

### 3. Soil Fertility Status of Different Agro-Ecological Zones

Bangladesh has a wide range of environmental conditions. Environmental diversity occurs not only at national and regional levels, it also occurs at the Upazila and village levels. Besides considerable year to year variability in moisture, the temperature and flood regimes it creates major problems for planning program on environment and agricultural research, extension and development activities.

Thirty agroecological regions and 88 subregions have been identified by adding successive layers of information on the physical environment which are relevant for land use and for assessing agricultural potential. These layers are :

- Physiography (land forms and parent materials)
- Soils
- Depth and duration of seasonal flooding
- Length of the rainfed kharif and rabi growing periods
- Length of the pre-kharif period of unreliable rainfall
- Length of the cool winter period and frequency of occurrence of extremely low (below  $0.4^{\circ}\text{C}$ ) winter temperature.
- Frequency of occurrence of extremely high ( $> 40^{\circ}\text{C}$ ) summer temperatures.

Agroecological regions and subregions are very broad units. The fertility status of these regions varies considerably. Individual farmers have fragmented the land into small pieces causing wide variation in the management of each and every piece of land. This leads to the large variation in the fertility levels even between adjacent plots. Realizing the difficulties of generalization of fertility level, only an indicative status of the fertility levels of each 30 agroecological regions is given here which serves as ground for AEZ based fertilizer recommendations for cropping patterns. Area, location and landtypes of different AEZs of Bangladesh are presented in Table 3. For detailed information about physical and chemical properties of soils, respective Upazila Nirdeshika may be consulted. However, for fertility data of a specific area soil samples should be collected for detailed analysis.

**Table 3. Area, locations and land types of agro-ecological zones of Bangladesh**

AEZ No. & Name	Area		Major Land types & extent		Location (district)
	km <sup>2</sup>	ha	Type	Extent (%)	
1. Old Himalayan Piedmont Plain	4008	398154	HL MHL	58 34	Most of Panchagar & Thakurgaon, and north-west part of Dinajpur
2. Active Tista Floodplain	836	83644	HL MHL	2 72	Adjoining channels of Nilphamari, Rangpur, Lalmonirhat, Kurigram & Gaibandha
3. Tista Meander Floodplain	9468	946803	HL MHL	35 51	Most of Rangpur, eastern parts of Panchagar & Dinajpur, northern Bogra and parts of Joypurhat, Naogaon & Rajshahi
4. Karatoya-Bangali Floodplain	2572	257158	HL MHL MLL	23 44 14	Eastern Bogra and most of Sirajgonj
5. Lower Atrai Basin	851	85105	MHL MLL LL	8 21 65	Most parts in Naogaon & Natore, and small parts in Rajshahi, Bogra & Sirajgonj.
6. Lower Purnabhaha Floodplain	129	12896	MLL LL	10 60	Western parts of Naogaon and northern part of Nawabganj
7. Active Brahmaputra-Jamuna Floodplain	3190	319001	MHL MLL	37 20	Eastern parts of Kurigram, Gaibandha, Bogra, Sirajganj, Pabna & Manikganj
8. Young Brahmaputra-Jamuna Floodplain	5924	592394	HL MHL MLL	18 42 19	Western parts of Sherpur, Jamalpur & Tangail
9. Old Brahmaputra Floodplain	7230	723037	HL MHL MLL	28 35 20	Most parts of Sherpur, Jamalpur, Tangail, Mymensingh, Netrokona, Kishoreganj, Narsingdi & Narayanganj
10. Active Ganges Floodplain	3334	333447	HL MHL MLL	12 33 18	Ganges and lower Meghna channels of Nawabganj & Rajshahi to Meghna estuary in Lakshmipur & Barisal
11. High Ganges River Floodplain	13205	1320549	HL MHL MLL	43 32 12	Nawabganj, Rajshahi, southern Pabna, Kushtia, Meherpur, Chuadanga, Jhenaidah, Magura, Jessore, Satkhira & Khulna.
12. Low Ganges River Floodplain	7968	796751	HL MHL MLL LL	13 29 31 14	Natore, Pabna, Goalanda, Faridpur, Madaripur, Gopalganj, and Sariatpur, eastern parts of Kushtia, Magura and Narail, north-eastern parts of Khulna & Bagerhat, northern Barisal, and south-western parts of Manikganj, Dhaka & Munshiganj.
13. Ganges Tidal Floodplain	17066	1706573	MHL	78	Barisal, Jhalakati, Pirojpur, Patuakhali, Barguna, Bagerhat, Khulna & Satkhira.
14. Gopalganj – Khulna Bills	2247	224700	MHL MLL LL VLL	13 41 28 11	Madaripur, Gopalganj, Narail, Jessore, Bagerhat & Khulna.
15. Arial Bil	144	14436	MLL LL	13 73	Munshiganj & Dhaka

