

Appendix-4

Red List of Vascular Plants of Bangladesh

Sl. No.	Scientific Name	Local Name	Habitat
1.	<i>Andrographis paniculata</i>	Kalomegh	Mixed forest
2.	<i>Gymnostachyum listeri</i>	Not known	Rocky places
3.	<i>Justicia oreophila</i>	Choto Arusha	Mixed evergreen forest
4.	<i>Buchanania lancifolia</i>	Chikki	Evergreen forest
5.	<i>Holigarna longifolia</i>	Jhawa/Barola	Evergreen forest
6.	<i>Man gifera sylvatica</i>	Uri Am	Evergreen forest
7.	<i>Nothopegia acuminata</i>	Not known	Evergreen forest
8.	<i>Swintonia floribunda</i>	Boilam	Evergreen forest
9.	<i>Desmos longiflorus</i>	Kulla	Evergreen forest
10.	<i>Sageraea listeri</i>	Dhaman	Mixed evergreen forest
11.	<i>Uvaria lurida</i>	Not known	Mixed evergreen forest
12.	<i>Rauvolfia serpentine</i>	Sarpoghandha	Mixed forest, plains
13.	<i>Aglaonema hookerianum</i>	Not known	Deep forest shade
14.	<i>Lagenandra gomezii</i>	Not known	Shady moist places
15.	<i>Steudnera colocasiodes</i>	Bish kachu	Shady moist hill slope
16.	<i>Typhonium listeri</i>	Not known	Deep forest shade
17.	<i>Ceropegia longifolia</i>	Not known	Open grassland, bushes
18.	<i>Cynanchum wallichii</i>	Not known	Evergreen forest
19.	<i>Gymnema molle</i>	Not known	Mixed evergreen forest
20.	<i>Hoya acuminata</i>	Not known	Evergreen forest
21.	<i>Hoya globulosa</i>	Not known	Evergreen forest
22.	<i>Hoya lenceolata</i>	Not known	Evergreen forest
23.	<i>Marsdenia eriocarpa</i>	Not known	Evergreen forest
24.	<i>Pentabothis nana</i>	Not known	Semi-evergreen forest
25.	<i>Bombax insigne</i>	Not known	Mixed forest
26.	<i>Tournefortia roxburghii</i>	Not known	Forest edge
27.	<i>Balsamodendron roxburghii</i>	Not known	Semi-evergreen forest
28.	<i>Canarium bengalense</i>	Borsam	Mixed evergreen forest
29.	<i>Canarium resiniferum</i>	Dhup	Hill forest
30.	<i>Terminalia citrina</i>	Hatiyal, Haritaki	Moist deciduous to Semi-evergreen forest
31.	<i>Vernonia thomsoni</i>	Not known	Forest edge
32.	<i>Cyathea gigantea</i>	Not known	Hill slope
33.	<i>Cycas pectinata</i>	Not known	Exposed hill slope
34.	<i>Dioscorea prazeri</i>	Not known	Along the stream
35.	<i>Anisoptera scaphula</i>	Boilam	Evergreen forest
36.	<i>Aldrovanda vesiculosa</i>	Malacca jhangi	Water bodies
37.	<i>Tectaria chattagramica</i>	Not known	Mixed evergreen forest
38.	<i>Elaeocarpus acuminatus</i>	Not known	Moist evergreen forest
39.	<i>Lithocarpus acuminata</i>	Dooba batna	Evergreen forest
40.	<i>Homalium schlichii</i>	Not known	Top of the hills in open places
41.	<i>Hydnocarpus kurzii</i>	Dalmugri	Evergreen forest
42.	<i>Aeschynanthus hookeri</i>	Not known	
43.	<i>Gnetum latifolium</i>	Not known	Evergreen forest
44.	<i>Gnetum montanum</i>	Not known	Evergreen forest
45.	<i>Gnetum oblongum</i>	Not known	Mixed forest
46.	<i>Cymbopogon osmastonii</i>	Jay ghas	Grassland on highland
47.	<i>Triadenum breviflorum</i>	Not known	Mixed evergreen forest
48.	<i>Iodes hookeriana</i>	Not known	Mixed forest
49.	<i>Litsea clarkei</i>	Not known	Mixed forest
50.	<i>Leea alata</i>	Not known	Moist deciduous forest
51.	<i>Butea listeri</i>	Not known	Evergreen forest
52.	<i>Calliandra umbrosa</i>	Not known	Mixed evergreen forest
53.	<i>Taxillus thelocarpa</i>	Not known	Evergreen forest

