., human resources development and access to credit were provided through co-operative activities.

- The Ministry of Environment and Forests (MoEF); sets policies for environmental protection and management and is responsible through DoE for enforcement of environmental rules and guidelines for all sectors.

- The Department of Fisheries (DoF); under the Ministry of Fisheries and Livestock, is

responsible for the development of both capture and culture fisheries. The Department consists of two main Divisions (Inland Fisheries and Marine Fisheries) each headed by Director. There is a Planning Research and Training Branch within the Head Office establishment. Development activities are heavily dependent on aid and the Aquaculture Section is responsible for 21 projects funded by both GOB and a number of donors.

In addition to projects, a Fisheries Officer (FO), Assistant FO and a Field Assistant are posted to each Upazila along with staff at Divisional and District level.

- The Ministry of Industry (MoI); The Ministry of Industries is engaged in expanding the national industrial base by accelerating the level of industrial investment. In order to promote industrial development, led by the private sector, the Government formulated an Industrial Policy in 1982 outlining the basic strategies for environment-friendly industrialization consistent with available resources. Under the revised policy of 1999, the Government is pursuing a competitive market economy through private investment, both local and foreign and gradual privatization of public enterprises to accelerate the process of economic growth.

- The Ministry of Land (MoL); All Government land comes under the jurisdiction of the Ministry of Land, which manages all land in the country through a system of lease settlement, sale, and acquisition. Agencies requiring land for implementation of a project enter into an agreement with the Ministry for suitable land within the existing legislative framework and/or rules.

  MoL has recently formulated the first draft of a land-use policy for efficient management and for resolving conflicts. Formulation of appropriate land use/zoning policy is underway to ensure optimum use of land, e.g. To prevent the use of agricultural land for brick making or industrial production, to protect land from degradation, to reclaim unutilized or degraded land properly, and to improve land resources. The policy will also provide guidelines to prevent cropping on accreted char land before it has stabilized properly. Flood control and drainage structures, which have altered land and water use patterns leading to a decline of fish stocks and production, will also receive careful attention in the policy guideline.

- Disaster Management Bureau (DMB); The Bureau carries out its responsibility through disaster management committees at Union, Upazila and District level. There is a co-ordination committee at Ministry level, and a Disaster Management Council at national level chaired by the Prime Minister. DMB provides services such as awareness raising, collecting, preserving and disseminating management and geographical information – including mapping and damage assessment. It is also responsible for all stages of managing disasters whether caused by flood, cyclone, drought, earthquake, etc.

  DMB is required to develop early warning (assisted by BWDB) and flood-proofing systems to manage flood, drought, and other natural disaster and designate flood risk zones and take appropriate measures to provide the desired levels of protection for life, property, vital infrastructure, agriculture and wetlands.

2.3.2 Local Government Institutions

(1) History of Local Government Reform

The history of decentralization and local government reform is briefly summarized in Table 2.7. This indicates the frequent changes in the policy on local government institutions. There has been a tendency throughout their history for LGIs to be undermined by the central government administration, resulting in an unhealthy trend that needs to be reversed.

Table 2.7 Fifty Years of Local Government Reform

Year	Changes in Direction
Pre 1947	Good progress with union and District boards fully effective
1947-71	Growth of LGIs lost momentum particularly under the martial law regime from 1958-69
1971	On liberation, government dissolved all local bodies and centralized the administration of local government
1973	Constitution committed the state to a decentralization programme to bring about rapid economic and social change. In practice progress was negligible.
1975	Government abolished all political parties except the party in power and placed control in the hands of District Governors. The Government was overthrown by a military coup in August 1975.
1976	LGIs reorganized by the Local Government Ordinance of 1976 but with effective control in the hands of central government.
1979-81	Establishment of Thana Development Committees to oversee the allocation of funds and execute development programs.
1980	Gram Sarker, movement introduced which was seen by many as a means by which the ruling Party could develop a grass roots power base.
1982	The Gram Sarker movement was stopped by the succeeding government with the martial law Administration reintroduced the Thana Development Administration, but again with real power in the hands of central government
1983-88	Local Government Acts established a two-tier decentralized administration consisting of Union and Zila Parishads; Upazila system was introduced.
1991	Zila Parishads were abolished as a tier of the administrative structure after the fall of the Ershad government
1991	Newly elected government abolished the Upazila system but provided no substitute
1997	Gram Parishad Act passed with provision for elected body
1998	Upazila Parishad and Local Government Act passed with provision for the election of representatives to the Upazila Parishad
2000	Zila Parishad Act passed with provision for elected body.

Source: NWMP working paper

A key rural institution is the local government, which has a central role in rural development and poverty alleviation. Broadly speaking, local government can be of three different types:

- Elected self-financing bodies accountable to the local people (known as local self-government);
- Local organs or agents of the central or provincial power financed by and accountable to the state; and
- Elected bodies overwhelmingly controlled by and accountable to the state.

The local government system of Bangladesh thus far is closest to the third category.

(2) Historical Change in the System of Local Government

Local Government: 1947-1971

The origins of local government in Bangladesh can be traced back to 1885, when the colonial rules established *Gram Panchayet* system at the village level mainly to bring the vast rural areas of the country within their administrative reach. That system gradually gave way to the 'Union Board (UB) ' system in the late 1920s, which continued until the independence of Pakistan in 1947. The UBs were the first local self-governments in the country that played limited development roles within the constrains of bureaucratic and colonial controls from above. Rural elites led the UBs as elected presidents.

The biggest disservice to the local government system came in the 1960s with the introduction of 'basic democracy' by Pakistan President Md. Ayub Khan. Basic democracy consisted of a three-tier local government system: the Union Council (UC) that replaced the UBs, the *Thana* Council and the District Council. Conscious design by the Government to channel development funds through UC chairman and members made UCs highly sensitive to national politics. Secret balloting was introduced to elect the UC leadership and members of the UCs were part of the electoral college that elected the President of Pakistan. The councils at the *thana* and district levels were composed of official and nominated members, none of them elected by the people. Except for the UCs, other tiers of the local government system lacked people's participation and worked merely as agents of state power.

Local Government Since Independence

The reforms have more to do with levels and composition than with powers and accountabilities. The best way to establish self-government at all tiers of the system – village, union, thana, and district – has been a subject of political debate, but there has not been much progress.

Village Level;

Attempts were made in the early 1970s to established *Gram (Village*) *Panchayet* in each village. But the attempt failed as the structure and function of the *Panchayet* was not spelled out clearly. The following Government, in the late 1970s, established *Gram (Village) Sarker (Government).* In June 1989, the next Government sought to establish *Palli (Rural) Parishad (Council)* comprising a chair and eight members elected by the villagers. But this idea was abandoned by the next Government. Gram Parishad Act passed with provision for elected body in 1997.

