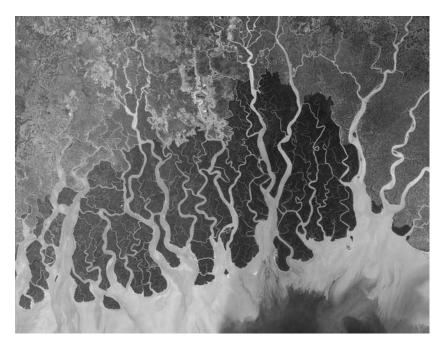


PART I

The long view





Part I Aerial view of the Sundarbans wetlands.



#### CHAPTER I

# A land of water and silt

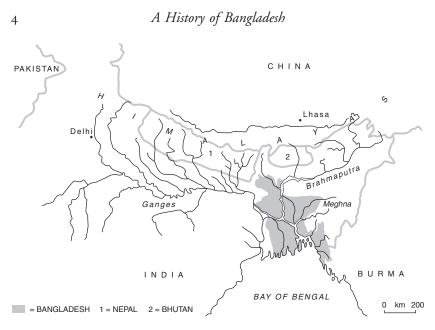
Imagine yourself high in the air over the Himalayas. Look down and you see a forbidding landscape of snow-capped mountains and harsh vegetation. But now look to the south-east and discover an immense floodplain stretching between the mountains and the sea. That shimmering green expanse is Bangladesh.

You may well wonder why a book about Bangladesh should begin with the Himalayas. There is a good reason: without the Himalayas, Bangladesh would not exist. In a sense, Bangladesh *is* the Himalayas, flattened out. Every spring the mountain snow melts and the icy water sweeps along particles of soil, forming into rivers that rush to the sea. As these rivers reach the lowlands, they slow down and deposit those particles, building up a delta. This age-old process has created the territory that we now know as Bangladesh – a territory that pushes back the sea a little further with every annual deposit of new silt.

The delta is huge because almost all water running off the Himalayas, the highest mountain range on earth, has to pass through it (Map 1.1). On the southern side numerous rivulets and rivers run together to form the mighty Ganges that flows eastwards through India for hundreds of kilometres before it enters western Bangladesh, where it is also known as the Padma.¹ On the northern side of the Himalayas an equally majestic river, the Brahmaputra (or Tsangpo), forms in Tibet. It too flows east, past the capital, Lhasa, and then makes a sharp turn, breaking through the mountains into the far north-eastern corner of India. It then flows west till it enters northern Bangladesh, where it is known as the Jamuna. It joins the Ganges in central Bangladesh and together they empty into the sea. Both rivers are truly gigantic: the Ganges is up to eight kilometres wide and the Brahmaputra spreads to the improbable width of eighteen kilometres.

This is the big picture. When you look closely you will notice that many more rivers criss-cross Bangladesh. A third giant is the Meghna,





Map 1.1. The catchment area of the Bengal delta.

which enters Bangladesh from the east, and over fifty other rivers flow from India across the border into Bangladesh. They join, split and join again in a crazy pattern of channels, marshes and lakes (Plate I.I). In historical times there has been a tendency for the water to be discharged through more easterly channels and for the western reaches of the delta (now in India) to become drier. Together these many rivers have deposited very thick layers of fertile silt that now form one of the largest river deltas on earth. Not all the silt ends up in Bangladesh, though. Every year, over a billion metric tons are delivered to the Indian Ocean, building up the world's largest underwater delta, the Bengal Fan. The Bengal delta is surrounded by higher land and hills to the east, north and west; it acts as the narrow end of a funnel through which an area more than ten times its size annually discharges a mind-boggling 650,000,000,000,000 m³ of water. And almost all this silt-laden water flows through the delta between May and October, when the rivers are in spate.