Appendices

Sl. No.	Scientific Name	Local Name	Habitat
54.	<i>Rotala simpliciuscula</i>	Not known	Rice fields
55.	<i>Magnolia pterocarpa</i>	Duli champa	Hilly area
56.	<i>Aspidopterys rotundifolia</i>	Not known	Semi-evergreen forest
57.	<i>Abelmoschus hostilis</i>	Not known	Moist hill slope
58.	<i>Hibiscus scandens</i>	Not known	Mixed evergreen forest
59.	<i>Phrynium imbricatus</i>	Pituli pata	Evergreen forest shade
60.	<i>Osbeckia capitata</i>	Not known	Wet shady places along the streams
61.	<i>Dysoxylum binectarium</i>	Rata	Semi-evergreen forest
62.	<i>Pycnarrhena pleniflora</i>	Not known	Evergreen forest
63.	<i>Knema bengalensis</i>	Khude Barala	Mixed evergreen forest
64.	<i>Acanthephippium sylhetense</i>	Not known	Mixed forest undergrowth
65.	<i>Bulbophyllum roxburghii</i>	Not known	Mangrove forest
66.	<i>Cymbidium alofolium</i>	Not known	Mixed forest
67.	<i>Dendrobium longicornu</i>	Not known	Mixed forest
68.	<i>Eulophia mackinnonii</i>	Not known	Forest floor
69.	<i>Gastrodia zeylanica</i>	Not known	Evergreen forest floor
70.	<i>Paphiopedilum insigne</i>	Not known	Among the scrub near stream
71.	<i>Paphiopedilum venustum</i>	Not known	Near stream, evergreen forest
72.	<i>Vandopsis gigantea</i>	Not known	Mangrove forest
73.	<i>Vanilla parishii</i>	Not known	Mixed forest
74.	<i>Calamus erectus</i>	Kadam Bet	Hill slopes
75.	<i>Calamus guruba</i>	Sundi Bet	Hill slopes, mixed evergreen forest
76.	<i>Calamus latifolius</i>	Korak Bet	Hill slopes, mixed evergreen forest
77.	<i>Calamus longisetus</i>	Udom Bet	Mixed evergreen forest
78.	<i>Corypha taylori</i>	Tali	Scrub
79.	<i>Licuala peltata</i>	Chata Pat	Mixed forest
80.	<i>Pinanga gracilis</i>	Ram Gua	Evergreen forest
81.	<i>Wallichia caryotoides</i>	Not known	Evergreen forest
82.	<i>Psilotum nudum</i>	Not known	Epiphytic on date palms
83.	<i>Myrioneuron clarkei</i>	Not known	Mixed forest
84.	<i>Ophiorrhiza villosa</i>	Not known	Mixed forest
85.	<i>Limnophila cana</i>	Not known	Stagnant water
86.	<i>Pterospermum semisagittatum</i>	Asswar	Evergreen forest
87.	<i>Aquilaria agallocha</i>	Agar	Semi-evergreen forest
88.	<i>Amomum aromaticum</i>	Morung Elachi	Mixed forest
89.	<i>Amomum costatum</i>	Not known	Mixed forest
90.	<i>Caulokaemferia secunda</i>	Not known	Mixed forest
91.	<i>Curcuma ferruginea</i>	Not known	Plains
92.	<i>Curcuma rubescens</i>	Not known	Open spaces
93.	<i>Globba multiflora</i>	Not known	Moist hill slope
94.	<i>Hedychium aureum</i>	Not known	Epiphytic, secondary forest
95.	<i>Hedychium coccineum</i>	Bhui Ada	Forest floor
96.	<i>Hedychium glaucum</i>	Not known	Wet ledges
97.	<i>Hedychium gracila</i>	Not known	Mixed forest
98.	<i>Hedychium griffithianum</i>	Not known	Mixed forest
99.	<i>Hedychium speciosum</i>	Not known	Hill forest
100.	<i>Hedychium stenopetalum</i>	Not known	Hill forest
101.	<i>Hedychium thyrsoforme</i>	Not known	Foot hills
102.	<i>Hitchenia careyana</i>	Not known	Edges of secondary forest
103.	<i>Mantisia radicalis</i>	No known	Moist and rocky slope
104.	<i>Mantisia spathulata</i>	Not known	Moist rocky slope
105.	<i>Zingiber capitatum</i>	Jangli Ada	Secondary forest
106.	<i>Zingiber roseum</i>	Not known	Forest floor

Source: Bangladesh National Herbarium (2001)

Appendices

Appendix 5

The State of Genetic Diversity of Some major Crops of Bangladesh

Crop	Scientific name	State of diversity	
		Present state of diversity	Diversity trend
Cereals			
Rice	<i>Oryza sativa L.</i>	About 12,000 local germplasm were identified through surveys that are all threatened. The causes of threats identified were: replacement of these varieties by modern varieties; disturbances of natural habitats by construction of coastal and flood control embankments; drainage and water logging problems resulting from development projects; lack of development of value chain and business development for traditional varieties (e.g. fine grain and aromatic rice); declining soil quality especially due to lack of organic matter and micro-nutrients	While the diversity of traditional varieties is decreasing, there is, however, an increasing trend in the diversity of modern varieties through release of new varieties from research institutes. (For example, BIRRI has released 47 new modern varieties since its establishment in 1970).
Wheat	<i>Triticum aestivum L.</i>	Some 565 accessions of wheat are being maintained in BARI gene bank (<i>ex situ</i> collection). Of these 140 cultivars were mentioned.	Increasing with new introductions and variety development
Maize	<i>Zea mays</i>	More than 100 germplasm are reported to be maintained at BAU, 69 in gene bank at BARI	Increasing with introduction of new varieties
Pulses (Grain legumes)			
		A total of 854 species under 98 genera represent the Legume flora of Bangladesh. Out of these, 21 species are used as food (vegetables or pulses) and 722 species were recorded as medicinal plants. A total number of 9,342 accessions are recorded to be in BARI gene bank but their species/variety wise data were not available.	The diversity of traditional varieties is decreasing but new varieties have added to the diversity of modern varieties.
Chickpea	<i>Cicer arietinum</i>	752 accessions available	The diversity of traditional varieties is decreasing but new varieties have added to the diversity of modern varieties.
Grass pea	<i>Lathyrus sativus</i>	Some 1,845 accessions available. Closely related species available include <i>Lathyrus aphaca</i> and <i>L. odoratum</i>	Decreasing
Lentil	<i>Lens culinaris</i>	466 accessions available	The diversity of traditional varieties is decreasing but new varieties have added to the diversity of modern varieties.