Union Level;

The *Union Parishads* (UP) are the oldest local institutions for self-government in Bangladesh, dating back to 1885. A UP currently consists of a chairman, nine elected members, and three women members. The UPs have practically no fiscal autonomy or capability, and their resource base depends on receiving development grants from the Government's annual development budget. The UPs are officially responsible for collecting taxes from a number of sources, but in practice not

much is collected. The UPs, with all their limitations, remain the most directly participatory local government unit in Bangladesh.

Upazila (Thana) Level;
A breakthrough in local government system in Bangladesh came in 1982, when the *upazila* system was introduced. The former *thanas* were upgraded to form *upazilas* by entrusting the units with both regulatory and development functions. The *Upazila Parishad* was placed under the control of an elected chairman, and all Government functionaries at the *upazila* level were brought under his control. Administration of the police and judiciary at this level was, however, outside the control of the upazila chairman. Although major political parties opposed the *upazila* from the very beginning, available evidence suggests that the ordinary people welcomed it. The power and responsibilities of the *Upazila Parishad*, however, brought the *Parishads* in conflicts with local Members of Parliament (MPs). In 1991, a new Government abolished the *upazila* system. But in 1998, the Awami Leaqne Government passed a bill in the Parliament to set up a modified *upazila* system of government.

Zila (District) Level;
The *Zila Parishad* has floundered ever since the 1970s, although there have been several attempts to revive it. The *Zila Parishad* operates under strict bureaucratic control and without people's representation. In 1988, in an effort to resolve the problem of coordination between *upazila* chairman and the local MPs, the Government made the MPs chairman of the respective *Zila Parishads*. The *Zila Parishad* was made as a coordinating body to resolve *upazila* matters and to monitor the development activities of the whole district. The successor regime of the early 1990s abolished the *Zila Parishad*, but the present Government has plans for its revival though its form and format are still not known.

2.3.3 LGED

(1) Relationships between LGI and LGED

LGED is an agency under LGD within MLGRD&C. LGED is represented at Zila (District) level. The FFYP suggests that LGED should also assist LGIs.

Of the four tiers of LGI, only the Union Parishad is active. The Gram, Upazila and Zila Parishad Acts now exist, but elections have not been held. When operational, LGIs are to be responsible for most development activities within their jurisdiction. The key issue is the relationship between LGED and LGI in terms of responsibilities for development and financial control. The obvious meeting point is at Zila level. (Figure 2.2)

(2) LGED

The background of LGED is traced back to early sixties when implementation of the following three elements of Comilla Model:

- Rural Works Program (RWP);
- Thana Irrigation Program (TIP); and
- Thana Training & Development Center (TTDC)

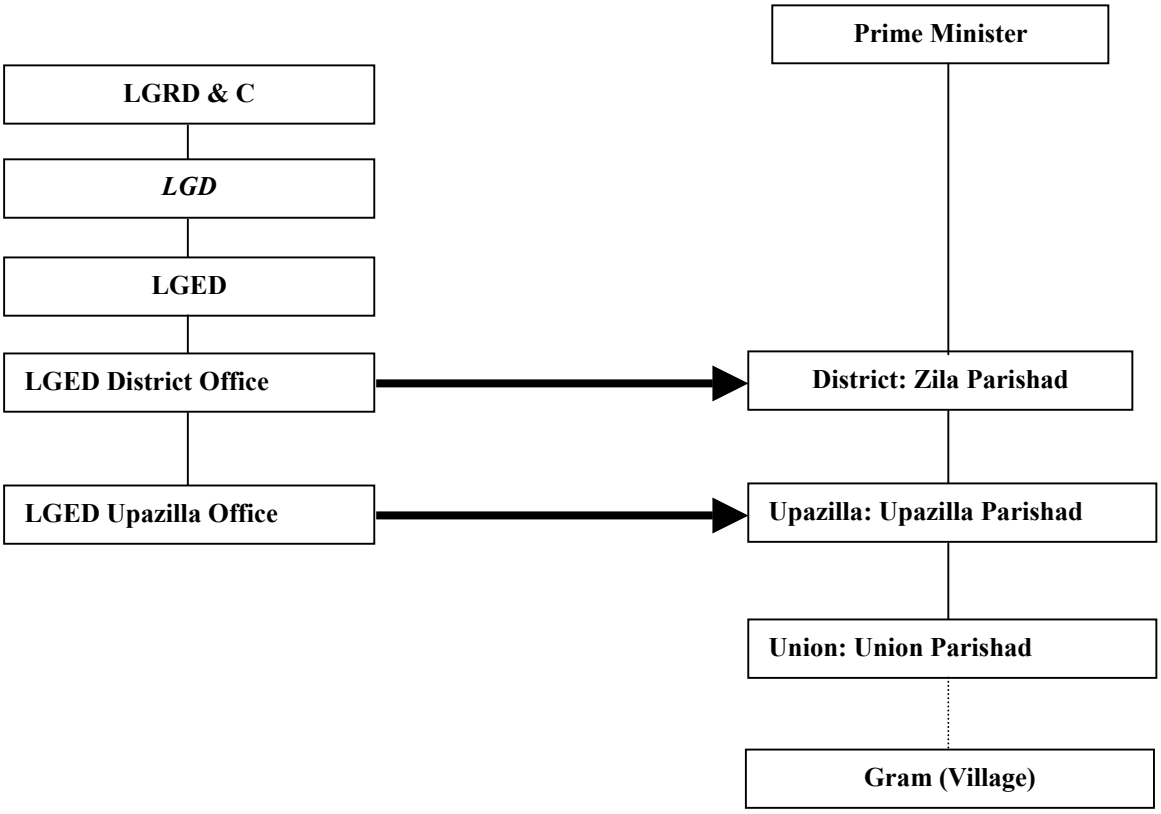


Figure 2.2 Relevant Institutions of LGED regarding the Local Government Institutions

These three elements known as Works Programme continued till 1982 with two branches: Rural Works Programme and Urban Works Programme. A "Cell" was established under the Local Government Division (LGD) in 1970s. To administer the Rural Works Programmes (RWP) nation-widely, the Works Programme Wing (WPW) was created in 1982 born on the Development Budget under LGD of MLGRD&C. It was converted into the Local Government Engineering Bureau (LGEB) under the Government Revenue Budget in October, 1984. LGEB was upgraded as the Local Government Engineering Department (LGED) in August, 1992.

As related organization of LGED and organization chart of LGED are shown in Figure 2.3. LGED is headed by Chief Engineer who is supported by 2 Additional Chief Engineers. Other officers include: 6 Superintending Engineers, 6 Executive Engineers and 6 Assistant Engineers at the Headquarters, 6 Superintending Engineers at the circles, 64 Executive Engineers at the districts and 463 Upazila Engineers at the upazilas. The total number of engineers and other staff under the permanent establishment of LGED is 9,600.

