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Biodiversity Status and its Management at Ramsagar National Park at Dinajpur in Bangladeh

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Abstract: According to this study a heterogeneous species assemblage of 393 species including 272 plants, 24 waterfowl and birds, 14 miscellaneous fauna and 84 species of fish was found at Ramsagar National Park. Among the entire plant types weed was found to be most abundant (36.76%), followed by the medicinal plants 27.57%, ornamental plants 15.07%, timber plant species 10.29%, fruit plants 8.46%, aquatic plants 6.62%, cultivated crops 6.25%, fodder plant 2.21%, spice plants 2.21%, and palm tree 1.84%. All kinds of plants were very common in the study area. In case of fishes, 13.10% was cultivated and 63.10% was small indigenous but 23.81% of small indigenous fishes were threatened. At the study area, 9 species of bank birds (37.50%), 4 species of prey birds (16.67%), and 11 species of waterfowl (45.83%) were found. Among the bank birds, 3 were very common and 4 were few. Among the 4 prey birds 3 species were very few and 1 species was few. In case of waterfowls, 5 species were few, 4 were common, and 1 species was very few. Seven species of miscellaneous faunal species were common, 1 very common, 3 few, and 3 were threatened. Contribution of biodiversity to the local people was mainly for food, although they used plants for furniture, fuel wood, wood, medicine, domestication etc. There was no management plan in the RNP but they had an annual work plan. Only 8 staffs were found for maintaining the Park which could not be adequate for proper management.

Key words: Biodiversity, Contribution, Management.

Introduction

Ramsagar is a historical National Park under the Forest Division of Dinajpur district in Bangladesh (Banglapedia, 2006). Due to anthropogenic pressures biodiversity of forests are decreasing rapidly. In order to conserve biodiversity, it is required to have precise data of current status of it. Taking into account of this requisite, Rahman (1989) assessed fresh water fisheries of Bangladesh; Islam (2006) studied the biodiversity of Jamuna River and its surrounding area. The co-management of protected areas in Bangladesh was studied by Huda (2008), while, the Forest Department's institutional organization and capacity to manage the protected area system of Bangladesh was investigated by IRG (2004). Islam (2001) studied on the status of Bhawal National Park exploring whether or not the objectives of protected areas have being met but no such studies was found on biodiversity of RNP which are biologically and environmentally important as well.

Therefore, this study was conducted at RNP with the following objectives: a) to assess diversity of species and thereby the biodiversity composition of the study area, b) to evaluate the contribution of biodiversity to the local community, and c) to depict the existing management structure of RNP.

Materials and methods

Study Area

The study area is located within the Sadar Upazila at approximately between the latitudes of 25°44′ and 25°33′ N and between the longitudes of 88°30′ and 88°44′ E at Dinajpur district. It is located 8.0 km south from Dinajpur town with Paikpara and Tajpur Mouza. It is about 50 km from Syedpur airport and 420 km by road from Dhaka (Banglapedia, 2006). Earlier the RNP had an area of 146.44 acres but now the total land area has reduced to 68.54 acres which is categorized as a reserved forest under the Gazette notification of 24 December 1974.

Data collection

The biodiversity status was recorded through identifying and recording all species present at RNP. During the field survey, observations were made on the habitats, leaves, flowers, fruits, abundance of the plant etc. An attempt was made to identify the plants and animals on the spot. Those plants that could not be identified were preserved in herbarium with flowers and fruits for identification with help of the taxonomist. Different types of standard taxonomic books have been consulted for collection of scientific names and the relevant information (Rashid, 1990). Prior to field visit, the detailed map of RNP was consulted. A questionnaire survey and Key Informant Interview (KII) were conducted for the study. For the purpose of survey, the simple random sampling was used and the sample size was 100. Key informants included Divisional Forest Officer, Dinajpur Divisional Forest Office and Forest Officer, RNP to ascertain species diversity of plants, animals, birds, waterfowl and fishes in the study area and its surrounding areas at Dinajpur.

Results and discussion

According to this study, the National Park was found to be a home of total 104 animal species representing 95 genera and 46 families and 272 plants species representing 237 genera and 132 families respectively. Plant types included timber, fruit, medicinal, fodder, palm, spices, ornamental, aquatic plants, cultivated crops and weed species group whereas animals could be categorized into cultivated fish, small indigenous fish, threatened small indigenous fish, bank bird, bird of prey, and waterfowls group. The plants species of timber were 28, fruit 19, medicinal 75, fodder 17, palm 06, spices 05, ornamental 06, aquatic plants 41, cultivated crops 18 and weed species 57. The cultivated fish group had 11 species, small indigenous fish 53, threatened small indigenous fish 20, bank birds 9, bird of prey 4 and waterfowl 11 species.