Appendices

Crop	Scientific name	State of diversity	
		Present state of diversity	Diversity trend
Mung bean	<i>Vigna radiata</i>	41 accessions available. Closely related species available include <i>Vigna aconitifolia</i> , <i>V. adenantha</i> , <i>V. luteola</i> , <i>V. mungo</i> , <i>V. pilosa</i> , <i>V. umbellata</i> , <i>V. mungo</i> , <i>V. unguiculata</i> , <i>V. diphylla</i> .	The diversity of traditional varieties is decreasing but new varieties have added to the diversity of modern varieties.
Oilseeds & Vegetables			
Coconut	<i>Cocos nucifera</i>	Data on diversity were not available. However, two cultivars were mentioned.	Decreasing
Groundnut	<i>Arachis hypogea</i>	99 accessions are available.	Decreasing
Mustard	<i>Brassica spp.</i>	154 accessions are available. However, 344 oil-producing Brassica species were mentioned.	Decreasing
Bitter gourd	<i>Momordica charantia</i>	103 accessions were mentioned. Closely related species available include <i>M. cochinchinensis</i> and <i>M. dioica</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Bottle gourd	<i>Lagenaria siceraria</i>	Data on diversity not available. However, a total of 242 accessions of Cucurbits in BARI genebank were mentioned	Increasing with the release of new varieties, but traditional varieties decreasing.
Hyacinth bean	<i>Lablab purpureus</i> (<i>Dolichos lablab</i>)	Data on diversity not available. However, some 551 cultivars were mentioned. ²³	Increasing with the release of new varieties, but traditional varieties decreasing.
Cucumber	<i>Cucumis sativus</i>	Some 65 accessions of <i>Cucumis sativus</i> were mentioned. Closely related species available include <i>C. callosus</i> , <i>C. mel var. melo</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Okra	<i>Abelmoschus esculentus</i>	Some 226 accessions were mentioned. Closely related species available include <i>A. hostilis</i> , <i>A. manihot</i> , and <i>A. moschatus</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Papaya	<i>Carica papaya</i>	Six accessions were mentioned.	Increasing with the release of new varieties, but traditional varieties decreasing.
Pumpkin	<i>Cucurbita maxima</i> (<i>C. moschata</i>)	Data on diversity not available. However, 92 accessions were mentioned. Closely related species available include <i>C. moschata</i> and <i>C. pepo</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Radish	<i>Raphanus sativus</i>	Data on diversity not available. However, 19 accessions were mentioned.	Increasing with the release of new varieties, but traditional varieties decreasing.
Ribbed gourd	<i>Luffa acutangula</i>	Some 124 accessions were mentioned. Closely related species available include <i>L. cylindrica</i> , <i>L. echinata</i> and <i>L. graveolens</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Snake gourd	<i>Trichosanthes anguina</i>	Some 122 cultivars were mentioned. Closely related species available include <i>T. bracteota</i> , <i>T. cordata</i> , <i>T. cucumerina</i> , <i>T. dioica</i> , <i>T. himalensis</i> and <i>T. listeri</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Tomato	<i>Lycopersicon esculentum</i>	Data on diversity not available. However, 73 accessions were	Increasing with the release of new varieties,

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Crop	Scientific name	State of diversity	
		Present state of diversity	Diversity trend
Brinjal (Eggplant)	<i>Solanum melongena</i>	Some 248 accessions were mentioned. Closely related species available include <i>S. torvum</i> , <i>S. erianthum</i> , <i>S. nigrum</i> , <i>S. barbisetum</i> , <i>S. trilobatum</i> , <i>S. sysmbrifolium</i> , <i>S. capsicoides</i> , <i>S. virginianum</i> .	Increasing with the release of new varieties, but traditional varieties decreasing.
Arum	<i>Colocasia esculenta</i>	Data on crop diversity not available. However, a total of 53 accessions less than 20 genera represent the family Araceae in Bangladesh. Of these, 10 species are used as vegetables and 15 species are of medicinal value. Some 16 species were found endemic which were not found during the survey.	Not known
Potato	<i>Solanum tuberosum</i>	A total of 23 cultivars were mentioned.	Increasing with new introduction
Sweet potato	<i>Ipomoea batatas</i>	Some 14 wild species available i.e. <i>I. imolucrata</i> , <i>I. learii</i> , <i>I. nil</i> , <i>I. purpurea</i> , <i>I. rubens</i> , <i>I. aspera</i> , <i>I. longiflora</i> , <i>I. illustris</i> , <i>I. peniculata</i> , <i>I. pescaprae</i> , <i>I. reptans</i> , <i>I. salicifolia</i> , <i>I. obscura</i> , <i>I. sepinria</i> , etc.	Not known
Fiber crops		4,111 germplasm of jute have been conserved in the genebank of BJRI.	Traditional varieties decreasing due to introduction of modern varieties.
Jute	<i>Corchorus sp.</i>		
Kenaf and Mesta.	<i>Hibiscus spp.</i>		
Cotton	<i>Gossypium hirsutum</i>	Some 460 accessions are being maintained in Cotton Research Farms, Mahiganj in Rangpur District, Sripur in Gazipur District and Sadarpur in Dinajpur District and Jagdishpur in Jessore District	Increasing with new introduction
	<i>Gossypium arboreum</i>	Some 30 accession at Balaghata Farm in Bandarban District	-
Spices			
Chilli	<i>Capsicum annum</i> ,	Data on diversity are not available. However, 126 accessions were mentioned.	Increasing with the release of new varieties, but traditional varieties decreasing.
Garlic	<i>Allium sativum</i>	Data on diversity not available. However, three cultivars were mentioned. Four other species available i.e. <i>A. ascalonicum</i> , <i>A. tuberosum</i> , <i>A. ampeloprasum</i> , <i>A. cepa</i> .	Decreasing
Ginger	<i>Zingiber officinale</i>	Five wild species occur in Bangladesh i.e. <i>Z. casumunare</i> , <i>Z. zerumbet</i> , <i>Z. capitatum</i> var. <i>elata</i> .	Not known
Onion	<i>Allium cepa</i>	Four cultivars were mentioned. Four other species available i.e. <i>A. ascalonicum</i> , <i>A. tuberosum</i> , <i>A. ampeloprasum</i> , <i>A. sativum</i>	Not known

