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## Coastal Zone Policies and Livelihoods in Bangladesh

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The coastal area of Bangladesh is an active delta, rich in water and land resources. The area is also one of high risks to natural and man-made calamities. The area is characterized by a constantly changing geographic and geomorphologic situation. In this region landownership is more skewed than in other parts of the country. There is a relative absence of government and NGO institutions and services, with little integration among those present. The law and order situation is often poor with the elite firmly in control of the economic, social, and political spheres of life. The poor are socially and politically marginalized. While in some parts, the natural resource base, such as the mangrove and other forests, has been irrevocably damaged by human intervention, in the major part, the resource base is still intact and able to support sustainable development in general and poverty reduction in particular.

In the last decades the coastal zone has seen economic growth along with some reduction of the extent and severity of poverty. The preconditions for this were created by the water-management, security- and transport-enhancing infrastructure developed by the Government. The commercial sector and NGOs have made use of these new conditions by speeding up development of the natural and human potential of the coastal zone.

To have a maximum poverty-reduction impact, coastal development should be a process rooted in the simultaneous enhancement of livelihoods and reduction of multiple vulnerabilities. To be effective, the integrated coastal zone management (ICZM) policy under development will have to be based on a process rather than a blueprint approach. It should focus on three crucial points: Facilitating coordination among various actors, complementing structural with non-structural measures, and ensuring more equitable benefit distribution. The ICZM policy must be accompanied by a phased, evolution-type implementation strategy, and time-bound action plan.

### Description of the Case Study Area

#### Physical Setting

The major part of the coastal zone is the active delta of the three largest rivers of Bangladesh, the Ganges, the Jamuna (also known as the Brahmaputra), and the Megna. The coastal area borders the Bay of Bengal and has three distinct geographic sections, the Sundarban mangrove forest in the southwest, the very active delta in the central south, and the narrow coastal strip along the Chittagong and Chittagong Hill Tracts area on the east.

The case study area, Polder<sup>1</sup> 55/1, belongs to the very active delta in the south-central area of the coast. Geographically and socially, the island and subdistrict of Galachipa, part of Pathuakhali district, is representative for a large part of the coastal zone. Until the mid-1960s, the island, like most of the other islands in the delta, was little more than a fertile mud bank, interspersed with an extensive network of natural channels. Although the land was only a few feet above the normal high tide, the rich water and land resources had already then attracted many people from other parts of Bangladesh.

## Historical Setting

In November 1970, a cyclone hit the area, which cost the lives of up to 500,000 people (Box 1). A few years before that the Government decided to establish the embankment of the coastal islands through the predecessor of the Bangladesh Water Development Board (BWDB). The aim was to protect the people and their property from cyclonic surges and create better conditions for agricultural production by reducing intrusion of saline water and improving drainage of rainwater. In Galachipa, the work started in 1967 and was completed by 1977. "Polder 55/1," as it is known, protects an area of 10,600 ha. Older people recall the immediate and positive impact of the polder on their lives, including the poverty reduction impact (Box 2).

However, in the 1980s, the quality of the embankment and the drainage structures started to deteriorate. Security went down as the river eroded parts of the embankment. Water management, and with it agriculture in the polder, suffered. Furthermore, changes in agricultural and fisheries technology meant the infrastructure no longer provided for the needs of the population.

In the early 1990s, BWDB took up the rehabilitation of Polder 55/1 under the Systems Rehabilitation Project (SRP). Major components were the rehabilitation of the infrastructure and addition of many new, relatively small structures, to cater for the new demand for irrigation inlets to grow rice in the dry season. The SRP started new institutional arrangements to ensure that in- and outlet structures would be operated as per the demand of the farmers and to ensure preventative maintenance.

At present, early on in the new millennium, the situation in Polder 55/1 remains dynamic. As in the whole of Bangladesh, rice production is no longer as profitable as it used to be. Farmers are therefore shifting from high input rice crops such as irrigated *boro*. At the same time the profitability of dry season crops and fish has gone up, thus changing farmers' choices and to some extent the water management needs.

Around the case study area, as in other parts of the coastal zone, very lucrative shrimp cultivation has taken off. In some adjacent polder, the whole area is already under shrimp cultivation, in others half. In almost all cases, the shrimp business is firmly controlled by a few powerful elite and local farmers have no option but to lease out their land to the shrimp business, often with negative impacts on them and their land.

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<sup>1</sup> The Dutch word "polder" is now part of the vocabulary of the Bangladesh water sector. It refers to an area enclosed on all sides by an embankment with in- and outlets to control the water inside the embanked area.

## Box 1. Empoldering: People's Perception

Memories of the November cyclone of 1970 are still fresh and alive. Mr. Siddique, 53, of Dakua village in Polder 55/1, recalled: "I had just gotten married when the storm surge hit our village. My wife, other family members and I took shelter in the corrugated iron house of a rich neighbor. In no time the house was full of water and the walls started to collapse. My wife clung on to me but suddenly a wave separated us and drove us out of the house. I managed to grab hold of a branch of a tree and hung on to it all night. I still do not know how she survived. In the morning, when the storm stopped and the water receded, I found my wife. She was unconscious but survived because her saree got caught around a tree. However, I never found my mother and two of my brothers."