Plant Biodiversity

According to the local people plant biodiversity in the study area was not decreasing because of the numbers of plants were increasing by the program of social forestry under Divisional Forest Office (DFO), Dinajpur. In the National Park 18.22 and 2 ha land was used for indigenous and exotic plantations respectively. Table 1, Table 2, Table 3, and Table 4 consequently show the biodiversity of timber plants, fruit plants, medicinal plants and cultivated crops species observed in the study area which were classified into tree, shrub, herb and climber plant types.

Table 1. Biodiversity of timber plant species observed in the study area

Local name	Family	Genus Species	Plant type
Eucalyptus	Myrtaceae	*Eucalyptus camaldulensis*	Tree
Khudijam	Myrtaceae	*Eugenia fruticosa*	Tree
Akashmoni	Mimosaceae	*Acacia auriculiformis*	Tree
Rain tree	Mimosaceae	*Albizia saman*	Tree
Sada koroi	Mimosaceae	*Albizia procera*	Tree
Kala koroi	Mimosaceae	*Albizia lebbeck*	Tree
Mangium	Mimosaceae	*Acacia mangium*	Tree
Raj koroi	Mimosaceae	*Albizia richardiana*	Tree
Lohakat	Mimosaceae	*Xylia dolabiformis*	Tree
Sissoo	Papilionaceae	*Dalbergia sissoo*	Tree
Pitali	Euphorbiaceae	*Trewia polycarpa*	Tree
Sinduri	Euphorbiaceae	*Mallotus philippinesis*	Tree
Jarul	Lythraceae	*Lagerstroemia speciosa*	Tree
Mehogoni	Meliaceae	Swietenia macrophylla	Tree
Kadam	Rubiaceae	Anthocephalus chinensis	Tree
Sheora	Urtieaceae	Sterblus asper	Tree
Sonalu		Cassia fistula	Tree
Simul	Bombaceae	Bombax ceiba	Tree
Bot	Moraceae	Ficus bengalensis	Tree
Pakur	Moraceae	Ficus comosa	Tree
Dumur	Moraceae	Ficus carica	Tree
Bas	Gramineae	Bambusa aurundinaceae	Tree
Debdaru	Annonaceae	Polyalthia longifolia	Tree
Sal	Dipterocarpaceae	Shorea robusta	Tree
Telsur	Dipterocarpaceae	Hopea odorata	Tree
Toon	Meliaceae	Cedrela toona	Tree
Shegun	Verbenaceae	Tectona grandis	Tree
Gamari	Verbenaceae	Gmelina arborea	Tree

Table 2. Biodiversity of fruit plant species identified in the study area

Local name	Family	Genus Species	Plant type
Aam	Anacardiaceae	*Mangifera indica*	Tree
Amra	Anacardiaceae	*Spondias pinnata*	Tree
Kathal	Moraceae	*Artocarpus heterophyllus*	Tree
Dewa	Moraceae	*Artocarpus lakoocha*	Tree
Peyara	Myrtaceae	*Psidium guajava*	Tree
Jam	Myrtaceae	*Syzgium cumini*	Tree
Jamrul	Myrtaceae	*Syzgium samarangense*	Tree
Boroi	Rhamnaceae	*Zizyphus mauritiana*	Tree
Chalta	Dilleniaceae	*Dillenia indica*	Tree
Jambura	Rutaceae	*Citrus grandis*	Tree
Bel	Rutaceae	*Aegle mermelos*	Tree
Kola	Musaceae	*Musa sapientum*	Herb
Ata	Annonaceae	*Annona reticulate*	Tree
Sarifa ata	Annonaceae	*Annona squamosa*	Tree
Kamranga	Averrhoaceae	*Averrhoa carambola*	Tree
Tetul	Caesalpinieae	*Tamarindus indica*	Tree
Jalpai	Elaeocarpaceae	*Elaeocarpus robustus*	Tree
Amloki	Euphorbiaceae	*Phyllanthus embelica*	Tree
Litchi	Sapindaceae	*Litchi chinensis*	Tree