Appendices

Crop	Scientific name	State of diversity	
		Present state of diversity	Diversity trend
Turmeric	<i>Curcuma domestica/longa</i>	About 20 species occur in Bangladesh, e.g . <i>C. angustifolia</i> , <i>C. leucorrhiza</i> , <i>C. zedoaria</i> , <i>C. caesia</i> , <i>C. ferruginea</i> , <i>C. rubescens</i> , <i>C. amada</i> , etc.	Not known
Guava	<i>Psidium guajava</i>	Data on diversity not available. However, 10 accessions were mentioned.	Increasing through introduction
Fruits		Some 10 varieties were mentioned. One wild species, <i>M. ornate</i> , occurs in Bangladesh	Decreasing
Banana	<i>Musa sapientum</i> , <i>M. paradisiaca</i> .		
Jack fruit	<i>Artocarpus heterophyllus</i>	Some 40 varieties were mentioned. Two wild species occur in Bangladesh i.e. <i>A. chaplasha</i> and <i>A. lacucha</i> .	Traditional varieties decreasing.
Litchi	<i>Litchi chinensis</i>	Data on diversity not available. However, three varieties were mentioned.	Decreasing
Mango	<i>Mangifera indica</i>	More than 200 varieties were mentioned. Two wild species occur in Bangladesh i.e. <i>M. sylvatica</i> and <i>M. longipes</i> .	Decreasing
Papaya	<i>Carica papaya</i>	See under vegetables above	Increasing with the release of new varieties, but traditional varieties decreasing.
Watermelon	<i>Citrullus lanatus</i>	At least one wild species occurs in Bangladesh i.e. <i>C. calocynthes</i>	Increasing with the release of new varieties, but traditional varieties decreasing.
Sugar crops			
Sugarcane	<i>Saccharum officinarum</i> , <i>S. spontaneum</i>	About 900 cultivars were mentioned. At least two wild species occurs in Bangladesh i.e. <i>S. robustum</i> and <i>S. spontaneum</i> . 40 sugercane HYV varieties were released from BSRI (1971-2010). Date palm and Pal myra palm are also regarded as Sugarcrops.	Increasing with the release of new varieties, but traditional varieties decreasing.
Beverage		Data on diversity are not available. However 475 accessions of <i>Camellia sinensis</i> collected.	Increasing with new collections and release of new varieties.
Tea	<i>Camelia sinensis</i>		

Source: Updated After BARC (2007)

Appendices

Appendix-6

Minor and underutilized crops of Bangladesh and their state of diversity

Crop	Scientific Name	Diversity	
		Present state of diversity	Diversity trend
Cereals			
Barley	<i>Hordeum vulgare</i>	Some 30 germplasm in BARI genebank	Decreasing
Foxtail Millet	<i>Setaria italica</i>	More than 500 germplasm in BARI genebank	Decreasing
Pearl Millet	<i>Panicum milliaceum</i>	Only two germplasm in BARI gene bank	Not known
Triticale	<i>Triticosecale</i>	Five germplasm in BARI gene bank	Remaining the same
Pulses (Grain legumes)			
Black gram	<i>Vigna mungo</i>	89 accessions in BARI genebank	Not known
Pigeon pea	<i>Cajanus cajan</i>	84 accessions in BARI genebank	Not known
Oilseeds			
Linseed	<i>Linum usitatissimum</i>	Not known	Not known
Niger	<i>Guizotica abyssinica</i>	2 accessions in BARI genebank	Not known
Safflower	<i>Carthamus tinctorius</i>	Not known	Not known
Sesame	<i>Sesamum indicum</i>	83 accessions in BARI gen ebank	Not known
Vegetables			
Amaranth	<i>Amaranthus spp.</i>	Data on diversity not available. However, 620 accessions in BARI genebank.	Not known
Bathua	<i>Chenopodium album</i>	One accessions in BARI genebank	Not known
Carrot	<i>Daucus carota</i>	Data on diversity not available. However, two varieties were mentioned.	Not known
Cheena shak	<i>Brassica spp.</i>	10 accessions in BARI genebank	Not known
Drumstick	<i>Moringa oleifera</i>	10 accessions in BARI genebank	Not known
French bean	<i>Phaseolus vulgaris</i>	10 accessions in BARI genebank	Not known
Indian spinach	<i>Basella alba</i>	34 accessions in BARI genebank	Not known
Kalmia shak	<i>Ipomoea aquatica/ reptans)</i>	Data on diversity not available. However, five varieties were mentioned.	Not known
Lima bean	<i>Phaseolus lunatus</i>	Not known	Not known
Marfa, Phuti	<i>Cucumis melo</i>	Not known	Not known
Spinach	<i>Spinacea oleracea</i>	Data on diversity not available. However, three varieties were mentioned.68	Not known