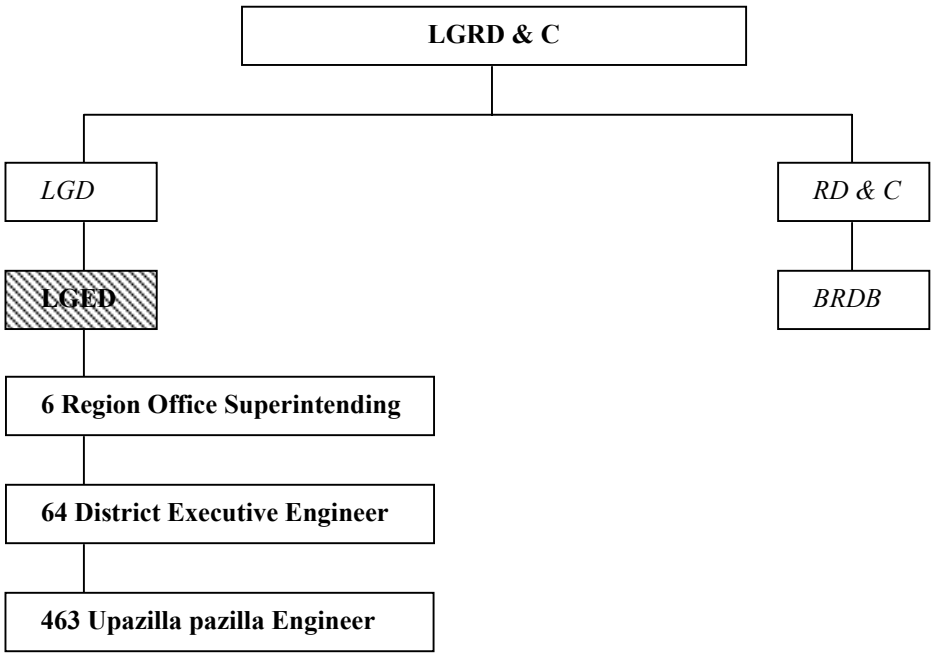


Figure 2.3 Related Organization of LGED

(3) Major Functions

The major functions of LGED are as follows:

- Provide technical support to Union Parishads and Upazila level;
- Provide technical support to Zila Parishads;
- Provide technical support to Paurashavas;
- Implementation of infrastructure development projects with donor assistance and food aid;
- Planning, construction and maintenance of feeder road type B and rural roads including bridge/culvert;
- Planning, construction and maintenance of Growth Center/Market and river ghats;
- Planning, construction and maintenance of small scale water resource schemes;
- Construction of primary schools, cyclone shelters, Union Parishad offices and Community Health Clinics;

- Deal with socioeconomic and beneficiary participation issues concerning development of rural infrastructure;
- Prepare Upazila/Union/Paurashava Plan Books, maps, local level data base, design manuals; and
- Impart training to Contractors, Local Government representatives and beneficiaries;

(4) Development Projects of Other Ministries Implemented by LGED

LGED is involved with the implementation of the other Ministries' infrastructure development projects and programmes.

- Ministry of Agriculture;
- Ministry of Water Resources;
- Primary and Mass Education Division (PMED); and
- Ministry of Health, Population and Family Welfare.

Ministry of Agriculture:

LGED is involved with the implementation of seven infrastructure development projects/ programmes under the Ministry of Agriculture.

Ministry of Water Resources:

LGED is also involved with implementation of one project under the Water Resources Sector at a cost of Tk.349 million (US$6.7 million). The allocation for the project during 2000-2001 is Tk.96 million (US$1.85 million).

Primary and Mass Education Division (PMED)

LGED is involved with construction of primary schools under 6 projects of the PMED.

2.3.4 Other Organization

Local and international NGOs provide goods and services normally associated with the public and private sectors. In some areas (e.g. micro-credit, non-formal education and primary health care), the NGOs of Bangladesh are internationally known for their successes. NGOs are increasingly significant in influencing public policy on issues such as land reform, primary education, environment and rural development planning. They have also become involved in advocacy on behalf of disadvantaged groups and other sections of civil society.

(1) The Co-operative Movement

The Co-operative movement started nearly a century ago and expanded rapidly in the 1960s. The Bangladesh Rural Development Board (BRDB) provides support to the national co-operative movement of 63,000 farmer societies (KSS) which are grouped into Upazila Central Co-operative Associations (UCCA). Despite determined efforts on the past of Government, the movement has achieved mixed results.

(2) Village Social Organization

A village in Bangladesh is organized into certain well-known social groupings. At the most basic level is the household, defined here as a group that shared a common stave (chula), and who eat daily meals together. Another term for household is paribar. This refers only to the related persons who share meals, not servants or other employees. Most households occupy a homestead (bari) that might include more than one related family. If so, they share a common courtyard and some facilities such as wells. A household is likely to have many ties to others in the village through marriage (the lineage is called gushti or bangsho). Women typically move to their husbands' homes at marriage, although men may have in with their wives' families under some circumstances. Networks of relations through married-in women can be very important in crises.

A grouping of homesteads usually makes up a village neighborhood, or para. This neighborhood is an important social resource during crisis. Village studies showed that the neighborhood often center around patron-client ties to a prominent man, a leader referred to as a matabbar. Relationships beyond the neighborhood level tend to be organized along factional lines, with the followers of competing leaders forming groups referred to as samaj. Social control beyond the family level tends to be in the hands of a village council made up of the various matabbars. These councils resolve conflicts or try to regulate the villagers' behavior through council meetings known as salish. Locally elected officials usually play a prominent role in the council and are likely to be matabbars in their own right.

Other important local groups are: religious congregations, Hindu castes, and voluntary organizations of several types such as cooperatives, credit associations, or youth clubs.

(3) Donor Agencies

The World Bank, the Asian Development Bank and numerous bilateral development agencies, notably Japan, Dutch, Danish, British and Canadian, have been active for many years in financing flood-proofing and rural development projects with technical assistance and capacity building. UNDP and other United Nations agencies, especially UNICEF, are active in support of rural development.

2.3.5 NGO Activities

(1) NGO in Bangladesh

NGOs emerged from the voluntary activities which came into begin in 1972 following the independence of Bangladesh. The War of Liberation, which resulted in the birth of Bangladesh, provided opportunity to idealist Bangladeshis to participate as freedom fighters. The independence also brought in its trail a massive task of relief and rehabilitation. Imbibed with the spirit of the freedom struggle many motivated Bangladeshis took part in the relief reconstruction work and set up voluntary organizations. A number of Bangladesh NGOs emerged through this process.

NGOs have grown very rapidly in Bangladesh since independence. If NGOs are broadly defined as private voluntary organizations, Bangladesh now has one of the largest concentrations of NGOs in the world. According to one estimate, there are at least 20,000 Bangladesh NGOs currently operating in Bangladesh. In 1995, the number of foreign-funded NGOs, registered with the NGO Affairs Bureau, was 986, compared to only 382 in 1990.