Table 3. Biodiversity of medicinal plant species observed in the study area

Local name	Family	Genus Species	Plant type
Basok	Acanthaceae	*Adhatoda vasica*	Shrub
Kalomegh	Acanthaceae	*Andrographis paniculata*	Shrub
Katanoty	Amaranthaceae	*Amaranthus spinosus*	Herb
Vehla	Anacardiaceae	*Semecarpus anacardium*	Tree
Amloki	Annonaceae	*Allamonda catharitca*	Shrub
Nayantara	Apocynaceae	*Vinca rosea*	Shrub
Nayantara (Sada)	Apocynaceae	*Vinca alba*	Shrub
Kolkeyphul	Apocynaceae	*Thevetia nerifolia*	Tree
Sarpogandha	Apocynaceae	*Rauwolfia serpentine*	Shrub
Boch	Araceae	*Acarus calamus*	Herb
Ishwarmul	Aristolochiaceae	*Aristolochia indica*	Climber
Anantamul	Asclepiadaceae	*Hemidesmus indica*	Herb
Tecoma	Bignoniaceae	*Tecoma stans chelonioids*	Shrub
Parul	Bignoniaceae	*Stereospermum*	Tree
Banhalud	Bixaceae	*Bixa orellana*	Shrub
Mohneem	Burseraceae	*Allananthes excels*	Tree
Kalokesunda	Caesalpinieae	*Cassia sophera*	Shrub
Choto Kalokesunda	Caesalpinieae	*Cassia tora*	Shrub
Kesuti	Compositae	*Eclipta alba*	Herb
Dadmardon	Caesalpinieae	*Cassia alata*	Shrub
Ashoke	Caesalpinieae	*Saraca indica*	Tree
Bohera	Combretaceae	*Terminalia belerica*	Tree
Horitoki	Combretaceae	*Terminalia hebula*	Tree
Mohavinghoraj	Compositae	*Wedilia calendulacea*	Herb
Bhui kumra	Convolvuaceae	*Ipomoea digitata*	Shrub
Sharnalata	Convolvuaceae	*Cuscuta reflexa*	Climber

Local name	Family	Genus Species	Plant type
Pathor kuchi	Crassulaceae	*Bryophullum calycium*	Herb
Mateaalu	Dioscoriaceae	*Dioscorea alata*	Climber
Sinduri	Euphorbiaceae	*Mallotus philippinensis*	Tree
Bishkhagor	Euphorbiaceae	*Croton tiglium*	Tree
Verenda	Euphorbiaceae	*Ricinus communis*	Shrub
Bissatu	Euphorbiaceae	*Tragia involuerata*	Climber
Lemon ghash	Gramineae	*Andropogon citrates*	Herb
Kash	Gramineae	*Saccharum spontaneum*	Herb
Nageshwarchapa	Gramineae	*Mesua ferrea*	Shrub
Shetodrone	Labiatae	*Leucas aspera*	Herb
Kalotulsi	Labiatae	*Ocimum sanctum*	Shrub
Ghritukumari	Liliaceae	*Aloe barbadensis*	Herb
Shatamuli	Liliaceae	*Asparagus sprengeri*	Climber
Agniswar	Liliaceae	*Cardyline terminalis*	Shrub
Mehedi	Lythraceae	*Lawsonia mermis*	Shrub
Neem	Meliaceae	*Azadirachta indica*	Tree
Pitraj	Meliaceae	*Amoora rohituka*	Tree
Lazzabati	Mimosaceae	*Mimosa pudica*	Herb
Gila	Papilionaceae	*Entada scandens*	Climber
Palash	Papilionaceae	*Butea monosperma*	Tree
Roktachandon	Papilionaceae	*Pterocarpus santalinus*	Tree
Pipul	Piperaceae	*Piper longum*	Climber
Bishlong	Rubiaceae	*Randia dumetorum*	Shrub
Pindal	Rubiaceae	*Randia uliginosa*	Shrub
Mahua	Sapotaceae	*Madhuca longifolia*	Tree
Bakul	Sapotaceae	*Mimusops elengi*	Tree
Ulatkambol	Sterculiaceae	*Abroma augusta*	Shrub
Agar	Thymelaceae	*Aquiliaria nudiflora*	Shrub
Harjora	Vitaceae	*Vitis quadrangularis*	Tree
Gulancha	Vitaceae	*Tinospora cordifolia*	Climber
Nishinda	Verbanaceae	*Vitex negundo*	Climber
Dholanchapa	Zingiberaceae	*Hedychium coronarium*	Shrub
Banada	Zingiberaceae	*Zingiber spectabile*	Herb
Chatim	Apocynaceae	*Alstonia macrophylla*	Tree
Arjun	Combretaceae	*Terminalia arjuna*	Tree
Akande	Asclepiadaceae	*Calotropic procera*	Tree
Bishjarul	Acanthaceae	*Justicia gendarussa*	Shrub
Goraneem	Meliaceae	*Melia sempervirens*	Tree
Dhutora	Solanaceae	*Datura metel*	Shrub
Chanchi	Amaranthaceae	*Alternanthera sessilis*	Herb
Hatisur	Boraginaceae	*Heliotropium indicum*	Herb
Mutha	Cyperaceae	*Cyperus alternifolium*	Grass
Muthavadhail	Cyperaceae	*Cyperus rotundus*	Grass
Dol	Gramineae	*Hygrorhiza aristata*	Herb
Tulsi	Labiatae	*Ocimum sanctum*	Herb
Amrul	Oxalidaceae	*Oxalis corniculata*	Herb
Thankuni	Umbelliferae	*Hydrocotyle asiatica*	Herb
Bontamak	Solanaceae	*Nicotiana plumbaginifolia*	Herb
Bonbegun	Solanaceae	*Solanum fexox*	Shrub