Appendices

Crop	Scientific Name	Diversity	
		Present state of diversity	Diversity trend
Sponge gourd	<i>Luffa cylindrica</i>	Not known	Not known
Squash	<i>Cucurbita moschata</i> <i>/pepo</i>	Not known	Not known
Teasle gourd	<i>Momordica</i> <i>dioica/cochinchinesis</i>	Data on diversity not available. However, two varieties were mentioned. ⁶⁹	Not known
Winged bean	<i>Psophocarpus</i> <i>tetragonolobus</i>	One accession in BARI genebank	Not known
Yam	<i>Dioscorea spp.</i>	62 accessions in BARI genebank	Not known
Yam bean (Shak alu)	<i>Pachyrhizus</i> <i>tuberosus</i>	3 accessions in BARI genebank	Not known
Yard Long Bean	<i>Vigna unguiculata</i>	147 accessions in BARI genebank	Not known
Spices			
Black cumin	<i>Nigella sativa</i>	6 accessions in BARI genebank	Not known
Black pepper	<i>Piper nigrum</i>	Not known	Not known
Coriander	<i>Coriandrum sativum</i>	18 accessions in BARI genebank	Not known
Cumin seed (Jeera)	<i>Cuminum cyminum</i>	Not known	Not known
Fenugreek (Methi)	<i>Trigonella foenum</i> <i>graceum</i>	Four accessions in BARI genebank	Not known
Join	<i>Carum capticum</i>	One accessions in BARI genebank	Not known
Fruits			
Amlaki (Aonla)	<i>Phyllanthus emblica</i>	10 accessions mentioned	Not known
Amra (Hog plum)	<i>Spondias dulcis</i>	10 accessions mentioned	Not known
Arboroi (Star goseberry)	<i>Cicca acida</i>	10 accessions mentioned	Not known
Bael (Wood apple)	<i>Aegle marmelos</i>	Data on diversity not available. However, 15 varieties were mentioned. ⁷⁰	Not known
Carambola (Kamranga)	<i>Averrhoa carambola</i>	Not known	Not known
Cashew nut	<i>Anacardium occidentale</i>	Not known	Not known
Chalta (Indian dellenia)	<i>Dillenia indica</i>	Not known	Not known
Custard Apple (Sharifa)	<i>Annona squamosa</i>	Not known	Not known
Dewa (Monkey jack)	<i>Artocarpus lakoocha</i>	Not known	Not known
Jalpai (Olea eropaea)	<i>Elaecarpus floribundus</i>	Not known	Not known
Jamrul (Wax apple)	<i>Syzygium samarengense</i>	Not known	Not known
Kalajam (Jamun)	<i>Syzygium cumini</i>	Not known	Not known
Kath badam	<i>Terminalia catappa</i>	Not known	Not known

Appendices

Crop	Scientific Name	Diversity	
		Present state of diversity	Diversity trend
Kothbel (Elephant's foot apple)	<i>Feronia limonia</i>	Not known	Not known
Sweet orange (Malta)	<i>Citrus sinensis</i>	Not known	Not known
Tamarind	<i>Tamarindus indica</i>	Not known	Not known
Fibre crops			
Cotton	<i>Gossypium spp.</i>	Not known	Not known
Mesta and Kenaf	<i>Hibiscus spp.</i>	Data not available	Not known
Sun hemp	<i>Crotalaria juncea</i>	Not known	Not known
Sugar crops			
Date palm	<i>Phoenix sylvestris</i>	Not known	Not known
Palm	<i>Borassus flabellifer</i>		Not known
Narcotics			
Tobacco	<i>Nicotiana tabacum,/ rustica</i>	Not known	Not known
Betel nut	<i>Areca catechu</i>	Not known	Not known
Green- maturing crops			
Sun hemp (Shun pat)	<i>Crotalaria juncea</i>	Not known	Not known
Sesbania (Dhaincha)	<i>Sesbania aculeata</i>	Not known	Not known

Source: Modified After BARC (2007)

Appendix 7

Short Description of Bio-ecological zones of Bangladesh (IUCN Bangladesh 2002f):

Himalayan Piedmont Plain: The Himalayan Piedmont Plain occupies most of Dinajpur and parts of Jamalpur, Netrokona, Sherpur, Sunamganj and Sylhet district. The area is composed of numerous smooth but irregular-shaped ridges with broad and braided rivers. Being the ecotone between hill forests and low land swamps, ecologically this zone is very rich and diverse. Reeds and grasslands are the characteristic vegetation of this zone. Wildlife species of this zone is also diverse. Although the bird population, like that of mammals, has been affected by the disappearance of its natural habitats, there still exist a large number of birds in this zone.

Barind Tract: Barind Tract is located in the centre and western part of Rajshahi division. The greater part of the tract is almost plain and is crisscrossed by only a few minor rivers. This tract is considered an ecologically fragile ecosystem with extremely low vegetation cover. Though this zone was rich with faunal diversity in the past, it has now noticeably reduced mostly due to various pressures like expansion of human habitat, agricultural extension, unwise use of agrochemicals and illegal hunting.

Madhupur Sal Tract: The Madhupur Sal tract extends across the district of Gazipur, Tangail and Mymensingh. The boundary between this ecosystem and its surroundings are generally sharp and well defined. Undulating Sal forest is the main ecological feature of this zone. This region is enriched with high floral diversity, but unfortunately, over 70% of the Sal forest area is either already degraded or encroached. The Madhupur Sal tract is prominent by the presence of Sal (*Shorea robusta*) tree. Records show that the Bengal tiger and One-horned rhinoceros, both of which have become extinct from this zone now, had healthy population in the past. However, due to continuous habitat destruction most of the wildlife of this region are either extinct or in vulnerable condition.

Teesta floodplain: Teesta floodplain spreads over several different landscapes in greater Rangpur and the adjoining regions. The diversity results from the fact that the Teesta river had occupied and later abandoned several different channel during the last few thousand years including the valleys now are occupied by the Mahananda, Punarnava, Atrai, Choto Jamuna, Kortoya and Ghagat rivers. There were large patches of forests in this zone, but they have in most cases been ruthlessly cut down. However, this zone is still fairly wooded with many valuable indigenous timber species. Although most of the large mammals have been disappeared- from this area but most of common bird species are still found in this location.