(2) Collaboration between the Government and NGOs

The main areas of collaboration are in the fields of primary education, health and family planning. In other areas, NGOs have been allowed to operate as sub-contractors on government projects. In some cases government ministries have held meetings with members of appropriate non-government organizations to form policy measures. For example, members of women's NGO met with officials of the Ministry of Law, Justice and Parliamentary Affairs and the Ministry of Women's and Children's Affairs in order to discuss the social and legal status of Bangladeshi women and their discrimination in different administrative sectors. Non-government organizations are vital to the government machinery in order to 'sound out' public opinion regarding the former.

(3) Role of NGOs in Development Programs of Today

The success of NGOs in Bangladesh stems from the fact that they are able to concentrate on specific population groups, especially vulnerable groups, in specific geographic areas and they are able to operate with lighter bureaucracy and decision-making structure as opposed to mechanistic, top-heavy and rigid governmental approaches to development. Another reason for overwhelming success of development NGOs is that they are believed to be imaginative and capable of adapting to local diversity. In sharp contrast to the government approaches to development, the NGOs' paradigm for rural development primarily centers around poverty alleviation by empowering the poor, developing institutions and strategies for poverty alleviation through active participation of the poor, and establishing grassroots democratization for sustainable, people-centered development.

Almost 80% of the villages of Bangladesh have likely been covered by NGOs, but they directly benefit only around 24 million people, 20% of the population. NGOs-which currently handle about 20% of the country's foreign-funded public investment programs- have been particularly effective

in replicating successful projects, mounting nationwide campaigns, and advocating special issues. In particular, they have been highly successful in popularizing micro-credit. Currently about 65% of the total rural credit is disbursed by the NGOs.

But NGO operations are much broader than micro-credit or agricultural growth. Over the years, NGOs have popularized oral dehydration, immunization, non-formal primary education, environmental protection, and maternal and child health. NGOs have also contributed significantly to expanding girl's education, creating employment for rural women, and providing extension for rural non-farm activities. BRAC has been successful in non-formal primary education; it operates over 10,000 satellite primary schools throughout the country that teach poor children with a strong emphasis on parent and community involvement. Successful models in micro-credit, non-formal education, and primary healthcare, developed by Grameen Bank, BRAC and others, are being replicated in other developing countries.

It is difficult to accurately assess the impact of the NGOs towards poverty reduction or achieving other goals but it can be stated with near certainty that they have helped to strengthen the capacity of the poor to deal with risk, such as in ability to smooth consumption. In contrast to formal credit, which often has a low recovery rate, and publicly provided social services that are often of poor quality, many NGO-managed schemes for micro-credit and social development have become world models. Grameen Bank has pioneered the NGO micro-credit model based on group lending and solidarity, strict credit discipline, and close monitoring and supervision. In the delivery of social services, BRAC and other NGOs have pioneered participatory methods for design and delivery.

The education and health programs of the NGOs stand in sharp contrast to the poor quality of public sector delivery mechanisms. In a survey conducted by World Bank, user satisfaction was highest for NGO schools, and lowest for Government-run schools. There was a similar pattern in the delivery of non-farm extension services-animal husbandry, poultry rearing. Key advantages of NGO delivery over Government delivery are beneficiary participation, high staff commitment, and constant program monitoring. NGOs constantly use client feedback to modify and improve their programs.

Relations between Government and NGOs have been swinging from distrust to ambivalence to cordiality depending on the attitudes of the political Government and of the bureaucrats holding key positions. At present, however, the Government is much more supportive of NGOs than it has been ever before.

(4) The Major Activities of the Main NGOs

The major activities of the main NGOs in Bangladesh can be enumerated as follows:

- Rural physical infrastructure building (food works, canal digging): mainly by CARE
- Agricultural development by CARE, CARITAS, CCDB, BRAC, PROSHIKHA

- Non-agricultural development programmes for promoting employment by the local level organizations;
- Health, population control and family welfare programmes of FPAB, BAVS, BRAC, Swanirvar Bangladesh, National Youth Federation and a number of women organizations; and
- Training and education and consciencetisation programmes of BRAC, FPAB, BAVS, IIRD, etc.

(5) NGOs Limitation

Notwithstanding various kinds of success, NGOs have some limitations. Critics point to the fact that NGOs are not accountable to the public and consequently some NGOs have worked irresponsibly. Also, operational expenses of some NGOs tend to be high. Other limitations cited are:

- NGOs micro-credit schemes are limited coverage of the small and marginal farmers who are too 'rich' to be eligible for micro-credit, but too poor to be of interest to providers of institutional credit, fragmented coverage within a village, regional imbalance and narrow focus in targeting.
- NGOs micro-credit schemes are yet to reach the hard-core poor primarily because the nature of the micro-credit and other income-generating programs require possession of basic assets as well as social and financial skill and stable habitation. Such requirements leave out the extreme poor.
- Coverage of a NGOs programs in a particular geographical area depends on its staff strength. The number of poor may be much more than the capacity of the NGO to cover. As a result, within a geographical area, the poor are divided into beneficiaries and non-beneficiaries of NGO programs. Such fragmented coverage does not lead to overall improvement of poverty in the locality.
- The strategy of the NGOs to target only the poor appeared to be a well-defined and effective entry point into the development arena in the early seventies. However, twenty years later, this approach, paradoxically, limits the effectiveness of NGOs in combating poverty. The reality on the ground is that there are segments of the rural population who are too rich to be eligible for micro-credit or other NGO-provided services, but not rich enough or well-connected with the rural power structure to be able to access such services from the public sector or the market. These groups are the marginal farmers, rural artisans such as weavers, dairy farmers etc. Most NGO's rigidly defined eligibility criteria exclude such groups and the evidence is that over time these groups have slid below the poverty line, thus increasing the number of the poor. A few of the NGOs now recognize these problems and are experimenting with pilot programs for marginal farmers and rural artisans.

2.4 Environmental Policies and Institutions

2.4.1 National Policies and Legal Framework

(1) Basic Law and Policies

The National Environmental Policy (NEP, 1992) concerned with the water sector is broadly similar to the fisheries policy, and this was echoed as a result of the National Environmental Management Action Plan studies. The objectives of NEP are to: (1) maintain ecological balance and overall development through protection and improvement of the environment, (2) protect the country against natural disasters, (3) identify and regulate activities which pollute and degrade the environment, (4) ensure environmentally-sound development in all sectors, (5) ensure sustainable, long-term and environmentally sound use of all national resources, and (6) actively remain associate with all international environmental initiatives to the maximum possible extent.