Table 4. Biodiversity of cultivated crops observed in the study area

Common name	Family	Genus Species	Plant type
Rice	Gramineae	*Oryza sativa*	Herb
Wheat	Gramineae	*Triticum aestivum*	Herb
Maize	Gramineae	*Zea mays*	Herb
Sugarcane	Gramineae	*Saccharum officinarum*	Herb
Potato	Solanaceae	*Solanum tuberosum*	Herb
Brinjal	Solanaceae	*Solanum melongena*	Shrub
Mustard	Cruciferae	*Brassica campestris*	Herb
Black gram	Leguminosae	*Vigna mungo*	Herb
Grass pea	Leguminosae	*Lathyrus sativus*	Herb
Lentil	Leguminosae	*Lens culinaris*	Herb
Green gram	Leguminosae	*Vigna radius*	Herb
Deshi jute	Tiliaceae	*Corchorus capsularis*	Herb
Tosa jute	Tiliaceae	*Corchorus olitorius*	Herb
Mesta jute	Malvaceae	*Hibiscus subdariffa*	Herb
Arhar	Papilionaceae	*Cajanus cajan*	Shrub
Turmeric	Zingiberaceae	*Curcuma longa*	Herb
Bottle gourd	Cucurbitaceae	*Lagenaria siceraria*	Herb

Different ornamental plants, aquatic plants and weed species found at RNP are show in the Tables 5, 6, and 7. All the plants were classified into tree, shrub, herb and climber plant types.

Table 5. Biodiversity of ornamental plant species observed in the study area

Local name	Family	Genus Species	Plant type
Kathalichapa	Annonaceae	*Artobotyris odoratissimus*	Shrub
Tagor	Apocynaceae	*Tabernaemontana odoratissimu*	Shrub
Kolky	Apocynaceae	*Thevetia neriiifolia*	Tree
Malotilota	Apocynaceae	*Aganosma caryophylla*	Climber
Christmas tree	Araucariaceae	*Arucarid cookie*	Tree
Radhachura	Caesalpinieae	*Caesalpinia pulcherrima*	Tree
Kanchan	Caesalpinieae	*Bauhinia purpurea*	Tree
Krishnachura	Caesalpinieae	*Delonix regia*	Tree
Chandromollika	Compositae	*Chrysanthemum segetum*	Herb
Dahlia	Compositae	*Dahlia imperialis*	Herb
Ghada (African)	Compositae	*Tagetes erecta*	Herb
Ghada (French)	Compositae	*Tagetes patula*	Herb
Juniper	Cupressaceae	*Juniperus prostate*	Tree
Patromonjuri (red)	Euphorbiaceae	*Euphorbia pulcherrima*	Shrub
Patromonjuri (white)	Euphorbiaceae	*Euphorbia sp.*	Shrub
Silver fern	Filiaceae	*Dryopteris extersa*	Herb
Fern	Filiaceae	*Ptetis sp.*	Herb
Degar plant	Liliaceae	*Yucca gloriosa*	Shrub
Magnolia	Magnoliaceae	*Magnolia alba*	Shrub
Jhumkojoba	Malvaceae	*Hibiscus schizopetalus*	Shrub
Lankajoba	Malvaceae	*Hibiscus sylvestris*	Shrub
Joba	Malvaceae	*Hibiscus rosasinensis*	Shrub
Sthalpadda	Malvaceae	*Hibiscus mutabilis*	Shrub
Panthopathop	Musaceae	*Ravenala madagascari*	Tree

Local name	Family	Genus Species	Plant type
Bottle brush	Myrtaceae	*Callistemon linearis*	Tree
Lotabot	Moraceae	*Fiscus pumila*	Climber
Bougainvillea	Nyctaginaceae	*Bougainvillea grabra*	Climber
Kanakchapa	Ochanaceae	*Ochna squarrrosa*	Shrub
Bely	Oleaceae	*Jasminum sambac*	Shrub
Shefali	Oleaceae	*Nyctanthes arbotristis*	Shrub
Thuja	Pinaceae	*Thuja orientalis*	Shrub
Golap	Rosaceae	*Rosa sp.*	Shrub
Sada rangan	Rubiaceae	*Ixora arborea*	Shrub
Lal rangan	Rubiaceae	*Ixora coccinea*	Shrub
Gandhoraj	Rubiaceae	*Gardenia jasminoides*	Shrub
Musanda (white)	Rubiaceae	*Mussaenda erythrophylla*	Shrub
Musanda (red)	Rubiaceae	*Mussaenda erythrophylla rosea*	Shrub
Kamini	Rutaceae	*Murrnaya paniculata*	Tree
Hasnahena	Solanaceae	*Cestrum nocturumn*	Tree
Duranta	Verbenaceae	*Duranta repens*	Shrub
Vat	Verbenaceae	*Clerodendrom infortumatum*	Shrub

