



General Certificate of Education  
Advanced Level Examination  
June 2011

## Geography

## GEO4B/PM

Unit 4B Geographical Issue Evaluation  
Advance Information Booklet

**Date of Issue: On or after Friday 1 April 2011**

You will need no other materials.

### Instructions

- This Advance Information Booklet will be issued on or after Friday 1 April 2011 in advance of the examination for Unit 4B. You should make yourself familiar with the information in the booklet.
- This material must be kept **unmarked** for use in the forthcoming examination.

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**STUDY ALL THE INFORMATION IN THIS BOOKLET**

The information in this booklet comprises the following:

	<b>Pages</b>
<b>Item 1</b> Extracts from report on Cyclone Aila	3–7
<b>Item 2</b> Extracts from the United Kingdom Government’s Department for International Development (DfID) documents on Bangladesh (2009)	8–9
<b>Item 3</b> Some observations on changing responses to cyclones in Bangladesh (2009)	10–11
<b>Item 4</b> Mangrove forests and protection from cyclone surges	12

**Item 1 Extracts from report on Cyclone Aila**

The following extracts are taken from the Bangladesh Ministry of Food and Disaster Management's (MFDM) preliminary report on Cyclone Aila, which struck the country on 26 May 2009.

Due to copyright restrictions we are unable to electronically publish the extract.

**Item 1 continues on the next page**

**Turn over ►**

Fourteen districts were affected by the cyclone. There were reports from most of the affected districts. Four reports from some of the worst affected districts are given here. The locations of these districts can be seen on the map from the MFDM Report, which is included as **Figure P1**. Note that the preliminary reports and the map refer to an ongoing crisis.

### **Preliminary damage reports in coastal areas**

#### **Barisal**

80% of the district flooded due to squally wind and increased height of waves. 150 houses were uprooted and many others affected. 20 persons reported injured, one of them admitted to hospital with severe trauma. People were taken to the shelter. District administration remains on alert and standby.

#### **Bhola**

Vast area flooded as ring embankment breached at many places due to wind-driven surge. Charfassion and Tazumuddin upazilas<sup>1</sup> were comparatively more affected. Most of the areas of Dauchar, Charkukrimukri, Charpatila and Charfassion were inundated. People were taken to the shelter. One person died in Charfassion as boat capsized. Two people from Sadar upazila were reported missing. One person badly injured as house collapsed on him. Water started to recede.

#### **Khulna**

Most of the areas of Dacope and Koira upazilas and Paikgachha and Butiaghata upazilas partially inundated. Wapda embankment at Dacope infringed. Water entered into Delutia and Lata union<sup>2</sup> as two polders<sup>3</sup> cracked. People of affected areas were moved to safe shelter. All the shelters are holding more people than capacity. Water started to reduce.