The National Environment Management Action Plan (NEMAP) was formulated in 1992. NEMAP highlights the need for integrated management of wetlands, for emergency response systems and improved disaster preparedness, and for the Char management systems. Main action regard to environment is follows:

- Environmental audit on an emergency basis is to be conducted. Steps to mitigate the adverse impact of on the environment identified in the audit will be taken through modification of the projects;
- EIA will be incorporated in all new projects and adverse impacts will be prevented through proper steps and adequate investment;
- Treatment of domestic water before discharging into water bodies is to be strictly enforced, and also water and road developments should not impede drainage and sewerage;
- Rivers, canals and other water bodies to be dredged to increase water holding capacity and navigability; and
- Artificial recharge of aquifers and rectification of projects to prevent further decline of the aquifer to be taken up.

(2) Laws Regulating Environment

The Environmental Conservation Act (ECA, 1995) is currently the main legislative framework document relating to environmental protection in Bangladesh, which repealed the earlier Environment Pollution Control Ordinance of 1977. It is expedient to provide for the conservation, improvement of environmental standard and control and mitigation the pollution of the environment. The ECA provides general legislation laying down principles for obtaining environmental clearance for major new development projects or expansion and modernization of existing industry in Bangladesh. The Act will be implemented through the Rules and Regulations document and subsequent revisions by the Department of Environment.

The Environment Conservation Rules (ECR, 1997) are the first set of rules, promulgated under the Environmental Conservation Act. The rules address three main issues, (1) to establish new procedures to be complied with by the developer of a new facility or operator of any exists facility, to obtain environmental clearance to operate the facility, (2) to establish the National Environmental Quality Standards for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust, etc., and (3) requirement of IEE/EIA according to categories of industries and other development interventions.

2.4.2 Environmental Administration

The Ministry of Environment and Forestry (MOEF) is the key government institution in Bangladesh for all matters relating to national environmental policy and regulatory issues. The MOEF oversees the activities of the following technical / implementing agencies.

- Department of Environment (DOE);
- Forest Department (FD);
- Bangladesh Forest Industries Development Corporation (BFIDC);
- Bangladesh Forest Research Institute (BFRI);
- Institute of Forestry;
- Forestry Division of the Bangladesh Agricultural Research Council (BARC); and
- National Herbarium.

(1) Department of Environment (DOE)

The DOE was set up in 1989 under the jurisdiction of the MOEF, and is the executing agency for planning and implementing of all environmental issues. The DOE has at present a total of 173 staff, headed by a Director General (DG) who is supported by a team of Directors, Deputy Directors, Assistant Directors, Engineers, and other technical staff (e.g. chemists and laboratory technicians). The DOE has four regional offices, 30 monitoring stations (not functional) and one laboratory, which contains outdated equipment with little analytical capability. The main problem is that the DOE is both technically and financially under researched and cannot as yet make adequate provision for training, routine monitoring or analysis.

And main activities are:

- Reviewing environmental impact assessments and issuing of environmental clearance where appropriate;

- Implementing environmental monitoring program including ambient environment monitoring and enforcement measures;
- Control, monitor and mitigate pollution of the environment;
- Provide environmental clearance for proposed industrial projects.

(2) Forest Department

This Department under the Ministry of Environment and Forest is responsible for protection and management of all Reserve Forests of the country. Its manpower extends down to the union level in areas where there are Reserve Forests. It has recently started some agro-forestry programs. The Forestry Department officers are also responsible for protection of wildlife in the forests.

2.4.3 Main International Legislation Related to Environment

The Convention of Biological Diversity (1992) signed by over 150 countries and ratified by Bangladesh in 1994 requires each signatory nation to develop national strategies, plans or programs for the conservation and sustainable use of biological diversity. No rare or sensitive ecosystems have been observed within the biological habitats of the area.

Convention on Wetlands of International Importance as Waterfowl Habitats (1971) RAMSAR, ratified by Bangladesh in 1992. Aims to stem encroachment on habitats including coastal beaches, coastal waters and tidal flats through promoting the wise use of all protected areas.

Convention Concerning the Protection of the World Cultural and Natural Heritage (1972) (World Heritage Convention) ratified by Bangladesh in 1983. Aims to protect the outstanding natural or man-made features considered the heritage of more then one state. Mankind as a whole has certain rights with respect to conserving such features. The Convention can be applied to habitats but is unlikely to be applicable within the study area.

2.5 Floods

2.5.1 People and the Flood

Annual floods are part of the natural environment of Bangladesh and people have adapted their lifestyle to accommodate them. However, in recent years, the characteristics of flood have changed for a number of reasons including change in land use and man-made alterations to natural drainage systems. People's sorrows know no bounds when the severity of floods crosses the normal magnitude without some mitigation measures near at hands.

The low lying regions of the country are worst affected in medium and severe floods due to disruption in communication, inundation of settlement areas, loss of properties, loss of crops and cattleheads, increased duration due to lack of adequate drainage etc. The Char areas of the major

rivers are likewise extremely vulnerable to floods. Damage to crops and inundation of homestead associated with erosion, lack of normal facilities associated with other constraints make their life miserable especially during the flood season.

The floodwaters recede at a slower rate from the areas where land elevation is comparatively low. Due to the depressed land in the Haor areas, the flood water remains for a prolonged period causing miseries to the population. In those low lying areas, at the onset of monsoon's first flood in March to May, the paddy fields - bearing Boro at the harvesting stage - are threatened to be submerged. In some years, the floodwater inundates and damages the only crop (Boro) just a few days before harvesting. A hurried cropping at an early stage may result in a poor output. During the entire monsoon period, people of the haor areas live a miserable life due to inundation of homesteads – roads – markets and other infrastructure. The wave actions from the vast mass of flood water cause erosion to the villages, roads and other infrastructure during this period.

Not only the people of the Haor areas suffer from floods, but also the people of the riverine Chars of the Brahmaputra, the Ganges and the Meghna are the usual victims. Increasing population in the mainland compels many of the disadvantaged to migrate in search of a livelihood to the riverine char areas where they face a tough situation for survival. During the normal floods, many of them must be evacuated to a safer place at least for a fortnight. In the event of a devastating flood, they loose their homes and lands to the devouring river erosion.

After the catastrophic floods of 1987, 1988 and 1991, the latest devastating one occurred in July 1998 inundating three quarters of the land of the country. This caused loss of more than 1,000 lives and also serious economic hardship to the country. During these floods, the worst hit were the people of the low lying Haors and the Char areas.

2.5.2 Classification of Floods

Flood in Bangladesh can be classified under 4 patterns:

(a) Flash flood during a short period due to heavy rainfall in hilly areas;

(b) River flood originated by rising of the water stage or overflow along the major river courses;

(c) Inundation flood in retardant areas due to lack of drainage of the rainfall waters; and

(d) High tide flood nearby the coastal zone along the Bay of Bengal caused by the high tide of cyclones.