These huge forces have shaped the natural environment of Bangladesh, and they continue to exert an enormous influence on human life today. But majestic rivers are not the only source of water. There are two other forms in which water has always played a vital role in Bangladesh: rain



## A land of water and silt



Plate 1.1. 'Knee-deep in water, whatever you do' (hore-dore hatu jol) An aerial view of central Bangladesh in the dry season.

and seawater. Each year in June, as the rivers are swelling rapidly, the skies over Bangladesh begin to change. In winter they are blue and hardly any rain falls, but in late May or early June, as temperatures shoot up, immense clouds form in the south. As they float in from the sea they release torrential downpours that continue off and on till late September. The wet monsoon has arrived, and in this part of tropical Asia it is truly spectacular. Not only may rains continue for days on end, turning the soft soil into a knee-deep muddy slush, but the sheer amount of water being discharged over Bangladesh is impressive. It is rain that has made Cherrapunji a household word among meteorologists the world over. This little village just across the border between north-eastern Bangladesh and India claims to be the world's wettest place. Here the monsoon clouds hit the hills of Meghalaya in a downpour that continues for months. Annually a staggering 11 metres of rain fall here; the maximum rainfall ever recorded during a 24-hour period was over 1 metre.

Seawater is a third companion of life in Bangladesh. During the dry season (October to May), saline water from the Bay of Bengal penetrates watercourses up to 100 km inland and the lower delta becomes brackish. In addition, the lower delta is very flat: its elevations are less than three metres above sea level. As a result, it is subject to tidal bores from tropical cyclones

5



6

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### A History of Bangladesh

that make landfall here about once a year. These are particularly hard on the many islands and silt flats that fringe the coast of Bangladesh. Some protection is provided by the Sundarbans, a mangrove forest that used to cover the coastal delta but has been shrinking since the eighteenth century as a result of human activity. This largest mangrove forest in the world is not impervious to the power of tropical storms, however. In 2007 it took a direct hit when a cyclone raged over it, destroying much vegetation.

These three forms of water – river, rain and sea – give Bangladesh a natural Janus face. In winter, the rivers shrink in their beds, the skies are quietly blue and saline water gently trickles in. Nature appears to be benign and nurturing. In summer, however, nature is out of control and Bangladesh turns into an amphibious land. Rivers widen, rains pour down and storms at sea may hamper the discharge of all this water. The result is flooding.<sup>2</sup>

Summer floods are a way of life. About 20 per cent of the country is inundated every summer, mainly as a result of rainfall. Rivers may cause floods as well. Usually the big rivers reach their peak flows at different times but if they peak together, they will breach their banks and inundate the floodplain. It is in this way that rivers forge new courses in what is known as an active delta. As a river flows through its channel for many years, it becomes shallower because of silt deposits. It slows down and may even get choked. On both sides silt banks may build up to keep it flowing through the same course even though its bed may be raised to the level of the surrounding floodplain, or even above it. But when an exceptionally large amount of water pushes its way through, the banks are eroded and the river will breach them, seeking a new, lower channel. The old channel may survive as an oxbow lake or it may be covered in vegetation. The Bangladesh landscape is dotted with such reminders of wandering rivers. Although most floods are caused by rainfall and inundation in deltaic rivers, they may also result from flash-floods after heavy rain in the hills, pushing their way through the delta, or by tidal storm surges.<sup>3</sup>

This combination of rainfall, river inundation, flash-floods and storm surges has made it impossible to control summer flooding in Bangladesh. Even today, the timing, location and extent of flooding are very difficult to predict, let alone control, and floods vary considerably from year to year. Every few years big floods occur and occasionally, during extreme floods, over 70 per cent of the country is covered by water.

From the viewpoint of human life, flooding has had both positive and negative effects. Annual floods constantly replenish some of the most fertile soils on earth. Rich silt has always allowed luxuriant natural vegetation and



### A land of water and silt

made early and successful agriculture possible. But the uncontrolled nature of floods, and the certainty of severe inundation every ten years or so, have played havoc with human life as well. It is not the amount of water that determines the harmful effects of flooding, however. As we shall see, human life in Bangladesh has long been adapted to cope with regular inundation. What makes some floods more harmful than others is the force with which the water pushes through (damaging life and goods) and the number of days it stays on the land (killing the crops). Thus a flash-flood or storm surge can be very destructive, even though the amount of water or the area affected is not very large. In 1991 a cyclone hit the south-eastern coast of Bangladesh at Chittagong. Huge waves travelling through water channels and across islands had a devastating effect. Despite early warnings and the evacuation of 3 million people, up to 70 per cent of the population in coastal villages was wiped out. According to official estimates, nearly 140,000 Bangladeshis perished. Casualties had been far worse in 1970, before a national system of cyclone warning had been developed. A cyclone made landfall at the Noakhali coast and its storm surge is thought to have killed at least 325,000 people.4