HL = Highland, MHL =Medium Highland, MLL = Medium Lowland  
LL = Lowland and VLL = Very Lowland

AEZ No. & Name	Area		Major Land types & extent		Location (district)
	km <sup>2</sup>	ha	Type	Extent (%)	
16. Middle Meghna River Floodplain	1555	155464	MLL LL VLL	29 25 11	Parts of Kishoreganj, Brahmanbaria, Comilla, Chandpur, Narsingdi & Narayanganj
17. Lower Meghna River Floodplain	909	90934	HL MHL MLL	14 28 31	Chandpur, Lakshimpur & Noakhali.
18. Young Meghna Estuarine Floodplain	9269	926885	MHL	45	Chittagong, Feni, Noakhali, Lakshimpur, Bhola, Barisal, Patuakhali & Barguna.
19. Old Meghna Estuarine Floodplain	7740	774026	MHL MLL LL	24 33 21	Kishoreganj, Habiganj, Brahmanbaria, Comilla, Chadpur, Feni, Noakhali, Lakshimpur, Narsingdi, Narayanganj, Dhaka, Shariatpur, Madaripur, Gopalganj & Barisal.
20. Eastern Surma - Kushiya Floodplain	4622	462159	MHL MLL LL	25 20 36	Sylhet, Moulvibazar, Sunamganj & Habiganj,
21. Sylhet Basin	4573	457345	MLL LL VLL	19 43 23	Sunamganj, Habiganj, Netrokona, Kishoreganj & Brahmanbaria.
22. Northern and Eastern Piedmont Plains	4038	403758	HL MHL MLL	33 31 16	Sherpur, Netrokona, Sunamganj, Sylhet, Moulivibazar, Habiganj, Brahmanbaria & Comilla
23. Chittagong Coastal Plains	3720	372007	HL MHL MLL	17 43 13	Feni, Chittagong & Cox's Bazar
24. St. Martin's Coral Island	8	804	HL MHL	33 63	St. Martin's Island
25. Level Barind Tract	8	504851	HL MHL	30 55	Dinajpur, Gaibandha, Joypurhat, Bogra, Naogaon, Sirajganj & Natore
26. High Barind Tract	1600	159964	HL	93	Rajshahi, Nawabganj & Naogaon
27. North Eastern Barind Tract	1079	107926	HL MHL	36 56	Dinajpur, Rangpur, Gaibandha, Joypurhat & Bogra
28. Madhupur Tract	4244	424359	HL MHL	56 18	Dhaka, Gazipur, Narsingdi, Narayanganj, Tangail, Mymensingh & Kishoreganj
29. Northern and Eastern Hills	18171	1817172	HL	92	Khagrachhari, Chittagong Hill Tracts, Bandarban, Chittagong, Cox's Bazar, Habiganj & Moulivibazar
30. Akhaura Terrace	113	11324	HL MHL MLL LL	55 11 10 15	Brahmanbaria district & miner area in Habiganj district

### ***AEZ 1: Old Himalayan Piedmont Plain (398154 ha)***

This distinctive region is developed in Old Tista Alluvial fan extending out from the foot of the Himalayas. It has complex relief pattern comprising broad and narrow floodplain ridges and linear depressions. Deep, rapidly permeable sandy loams and sandy clay loams are predominant in this region. Its topsoils are strongly acidic and sub-soils moderately acidic; rich in weatherable sand minerals. Seven General Soil Types occur in the region of which, Noncalcareous Brown Floodplain soils, Black Terai soils and Noncalcareous Dark Grey Floodplain soils predominate. Organic matter contents are relatively higher (Piedmont area) than the other floodplain areas. The natural fertility of the soil, except the coarse textured, is moderate but well sustained. Soil fertility problems include rapid leaching of N, K, S, Ca, Mg and B.