Table 6. Biodiversity of aquatic plants observed in the area of Ramsagar

Local name	Family	Genus Species	Plant type
Kachuripana	Pontederiaceae	*Eichhornia crassipes*	Herb
Panikachu	Pontederiaceae	*Monochoria hastate*	Herb
Khudipana	Lemnaceae	*Lemna minor*	Herb
Topapana	Araceae	*Pistia stratiotes*	Herb
Kachu	Araceae	*Colocasia esculenta*	Herb
Sada Shapla	Nymphaceae	*Nymphaea pubesceae*	Herb
Panilong	Onagraceae	*Ludwigia hyssopifolia*	Herb
Helencha	Onagraceae	*Jussleua repens*	Herb
Kalmilata	Convolvulaceae	*Ipomoea aquatic*	Shrub
Dholkalmi	Convolvulaceae	*Ipomoea fistulosa*	Herb
Malancha	Amaranthaceae	*Alternanthera philoxeroides*	Herb
Jonia	Cyperaceae	*Fimbristylis miliacea*	Grass
Keshur	Cyperaceae	*Cyperus michelianis*	Grass
Dol	Gramineae	*Hygrorhiza aristata*	Herb
Arail	Gramineae	*Leersia hexandra*	Herb
Bishkatali	Polygonaceae	*Polygonum hydropiper*	Herb
Gangpalong	Polygonaceae	*Rumex maritimus*	Grass
Panimorich	Polygonaceae	*Polygonum oriental*	Herb

Table 7. Biodiversity of weed species observed in the study area

Local name	Family	Genus Species	Plant type
Shaknotey	Amaranthaceae	*Amaranthus viridis*	Herb
Shusni	Marseliaceae	*Marsilia quadrifolia*	Herb
Ghagra	Compositae	*Xanthium italicum*	Shrub
Bontula	Compositae	*Sonchus arvensis*	Herb
Shial mutra	Compositae	*Blumea lacera*	Herb
Mikania lota	Compositae	*Mikania cordata*	Herb
Bonkopi	Compositae	*Gnaphalium affine*	Herb

Local name	Family	Genus Species	Plant type
Bon sharisha	Cruciferae	*Brassica kaber*	Herb
Bon mula	Cruciferae	*Raphanus raphanistrum*	Herb
Bathua	Cheenopodiaceae	*Chenopodium alabum*	Herb
Bhatshola	Leguminoceae	*Aeschynomene aspera*	Herb
Katabegun	Solanaceae	*Solanaum carolinense*	Herb
Tit begun	Solanaceae	*Solanaum torytam*	Herb
Foska begun	Solanaceae	*Physalis heterophylla*	Herb
Kanaibashi	Commelinaceae	*Cyanotis bengalensis*	Herb
Kanainala	Commelinaceae	*Cyanotis axillaries*	Herb
Monayna	Commelinaceae	*Commelia diffusa*	Shrub
Holde mutha	Cyperaceae	*Cyperus esculenrus*	Shrub
Muthachaise	Cyperaceae	*Fimbristylis diphylla*	Shrub
Panichaise	Cyperaceae	*Eleocharis atroperpurea*	Shrub
Chechra	Cyperaceae	*Seirpus mucronatus*	Shrub
Bara chucha	Cyperaceae	*Cyperus iria*	Shrub
Sabuj nakful	Cyperaceae	*Cyperus difformis*	Shrub
Khudi patai	Cyperaceae	*Cyperus flavidus*	Shrub
Shakta khagra	Cyperaceae	*Cyperus pilosud*	Shrub
Jonia	Cyperaceae	*Cyperus miliacea*	Shrub
Chapragash	Gramineae	*Elusine indica*	Grass
Anguligash	Gramineae	*Digitaria sanguinalis*	Grass
Khudeyanguli	Gramineae	*Digitaria ischaemum*	Grass
Sabujsialleza	Gramineae	*Setaria viridis*	Grass
Haludshialleja	Gramineae	*Setaria glarica*	Grass
Chiragash	Gramineae	*Eragrostis gangetica*	Grass
Carpetgash	Gramineae	*Axonopus compressus*	Grass
Premkata	Gramineae	*Chrysopogon aciculatus*	Grass
Chlagash	Gramineae	*Parapholis strigosa*	Grass
Monagash	Gramineae	*Paspalum commersonii*	Grass
Ulugash	Gramineae	*Imperata cylindrricas*	Grass
Durba	Gramineae	*Cynodon dactylon*	Grass
Gitla gash	Gramineae	*Paspalum distichum*	Grass
Chapatti gash	Gramineae	*Paspalum conjagatum*	Grass
Khudeyshama	Gramineae	*Echinochloa colonum*	Grass
Boro shama	Gramineae	*Echinochloa crusgalli*	Grass
Fulka gash	Gramineae	*Leptochloa chinesis*	Grass
Kakpaya	Gramineae	*Dactyloclenium aegyptium*	Grass
Ban palong	Polygonaceae	*Rumex maritimus*	Herb
Holdenakphul	Campanlaceae	*Wahlenbergia marginata*	Herb
Tripatrishak	Leguminoceae	*Desmodium triflorum*	Herb
Araich	Leguminoceae	*Cassia tora*	Herb
Banmosur	Leguminoceae	*Vicia savita*	Herb
Masurchana	Leguminoceae	*Vicia hirsute*	Herb
Shalukdhekis	Nymphaeaceae	*Nymphaea rubra*	Aquatic
Hak	Dryopteidaceae	*Dryopteri serrate-dentata*	Herb
Nunia	Portulaceae	*Portulaca oleracea*	Herb
Hazardana	Euphorbiaceae	*Croton sparsiflorus*	Herb
Chotodudhia	Euphorbiaceae	*Euphorbia hirta*	Herb
Borodudhia	Euphorbiaceae	*Euphorbia sparsiflorus*	Herb