In contrast to these very destructive cyclone floods, a rain or river flood can spread over a much larger area and yet do little harm if it lasts only a few days. In fact, such a flood is typically followed by a bumper harvest. But long-term inundation does pose a serious problem: the floods of 1988, which covered 60 per cent of Bangladesh for fifteen to twenty days, caused enormous damage to crops, property, fish stocks and other resources, in addition to claiming human lives. Ten years later another flood again inundated 60 per cent of the country and, because this time it lasted for sixty-five days, its effects were even more damaging.<sup>5</sup>

Living in this environment means living on a perennially moving frontier between land and water, and it is this moving frontier that dominates the *longue durée* of Bangladesh history. Despite regular setbacks, humans have been extraordinarily successful in using the resources of this risky deltaic environment. Today, with over 1,000 people per km², Bangladesh is one of the most densely populated countries in the world. Such pressure on the land ensures that the ancient environmental frontier remains of everyday significance. Encounters at the water's edge have become more crucial over time as Bangladeshis are forced to push the margins of their environment as never before, settling on low-lying land, coastal areas and islands exposed to storms and floods. In this way, some Bangladeshis are forced continually to put themselves dangerously in water's way (Plate 1.2).

7



8

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Plate 1.2. 'Be prepared for floods! Save your life and possessions by seeking a high shelter.' Educational poster, 1990s.



### A land of water and silt

Floodplains dominate life in Bangladesh – they cover about 80 per cent of the country - but not all of Bangladesh is flat. On the eastern fringes some steep hills surrounding the delta have been included in the national territory and they provide an altogether different terrain. These hills (in the Chittagong Hill Tracts and Sylhet) point to geological processes occurring far below the smooth surface of Bangladesh. Here tectonic plates collide: both the Himalayas and the Bangladesh hills (and beyond these the mountains of Burma and north-east India) are fold belts resulting from these collisions. The faults running underneath Bangladesh also push up or draw down parts of the delta, creating slightly uplifted terraces that look like islands in the floodplain (notably the Barind in the north-west and Madhupur in central Bangladesh) and depressions (hāor or bil) that turn into immense seasonal lakes. The unstable geological structures underlying Bangladesh generate frequent earthquakes, most of them light but some strong enough to cause widespread destruction.

In Bangladesh the natural environment has never been a mere backdrop against which human history unfolded. On the contrary, time and again natural forces have acted as protagonists in that history, upsetting social arrangements and toppling rulers. For example, in the 1780s an earthquake and floods forced the Brahmaputra river into a new channel, wiping out villages in its course and causing trade centres along its old channel to collapse. More recently, in 1970, the mishandling of cyclone damage robbed the government of its legitimacy and precipitated a war of independence. And floods in 1988 cost Bangladesh more than that year's entire national development budget.

Managing the natural environment has been a central concern for all societies and states that have occupied the Bengal delta. The people of Bangladesh have never been able to lull themselves into a false belief that they controlled nature. They live in an environment where land and water meet and where the boundaries between these elements are in constant flux. As a result, settlement patterns have always been flexible and often transient. Bangladeshi villages have been described as elusive. They are not clustered around a central square, protected by defensive walls or united in the maintenance of joint irrigation works. Instead they consist of scattered homesteads and small hamlets  $(p\bar{a}r\bar{a})$  perched on slightly elevated plots that become islands when moderate floods occur. Few dwellings are built to last, and traditional irrigation requires hardly any joint organisation because it is largely rain-fed. As the lie of the land changes in the active delta, villagers are often forced to relocate and

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10

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rebuild their houses. Thus nature's changing topography acts as a social and economic resource, and the mobile and fragmented nature of settlement has shaped rural politics. Bangladeshi villages are not tightly organised communities under a single village head. Instead, they are dominated by continually shifting alliances of family and hamlet leaders. States seeking to control the rural population have always had to find ways of dealing with this flexible pattern of power sharing adapted to life on the frontier of land and water.

Predictions for the future point towards a renewed need for flexibility. The intervals between severe floods are shortening (according to some, largely owing to deforestation in the Himalayas<sup>7</sup>) and experts on climate change predict that Bangladesh will be one of the countries most severely affected by rising sea levels resulting from global warming. On the other hand, in a world increasingly concerned about water scarcities, Bangladesh's abundance of fresh water could be turned into a critical resource.

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