#### **Satkhira**

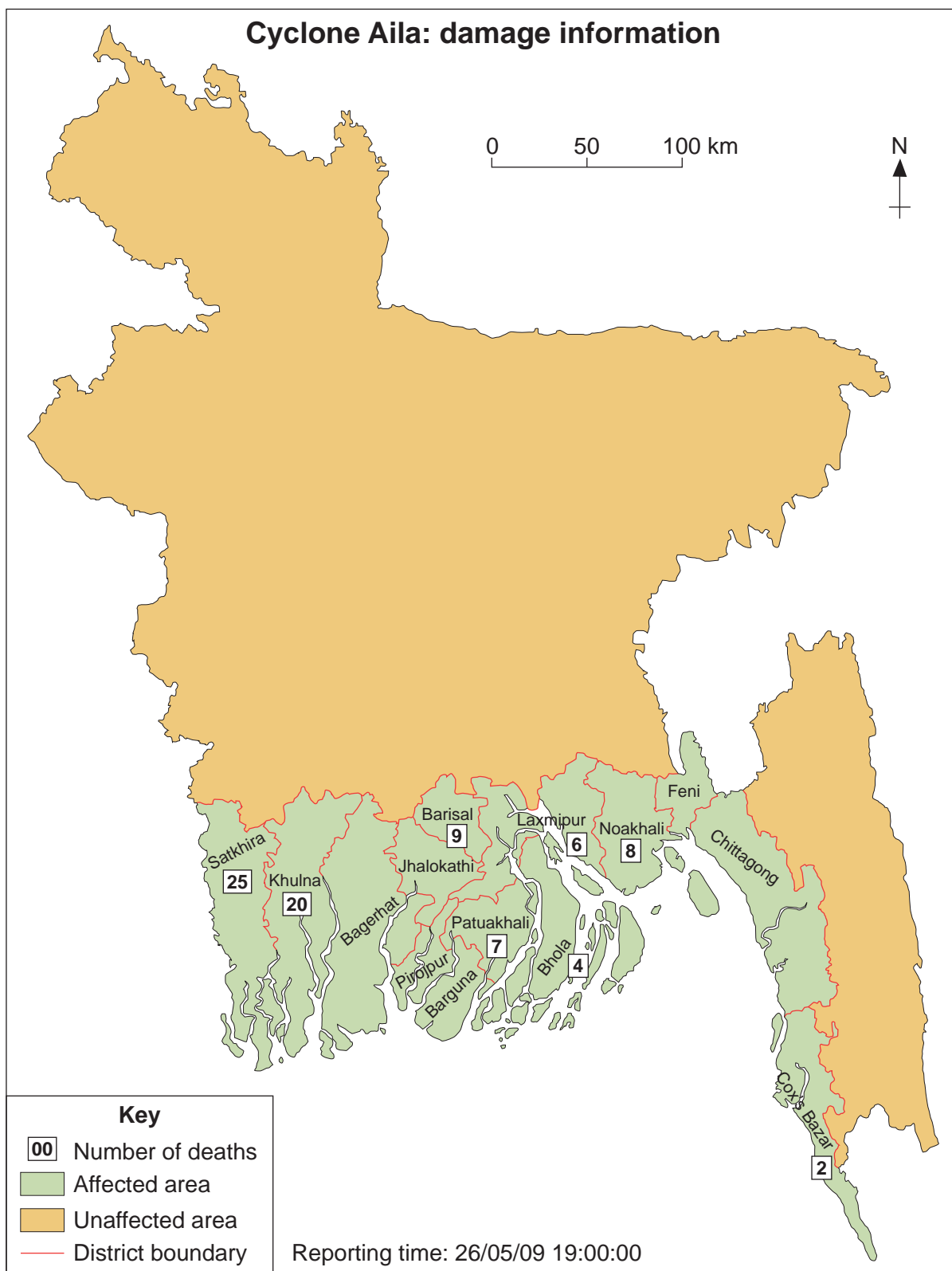
Shayamnagar and Asasuni upazilas were affected by wind-driven surge which was about 1.5 metres above normal astronomical tide. Nine unions of Shayamnagar and Asasuni were flooded adversely. Total of 88 km of ring embankments damaged and 100 000 people were affected in these two upazilas. 96 and 40 shelters were opened in Shayamnagar and Asasuni upazilas respectively. Dwellers of Kaliganj and Debhata upazila were also waterlogged. Army, Navy, Coast Guard and volunteers of different government and non-government organisations have been involved in rescuing, relief and rehabilitation.

<sup>1</sup> 'upazila' is an administrative area, smaller than a district

<sup>2</sup> 'union' is an administrative area, smaller than an upazila

<sup>3</sup> 'polder' is used in Bangladesh to mean a wall built around an area of land to keep out floodwater.

Figure P1



Item 1 continues on the next page

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There were also preliminary reports from four aid organisations that were working in the area in the aftermath of the cyclone – World Food Programme (WFP), World Health Organisation (WHO), Muslim Aid and Caritas. The WHO report is provided here.