The cyclone that hit the area in 1970 had a surge height of up to 9 meters with a wind speed of 200 kilometers per hour. The affected area was reduced to rubbles within a few hours and up to 500,000 people lost their lives.

The general perception of the people about the polder is very positive. According to them the polder changed their lives and the overall situation of the area dramatically. The risk of getting inundated or washed away by a tidal surge is now virtually zero. None of the cyclones and surges since 1970 has created much damage in Polder 55/1. The security of life and property against cyclone and tidal surge is seen as the most remarkable contribution of empoldering.

### Positive changes of empoldering

- Security to crops and livestock
- Better conditions for new crops (boro rice and betel leaf)
- Improved year-round road network leading to access to markets, new avenues of employment such as transport and higher enrollment/attendance in schools

### Negative impacts of empoldering

- Restricted water flow in the internal channels leading to stagnant water and breeding grounds for mosquitoes
- Dry season scarcity of water, particularly for domestic use, and pollution of the little water that is available
- Loss of capture fisheries

People point out that some of these negative impacts were not there in the beginning. They came about when the new system was not managed properly and the infrastructure started to deteriorate.

## Water Resources

Because the coastal zone is a delta, water resources are considerable. The most visible resources are the rivers. Over the last few decades the salinity of the river water has steadily increased, mainly because of a reduced inflow of sweet water in the dry season. This has increased the salinity of the land and the groundwater. The rivers provide an easy means of transport as well as various fisheries resources. The Bay of Bengal features key spawning grounds as well as rich offshore marine habitats.

The rivers and internal channels are usually government-owned land (called *khas* land). Nevertheless, many farmers with land adjacent to the channels have appropriated the land and/or water resources of the channel for their private use. In line with the prevailing law, the Ministry of Youth and Sports leases out stretches of channel for fisheries.

Some parts of the coastal zone have low-lying areas, called *beels*. These used to produce a wide variety of common resources such as reeds, aquatic plants, snails, and fish, which were important resources to support livelihoods of the poorer sections of

## Box 2. Empowering and Poverty Reduction

Local people say that poverty in polder 55/1 has declined. In the pre-polder situation only one rice and some rabi crops were grown. Often intrusion of saline water destroyed the crops. Construction of the polder stopped saline water intrusion and also created conditions for a second rice crop. People say these changes first triggered overall development and poverty reduction in the area.

The accretion of land also helps to reduce poverty. In Galachipa district yearly accretion is around 40-60 ha. The accreted lands are used for grazing cattle and to produce local rice varieties, creating employment for many poorer households. Officially, this land is distributed among the landless households, but given the sociopolitical structure of the region, many of the allotment holders cannot establish their ownership rights over the land.

Local people say that the safety net programs of the government (i.e., food for work, food for education, etc.) have a positive impact on the life of the poor. This is the case even when it is acknowledged that the programs are not free from corruption. Furthermore, government resettlement programs such as "Adarsha Gram" and "Asahrayan" make significant impacts on the life of the poorest of the poor. In Galachipa subdistrict, 3,750 families received a home and homestead plot under these programs, as well as some supports for income generating activities.

Finally the impact of NGOs on poverty reduction is often mentioned. Starting with the Grameen Bank, which launched its program in early 1980s, presently there are over a dozen of NGOs working in the region. They work on various social and economic issues, but microcredit is an integral component of their programs. National level NGOs such as Grameen Bank, BRAC and ASA have large microcredit programs and these three NGOs cover roughly 45,000-50,000 poorer households in Galachipa subdistrict. Much of this credit goes to petty trading, rearing livestock, rickshaw and van pulling, buying of fishing gears and boats, pond aquaculture, and a limited amount, to farming.

society. In many places overdrainage and encroachment have reduced the size of these beels and common access, beneficial particularly to the poor, limited.

The quality of the groundwater varies. In some areas the shallow 10–30 top layer is sweet, followed by a layer of saline groundwater that can extend up to several hundred feet. The deepwater layers are again sweet. Groundwater is used for drinking and domestic use, but not normally for irrigation as sweet river water is available for part of the dry season.

### Water-Related Vulnerabilities

The major vulnerability-related events in the coastal area are cyclones (major ones in 1970, 1985, 1991); riverbank erosion; increased water and soil salinity; increased drainage congestion inside polders; and the damage to land, crops, and trees due to saltwater shrimp cultivation.