Major Land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (58 %)	4.0-6.0	L-M	VL-L	L-M	VL-L	L-M	L	L	L	L	L-M
Medium highland (34%)	4.0-6.5	L-M	VL-L	L-M	VL-L	L-M	L	L	L	L	L-M

OM = Organic matter

VL= Very low

L= Low

M=Medium

Opt = Optimum

H = High

VH = Very high

### ***AEZ 2: Active Tista Floodplain (83644 ha)***

This region includes the active floodplains of the Tista, Dharla and Dudkumar rivers. It has complex patterns of low, generally smooth ridges, inter-ridge depressions, river channels and cut-off channels.

The area has irregular patterns of grey stratified sands and silts. They are moderately acidic throughout and parent alluvium is rich in weatherable minerals. Four General Soil Types occur in the region of which, Noncalcareous Alluvium predominates. Organic matter content is low and CEC is medium. Soil fertility level, in general, including Mg and B status is low to medium.

Major Land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium highland (72%)	5.2-6.9	L	VL-L	L	L-M	L	L	L-M	L	L	L-M

### ***AEZ 3. Tista Meander Floodplain (946803 ha)***

This region occupies major part of the Tista Floodplain as well as the floodplain of the Atrai, Little Jamuna, Karatoya, Dharla and Dudkumar rivers.

Most areas have broad floodplain ridges and almost level basins. There is overall pattern of olive brown, rapidly permeable, loamy soils on the floodplain ridges, and grey or dark grey, slowly permeable, heavy silt loam or silty clay loam soils on the lower land and parent materials rich in weatherable minerals. Eight General Soil Types occur in the region of which, Noncalcareous Grey Floodplain and Noncalcareous Brown Floodplain soils predominate. They are moderately acidic throughout, low in organic matter content on the higher land, but moderate in the lower parts. Fertility level, in general, is low to medium but the status of K and CEC is medium in most of the places. Soils in general have a good moisture holding capacity.

Major Land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (35 %)	4.6-6.5	L	VL-L	L-M	L-M	L	L	L	L	L	L-M
Medium highland (51%)	4.9-7.0	L	VL-L	L-M	M	L	L	L	L	L	L-M

#### ***AEZ 4. Karatoya-Bangali Floodplain (257158 ha)***

This floodplain apparently comprises a mixture of the Tista and Brahmaputra sediments. Most areas have smooth, broad, floodplain ridges and almost level basins.

The soils are grey silt loams and silty clay loams on ridges and grey or dark grey clays in basins. Five General Soil Types occur in the region of which, Noncalcareous Grey Floodplain and Noncalcareous Dark Grey Floodplain soils predominate. They are moderately acidic throughout. Organic matter content is low in ridge soils and moderate in basins. General fertility level is medium.

Major Land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (23 %)	4.7-7.8	L	VL-L	L-M	L	L-M	Opt	Opt	L-M	L-M	Opt
Medium highland (44%)	5.4-7.9	L	VL-L	L-M	L	L-M	Opt	Opt	L-M	L-M	Opt
Medium lowland (14%)	6.2-7.7	L	VL-L	L-M	L	L-M	Opt	Opt	L-M	L-M	Opt

#### ***AEZ 5. Lower Atrai Basin (85105 ha)***

This region comprises low lying areas between the Barind Tract and the Ganges River Floodplain. The smooth, low lying, basin land occupies most of the region. Dark grey, heavy, acidic clays predominate. Seven General Soil Types occur in the region, but Noncalcareous Dark



### ***AEZ 8. Young Brahmaputra and Jamuna Floodplain (592394 ha)***

The region comprises the area of Brahmaputra sediments. It has a complex relief of broad and narrow ridges, inter-ridge depressions, partially in filled cut-off channels and basins.

This area is occupied by permeable silt loam to silty clay loam soils on the ridges and impermeable clays in the basins; neutral to slightly acid in reaction. General Soil Types include predominantly Grey Floodplain soils. Organic matter content is low in ridges and moderate in basins. Soils are deficient in N, P and S but the status of K and Zn is medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (18 %)	5.6-7.5	VL-L	VL-L	L	M	L	M	M	L-M	L-M	M
Medium highland (42%)	5.4-7.5	VL-L	VL-L	L	M	L	M	M	L-M	L-M	M
Medium lowland (19%)	5.4-7.5	L	L	L	M	L	M	M	L-M	L-M	M

### ***AEZ 9: Old Brahmaputra Floodplain (723037 ha)***

This region occupies a large area of Brahmaputra sediments before the river was diverted to its present Jamuna channel about 200 years ago. The region has broad ridges and basins.