According to the total available number of plant species by type; the weeds were the largest group having 57 species (36.76%), the second largest group was the medicinal plants having 75 species (27.57%) and the lowest group was the Palm plants having only 5 species (1.84%) (Figure 1).

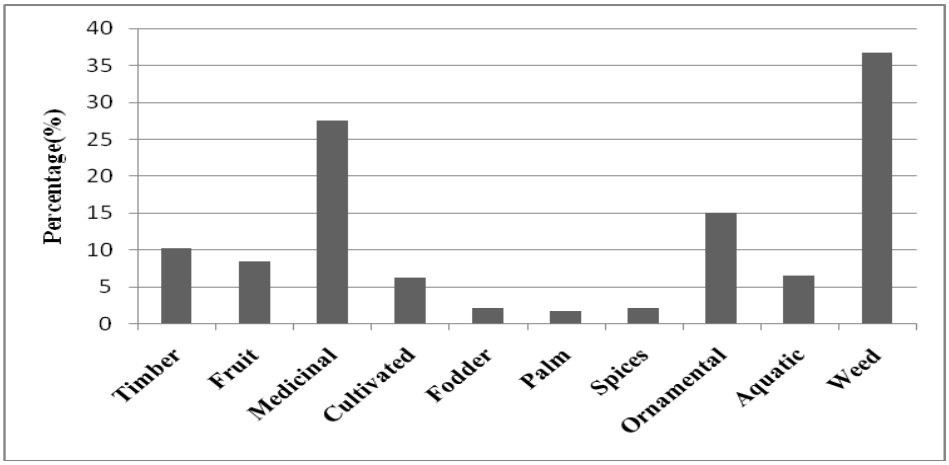

Fig 1. Percentage of total species for different groups of plants in the study area

Animal Biodiversity

Only one species among the cultivated fishes was found under the family Chicklidae which was Telapia (*Oreochromis mossumbicas*), the other 8 of cultivated fishes were found under the family Cyprinidae which included Mirror Carp (*Cyprinus carpo*), Silver Carp (*Hypophthalmichthys molitfix),* Grass Carp (*Ctenopharyngodon idella),* Catla (*Catla catla),* Rui (*Labeo rohita),* Mrigel (*Cirrhinus mrigala),* Sharputi (*Puntius sarana*), Kalbaush (*Labeo calbasu*). One species of cultivated fishes was found under the family Pangus Siluridae (Pangasius, pangasius) and another species found under family Cichilidae which included Nilotica (*Oreochromis niloticus).*

The diversity of indigenous fish species found in the study area included the following groups Needle fish climbing perch, Mud perch, Snake head, Goby, Glass fish, Catfish, Puffer, Loach, Spiny eel, Minnows and minors, Feather backs, Croaker, Carp, and Other as shown in the table 8. There were some threatened small indigenous fish species in the study area which are liated in the table 9.

Table 8. Biodiversity of indigenous fish species found in the study area

Group	Local name	Family	Genus Species
Needle fish climbing perch	Kakila	Belonidae	*Xenetodon cancila*
	Koi	Anabantidea	*Anabas testudineus*
	Kholisha	Belontiidae	*Colisa fasciatus*
Mud perch	Napit koi	Nandidae	*Badis badis*
	Bheda	Nandidae	*Nandus nandus*
	Kuicha	Mastacembelidae	*Monopterus cuchia*
Snake head	Taki	Channidae	*Channa punctata*
	Shol	Channidae	*Channa striata*
	Cheng	Channidae	*Channa oriatalis*
	Gojar	Channidae	*Channa marulius*
Goby	Bailla	Gobiidae	*Glossogobius giuris*
Glass fish	Chanda	Ambassidae	*Chanda nama*
Catfish	Magur	Clariidae	*Clarius batrachus*
	Shing	Heteropneudtidae	*Heteropneustes tossilis*
	Pabda	Siluridae	*Ompok bimaculatus*
	Air	Bagridae	*Aorichthys aor*
	Tengra	Bagridae	*Mystus vittatus*