The coastal belt also suffers seasonal vulnerabilities. In the monsoon and post-monsoon season, drainage congestion is often a problem. This is caused by poor O&M of outlet structures, silting up of channels, construction of roads without culverts, and blocking of channels with cross-dams to make ponds for fisheries. In much of the coastal belt, people now have access to tube wells for drinking water, though coverage, particularly in the newly inhabited areas, is less than elsewhere. In some parts of the coastal area, particularly in Noakhali district, the tube well water is contaminated by arsenic. Drinking this water exposes people to a high risk of cancer and other diseases.

While tube wells are used for drinking, ponds and channels are still used for washing, bathing, and feeding cattle. At the end of the dry season, most water

bodies dry up. In others, the water level gets so low and the contamination so bad, that the water is no longer usable. This results in acute increased health risks for both humans and livestock.

The *aus* and *aman* varieties of rice crops depend on the uncertain rainfall during the pre- and post-monsoon season. In Polder 55/1, the SRP built infrastructure to provide supplementary irrigation, but the infrastructure has not been maintained and is no longer used.

### Perceived Trends

There is a general consensus that poverty in Polder 55/1 has declined. The construction of polder is seen as an important contributing factor, increasing security of life and property as well as employment opportunities for poorer sections of society such as the landless.

The people's opinion, confirmed by scientific measurements, is that salinity in the coastal zone is increasing. Two reasons are mentioned, a reduced inflow of sweet water from the rivers at the end of the dry season and the expansion of shrimp cultivation in polders. Crops and people suffer from this salinity.

There is consensus that poor O&M of polder infrastructure has led to drainage congestion. In Polder 55/1, blocking of drainage channels for fish cultivation has aggravated this trend. As a result, both *aus* and *aman* yields and production have decreased.

Initially, water management basically aimed at increased agricultural production. With the profitability of rice production decreasing over the years, and demand for fish and shrimps increasing, there is now in many areas a growing conflict between these different uses. A small, but very powerful group often controls the very profitable shrimp and fish production. As a result of these conflicts, the vulnerability of the poorer sections of society has increased. Overall, the patterns of change in Polder 55/1 show that new vulnerabilities emerge as actions to reduce existing vulnerabilities and wider development trends take effect. This dynamic process needs to be reflected in pro-poor policy development.

## Local Water Context

### Local Institutions

In most of the coastal belt, the informal village power structure is the single most important institution. This is particularly the case with new land until the area is officially recognized and brought under the official administration. This recognition can take many years and, until that time, local power brokers rule.

Bangladesh has number of political parties and these are well represented in the coastal area. Although technically political parties are formal institutions, at local levels they function closer to the informal power structure. The case study suggests that control over local resources is often more important to the power brokers in the area than party politics. To secure and control access, groups of different parties forget about their differences and unite.

The Union Parishad (UP) is the lowest elected body in Bangladesh and deals with issues that directly effect local people. Elections for the UP are keenly

### Box 3. The Elite Dominating Government Institutions

In rural Bangladesh economic power and political power are often mutually convertible. However, as the following examples from Polder 55/1 illustrate, in the coastal zone the rural rich use their economic/political power to such extent that it actually undermines the basic governance structure.

In Galachipa subdistrict there is much newly accreted land, producing rice and rabi crops. However, over the last 5–6 years these lands have been converted into shrimp ponds, at times without the consent of the legal owners. The shrimp cultivators are all rich and politically well connected. The small and marginal landowners tried to resist this process of expanded shrimp culture, but failed. A few years ago they made an appeal to the subdistrict administration for their help. The Upazila Nirbahi (Executive) Officer (UNO) agreed with their demands and, with the support of the police, demolished some shrimp ponds, returning control to the landowners. The rich shrimp farmers objected and complained to higher authority against the UNO. They brought out a *zaru michil* (procession with broom) to have him removed. While demonstrations continued the elite used their high-level political connections to secure the transfer of the UNO. Given the coalition of forces, the UNO was transferred. Since then shrimp culture in the area has continued unabated, with much of the profit siphoned off by a few outsiders.

This incident is not an exception. From March 1998 to May 2002 (i.e., over a period of 4 years) five UNOs served in this subdistrict. Of them only one served in this station for slightly over 2 years while the others served 3–11 months, instead of the normal 3 years.

The second example concerns the allocation of 44 low-lift irrigation pumps by the Department of Agricultural Extension (DAE). Farmers can apply to DAE for pumps and the Subdistrict Council decides the allocation. Initially these pumps were solely used for irrigating boro rice. However, the pumps are now all used for draining out water to harvest shrimp and fish. Since this is against its prescribed use and jeopardizes possibilities for growing crops, DAE objected to this (mis)use. The fishery lobby, supported by UP chairmen (many directly or indirectly involved in shrimp cultivation), did not support the DAE's viewpoint in the Subdistrict Council. With support from the Department of Fishery, they persuaded the UNO to overrule the clause that low-lift pumps are to be rented out for irrigation only. It was decided that pumps could be given to whoever asks for them without raising any question on the purpose. Since this decision was taken shrimp cultivators have used all the pumps.

contested. Traditionally, local elite occupy most UP seats. From 1997, the UP has three seats reserved for women and a few are elected directly to general seats as well. The UP chairman and members protect factional and/or private interests (Box 3).