- A total of 686 medical teams (doctors, health assistants) are working in Satkhira, Khulna, Bagerhat, Barisal, Patuakhali, Bhola, Barguna and Pirojpur districts and providing emergency medical care, mostly first aid.
- The Disaster Control rooms at central and coastal districts have been made operational on a 24/7 basis and all the Civil Surgeons of coastal districts are directed to initiate treatment to the affected population.
- When contacted, all the concerned Civil Surgeons mentioned that they have sufficient logistics to combat any immediate emergencies that might occur following Cyclone Aila.
- The Programme Manager has advised all the Rapid Response Teams at the district and upazila levels to be fully alert and report any situation that may arise from the consequences of the cyclone.
- With the technical support from WHO, local doctors will undertake Rapid Needs Assessment (RNA) to assess the loss and needs of the health sector following Cyclone Aila.

The MFDM report contained tables showing damage reports from each affected district (**Figure P2**). The final column in the table shows the total number of deaths and injuries reported by September 2009. These figures were taken from a later report published by the MFDM.

Finally, the original MFDM report contained a table to show the supplies of rice, house-building materials and cash for emergencies that was available in each of the districts affected by the cyclone, and how much of this had been distributed by 26 May 2009. This can be summarised as showing:

- There were almost 4 million tonnes of rice available
- Of this rice, about 40% had been distributed to people in need, whilst the rest was still being kept in storage
- The biggest distributions had taken place in Bhola, Khulna, Barisal, Satkhira and Barguna
- Cash worth about US\$8 000 000 was available
- Of this, just over 50% had been distributed already
- The biggest distributions that had taken place already were in Satkhira, Bhola, Barisal, Barguna and Patuakhali, which were amongst the worst affected states
- House-building materials worth about US\$21 000 were available
- Of this, about 60% had been distributed and 40% was still in store
- No distributions of rice, cash or house-building materials had taken place in the four eastern districts of Chittagong, Cox's Bazar, Laxmipur and Noakhali.

**Figure P2**  
**Extracts from Damage Report of Cyclone Aila**

Name of District	No. of affected upazilas	No. of affected people	Damaged households		No. of deaths	No. of injured people	No. of livestock deaths	Affected education institutes		Damaged roads (km)		Damaged embankments (km)	No. of people who took shelter	Deaths/ injuries (total reported Sept 2009)
			Fully	Partially				Fully	Partially	Fully	Partially			
Barisal	7	30 925	1 990	9 749	9				149		772	66	110 000	11/121
Bhola	4	150 000			4								167 925	18/201
Pirojpur	4	300 000												1/0
Patuakhali	7	1 150 153	34 061	70 695	7	610	530	171	135	301		133	92 500	8/610
Barguna	5	350 000	5 700	33 895			51 202	238	83	214		78	109 220	0/0
Jhalokathi	4													0/0
Khulna	5	334 610		59 587	20								19 000	57/543
Bagerhat	5	230 022		20 297		187	7 158	265	40	761		69		4/187
Satkhira	4	175 000			25							127		59/5357
Chittagong	3	12 523	100	362				2		25		12	10 500	1/10
Cox's Bazar	8		17	1 988	2				1	42		19	13 700	2/0
Laxmipur	4	7 206	170	1 050	6	6	60						21 030	7/6
Feni	1	6 800												0/0
Noakhali	1	1 200		1 200	8					40		5	36 200	24/255
<b>TOTAL</b>	<b>62</b>	<b>2 748 439</b>	<b>42 038</b>	<b>198 823</b>	<b>81</b>	<b>803</b>	<b>58 950</b>	<b>825</b>	<b>259</b>	<b>2 155</b>	<b>509</b>	<b>580 075</b>	<b>192/7290</b>	

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## Item 2 Extracts from the United Kingdom Government's Department for International Development (DfID) documents on Bangladesh (2009)

Straddling the Ganges/Brahmaputra delta, Bangladesh is one of the most low-lying and densely populated countries in the world. Almost 20 million of its people are extremely poor and vulnerable to natural disaster.

Bangladesh is striving to become a middle-income country with much reduced poverty. This is a challenge. By 2035, its population could reach 200 million, and the capital Dhaka, the second fastest-growing city in the world, is on track to be home to 50 million by 2050. With climate change, it's possible that 40% of the country will flood during the wet monsoon season, compared with 25% today.