Ganges Flood plain: The Ganges floodplain is basically consisted of the active floodplain of the Ganges River and the adjoining meandering floodplains, and is mostly situated in the Greater Jessore, Kustia, Faridpur and Barisal districts. This floodplains are comprises of ridges, basins and old channels. The Gangetic alluvium is readily distinguished from the old Brahmaputra, Jamuna and Meghna sediments by its high lime contents. Ganges channel is constantly shifting within its active floodplain, eroding and depositing large areas of new char lands in each flooding season, but it is less braided than that of the Brahmaputra- Jamuna. Both plants and animals are adapted with the pattern of flooding. The floodplains are characterized by mixed vegetation. Huge number of stagnant water bodies and channels, rivers and tributaries support a habitat of rich biodiversity. Free-floating aquatic vegetation is commonly shown in most of the wetlands. Both cultivated and wild plants species are found in homesteads forest. Major groups of the oriental birds are represented in this zone by many species. A large number of migratory birds are observed in winter. Different species of tortoises and turtles are found in perennial water bodies.

The BrahmaputraJamuna floodplain: The Brahmaputra floodplain situated in greater Mymensingh and Dhaka districts comprises the active channel of the Brahmaputra River and the adjoining areas of the young floodplain lands formed since about 1780, when the river shifted to its present course (i.e. the Jamuna River) to the south of Dewanganj in Jamalpur district. The main river course is strongly braided and consists of several interconnecting channels. This floodplain posses a unique variety of plants, medicinal herbs, fruit yielding trees, many jungle shrubs, creepers and climbers, flowering trees etc., many of which yield valuable products. Bushes of reeds and canes are also found here. The faunal diversity in this zone is also rich. Leopard was frequently sited in this zone. The most common poisonous snake is the Banded krait (*Bungarus fasciatus*) in this area, which could easily be identified by its broad black and yellow bands.

Surma-Kushiara floodplain: The Surma-Kushiara floodplain comprises of river draining from the Northeastern borders towards the Sylhet basin. The relief is generally smooth, comprising broad ridges and basins, but it is locally irregular alongside river channels. The zone is abounded with diverse wetlands, small and medium beels and channels, secondary rivers and huge seasonally inundated lands where locals do fishing in wet season and cultivate rice in dry season. There are patches of degraded swamp forest still exist remnant of its historic extent. Floral composition is interesting with numerous hydrophytes. The extensive network of the wetlands in this zone, especially in the winter, is inhabited by migratory waterfowl as numerous water birds, ducks, egrets and herons come to visit for wintering and breeding.

Meghna floodplain: A major part of the Meghna floodplain was created by the deposition of sediments brought in by the old Brahmaputra River, before it changed its course. The rest of the sediments were laid down principally by the Meghna River

Appendices

itself and by some minor rivers draining from Tiperrah hills. The floodplain is characterized by many broad meandering channels, char and low lying landscape and is mostly affected by seasonal flooding while river bank erosion is occurred commonly. The luxuriant growth of palm trees is the dominant characteristic feature of the vegetation type of this zone. The Betel nut “Supari” (Areca catechu) is most visible as the dominant species in the western portion of this region. This zone also abundance in several varieties of cane, a good deal of bamboo and thatching grass. Faunal diversity is richer in here than other part of the country. In mammalian species, different species of cats, bats, otters, pangolins, and raptorial birds are found.

The Haor basin: The haor basin is an internationally important wetland ecosystem, which is situated in Sumanganj, Habiganj, Sylhet, Kishorganj, Moulavibazar and Netrokona districts. It is a mosaic of wetlands habitats, including numerous rivers, streams and irregular canals. The Haor basin contains about 400 haors and beels in different sizes. These haors and beels provide habitats for various types of aquatic species of plants and animals. These haors and beels support major subsistence and commercial fisheries while the seasonally flooded lake margins support major rice-growing activities and abundant aquatic vegetation provides ideal grazing for domestic livestock and a source of fuel and fertilizers for the local inhabitants. The wetlands are also home to a wide variety of resident and migratory waterfowls including perhaps as many as 100,000 to 150,000 duck and provide a refuge to many other species of wildlife. Keeping in mind all these ecological benefits, The Tangua Haor which is located in this zone has been declared as a Ramsar site as well as Ecologically Critical Area (ECA). The Haor basin is the only region in Bangladesh where remnant patches of freshwater swamp and reed lands still exist. About 150 species of waterfowl have been recorded in this zone, but over 70 of these are now rare.

Chalan Beel: Chalan beel is an extensive low land area at the lower Atrai basin in the northwestern region of Bangladesh, spreads across the district of Nator, Pabna and Sirajganj. It consists of a series of beels connected to one another by various channels to form more or less a continuous water body during the rainy season. Although, the beel area expands into a vast water body, so long the Jamuna remains flooded during the monsoon months with dense aquatic vegetation, it however, dries out in the winter leaving only patches of ‘water-holes’ in the central part of this zone. Chalan beel is an ecologically diversified area due to its diversified physiological foundation. The fertile soils, less migration of nutrients from soils, abundance of moisture and climatic factors helped the area to provide good vegetation and dependant faunal composition. Biologically, the beel offers a vast variety of terrestrial, aquatic and marshy habitats, predominantly used by waterfowl. Chalan Beel was formerly an important wintering area for ducks, geese and shorebirds, but now that the wetland dries out in early winter, fewer migrant waterfowl visit the area.

Kaptai Lake: This is an artificial lake created by a dam, which was completed in 1962 and has since flooded over 68,800 ha of forest valleys and arable land in Chittagong and the Chittagong Hill Tracts (CHTs) districts. This wetland is surrounded by evergreen forests. However, the aquatic diversity of this lake is not well known. Aside from the immediate ecological damages such as inundating croplands, villages and forest, the lake that is created had far-reaching ecological consequences.

Gopalganj-Khulna Peat Land: Gopalganj-Khulna peat land is occupies a number of low-lying areas between the Ganges river floodplains and the Ganges tidal floodplains in the south of Faridpur region and the adjoining part of Khulna and Jessore districts. Thick deposits of peat occupy perennially wet basins but they are covered clay around the edges. The soil in this zone is potentially strong acidic and low in essential plant nutrients. Basins are deeply flooded by rainwater monsoon however in close to Khulna, water is brackish in some degrees. The floral diversity in this zone is quite limited. Due to lack of diversity in vegetation, the variety in faunal species and there population size in this zone are also less than enviable (Brammer, 2000), of which, the diversity of bird species is relatively better in this zone (Rashid, 1980).