Until the mid-1980s, few NGOs were active in the coastal zone, but since then, their number and coverage has increased. In Polder 55/1, there are national NGOs such as ASA, BRAC, and the Grameen Bank, and smaller local NGOs and internationally funded activities such as Danida's water supply and sanitation program. The consensus is that NGO activities have helped reduce the severity and extent of poverty.

In many parts of the coastal zone, including Polder 55/1, private commercial business is now well established. Agricultural inputs such as seeds, fertilizer, and pesticides are widely available, though often too expensive in the eyes of the farmers. The commercial sector has invested heavily in road and river transport, contributing to overall development of the zone.

In its Fifth Plan, the Government identifies the coastal zone as neglected, and sets goals to rectify this. The effectiveness of government agencies in coastal areas such as Polder 55/1 has been limited, however, reflecting poor coordination between different agencies and the problems of staffing posts in what are regarded as remote and low prestige areas.

## National Policies

Since early 2002, the Government has been developing an ICZM policy and strategy. The Water Resources Planning Organization (WARPO) is the lead agency in this process that is due to be completed by 2005. The approach being adopted in this policy development process reflects radical new thinking about the role of policy in development and the types of approaches that are needed if the goals of reducing poverty and protecting vulnerable people are to be achieved.

Over the last decade, management objectives for the coastal zone have moved beyond the prescriptive use of plans, laws, and administrative modalities that emphasized a sectoral approach, to a more unified one that addresses the coastal system as a whole. In 1999, the Government of Bangladesh, supported by a number of international development partners, started to develop a distinctive approach to coastal zone management. Basing the analysis on earlier work in Bangladesh, and specific assessments in Asia and further afield, it aimed at a thoroughly integrated approach that reflects the needs and interests of all stakeholders and the zone's special challenges.

The overall approach focuses on the integration of development and disaster management policies and activities, in response to the priorities of the communities that are experiencing them. The coastal zone is characterized by many factors that limit development potential and diverse threats from natural disasters. These have tended to be considered separately, but it is now realized that while natural disasters curb sustainable development, a strong development-based program will lessen the impact of disasters and hasten the postdisaster recovery process. It also provides the basis for poverty reduction in the coastal area through the creation of a wider range of sustainable livelihood opportunities for poor people.

This process would be based on the harmonization of existing institutions and a process of subsidiarity, where decisions are devolved to the lowest appropriate level. This is in line with the move in Bangladesh toward decentralization, democratization, and institutional integration. It does not mean that every decision and action is taken at the purely local level. Some issues are national in character and need strong national inputs. However, many issues require the integration of different levels. The key to ICZM is to ensure that the appropriate people are taking the right decisions, in a timely fashion, so that effective implementation has a chance of success.

This approach is reflected in the first government policy paper on ICZM in September 1999, which is the accepted policy framework for coastal development in Bangladesh and as such provides a context within which coastal policy-livelihoods relationships need to be analyzed. This paper built on the analysis of the donor mission discussed above (Soussan et al. 1999) to identify the issue of interdepartmental coordination as a major challenge in coastal areas: "development problems do not occur departmentally; they appear in a complex web of interrelationships needing concerted efforts by more than one agency" (Government of Bangladesh, 1999, page 1).

The paper recognizes that this is a diverse and dynamic area that is nevertheless unified by the range and complexity of vulnerabilities and development challenges that face this zone: "the other special feature of the coastal zone is its multiple vulnerabilities" (Government of Bangladesh, 1999, page 11). A range of

environmental hazards (shocks such as cyclones; and trends such as erosion, mangrove destruction, and saline intrusion) is identified as the focal point of the development challenge of the area. The paper also recognized anthropogenic vulnerabilities such as poor access to markets, institutional weaknesses, and poor service provision as characterizing many parts of the coast.

This analysis is brought together in the definition of ICZM.

ICZM offers a means of balancing the competing demands of different users for the same resources and of managing the resources to optimize benefits . . . it is an effective framework for dealing with the conflicts arising from interactions of the various uses of coastal areas. (Government of Bangladesh, 1999, page 10).

The paper goes on to list the range of issues that an ICZM program should address, including natural hazards, resource opportunities, social and institutional constraints, and development principles such as sustainability and participation. A specific and important feature of the note is the clear decision *not* to establish a special coastal development agency, but rather to base ICZM on *harmonization* of the policies, programs, and capabilities of existing institutions. This means that effective institutional processes for this harmonization are pivotal to coastal development.

The development of the coastal policy in Bangladesh also needs to be seen in relation to policies in linked sectors. In 1998, the Government issued its first National Water Policy, which calls for an integrated approach to water resources management as well as active involvement of direct stakeholders in all stages of the process. The policy gives the highest priority to supplying clean and safe drinking water. Major efforts have been made since the 1980s, but in recent years, these have been undermined by the discovery of arsenic in many drinking water tubewells.