Soils of the area are predominantly silt loams to silty clay loams on the ridges and clay in the basins. General Soil Types predominantly includes Dark Grey Floodplain soil. Organic matter content is low on the ridges and moderate in the basins, topsoils moderately acidic and subsoils neutral in reaction. General fertility level is low. However, the status of P and CEC is medium and the K status is low.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (28 %)	4.5-7.4	L	VL-L	L-M	L	L-M	Opt	Opt	L-M	L-M	Opt
Medium highland (35%)	4.7-7.2	L	VL-L	L-M	L	L-M	Opt	Opt	L-M	L-M	Opt
Medium lowland (20%)	4.5-7.2	L	VL-L	L-M	L	L-M	Opt	Opt	L-M	L-M	Opt

### ***AEZ 10: Active Ganges Floodplain (333447 ha)***

This region occupies unstable alluvial land within and adjoining Ganges river. It has irregular relief of broad and narrow ridges and depressions.

The area has complex mixtures of calcareous sandy, silty and clayey alluvium. The General Soil Types predominantly include Calcareous Alluvium and Calcareous Brown Floodplain soils. Soils are low in organic matter and slightly alkaline in reaction. General fertility level is medium with high CEC but deficient in N, P and Zn contents. Boron status is medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (12 %)	7.1-8.1	L	L	L-M	M	L-M	H	H	L	M	M
Medium highland (33%)	7.1-8.1	L	L	L-M	M	L-M	H	H	L	M	M
Medium lowland (18%)	7.1-8.1	L	L	L-M	M	L-M	H	H	L	M	M

### ***AEZ 11. High Ganges River Floodplain (1320549 ha)***

This region includes the western part of the Ganges River Floodplain which is predominantly high land and medium highland. Most areas have a complex relief of broad and narrow ridges and inter-ridge depressions, separated by areas with smooth, broad ridges and basins.

There is an overall pattern of olive-brown silt loams and silty clay loams on the upper parts of floodplain ridges and dark grey mottled brown, mainly clay soils on ridge sites and in basins. Most ridge soils are calcareous throughout. General Soil Types predominantly include Calcareous Dark Grey Floodplain soils and Calcareous Brown Floodplain soils. Organic matter content in the brown ridge soils is low but higher in the dark grey soils. Soils are slightly alkaline in reaction. General fertility level is low although CEC is medium and K-bearing minerals are medium to high but the Zn and B status is low to medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (43 %)	5.9-8.1	L	VL-L	L-M	M	L-M	Opt-H	Opt-H	L-M	L-M	M
Medium highland (32 %)	6.0-8.1	L-M	VL-L	L-M	M	L-M	Opt-H	Opt-H	L-M	L-M	M
Medium lowland (12 %)	6.5-8.3	L-M	L	L-M	M	L-M	Opt-H	Opt-H	L-M	L-M	M

### ***AEZ 12. Low Ganges River Floodplain(796751 ha)***

The region comprises the eastern half of the Ganges River Floodplain which is low-lying. The region has a typical meander floodplain landscape of broad ridges and basins.

Soils of the region are silt loams and silty clay loams on the ridges and silty clay loam to heavy clays on lower sites. General Soil Types predominantly include Calcareous Dark Grey and calcareous Brown Floodplain soils. Organic matter content is low in ridges and moderate in the basins. Soils are calcareous in nature having neutral to slightly alkaline reaction. General fertility level is medium with high CEC and K status and the Zn and B status is medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (13 %)	6.8-8.2	L	VL-L	L-M	M-Opt	L-M	Opt-H	Opt-H	L-M	M-Opt	Opt
Medium highland (29 %)	6.2-8.3	L-M	VL-L	L-M	M-Opt	L-M	Opt-H	Opt-H	L-M	M-Opt	Opt
Medium lowland (31 %)	6.0-8.3	L-M	L	L	M-Opt	L-M	Opt-H	Opt-H	L-M	M-Opt	Opt
Lowland (14%)	6.0-7.7	M	L	L	M-Opt	L-M	Opt-H	Opt-H	L-M	M-Opt	Opt

### ***AEZ 13. Ganges Tidal Floodplain (1706573 ha)***

This region occupies an extensive area of tidal floodplain land in the south-west of the country. The greater part of this region has smooth relief having large areas of salinity.