The Sundarbans: The Sundarbans mangrove forest is situated in the southwest of Bangladesh and extends from the international boundary with India. Sundarbans is the world’s largest Mangrove forest consist of about 330 species of plants, 42 species of mammals, 35 species of reptiles, 400 species of fishes and 270 species of birds. Salinity and provide a different type of ecosystem (Mangrove ecosystem) in this region. Plants and wildlife species tidal effect distribution is depend on the salinity. The Sundarbans are divided in 3 ecological zones on different degrees of salinity. These are (1.) Oligohaline, (2.) Mesohaline and 3. Polyhaline zone.

Chakaria Sundarbanss: The Chakaria Sundarbanss was used to be a mosaic of newly formed grassy islands, river channels, tidal creeks, aquaculture ponds, mangrove forests and intertidal mudflats, located in the estuarine system of Matamuhuri and several other minor rivers. Unfortunately, most of this ecosystem has been destroyed and cleared for shrimp culture.

The coastal plains: The coastal plains are underlain by heavy marine or tidal clays but these have been buried under by more sand or silty deposits near the foot of the hills and along the courses of rivers and streams, which run across the plains. The eastern coastline, extending from the mouth of the Feni river to the southern tip of mainland along Chittagong, is regular and unbroken and protected along the sea by mud-flats and submerged sands. This zone is important for a wide variety of waterfowls.

Appendices

Offshore islands: This zone covers numerous offshore islands, including Hatiya, Bhola, Nijhum dweep etc. Shapes of most of these islands are continuously changing as a result of erosion and accretion. Moreover, there are extensive inter-tidal mudflats composing parts of the islands. The vast amount of sediments brought down by Meghna made the estuary shallow for a considerable distance. Most of these islands have man made mangrove plantations. The islands of this zone are very important staging and wintering areas for a wide variety of waterfowls, particularly the migratory shorebirds.

Narikel Jinjira coral island: The southern-most tip of Bangladesh, the Narikel Jinjira coral associated island is separated from the mainland by “Naaf estuary”. There are two well-defined lagoons in this island and some 200 fresh water ditches. There is some stunted Mangrove forest in the south-west of the island while the sand dunes support an extensive growth of some herbs and shrubs. All five species of marine turtles known to occur in Bangladesh have been observed in this area, among them the first three species are known to nest in the area.

Meghna estuarine floodplains: A huge newly accreted mudflat is the main physiographic feature of the Meghna estuarine floodplains, which is situated at the southern part of the Southeast region. Deposition and erosion are constantly taking place on the land margins. In many places during the dry season, part of the zone and surface becomes saline in varying degrees. Urighash (*Portalesia coarctata*) is the pioneer plant species in the new land formation whereas the luxuriant growths of Palms are the dominant. All the accreted inter-tidal lands are important wintering grounds for migratory waterfowls.

Sandy beach/Sand dunes: The main feature of this zone is the continuous line of sandy beaches and sand dunes, backed in places by narrow coastal plains, and bounded almost throughout by hills. Vegetation cover is relatively less diverse and consists primarily of dopati lata (*Ipomoea pescaprae*) and nil nishinda (*Vitex trifolia*). This zone is very important for marine turtle and snakes, in particular a large number of marine turtle use this beach area as their breeding habitat.

Chittagong Hills and the CHTs: The south-eastern hill range of the country is composed of tropical evergreen and semi-evergreen forest, which are important watershed areas of the country. The majority of the species in the lower canopy are evergreen, and the upper canopy of the forest is deciduous type. Tropical evergreen forest is found in the valleys of this zone. Knowledge on the diversity of reptiles and amphibians of this zone is rather rudimentary, as few surveys of these animals have been made. This zone possesses richest avifauna population of the country mostly marine and shore birds.

Sylhet hills: The Sylhet hilly tracts could be remnants of Pleistocene terraces with small hillocks are locally known as “Tilla”. Tropical evergreen forest is found in this zone particularly in the valleys. This zone is still relatively rich with faunal diversity. The region is popular among bird watchers due to its rich bird diversity.