The 1999 National Agricultural Policy aims to make Bangladesh self-sufficient in food. All 18 specific objectives apply to the coastal zone, which is not classified as a special agricultural zone. The policy does advocate a special program for crops suitable for the coastal zone, as well as projects to store tidal sweet water for minor irrigation. The policy recognizes the export earning potential of shrimp cultivation and also the possible environmental impacts. However, it does not mention the conflict between agriculture and shrimp cultivation, although it mentions the need to combine crop and fish culture and prevent waterlogging. The policy advocated "land use zoning," which may be a way to deal with the shrimp issue.

The 1998 National Fisheries Policy gives much importance to coastal and marine fisheries. The policy aims at export over and above self-sufficiency, with quality rather than quantity being the bottleneck. The policy aims at combining rice, fish, and shrimp cultivation, which may lead to conflicts over waterlogged areas. The policy advocates caution to ensure that shrimp production does not damage the mangrove forests. Finally, the policy advocates a ban on marine fishing by trawlers in waters of less than 40 meters deep. However, currently most marine fishing is done in these waters.

## Livelihood Patterns

This policy framework, and especially the newly emerging coastal policy process, aims to directly address the vulnerabilities that confront poor coastal communities. How well does it reflect the distinctive livelihood patterns of coastal areas? The stability of people's livelihoods depends largely on their vulnerabilities and the resources that they depend on. In the coastal zone the following main livelihood patterns can be distinguished.

- The large absentee landowners are the main local power brokers. Their livelihood pattern is one of constant adaptation to the most profitable economic activities. Many have left the agriculture sector and moved into other activities. With access to institutional capital, fisheries and business expertise, the international market, and the political power structure, they have found shrimp cultivation a golden opportunity to get rich quickly. The negative environmental impacts of their activities do not affect them as they live elsewhere.
- For large farmers who still live in the coastal zone, most often inside a polder, agriculture has become less profitable due to rising cost of inputs, including labor, and stable output prices, particularly for rice. These large farmers see the potential of shrimp cultivation along with its negative effects and many face the dilemma of what to do. Some have moved into shrimp cultivation while others still continue with farming and some others have moved into sectors such as transportation (often in conjunction with farming).
- Polder 55/1 has a diminishing number of small and marginal farmers as well as tenants. It is quite likely that the same applies to most of the coastal zone. Existing input and output prices, lack of control over water levels, increased salinity, and drainage congestion have made their small and marginal farms economically unviable, and in some cases, unproductive. Many have sold their land and diversified their livelihoods into nonfarming activities. Households send their sons to the city or abroad. Tenant farming, too, has diminished because of the unfavorable tenancy arrangements. In spite of the official tenant laws, landlords, without incurring any costs, still claim two thirds of the output as land rent instead of one third.
- In the past, wage laborers in Polder 55/1, as in the whole coastal zone, would have worked as agricultural laborers, either on a contract or a daily basis. The number of permanent contract laborers has decreased, and large farmers now employ more casual labor. Nowadays, agriculture is no longer the mainstay of the local economy, and many wage laborers have diversified their livelihoods by moving into nonfarming activities as well as self-employment opportunities. Employment opportunities in the coastal zone have increased considerably, but labor supply seems to outstrip the demand in many places. Until about a decade ago, migrant labor from the north would assist during the harvesting season. There is now a reverse flow of laborers seeking work outside the areas.
- The category of self-employed persons has increased considerably. The main driving force is the availability of credit through NGOs. Another factor is the increased road network, which has created opportunities for road transport as well as agricultural and nonagricultural activities. This category includes women who are involved in various home-based income-generating activities

as well as catching shrimp fry in the rivers. Many women and girls are involved in this activity, sometimes as wage laborers, sometimes as self-employed persons.

- Fishers have always been a sizeable group in Polder 55/1 and throughout the coastal zone. Before the empoldering, they used to fish in the rivers and the channels of the island. Since the mid-1970s the common resource fish stock inside the polder has decreased considerably and the fishers now go fishing in the adjacent rivers. From the early 1990s culture fisheries in the channels of the polder have increased. While the elite control this resource, the local fishers have benefited marginally from the additional work this provides to them.

As such, it is clear that the livelihood patterns in coastal areas are changing, with traditional agricultural activities declining and new opportunities emerging. The exclusive focus on agriculture as the main source of livelihoods is no longer appropriate and coastal policies need to ensure that coastal communities, especially the poor, are able to access new opportunities that emerge as the coastal area is more effectively integrated into the rest of Bangladesh. They should also ensure that the many effective coping strategies that local people have developed to deal with the multiple vulnerabilities that they face are supported.

### Disaster-Coping Strategies

The main disaster-coping strategy of almost all groups in the coastal zone is diversification of income sources. Instead of households depending on one or two activities, they now spread their working-age adults over different activities, and if possible, localities, thereby ensuring that problems in one area of their livelihoods has a lesser impact on them.