### Key facts (2007)

Population	143 million
Average life expectancy	64 years
Average per capita income	US\$1870
Total UK aid received	£129.7 m

### DfID's main challenges in Bangladesh are:

- making government more effective
- giving people access to better health, education, safe water and improved sanitation
- lifting people out of extreme poverty and reducing vulnerability to effects of climate change
- making growth work for everyone.

### Poverty and vulnerability to disasters/climate change

At least 50% of Bangladesh's population is attempting to survive below the international poverty line. Of these, almost 15 million Bangladeshis (10% of the population) comprise the extreme poor, who struggle each day to survive on less than 60 cents a day. Monga – seasonal periods of hunger due to lack of income – still affect millions every year, as do flooding and cyclones/tropical storms. It only takes a single traumatic event to reduce an entire family to extreme poverty.

We help the extreme poor – especially women and girls – by providing them with assets with which to earn income, and by helping them to get credit and take advantage of other economic opportunities via a range of programmes that alleviate the symptoms of poverty as well as address its underlying causes. For instance, the Chars Livelihoods Programme (£50 million over eight years) helps people living on chars<sup>1</sup>. Through it, 62 000 homesteads have so far been raised above the 1998 flood level, and it has provided livestock, seeds and other items to almost 50 000 families in this low-lying, flood-prone area.

However, climate change threatens to undo many of the development gains of recent years, by:

- decreasing agricultural productivity
- reducing the actual amount of land due to rising sea levels
- increasing the number and length of periods of drought and the intensity of flooding
- increasing outbreaks of disease due to rising temperatures.

We recently made a commitment of £75 million over five years to help Bangladesh implement its new Climate Change Strategy. This will go some way towards protecting the lives and livelihoods of some 15 million people who live in the most vulnerable places of Bangladesh. We also aim to help the Bangladesh government to include climate change prominently in its developmental planning and support for research and modelling.

<sup>1</sup> 'Chars' are low, sand/silt islands, formed by deposition in the delta area, but susceptible to erosion during periods of flood.



## Case study from DfID

Abul Hussain is headmaster of a primary school in Munshiganj. In 2004, the Government built a cyclone shelter in the village and Abul was put in charge of it. In cyclone-free times, the building is used as a school, attended by around 200 pupils.

“We’ve had two cyclones since the shelter was built,” says Abul. “On the night of Cyclone Sidr<sup>1</sup>, we heard the warning on the radio at 10 pm. Nowadays, there are radios in every home. People can listen to weather reports all the time and they are informed about when they need to go to the shelter.

“I opened the doors of the shelter and about 5000 local residents came here. It was full. People were on all the floors and some even went on the roof because there was no more room for them and it was the only shelter for the region.

“This shelter makes a real difference. And it definitely saves lives. People can come here at times of natural calamity. It gives them security of life. During the 1991 cyclone, when more than 5000 people from this area lost their lives, things were very different. We saw dead bodies floating in the river water – animals like tigers and deer all died in such large numbers.

“If there’s no cyclone shelter, people don’t know where to go and they always feel insecure. Many more cyclone shelters like this should be constructed along the coastal belt. Because we live on the seashore, cyclones and tidal surges are very likely to happen here.” There are now 2100 cyclone shelters along the coast of Bangladesh.

Like many other Bangladeshis, Abul has seen with his own eyes major changes in climate in recent years. “Previously we had six seasons,” he says, “but now I can’t feel six separate seasons any more. The temperature has gone up in summer and it’s colder in winter.

“If we care about the environment, we should plant more trees. Nationally, we should make integrated efforts to tackle the situation and, internationally, we should seek help. Immediate action must be taken to stop further deterioration in the environment for the sake of the nation – and for the future of our children.”