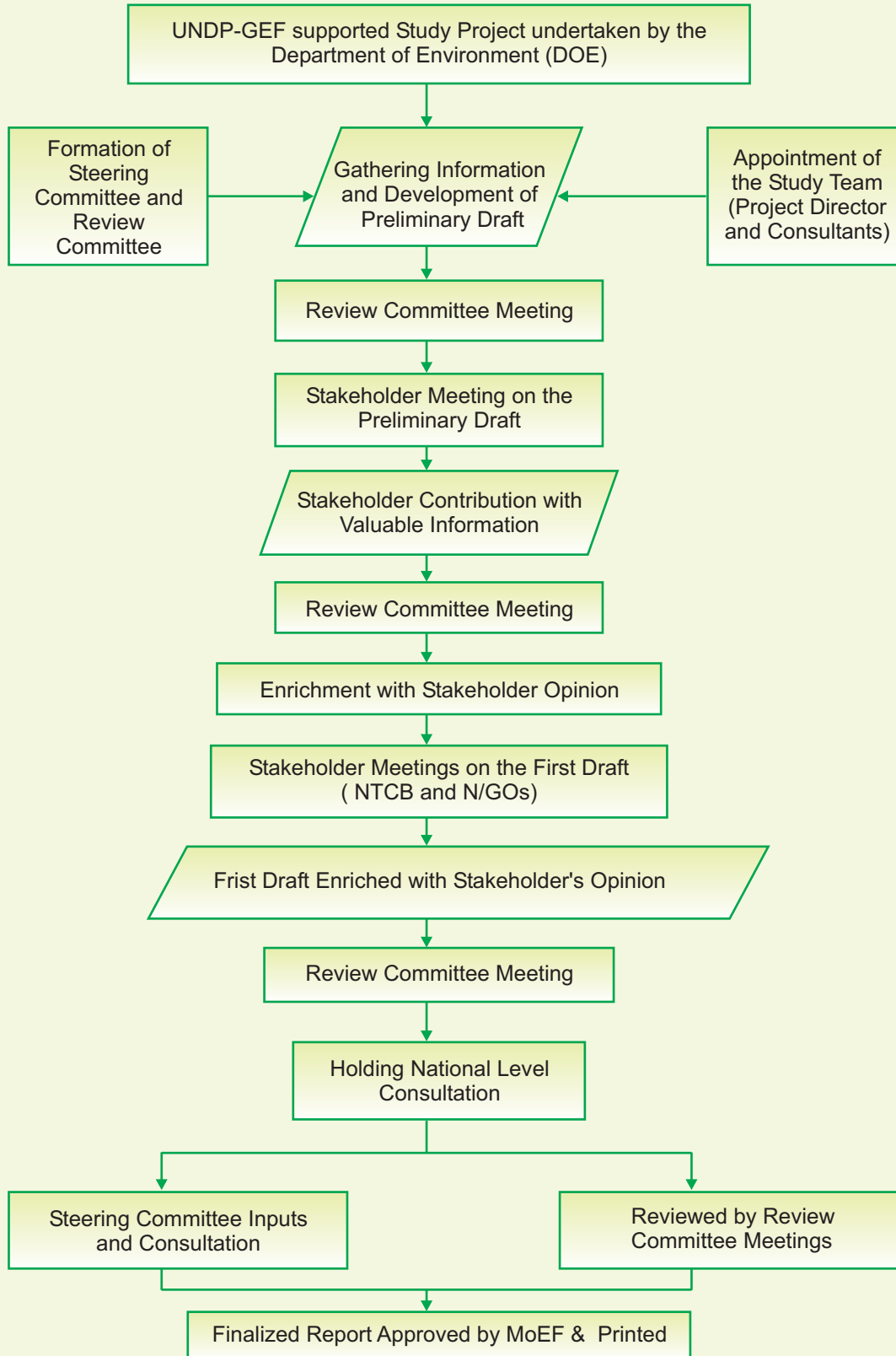
The Lalmai-Tipperah hills: The Lalmai-Tipperah hills laying the eastern border of South-East region constitutes a distinct physiographic unit enjoys tropical semi-evergreen forests. The principal floral characteristic of this zone is present a large proportion of deciduous species. The diversity of bird and mammal species is still considerably high but these species are increasingly under threat of extinction due to unhindered loss of habitats. The zone faces flash flood in rainy season.

The saline tidal floodplain: The saline tidal floodplain has a transitional physiography, which is located at the south portion of Southwest and South central region. It has a low ridge and basin relief, crossed by innumerable tidal rivers and creeks. Soils are the non-saline throughout the over substantial amount of areas in the north and east but they become saline to various degrees in the dry season in the south-west and are saline for much of the year in the Sundarbanss. The river carry fresh water throughout the year to the east and north-east, but saline water penetrates increasingly further inland towards the west. Of the floral diversity, this zone has innumerable indigenous weeds grow in beel areas. Several types of palms and bamboo clumps grow in almost all the villages. This zone affords a very lucrative place for game birds include goose, duck, cranes, spine, jungle fowls etc. in both Sundarbanss and the beels and char areas. Moreover, the river network and expanses of beels are abound with different species of fishes.

Major Rivers: Bangladesh consists mainly of riverine and deltaic deposits of three large and extremely dynamic rivers entering the country: the Brahmaputra, Ganges and Meghna rivers. Newly accreted land, if it does not erode quickly, is initially colonized by grass, particularly catkin grass (*Saccharum spontaneum*, for example). Dense growth of catkin grass can accelerate silt deposition on chars. Jamuna river provide highest amount of char lands. Many of the species' natural distribution, migration and storage are primarily functioned via these rivers into other wetland ecosystems (GoB-IUCN, 1992). A diverse range of waterfowls are directly or ecologically dependent on these rivers and its associated ecosystems. However, it is quit alarming that, with the exception of few species of turtles, all other river biodiversity is threatened with extinction.

Coastal Marine Water: There is over 25 million acres of marine area, which comprise the territorial waters and the Exclusive Economic Zone (EEZ) of Bangladesh. A large area in the south, therefore, is the coastal zone, which has its own dynamics and deserves special attention as a very distinct terrain (GoB, 1994). The coastal area, comprising the complex delta of the Ganges-Brahmaputra-Meghna river system has immense biological resources. Information on the status of the biological wealth, both in terms of flora and fauna, is very rudimentary this zone.

Appendix-8
Development Process of the Fourth National Report



Appendices



Hon'ble State Minister for Environment and Forests, Dr. Hasan Mahmud, MP (3rd from the left) is seen along with other dignitaries Dr. Mihir Kanti Majumder, Secretary, Ministry of Environment and Forest (4th from the left), Dr. Zafar Ahmed Khan, Director General, Department of Environment (2nd from the left) Mr. Abdul Motaleb, Chief Conservator of Forest (Right most), Mr. Robert Juhkum, Deputy Country Director, UNDP, Dhaka (2nd from the right) & Mr. Mohammed Solaiman Haider, Project Director, 2010 Biodiversity Target National Assessment Project (Left) in the National Consultation Workshop held on 24 November 2009 in LGED-RDEC, Dhaka.

Appendices

Appendix-9

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Appendices

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Appendices

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Appendices

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