To cope with the possible damage of storms, people protect their homestead by planting trees around it. That strategy is fairly effective when it comes to protecting homesteads and houses, but it is insufficient to protect crops against strong winds.

Farmers have two strategies to cope with the increased salinity. The first is to plant boro late to avoid the time when water is most saline. In practice, the boro crop then moves into the traditional aus seasons and is therefore referred to as braus (as Dr. Hugh Bremmer phrased it). In cases where salinity is extreme, farmers drop boro altogether and only produce *aman*.

Since the 1970s many cyclone shelters have been built in the coastal zone. Initially people were reluctant to use them for cultural and practical reasons. In the last few decades, these shelters have been made multipurpose buildings and are therefore easily accessible in time of need. Also, arrangements have been made for women and men to stay in separate parts of the building during a cyclone. Furthermore, the cyclone warning system has improved and now more people go to the shelters when warned by radio of an approaching cyclone. This effective disaster response system has lessened greatly the specter of the destruction of life and livelihoods during the immediate time of the cyclones.

The main man-made vulnerability is misuse of power by local lords and government officials. This often occurs in relation to shrimp cultivation. In many areas large absentee landlords start shrimp cultivation on new land outside the

embankment, often in and around the major outlet channels of polder. This has resulted in drainage congestion inside the polder. The next step is then to start shrimp ponds inside the polder itself. For this, they allow saline water into the polder, upsetting agricultural production.

Courageous farmers and some government officials have tried to challenge the stranglehold of the local elite over water management in the polder through the courts. The elite have fought back and to date their use of all sorts of pressure tactics have ensured that the power brokers remain in full control. Those who have challenged the local power structure have usually ended up with more trouble. Most of the poor therefore cope with the vulnerability of misuse of power by lying low, keeping their mouth shut, and “minding their own business.”

These coping strategies are a key feature of life in coastal areas on which actions to reduce coastal vulnerabilities can be based. Key government programs such as empolderment and cyclone shelters can be very effective, as can programs such as road construction in creating new opportunities. These need to be supplemented by actions to support people's own initiatives, such as tree planting to protect homesteads, and actions to reduce the institutional and governance weaknesses of coastal areas. Finding the right balance between these different spheres of action is critical to coastal policy development in the coming years. What can we learn from what has happened in the past in defining and implementing new approaches for the future?

### Historic Interventions in Settling New Coastal Lands

One characteristic of coastal areas of Bangladesh is the emergence of new lands as silts accrete in the delta areas. These new lands are a major resource opportunity, but all too often poor people have had their access to them limited by local power relations. Land development in the coastal zone starts when mud banks fall dry during low tide. Local grass (*uri*) starts growing on these so-called *chars* and they become a productive resource. Absentee landlords have traditionally competed with each other for control over these chars, with families under their patronage instructed to claim the land by settling there and living in huts on poles. Initially, the new land produces only grass, which is cut and sold as cattle feed at nearby markets. As the grass speeds up the deposit of silt, the land gradually rises and buffalos are moved to the new area to graze. During high tide they graze in knee-deep water. The next stage of land development is when the char is planted with rice during the monsoon. When crops are harvested, clashes occur between henchmen of various landlords who claim the land as theirs. It is not uncommon for people to get killed during such clashes.

As the chars are still flooded during high tide the land level continues to increase. In due course, more and more laborers and later on, their families, start settling on the land. At this stage, low-level isles are made between the fields to protect the crops from unwanted riverine water and retain sweet water. At this stage, the chars are still dissected by a network of natural channels. These are a safe haven for fish, and the inhabitants catch the fish for their own consumption and for sale in nearby markets. In some areas the new chars are ideally situated for shrimp cultivation. In such places, shrimp ponds are built with wooden structures that allow the inflow and outflow of saline water.

Traditionally transportation in the coastal belt has been by boat. For short distances pedal power was used while larger boats were powered by wind. From the 1980s onward, there has been a rapid mechanization of all but the smallest of these country boats. As a result, transportation speed has increased considerably, passenger transport over longer distances was, and still is, done by purpose-built launches.

This reality is in some contradiction to the official system for land allocation. As per the Bangladesh law, newly accredited land belongs to the Government. To speed up the process of accretion, the Forest Department plants mangrove and other suitable plants and trees on emerging chars. However, in some cases, the department is unable to do so as others have already claimed the land, as mentioned above.

Where forestation is successful, trees seldom grow to full maturity. At some stage, people from nearby areas start illegally cutting the forest for firewood and later clearing it all to allow settlement, cattle grazing, and later on crop production. At this stage the area usually remains outside the influence of the Government and under control of local lords.

At some later stage, when the char is well established and populated, the Government will establish a foothold in the area, usually by establishing a police outpost. Gradually the various governmental departments will start up their activities such as building roads and cyclone shelters, sinking tube wells, establishing schools, markets, etc. Depending on resource availability, BWDB may study the feasibility of protecting the area by building an embankment around it or linking it with an existing polder.