There is a general pattern of grey, slightly calcareous, heavy soils on river banks and grey to dark grey, noncalcareous, heavy silty clays in the extensive basins. Noncalcareous Grey Floodplain soil is the major component of General Soil Types. Acid Sulphate soils also occupy significant part of the area where it is extremely acidic during dry season. In general, most of the topsoils are acidic and subsoils are neutral to mildly alkaline. Soils of the Sundarban area are alkaline. General fertility level is high with medium to high organic matter content and very high CEC and K status but have limitations of high exchangeable Na and low Ca/Mg ratio. The Zn status is low to medium and the B and S status is high.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium highland (78%)	4.2-8.1	L-M	VL-L	VL-L	Opt-H	Opt-H	Opt-H	Opt-H	L-M	Opt-H	Opt

#### **AEZ 14. Gopalganj-Khulna Bils (224700 ha)**

The region occupies extensive low-lying areas between the Ganges River Floodplain and the Ganges Tidal Floodplain. Almost level, low-lying basins occupy most of the region, with low ridges along rivers and creeks.

Soils of the area are grey and dark grey acidic heavy clays, overlie peat or muck at 25-100 cm. Soft peat and muck occupy perennially wet basin centres. General Soil Types include mainly Peat and Noncalcareous Dark Grey Floodplain soils. Organic matter content is medium to high. They have low bearing capacity when wet, potentially strongly acid and low in P and Zn status. Fertility level is medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium highland (13%)	5.0-7.7	H	Opt-H	L	Opt	H	Opt	Opt	L	M	Opt
Medium lowland (41%)	5.0-7.4	H	Opt-H	L	Opt	H	Opt	Opt	L	M	Opt
Lowland (28%)	4.3-6.7	H	Opt-H	L	Opt	H	Opt	Opt	L	M	Opt
V.lowland (11%)	4.3-6.7	H	Opt-H	L	Opt	H	Opt	Opt	L	M	Opt

#### **AEZ 15. Arial Bil (14436 ha)**

This region occupies a low lying basin between the Ganges and Dhaleshwari rivers in the south of the former Dhaka district

The soils of this area are dark grey, acidic heavy clays. A noncalcareous Dark Grey Floodplain soil is the major General Soil Type. Organic matter content generally exceeds 2% in the top and subsoil. Available moisture holding capacity is inherently low. They have high CEC, and general fertility level is medium to high.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium lowland (13%)	5.3-6.8	M-H	L	L-M	M-Opt	M-Opt	Opt	Opt	M	Opt	Opt
Lowland (73%)	4.7-5.4	M-H	L	L-M	M-Opt	M-Opt	Opt	Opt	M	Opt	Opt

### ***AEZ 16. Middle Meghna River Floodplain (155464 ha)***

This region occupies abandoned channel of the Brahmaputra river on the border between the greater Dhaka and Comilla districts. This region includes islands – former Brahmaputra chars, within the Meghna river as well as adjoining parts of the mainland.

Soils of the area are grey, loamy on the ridges and grey to dark grey clays in the basins. Grey sands to loamy sands with compact silty topsoil occupy areas of Old Brahmaputra char. Dominant General Soil type is Noncalcareous Grey Floodplain soils. Topsoils are strongly acidic and subsoils moderately acidic to slightly alkaline. General fertility level is medium with low N and organic matter contents. The P, Zn and B levels are low to medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium lowland (29%)	4.9-7.0	L-M	L	L-M	L	M-Opt	Opt	M-Opt	L-M	L-M	Opt
Lowland (25%)	4.1-6.8	M	L	L-M	L	M-Opt	Opt	M-Opt	L-M	L-M	Opt
Very lowland (11%)	4.6-5.5	M	L	L-M	L	M-Opt	Opt	M-Opt	L-M	L-M	Opt

### ***AEZ 17. Lower Meghna River Floodplain (90934 ha)***

This area occupies transitional area between Middle Meghna River Floodplain and the Young Meghna Estuarine Floodplain. The region has slightly irregular relief, but with little difference in elevation between the ridges and depressions.