(1) Flash Floods

This type of flood occurs due to intense rainfall in the steep catchments of the neighboring hilly areas. The flash floods rise and fall very rapidly usually within a day or two and may flow rapidly along river channel and travel overland. In some rivers like Khowai, water levels may rise several meters in 24-48 hours. Mostly, they occur in the foot of northern and eastern hills.

In the hoar areas, where normally only one crop is possible annually, early flash floods in March-May cause damage to the Boro crop by flooding mostly just before harvesting. Although the flash floods cause less damage during monsoon, but exceptionally high flash floods can damage aus and aman crop where they are grown. In the post monsoon period in September-November, flash floods may also damage transplanted aman.

During the exceptionally high flash floods, roads, railways, bridges, culverts, flood embankments and regulating structures along some eastern transboundary rivers are damaged almost annually. Arable lands near such breaches are often made infertile by sand deposit.

(2) River Floods

Heavy monsoon rainfall over the catchments areas of the three major rivers, the Ganges, the Brahmaputra and the Meghna and the snowmelt of the Himalayan ranges cause river floods in Bangladesh, which particularly affects the river flood plains. In the years when the rivers rise earlier, the neighboring meander floodplains, which are normally flooded by rainwater, are flooded by river flood.

The normal annual floods of the Padma and the Brahmaputra-Jamuna rivers do not cause appreciable damage except by riverbank erosion. Generally, every 3-4 years, river floods go beyond their active flood plains and damage crops in the neighboring meander floodplains, primarily beside the distributaries. The timing, duration and height of the water level of a flood are the important factors that determine the damages. The river floods bring with them sediments that are deposited in channels thus reducing the drainage capacity of the minor rivers, bridges and culverts on roads and railways and the drainage channels. Severe floods, which cause extensive damages to crop, properties and infrastructure generally, happen at intervals of 7-10 years. The ostensible catastrophic floods occur at intervals of 20-50 years and bring about devastating damages to crops, property and infrastructure on adjacent floodplains. The great flood of 1988 has been termed as one in 50-100 year event.

The Brahmaputra-Jamuna flood peaks generally occur about one month earlier than that of the Ganges. High floods in either of these rivers may cause damages downstream along the Padma or lower Meghna river. Overland flooding will become particularly severe in the years when the peaks of the two rivers coincide, as it happened in 1988.

(3) Rainwater Floods

This kind of flood is caused by the heavy rainfall over the floodplains and terraces within Bangladesh. Intense pre-monsoon rainfall (April-May) causes local runoff to accumulate in floodplain depressions. Subsequently, during June-August local rainwater is increasingly ponded in land by the rising water levels in the adjoining rivers. Depending upon the intensity of rainfall and the water levels on the major rivers which controls drainage from the land, the rainwater depth vary within the rainy season and from year to year.

Rainwater flooding is characteristics of the meander floodplains, major floodplain basins, and old piedmont and estuarine floodplains. Interior parts of the tidal and young estuarine floodplains are also flooded mainly by rainwater. Excessive rainfall occurring over the area throughout the rainy season mainly caused the serious 1987 flood in northwestern part of Bangladesh. The flooding was aggravated by the flash floods in the Teesta and other rivers and by the high river stage in the Ganges and the Jamuna rivers. Road and Railway embankments with inadequate bridges and culverts and silted-up minor drainage channels impeded drainage of overland flow.

(4) Tidal Floods /Storm Surges

Storm surges are raised sea level caused by a combination of barometric depression and strong on-shore winds associated with tropical cyclones. Storm surges cause sudden temporary flooding of the coastal areas with seawater or brackish estuarine waters flowing inland for a few kilometers during the passage of a cyclone. During storm surges, water levels can rise four to six meters above normal high tide within a few hours. Exceptionally, as in 1965, storm surges move to the interior of the country by passing up the Meghna estuary. Damages due to storm surges are particularly heavy, especially in terms of loss human life.

In addition to the natural type of floods, there are floods caused by man-made interventions, which include those resulting from breaches in embankments and also those resulting from water ponding behind the embankments. Embankments can be breached by erosion from adjacent rivers or due to cut being made by the people who consider that the embankment is aggravating their own flooding. Ponding of water behind road, railway and flood embankments following heavy rainfall is a common occurrence.

2.5.3 Timing of the Floods and their Extent

At the advent of rainy season in pre-monsoon months of April-May, flash floods occur from the northern and eastern hills. The monsoon normally starts in June. The Meghna and the Brahmaputra generally reach their peaks in July and August and the Padma river during August and September. If the peaks of the Padma and the Brahmaputra coincide, severe flooding results. Successive floods with the coincidence of peaks like those occurred in 1954 and 1955 and also in 1987 and 1988 are indeed rare events.

The difference in water levels of different return periods of a river flood in Bangladesh is not very high. However, due to the flat topography of the country, it can be seen that a small difference in flood level can be significant with respect to the area affected and hence the total damage caused.

2.5.4 Flood proofing

(1) General

Flood proofing has been defined as "provision of long term non-structural or minor structural measures to mitigate the effects of floods". The flood-proofing aims at lessening the chance of human death toll and reducing inconveniences to the daily activities of the people in a flood environment. It further provides people in the flood prone areas with the security and motivation necessary to make and sustain developments in their economic and social well-being and achieve prosperity. Further, it helps the flood affected society in their quick resilience to normalcy after the onslaught a flood. Although the National Water Policy (January 1999) emphasize the flood-proofing to become mainly a private sector activity, public funding will also need to be applied if the millions of people living in the flood prone areas are to be helped in their endeavor to reach a minimally acceptable standard of living.

(2) Flood proofing Classifications

Flood proofing may be classified under the structural and the non-structural categories.

(a) Structural flood-proofing

The Structural flood-proofing include small physical interventions like the raising of homestead, tubewells etc. above flood levels. Structural flood-proofing also includes provisions of refuge areas or flood shelters, ideally with water supply and health facilities operating throughout the flood period. Flood proofing also includes raising of roads above peak flood levels, providing additional bridges and culverts to improve water flows across, stabilizing of village mounds, embankments and structures against chance of their being washed out. Structural flood-proofing may also encompass the low height dry season roads that will be submersible during the flood period. The low height roads used during dry season will compensate to some extent for the absence of all-season normal roads above flood level in a technically or otherwise non-viable situation.

(b) Non structural flood-proofing

Amongst the non-structural measures under flood-proofing, the following are major items:

(i) the institutional measures that coordinate the activities related to the flood-proofing, planning and development in flood prone areas, account for the prevailing hydrological conditions and ensure hydrological data and analysis are available to those involved with design and construction of infrastructure and other facilities,

(ii) the evacuation facilities, community education for improved health etc,

(iii) erosion protection by plantation and homestead gardening, plantation for nutritional support etc.