<sup>1</sup> In November 2007, more than 3500 people were killed when Cyclone Sidr hit the Bangladesh coast. It was the second-strongest storm ever recorded in Bangladesh. The strongest was in 1970, when some half a million people died, while an estimated 138 000 people died as a result of a cyclonic surge in 1991. The lower death tolls in 1991 and 2007 were attributed to a network of cyclone shelters and a warning system introduced after the 1970 disaster.

## Further research

You are strongly advised to carry out further research on the type of work that the DfID is funding and supporting to help people in cyclone-prone areas of Bangladesh. The department’s website is a rich source of information. It can be found at:

<http://www.dfid.gov.uk/Where-we-work/Asia-South/Bangladesh/>

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### Item 3 Some observations on changing responses to cyclones in Bangladesh (2009)

A range of changes that have taken place over the last 20 years or so has made Bangladesh far better able to deal with the cyclones, which build in the Bay of Bengal and surge north to hit the country with dreadful regularity. Over the past decade especially, the country's cyclone early warning and preparedness systems have improved considerably. In the few days before Cyclone Sidr struck the coast, officials evacuated 3.2 million people who lived along the coastline and stockpiled rescue equipment and relief supplies, particularly rice, water purification equipment and tablets, tents and blankets, medical supplies and material for saris (particularly important for the modesty of the women in this deeply conservative area). They also arranged for the deployment of more than 700 medical teams, usually consisting of doctors with trained village health workers, to the worst-affected areas. Early warning systems were in place to measure, track and forecast the cyclone's movement and to disseminate information as widely as possible. This has had a "significant mitigating effect in recent emergencies", according to a United Nations spokesman.

Still, keeping future death tolls low is likely to get a lot harder. Scientists of the Intergovernmental Panel on Climate Change (IPCC) believe that global warming will make cyclones in the Indian Ocean region stronger and more frequent. The effect will be felt especially hard in Bangladesh. The country's location and geography make it particularly susceptible to the effects of floods from both the monsoon rainfall on land and cyclones from the Bay of Bengal. Both of these phenomena will probably be made worse by climate change.

Most of Bangladesh sits on the giant alluvial delta created by the Ganges and Brahmaputra rivers, whose courses are constantly shifting, making it difficult to build up river banks to protect farmland. A World Bank project, backed by France, Japan and the USA, has made plans to construct 8000 km of dikes to control the rivers, but the \$10 billion proposal has run into opposition from farmers. Some are opposed because they would lose their land during the building process; others because the dikes, in stopping or reducing the flood risk, would also deprive the land of floodwater and associated sediment that are needed to produce the crops of rice on which everyone depends.

Massive Dutch-style engineering to hold back the sea – particularly during cyclone-induced storm surges – is probably even more unworkable. The nature of the surface itself makes such constructions extremely challenging, even with the most modern technology and engineering. The soil is mainly very recently deposited silt or mud and the rapidly changing shape of the coastline and the seabed make it a very hard place to protect.

On a smaller scale, however, there are some far more manageable and affordable schemes being attempted.

- Already people in some areas of Bangladesh have begun building houses on tall stilts to raise them above the levels of the annual floodwaters. Practical Action, a UK-based NGO, has developed simple house designs – concrete plinths topped with inexpensive and easily replaced jute panel walls – that help to prevent some homes from being washed away.
- The DfID has sponsored the building of simpler structures called 'killas'. These are simply mounds of mud, built by hand using sediment dredged from the stream bed, on which people and their animals can seek refuge from storm surges and floods.
- CARE, the US-based NGO, has helped people living along the coast to rediscover forgotten farming techniques such as baira cultivation – floating gardens – an age-old agricultural system well suited to areas that are flooded for long periods of time.

- Farmers might also benefit from salt-tolerant varieties of rice or fast-growing crops that can be harvested before the devastating monsoon rains arrive.
- It will help, too, if the Bangladeshi government speeds up its implementation of plans created after earlier ruinous floods, including improving drainage in cities, better sanitation management and improving the worst slums.