Soils of this area are relatively uniform, silt loams occupy relatively higher areas and silty clay loams occupy the depressions. Noncalcareous Dark Grey Floodplain and Calcareous Grey Floodplain soils are major components of General Soil Types. Topsoils are moderately acidic and subsoils neutral in reaction. General fertility level is medium to high with low to medium organic matter status and K-bearing minerals.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (14 %)	5.5-6.3	L-M	VL-L	L-M	L-M	L-M	Opt-H	Opt-H	M-Opt	M	M
Medium highland (28%)	4.8-7.1	L-M	L	L-M	L-M	L-M	Opt-H	Opt-H	M-Opt	M	M
Medium lowland (31%)	5.1-7.8	L-M	L	L-M	L-M	L-M	Opt-H	Opt-H	M-Opt	M	M

### ***AEZ 18. Young Meghna Estuarine Floodplain (926885 ha)***

This region occupies young alluvial land in and adjoining the Meghna estuary. It is almost level with very low ridges and broad depressions. The major soils are grey to olive, deep, calcareous silt loam and silty clay loams and are stratified either throughout or at shallow depth. Calcareous Alluvium and Noncalcareous Grey Floodplain soils are the dominant General Soil Types. The soils in the south become saline in dry season. Top soils and subsoils of the area are the dominant General Soil Types. The soils in the south become saline in dry season. Top soils and subsoils of the area are mildly alkaline. General fertility is medium but low in N and organic matter. Sulphur status is medium to high.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium highland (45%)	4.8-8.4	L-M	VL-L	L-M	M-Opt	M-Opt	Opt-H	Opt-H	L-M	Opt	Opt

### ***AEZ 19. Old Meghna Estuarine Floodplain (774026 ha)***

This region occupies a large area, mainly low lying between the south of the Surma-Kushiyara Floodplain and the northern edge of the Young Meghna Estuarine Floodplain. It comprises smooth, almost level, floodplain ridges and shallow basins.

Silt loam soils predominate on highlands and silty clay to clay in lowlands. A noncalcareous Dark Grey Floodplain soil is the only General Soil Types of the area. Organic matter content of the soils is moderate. Moisture holding capacity is medium. Topsoils are moderately acidic, but subsoils neutral in reaction. General fertility level is medium. Status of K is low in uplands and low to moderate in lowlands. Levels of P, S, Zn and B are low to medium.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium highland (24%)	4.4-7.8	L-M	VL-L	L-M	L-M	L-M	Opt	Opt	L-M	L-M	Opt
Medium lowland (33%)	5.5-7.7	M	VL-L	L-M	L-M	L-M	Opt	Opt	L-M	L-M	Opt
Lowland (21%)	5.7-6.9	M	L	L-M	L-M	L-M	Opt	Opt	L-M	L-M	Opt

## ***AEZ 20. Eastern Surma-Kushiyara Floodplain (462159 ha)***

This region occupies the relatively higher parts of the Surma-Kushiyara Floodplain formed on sediments of the rivers draining into the Meghna catchment area from the hills. The area is mainly smooth, broad ridges and basins.

This area is occupied by grey, heavy silty clay loams on the ridges and clays in the basins. Noncalcareous Grey Floodplain soils is the only General Soil Type. Organic matter content of the soil is moderate. Soil reaction ranges from strongly acidic to neutral. Levels of CEC and Zn are medium while the status of P, K and B is low.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium highland (25%)	4.4-6.5	L-M	VL-L	L	L	L-M	L-M	L-M	M	L-M	M
Medium lowland (20%)	4.6-6.0	L-M	VL-L	L	L	L-M	L-M	L-M	M	L-M	M
Lowland (36%)	4.3-7.6	M	L	L	L	L-M	L-M	L-M	M	L-M	M

## ***AEZ 21. Sylhet Basin (457345 ha)***

The region occupies the lower, western side of the Surma-Kushiyara Floodplain. The area is mainly smooth, broad basins with narrow ridges of higher land along rivers.