(3) Flood Preparedness

Flood preparedness, considered a part of the flood-proofing, is the provision of short-term measures to be practiced by individuals, families and other institutions with the aim of reducing the disruption and damage caused by flood. Flood preparedness is essentially the services for the vulnerable mass before, during or after a flood event. The measures of flood preparedness include ensuring ability of a society to forecast and take precaution in advance of a flood. The measures also include securing capability to respond to and cope with the onslaught of a flood by administering and delivering timely and effective rescue, relief and other suitable post flood supports.

(4) Flood Protection

Compared to flood-proofing, the flood protection projects in rural Bangladesh principally seek after improvement of the agricultural sector. They protect life and properties of the agrarian community living within the project areas. The utilization of the flood protection embankments as the shelter by those residing outside the protected area comes as a secondary significance.

Unlike flood-proofing, the provision of flood protection ensures major long-term structural measures that allow the floodwater to enter an area only in a controlled way to suit the requirements of the area protected. This essentially includes the provision of drainage. In Bangladesh, flood control measures involve the construction of embankments, appurtenant structures and improving the flow of drainage channels. Excepting the limited provision of flood control facility associated with the Karnafuli Hydro-electric Project reservoir in the southeastern part of the country, there is perhaps little potential for mitigation of flood damage by storage reservoir.

(5) Comparative Discussion on Mode of Mitigation Measures

Flood proofing and flood protection have a distinct difference in the areas over which the particular measures are applicable. Flood proofing relates to local measures that affect a smaller area comprising of one or several households, a village, small urban or rural areas or specific infrastructure facilities; while flood protection ensures protection for all social and economic activities and infrastructure in larger areas that may encompass parts or whole villages, unions, upazilas or even districts. Although people's participation is an essential requirement for success of both flood-proofing and flood protection measures, nevertheless flood-proofing requires low capital input while flood protection tends to require high capital investment from the public sector.

Flood proofing and flood protection are complementary to each another. Flood proofing is applicable both within and outside the flood protected areas. Furthermore, all flood affected areas may not be suitable for flood protection due to physical, hydrological, social or economic reasons where flood-proofing measures may be applied to lessen the damage and disruptions. However, flood-proofing and flood protection are not mutually exclusive. Flood protection measures are designed to give protection from specific flood events, but homesteads and other essential social and economic facilities and infrastructure within a protected area may require protection from more extreme floods during which the larger protection measures may not be effective. The additional defense required for specific facilities and infrastructure may be rendered by suitable flood-proofing steps. Further, in some instance the flood protection is designed for a specific purpose to be effective up to a specific flood level. Once this level is surpassed, the flood protection system is rendered totally ineffective when the flood-proofing measures come to play. Example of this phenomenon is the function of low height flood control embankments of BWDB in the Haor areas, which is designed to protect Boro crops in April-May (pre-monsoon) till they are harvested. Measures relating to flood preparedness are essential for all flood-affected areas irrespective of availability of facilities for partial flood protection or flood-proofing.

(6) Present Status of Flood proofing Practices

In Bangladesh, people have always accommodated floods in their lifestyle and within the resources available to them applied the principles of the flood-proofing. Generally, the villages are situated in the higher grounds; and houses, when build near riverbanks subject to erosion, are made easy to be dismantled. As the flood protection is generally not available, people have to practice flood-proofing by their own resources. Due to lack of resources, however, their efforts are often inadequate.

The tidal zone in the southern Bangladesh has the ‘cyclone shelters’, which are used by the people in time of the tidal surges during the cyclonic storms. In the other flood affected areas, the GoB’s Relief and Rehabilitation maintain the ‘flood shelters’. Generally the flood affected people move to safe places, which include open air raised areas like roads, embankments, etc. where available. However, many of them would prefer to stay in their submerged homesteads, as they are afraid of loosing their belongings due to various factors in case they go to a shelter situated at a long distance away. People has to be informed from the radio/newspaper reports about an incoming flood, in some places local administration announce by loudspeaker.

2.5.5 Flood Forecasting and Warning System

(1) Role of Flood Forecasting and Warning Center (FFWC) of BWDB:

The FFWC was established in 1972. The UNDP supported the center through different projects from the inception till 1992. The center received assistance for its improvement and expansion from DANIDA during 1991-1995 though a component of the FAP. Currently the DANIDA-assisted

project “Consolidation and Strengthening of Flood Forecasting and Warning Services” is under implementation for the period January 2000 through December 2004.

During 1975-1991, the center used to forecast flood by Co-axial correlation, gauge to gauge relation and Muskingum-Cunge Routing Model. From 1991 onward, the forecasting has been based on the flood modeling technology developed by Danish Hydraulic Institute (DHI) with the support services from the SWMC. The forecasting center uses the MIKE 11 and FLOOD WATCH modeling systems. After 1998, modern techniques of flood monitoring have been introduced with computerized programs.

The services rendered by the Center in relation to the flood and flood warning information are being used by various organizations, government and non-government agencies for carrying out their own operations. However, the FFWC has its own limitations, which are enumerated below:

- Only the northern regions of Bangladesh are covered for the operation of flood forecasting and warning;
- The accuracy of flood forecasting is constrained due to lack of access to rainfall data of the upper catchments in India;
- The forecast regarding area of inundation is based on coarse model and old topographic maps;
- Preparation of Upazila flood maps are based on the proximity of the rivers;
- Close-interval data are not available for the forecasting of flash floods; and
- The forecasting provides estimates of danger levels at BWDB gauge stations for the 24 hours in advance. It is released to the Internet, radio and television for quick circulation. However, there is much scope for the improvement in the process of dissemination to the target people.

The Center has an objective to cover the whole flood prone areas of the country and to disseminate information and warnings to the people of the probable affected areas in a more straightforward and meaningful way through its on-going project mentioned earlier.

(2) Present Telemetering System

There are 14 telemetering stations installed in 1996. Six are now operational as they are directly connected with the FFWC. But the remaining eight, connected through T&T microwave, are not functioning due to problem in the T&T microwave. The locations of present telemetering stations are shown in Table 2.8.

Table 2.8 List of Telemeter Stations in the FFWC of BWDB

Sl. No.	Location	River	Situation
1	Chapai Nowabganj	Mohananda	Functioning
2	Kurigram *	Dharla	Not functioning
3	Nayerhat	Kaligana	Functioning
4	Mirpur (Dhaka)	Turag	Functioning
5	Mill Barak (Dhaka)	Buriganga	Functioning
6	Rekabi Bazar (N.Ganj)	Shitolakhyd	Functioning
7	Tongi (Tongi Khal) *	Turag	Not functioning
8	Shaistaganj *	Khowai	Not functioning
9	Narayanganj	Lakya	Functioning
10	Kamalganj *	Monu	Not functioning
11	Dhalai (Moulvibazar) *	Dhalai	Not functioning
12	Manu (Moulvibazar) *	Manu	Not functioning
13	Zakiganj *	Kushiyara	Not functioning
14	Sherpur *	Sherpur	Not functioning

Source: BWDB

(3) Data Collection by Wireless

There are 80 stations from which data are collected through wireless. Beside the telemetering receiver station, the wireless data receiving station is also situated in the FFWC (BWDB HQs).