Unfortunately, despite these preparations, much of Bangladesh is still under threat from current global warming trends. If the sea level rises, as the IPCC predicts, vast areas of coastal land will disappear in coming decades – as much as 18% of Bangladesh’s current landmass, according to the World Bank. At the same time, increased monsoon rainfall and increased meltwater from Himalayan glaciers, will bring higher floods to even larger areas of the country. The combined effects of river floods and cyclone-induced storm surges could lead to climate refugees fleeing for the cities and for other countries.

That is a problem, because Bangladesh is already one of the most densely populated countries on the globe. Neighbouring India is already so worried about the growing number of Bangladeshi migrants that it is building a huge fence on the nations’ shared border. However, Atiq Rahman, a leading Bangladeshi scientist, sees a possible advantage: Bangladesh’s fleeing multitudes can help feed the West’s need for cheap labour as its own population ages. “The globalisation of the climate process will force the globalisation of the demographic process,” he says. Then he adds: “The rich world caused this problem so they’re going to have to pay for it. We might have to introduce a system that says if you produce 10 000 tonnes of carbon you have to take a Bangladeshi family. People from the Rich World don’t like hearing that.” They may have to get used to it!

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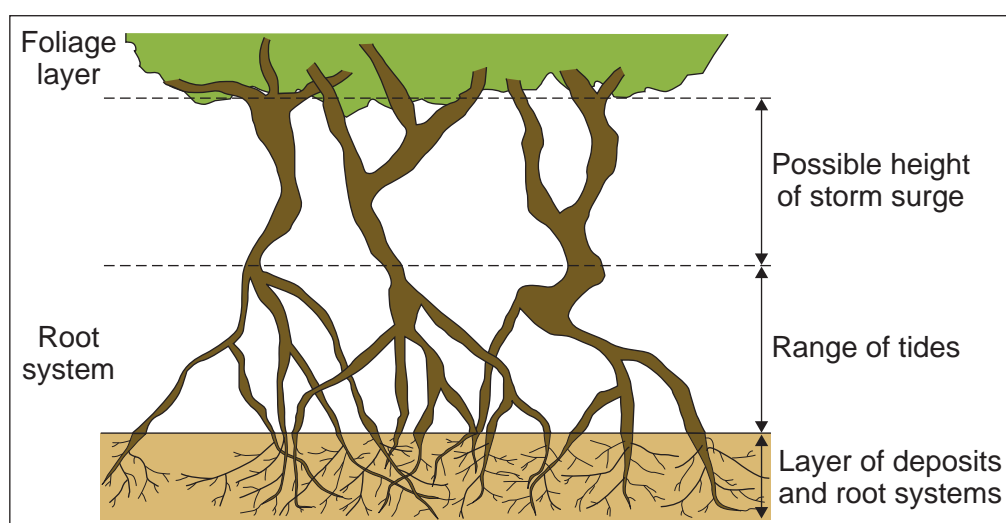
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#### Item 4 Mangrove forests and protection from cyclone surges

**Mangroves** are trees and shrubs that grow in saline (salt-water) coastal habitats in the tropics and subtropics.

Mangroves form a characteristic habitat, called **mangrove swamp** or **mangrove forest**. They are found in gently sloping, shallow coastal environments where fine sediments collect in areas protected from high energy wave action. They occur both in estuaries and along open coastlines. The mix of species is partly determined by the tolerances of individual species to physical conditions, such as tidal inundation and salinity. Many species within the mangrove forest grow large roots that lift the main trunk of the tree above the level of normal high tides. The root systems of different plants often intertwine to form a dense mass of vegetation that is difficult for humans to penetrate and which also may help to break the force of waves.

**Figure P3**



It is often said that mangroves protect coastal areas from erosion, storm surges and tsunamis. Mangroves' massive root systems are efficient at dissipating wave energy. They can slow down tidal water enough so that its sediment is deposited as the tide comes in, leaving all except fine particles when the tide ebbs. Because of the uniqueness of mangrove ecosystems and the protection against erosion that they provide, they are often the object of conservation programmes, including national Biodiversity Action Plans. However, in areas where there is population pressure on farmland, mangroves may come under threat of removal.

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