Group	Local name	Family	Genus Species
	Batashi	Schibeidae	*Pseuaeytropius atherinoides*
	Banspata	Schibeidae	*Ailia punctata*
	Bacha		*Eutropiichthys vacha*
	Kazoli	Schibeidae	*Ailia coila*
	Golsha	Bagridae	*Myzus cavasius*
Puffer	Potka	Tetradontidae	*Tetraodon cutcutta*
Loach	Rani	Cobitidae	*Botia dario*
	Gutum	Cobitidae	*Lepidocephalus guntea*
	Paharigutum	Cobitidae	*Somileptes gongota*
Spiny eel	Sal baim	Mastacembelidae	*Mastacembelus armatus*
	Guchi	Mastacembelidae	*Mastacembelus pancalus*
	Tara baim	Mastacembelidae	*Mastacembelus aculeat*
Minnows and minors	Puti	Cypinidae	*Puntius chola*
	Elang	Cypinidae	*Rasbora elang*
	Mola	Cypinidae	*Amblypharyngodon mola*
	Chela	Cypinidae	*Salmostoma bacaila*
	Kash khaiya	Cypinidae	*Chela laubuca*
	Dhela	Cypinidae	*Osteobrama cotio*
	Tit puti	Cypinidae	*Puntius tieoto*
	Jat puti	Cypinidae	*Puntius sophore*
Feather backs	Foli	Notopteridae	*Notopterus notopterus*
	Chital	Notopteridae	*Chitala chitala*
Croaker	Poa	Sciaenidae	*Macrospinosa cuja*
Carp	Nandil	Cyprinidae	*Labeo nandina*
	Mahashol	Cyprinidae	*Tor tor*
Other	Bamosh	Anguillidae	*Ophisternon bengalense*
	Darkina	Cyprinidae	*Rasbora rasbora*
	Boal	Siluridae	*Wallagu attu*
	Khakila		*Rhinomugil corsula*
	Bhangra	Cyprinidae	*Labeo boga*
	Chapila	Clupidae	*Gudusia chapra*
	Chep chela	Cyprinidae	*Danio devario*
	Ekthota		*Dermogenys pusilla*
	Rita		*Rita rita*
	Piali		*Aspidoparia morar*
	Neptani	Belonatiidae	*Ctenops nobilis*

Table 9. Biodiversity of threatened Small Indigenous Fish Species (SIS) in the study area

Local name	Family	Genus Species
Darkina	Cyprinidae	*Rasbora rasbora*
Pabda	Siluridae	*Ompok bimaculatus*
Rani	Cobitidae	*Botia dario*
Tengra	Bagridae	*Mystus vittatus*
Sal baim	Mastacembelidae	*Mastacembelus armatus*
Bheda	Nandidae	*Nandus nandus*
Gol chanda	Ambassidae	*Parambassis ranga*
Dhela	Cypinidae	*Osteobrama cotio*
Kash khaiya	Cypinidae	*Chela laubuca*
Chela	Cypinidae	*Salmostoma bacaila*
Shol	Channidae	*Channa striata*

Local name	Family	Genus Species
Kakila	Belonidae	*Xenetodon cancila*
Tit puti	Cypinidae	*Puntius tieoto*
Jat puti	Cypinidae	*Puntius sophore*
Gojar	Channidae	*Channa marulius*
Mahashol	Cyprinidae	*Tor tor*
Magur	Clariidae	*Clarius batrachus*
Shing	Heteropneudtidae	*Heteropneustes tossilis*
Boal	Siluridae	*Wallagu attu*
Bhangra	Cyprinidae	*Labeo boga*

Indigenous fish species are decreasing day by day. Causes behind decreasing indigenous fish species mainly attributed to over population, which causes over exploitation due to their poverty. Furthermore, agricultural pollution into the water bodies through rainfall and flood washout, destruction of breeding grounds of indigenous fish species due to construction, various diseases of fish were other major causes behind decreasing indigenous fish species.

The bank birds named Common Mayna (*Acridotheres tristis),* Bulbul (*Pcynonotas jocosus)* and Sociable Lapwing (Vanellus gregarious), observed in study area were resident and very common and common respectively in status. Other bank birds named Magpie Robin (*Copsychus saularis),* Dove (*Streptopelia decaocto),* Woodpecker (*Chrysocolaptes lucidus),* Weaver (*Ploceus benghalesis)* observed in RNP were few in status. Two bank birds - Common Starling (*Sturnus vulgaris)* and Sky Lark (*Alauda arvensis)* were migratory in status. The prey birds observed at the study area included Owl (*Ketupa zeylonensis),* Kite (*Haliastur Indus),* Osprey (*Pandion haliaetus),* and Falcon (*Falcon peregrines).*

Among them owl was resident and few in status, while, the remaining three species were very few. The waterfowl named White Stork (*Ciconia boyciana),* Kingfisher (*Alcedo atthis),* Black Heron (*Egretta ardesiaca)* and Little Grebe (*Tachybaptus ruficollis)* observed in study area were resident and few in status. Grey Heron (*Ardea cinerea),* Pond Heron (*Ardeola grayii),* and Great Egret (Egretta *alba),* were common. Other waterfowl named Diver (*Gavial stellata)* were migratory and few, Night Heron (*Nycticorax nycticorax)* were threatened, Greylag Goose (*Anser anser)* were migratory and very few and Duck (*Cairina scutulata)* were domestic and common.