In the Char Development and Settlement Project (CDSP) in Noakhali district, the Government has actively pursued the policy of allocating new land to genuinely landless households. Already over 4,000 households have received both the land itself and the necessary ownership documents. Claims by 12,000 households are being processed.

## Impacts

### Short- and Long-Term Impacts

The dominant traditional approach to coastal development in Bangladesh has been through empoldering deltaic lands. The main impacts of empoldering are

- protection against all but a direct hit by a cyclone;
- creation of secure conditions for other infrastructural investments such as roads, schools, marketplaces, cyclone shelters, etc.;
- increased agricultural production by increased cropping intensity and yields;
- increased employment opportunities;
- increased potential for aquaculture in private ponds and leased canals;
- reduced availability of common property resources, i.e., capture fisheries; and
- reduced grazing area for livestock.

In principle most impacts of empoldering are long term and by enabling other interventions such as microcredit, empoldering has a clear poverty reduction

### Box 4. Poverty Reduction through Microcredit

Again and again, people with few assets mention how important microcredit is to get them out of poverty. Take Rokan Mia: "I was born landless and started my working life as a cowboy. When I turned 22, I got married. I am now 45, married with three children. I used to work as a farm laborer on a yearly or seasonal contract. As a part of my wage I got free food, some clothing, and wages in kind (i.e. 4–6 bags of paddy, depending on the nature of the contract). My income was sufficient for my wife and me.

Soon our family started to grow with the arrival of our two daughters and a son. I could no longer maintain my family with my wage income. At that time the Grameen Bank started its work in our village. Many women then became members of Grameen Bank-organized groups and received loans for various activities. My wife one day asked my permission to join the group. I was reluctant and did not give my consent. In the meantime I continued my struggle to maintain the family, but found it very difficult to feed the five of us.

Finally, I decided to allow my wife to join the Grameen group. Thanks to the cooperation of our fellow villagers, my wife was included in the group. After a few months, she approached the bank for a loan and that was granted. After two small loans, she approached the bank for a larger sum. This time she received a loan of Taka (Tk)4,000 to be paid back in 52 installments of Tk100 over a period of 1 year. With this money I bought a rickshaw for Tk2,600 and we used the rest to buy a few chickens and for consumption. I quit my job as wage laborer and started to pull a rickshaw.

In a year's time, I managed to repay the loan. Now I own the rickshaw and on average I earn Tk100–150 per day, of which I spend around Tk10 for maintenance of my rickshaw and another Tk10–15, for tea and snacks. With the rest of the income, I maintain the family." Rokan Mia proudly concluded: "One of our daughters and our son now attend a primary school."

impact. As people in the case study area remarked, "now we eat three meals a day and very few people go hungry." However, if the infrastructure is not operated and maintained properly, these benefits may dissipate or disappear altogether. For instance, in many polders, inappropriate operation and the lack of maintenance of gates and embankment breaches have resulted in saline intrusion and a decline in the earlier positive impacts.

The coastal area was, and to some still is, rich in natural aquatic resources such as reed, wood, snails, fish, etc. and general biodiversity. Human interventions, such as empoldering, have resulted in a reduction of natural habitats such as *beels* (low-lying areas permanently under water) and forests and a reduction in the biodiversity. The development of approaches to land protection and management that maintain the benefits of polders, but do so without these negative environmental consequences, are critical to the new coastal policy process.

### Sustainable Operation

Sustainable operation of the infrastructure is necessary if the benefits of empoldering are to last. In the mid-1990s, the Systems Rehabilitation Project (SRP) therefore made an effort to broaden local participation in operating and maintaining the water management infrastructure. In line with the then Guidelines for People's Participation in Projects, a four-tier system of water users organizations was introduced in Polder 55/1. It was made up of water users groups, linked through water users committees that were federated in water users associations. These organizations were represented in the Polder Committee, which also included officials from relevant government departments.

These groups initiated under the SRP never really became actively involved in operation and water management in Polder 55/1, as in other project areas. The Polder Committee, with more than 50 members, met every few months, but disintegrated after the project came to a close. The local elite (UP members, local religious leaders, and landlords) soon took over operation of the gates and still does so today, and minorities often feel their needs are overlooked. Others complain that gate operation is done only after paying the necessary “grease money.” Those outside the inner circle of control feel powerless to change the situation and are utterly frustrated. This is one of the factors why small and marginal farmers move out of farming altogether. In the case study area this has resulted in more and more land ending up in the hands of the big landlords. In polders, where a few people control land and water management, the technical and social sustainability of polders is questionable. As such, the governance conditions under which interventions are developed and operated is a critical factor, perhaps the most critical factor, in determining their effectiveness in contributing to poverty reduction objectives.