Soils of the area are grey silty clay loams and clay loam on the higher parts that dry out seasonally and grey clays in the wet basins. Noncalcareous Grey Floodplain soils and Acid Basin Clays are the major components of the general soil types. The soils have moderate content of organic matter and soil reaction is mainly acidic. Fertility level is medium to high with medium P and Zn contents.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Medium Lowland (19%)	4.8-6.0	L-M	L	L-M	L-M	M-Opt	M-Opt	M-Opt	M-Opt	Opt	Opt
Lowland (43%)	4.8-6.0	M	L	L-M	L-M	M-Opt	M-Opt	M-Opt	M-Opt	Opt	Opt
Very lowland (32%)	4.8-6.0	M	L	L-M	L-M	M-Opt	M-Opt	M-Opt	M-Opt	Opt	Opt

## ***AEZ 22. Northern and Eastern Piedmont Plains (403758 ha)***

This is a discontinuous region occurring as a narrow strip of land at the foot of the northern and eastern hills. The area comprises merging alluvial fans which slope gently outward from the foot of the hills, into smooth, low lying basin.

Grey Piedmont soils and Noncalcareous Grey Floodplain soils are the major General Soil Types of the area. soils of the area are loams to clays in texture having slightly acidic to strongly acidic reaction. General fertility level is low to medium.

Major land type	Soil pH	Soil OM	Nutrient status									
			N	P	K	S	Ca	Mg	Zn	B	Mo	
Highland (33%)	4.2-6.1	VL-L	VL-L	L	L	L	L	L-M	L-M	M	L-M	L
Medium highland (31%)	4.2-6.1	VL-L	VL-L	L	L	L	L	L-M	L-M	M	L-M	L
Medium lowland (16%)	4.2-6.0	L	VL-L	L	L	L	L	L-M	L-M	M	L-M	L

## ***AEZ 23. Chittagong Coastal Plains (372007 ha)***

This region occupies the plain land in greater Chittagong district and the eastern part of Feni district. It is a compound unit of piedmont, river, tidal and estuarine floodplain landscapes. The major problem in these soils is high salinity during dry season (October to May).

Grey silt loams and silty clay loam soils are predominant. Acid Sulphate soils which are potentially extremely acidic occur in mangrove tidal floodplains. Noncalcareous Grey Floodplain soils, Noncalcareous Alluvium and Acid Sulphate soils are the major components of the General Soil Types of the area. General fertility level of the soils is medium, and N and K are limiting. Status of S is high. Organic matter content is low to moderate and the status of Zn and B is medium.

Major land type	Soil pH	Soil OM	Nutrient status									
			N	P	K	S	Ca	Mg	Zn	B	Mo	
Highland (17 %)	4.3-6.0	L-M	L	VL-L	L-M	M-Opt	L-M	L-M	L-M	L-M	L-M	M
Medium highland (43%)	4.4-6.2	L-M	L	VL-L	L-M	M-Opt	L-M	L-M	L-M	L-M	L-M	M
Medium lowland (13%)	4.6-6.0	M	L	VL-L	L-M	M-Opt	L-M	L-M	L-M	L-M	L-M	M

### ***AEZ 24. St. Martin`s Coral Island (804 ha)***

This small but distinctive region occupies the whole of St. Martin`s Island in the extreme south of the country. The area has very gently undulating old beach ridges and inter-ridge depressions, surrounded by sandy beaches.

The soils are developed entirely on old and young coral beach sands. Calcareous Alluvium is the only General Soil Type of the area. General fertility level is low with poor moisture holding capacity.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (33 %)	4.6-7.8	VL-L	VL-L	VL-L	L-M	Opt-H	Opt-H	Opt-H	L	H	M
Medium highland (63%)	4.6-7.8	VL-L	VL-L	VL-L	L-M	Opt-H	Opt-H	Opt-H	L	H	M

### ***AEZ 25. Level Barind Tract (504851 ha)***

This region is developed over Madhupur Clay. The landscape is almost level, locally irregular along river channels. The predominant soils have a grey, silty, puddled topsoil with ploughpan, which either directly overlies grey, heavy, little weathered Madhupur Clay or merges with the porous, silt loam or silty clay loam subsoils which overlies strongly acid clay at greater depth. Shallow Grey Terrace soils and Deep Grey Terrace soils are the major components of General Soil Types of the area. The soils are low in available moisture holding capacity and slightly acidic to acidic in reaction. Organic matter status is very low and most of the available nutrients are limiting.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (30 %)	4.3-6.1	VL-L	VL-L	L-M	L	L-M	L-M	L-M	L-M	L-M	L-M
Medium highland (55%)	4.8-7.1	VL-L	VL-L	L-M	L	L-M	L-M	L-M	L-M	L-M	L-M

### ***AEZ 26. High Barind Tract (159964 ha)***

It includes the south western part of the Barind Tract where the underlying Madhupur clay has been uplifted and cut into by deep valleys.