(4) Different Studies on Flood Forecasting

(a) FAP 6 Study for flash flood warning system in the Northeastern Region

FAP 6 conducted a Study in 1994 to provide timely and readily understood warnings to villagers in Flash Flood prone areas of Northeast Region, which cover also the Haor area of the present Rural Development Study. Storm over the Indian states of Meghalaya and Tripura can occur both in pre-monsoon or monsoon. The flash floods travel down these rivers 20 to 30 km from across the border, wrecking havoc in the riverside villages before their energy is dissipated by merging of the flows with those in the larger rivers in the Haor areas. Details of the technology required including the cost to generate these warning signals which included installation of telemetering in cross-country locations in Tripura and Meghalaya, and of the actions villagers should take in case of receiving a notice of flash flood have been worked out in the FAP 6 Report. It was recommended that a full directorate name “Flash Flood Warning Agency” be established within the BWDB to establish operate and maintain the proposed system. The Study identified 9 major flash flood affected channels and areas, 4 of which are the source of early floods in the Haor areas of the present Study.

(b) FAP 10 Study for Expansion of Flood Forecasting and Warning Services

The DANIDA collaborated FAP 10 Study was conducted in 1995 with an overall objective to provide improved information on floods to aid national preparedness in flood disaster and to minimize flood impacts by modeling studies and developing range of forecasts outputs, public and user awareness and dissemination. It also envisaged development of telemetering system to upgrade data collection.

The Study addressed the following points:

1. Increasing the no. of forecast points from 16 to 30,
2. Expand forecast period to 72 hours,
3. Develop a real-time coarse model for inundation forecasting in the northern region (NW, NC, NE),
4. Develop flash flood forecast for two rivers – one each in NE and NW regions,
5. Improve data communication system,
6. Improve hydrological and meteorological monitoring,
7. Improve dissemination system in close cooperation with Disaster Management Bureau,
8. Develop program of public awareness on the understanding of flood warnings,
9. Improvement of the institutional structures of the FFWC.

2.6 Foreign Aid

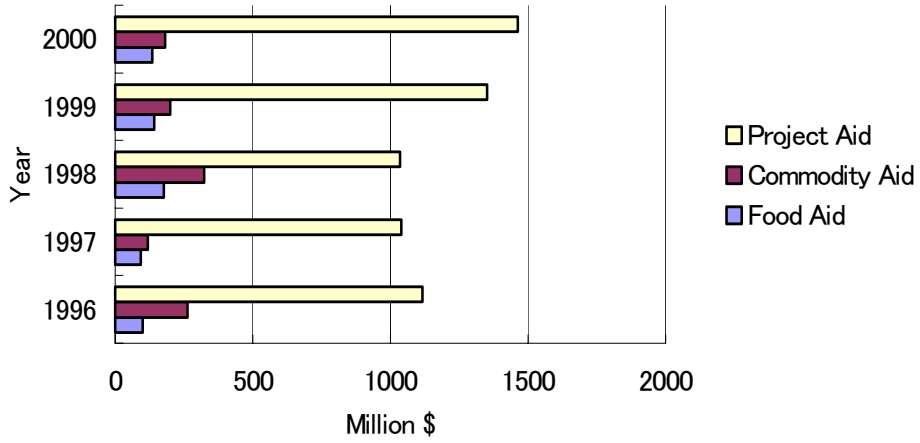
Total amount of foreign aid amounts to approximately 34.8 billion US dollar from the Independence, 1971, to 1999. Breakdown of foreign aid: Grant occupies 48.2 %, and Loan occupies 51.8 %.

At the time of Independence, bilateral foreign aid occupied approximately 70 %, but currently aid from the multilateral organizations increased and actually amounted to about 60 % in 1998. As a result, the ratio between grant and loan was reversed.

Same tendency is found for the ratio of grant and loan in the ratio of each year. At the time of Independence, some 90 % was grant, but currently the ratio of it decreased to about 40% in 1998.

2.6.1 Aid Form

Aid comprises three forms, Food Aid, Commodity Aid and Project Aid. Mainstream of foreign aid was Food Aid and Commodity Aid by 1980. After that, Project Aid increased rapidly and it occupied approximately 70 % to 80 % of foreign aid recently. (Figure 2.4)



Source: Economic Relations Division, Ministry of Finance

Figure 2.4 Trend of Aid Form in Foreign Aid

The ratio of foreign aid in development budget in Bangladesh amounted to 80 % by the time of 1991 that they accepted the structural condition of IMF due to the failure of financial management. However, improvement of national finance due to structural condition and together with the "Aid fatigue" of developed countries got lower the ratio of foreign aid in the development budget. Recently, the ratio of foreign aid in development budget changed to approximately 50%.

2.6.2 Aid Trend on Each Sector

According to the historical trend of foreign aid, it is an obvious fact that the construction of infrastructure, i.e. electricity, road, bridge, took precedence over the other sectors. (Table 2.9)

Table 2.9 Amount of Foreign Aid by Sector in the Past Five Years

(unit: Million $)

	1994	1995	1996	1997	1998	Total
Agriculture	101.6	70.6	56.0	48.4	64.6	1338.7
Rural Development	81.5	51.2	59.7	48.0	45.1	905.0
Water Resource	99.5	75.3	110.1	149.5	121.9	2018.5
Industry	15.3	25.4	3.4	2.7	4.5	1601.8
Electricity	218.4	173.5	127.3	94.9	107.7	3292.4
Oil & Gas	68.3	43.3	45.8	27.6	47.9	1096.6
Transportation(Road, Bridge)	304.7	271.7	322.2	221.4	157.7	3261.3
Communication	14.4	3.4	3.1	21.6	35.7	403.4
Water supply & Housing	59.2	80.3	107.0	103.4	130.6	960.4
Education & Religion	123.8	106.3	103.7	100.5	91.9	1134.9
Health & Population	39.2	35.0	50.1	46.8	145.8	644.1
Social Welfare	80.7	89.7	79.5	70.3	6.1	922.4

Source: Flow of External Resources into Bangladesh, Feb.2000

On the other hand, foreign aid to industry was ranked fourth in total amount base, but foreign aid to industrial sector drastically decreased in reflection of policy change for industry in 1980's. Social infrastructure, i.e. water supply, housing, education, health, increased in the amount of aid recently.

Japan, UK, and Holland were always ranked in the high position in aid for Bangladesh, in particular, there is much aid from Japan compared with other DAC countries in aid amount. And IDA and ADB of international institution are overwhelming in aid amount every year. But it is general trend for every donor to decrease the amount of aid gradually.