### Sustainable Maintenance

Alongside sustainable operation, the SRP also attempted to increase the sustainability of maintenance by introducing embankment maintenance groups made up of women. The system worked well, with some changes after the end of the project, until mid-2002, when the system was discontinued and it is uncertain what, if anything, will replace it.

Under the SRP, major work on the embankment remained the responsibility of BWDB. River erosion is the main threat and BWDB must do the necessary rehabilitation and/or embankment retirement. However, the lack of funds or their late release often means that breaches are not closed in time. The case study area, Polder 55/1, is a case in point. The breach of the embankment in the southeast could not be properly closed by mid-2002. If a cyclone hits this point of the polder, the impact on life and property would be disastrous.

One of the effects of the elite controlling gate operation is that people in general do not feel any sense of “ownership” of the polder infrastructure. They are therefore also not willing to contribute to its operation, let alone maintenance. This, together with the lack of government funds for O&M, results in the infrastructure gradually deteriorating and the initial positive impacts disappearing.

### Policy Analysis

Because the coastal zone in Bangladesh is so rich in natural resources it has attracted people for centuries, in spite of the clear vulnerabilities of the area. From discussions with top-level government officials, it is clear that the Government rightly sees the coastal zone as one with tremendous development potential, many untapped resources, and much scope for livelihood diversification. This high-level support is a crucial precondition for development.

Discussions also indicate that infrastructural development is no longer considered as an isolated act, but seen as part of the wider system of addressing different problems. Structural interventions must be combined with relevant and

supporting nonstructural interventions and with effective governance arrangements. In relation to natural disasters, this implies community capacity building so that people can cope with immediate natural shocks and recover from losses with dignity. In the case of water management infrastructure such as embankments and regulators, this understanding calls for broad-based O&M. This broad view of development, too, is a major advantage when it comes to using coastal resources for poverty reduction.

Furthermore, there is a move away from a sectoral to a holistic approach in which all aspects of coastal development are structured into the development process, based on core objectives of empowerment and changing governance structures. The Government is particularly interested in linking institutional development in the coastal area with the ongoing wider processes of decentralization and democratization. The Government also sees the focus of the coastal development process as working through existing institutions, specifically improving local government structures and developing more effective interagency collaboration. This view is particularly relevant for wider poverty-focused strategies.

In some places the coastal resource base has been overexploited and permanently damaged—particularly the Sundarbans and other forestry resources—which have not been able to withstand the population's need for more land. In the case of the Sundarbans, the process of deterioration may have now come to a halt with the recognition of the Sundarbans as a World Heritage site and subsequent government action. Apart from these specific instances, as yet, relatively little of the coastal resource base has been permanently damaged. The potential productivity and contribution to poverty reduction of these resources remains strong.

The general public is quite aware of the need to maintain a healthy environment. Living close to nature, they are only too aware of how disastrous the consequences can be if the natural environment is mistreated. Therefore there is still a fairly widespread interest in managing the coastal resources in a sustainable and judicious manner.

There are major concerns over the influence of the powerful local elite, discussed above, and the barriers to effective institutional harmonization (between government agencies and among NGOs). Addressing these concerns, which are essentially about governance issues, is fundamental to the future development of pro-poor policies in coastal areas and demonstrates how these issues cannot be separated from the wider social and political conditions of countries such as Bangladesh.

The first challenge is to ensure that the ICZM being developed follows a process approach, rather than a master plan or blueprint approach. For it to be useful, it should have a "twin-track" character, consisting of activities that are effective in addressing real and immediate needs and contributing to long-term capacity development and structural change in the coast.

The second challenge relates to shrimp production. Rather than dealing with the old question of whether or not there should be any shrimp farming, it is best to assume that it is there to stay. The key question now is how to make shrimp production more equitable in the benefits that go to local people, less environmentally damaging, and more sustainable.

The third challenge is to ensure that the overall approach to coastal development will harmonize policies, strategies, and activities of different agencies and sectors. This should be linked to a process of subsidiarity whereby different decision making levels are integrated, and decisions taken at the lowest appropriate level.

The overall conclusion of this analysis is that better water management is a precondition for coastal resources to contribute to poverty reduction. Water is critical to coastal livelihoods in so many ways, while water-related vulnerabilities are a dominant feature of coastal life. Recent years has seen substantial development in many coastal areas, with activities by the government and private sector together creating employment opportunities and security that have allowed many poor to move out of poverty. Better water management will only achieve its full poverty reduction impact if it is complemented by other activities that make use of the opportunities created, including schemes such as microcredit that are not obviously connected to water resources issues. Above all, the key to coastal development that reduces the vulnerabilities and poverty that so many face is the creation of governance conditions whereby water and other resources can be accessed and managed equitably and sustainably. The existing focus of the coastal policy on integrated approaches that target vulnerabilities and the needs of the poor and address governance issues is extremely encouraging and offers the basis for the transformation of coastal areas in Bangladesh. Only time will tell if this potential will be realized, but essential to it is the continuation of the political support from the center that has characterized recent years.

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