The soils include puddled silt loam to silty clay loam in the topsoils and porous silt loam with mottled plastic clay at varying depth. Deep Grey Terrace soils and Grey Valley soil are the

major components of the General Soil Types of the area. General fertility status is low having low status of organic matter, including low status of P & K and medium status of Zn and B.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (93 %)	4.1-7.6	VL-L	VL-L	VL-L	L	L	L-M	L-M	L-M	L-M	L-M

### ***AEZ 27. North Eastern Barind Tract (107926 ha)***

This region occupies several discontinuous areas on the north-eastern margins of the Barind Tract. It stands slightly higher than adjoining floodplain land.

The region has silty or loamy topsoil and clay loams to clay subsoils and grades into strongly mottled clay. The Madhupur Clay underlying this region is deeply weathered. Deep Red Brown Terrace soils and Deep Grey Terrace soils are the major components of the General Soil Types of the area. The soils are strongly acidic in reaction. Organic matter of the soils is low. General fertility level is poor with medium status of Zn.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (36%)	4.3-6.6	VL-L	VL-L	L-M	L-M	L	L-M	L-M	L-M	L-M	L-M
Medium highland (56%)	4.6-6.4	VL-L	VL-L	L-M	L-M	L	L-M	L-M	L-M	L-M	L-M

### ***AEZ 28. Madhupur Tract (424329 ha)***

This is a region of complex relief and soils are developed over the Madhupur Clay, The landscape comprises level upland, closely or broadly dissected terraces associated with either shallow or broad deep valleys.

Eleven General Soil Types exist in the area of which, Deep Red Brown Terrace, Shallow Red Brown Terrace soils and Acid Basin Clays are the major ones. The soils on the terrace are better drained, friable clay loams to clays overlying friable clay substratum at varying depths. Soils in the valleys are dark grey heavy clays. They are strongly acidic in reaction with low status of organic matter, low moisture holding capacity and low fertility level. The soils are mainly phosphate fixing, and low in P, K, S and B levels.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (56 %)	4.1-6.2	L	VL-L	L	L	L	L-M	L-M	L-M	L-M	L-M
Medium highland (18 %)	4.4-6.5	L	VL-L	L	L	L	L-M	L-M	L-M	L-M	L-M

### ***AEZ 29. Northern and Eastern Hills (1817172 ha)***

This region includes the country's hill areas. Relief is complex. Hills have been dissected to different degrees over different rocks. In general, slopes are very steep and few low hills have flat summits.

The major hill soils are yellow-brown to strong brown, permeable, friable, loamy; very strongly acid and low in moisture holding capacity. However, soil patterns generally are complex due to local differences in sand, silt and clay contents of the underlying sedimentary rocks and in the amount of erosion that has occurred. Brown Hill soils is the predominant General Soil Types of the area. Organic matter content and general fertility level are low.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (92 %)	4.1-7.1	L-M	VL-L	L	L-M	L-M	L-M	L-M	L-M	L-M	L-M

### ***AEZ 30. Akhaura Terrace (11324 ha)***

This small region occupies the eastern border of Brahmanbaria and southwest corner of Habiganj district. In appearance, the region resembles Madhupur Tract with level upland, dissected by mainly deep, broad valleys.

The main soils on the upland have strong brown clay which grades into red mottled clay substratum. The valley soils range from silty clay loams to clays. Deep Red Brown Terrace soil, Grey Piedmont soils and Acid Basin Clays are the major components of the General Soil Types of the area. The general fertility including organic matter status is low. The soils are strongly acidic in reaction.

Major land type	Soil pH	Soil OM	Nutrient status								
			N	P	K	S	Ca	Mg	Zn	B	Mo
Highland (55 %)	5.5-6.5	VL-L	VL-L	L	L	L	L	L	L-M	L-M	L-M
Medium highland (11 %)	5.5-6.5	VL-L	VL-L	L	L	L	L	L	L-M	L-M	L-M
Medium lowland (10 %)	5.5-6.5	VL-L	VL-L	L	L	L	L	L	L-M	L-M	L-M
Lowland (15 %)	5.5-6.5	VL-L	VL-L	L	L	L	L	L	L-M	L-M	L-M