Table 10. shows the biodiversity of miscellaneous faunal species found in the study area with their status. Most of them were found to be common, three were threatened (Jackal, Weasel and Sona Toad) and three were few (Small Prawn, Leech and Kobra) while only one was very few (Guisap).

Table 10. Biodiversity of miscellaneous faunal species found in the study area

Common name	Genus Species	Status
Freshwater Mussel	*Lamellidens marginalis*	C
Apple Snail	*Pila globosa*	C
Freshwater Crab	*Paratel masoniana*	C
Mud Crab	*Scylla serrata*	C
Small Prawn	*Palaemon sp.*	F
Leech	*Hirudinaria granulose*	F
Jackal	*Vulpes bengalensis*	WT
Weasel	*Herpestes urva*	WT
Snake	*Cerberus rhynchops*	C
Guisap	*Varanus bengalensis*	VF
Kobra	*Naja naja*	F
Sona Toad	*Rana tigrina*	T
Common Toad	*Bufo melanostictus*	C
Rat	*Ratus bengalensis*	C

C: Common, F: Few, VF: Very Few, T: Threatened, W: Wild

Total 73 species of fishes were observed in the study area. Indigenous fish was the largest group having 53 species (63.10%), then the threatened small indigenous fish was 20 species (23.81%), and cultivated fish group contained 11 species (13.10%). Birds were recorded into three groups named Dank birds, Bird of pryaud waterfoud and the percentage of these group are showd in (Figure 2).

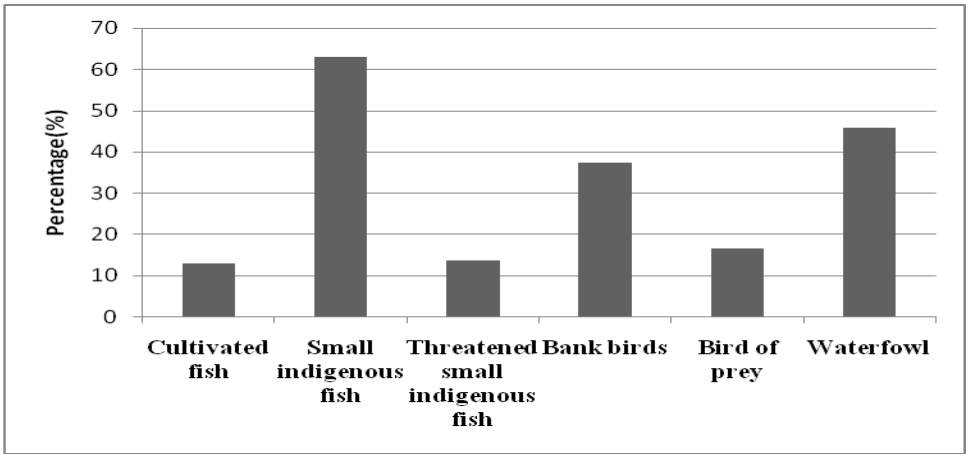

Figure 2. Percentage of total species for different groups of fauna in the study area

Contribution of biodiversity to local people

The contribution of floral and faunal biodiversity to the local people in the study area was mainly for food. Although medicinal plants were used for medicine purpose, weeds and fodder plants were used as a food for domestic animals, timber plants were used for making furniture or as fuel wood etc.

Management of RNP

There was only 8 staff for maintaining the National Park. There was no management plan in the RNP but they had annual work plan. There was boundary constructed around the National Park.

Table 11. Overall management of RNP

Management Plan	No.
Annual Work Plan	Yes.
Boundary Demarcation	Yes and boundary wall is constructed.
Management Zoning	No.
Inventory	Not applicable.
Land use	Indigenous plantations–18.22 ha, Exotic plantations–2 ha.
Roads and Bridges	Roads and foot trails have been developed.
Miscellaneous works	Provisions construct picnic sheds and cottages.

There were only 8 staffs including 1 forest officer, 3 gardeners, 3 guards and 1 watchman in the RNP for maintaining the management system which cannot be adequate for proper management of this Park.

Conclusion

A heterogeneous assemblage of 367 species including 256 plant species, 24 species of waterfowl and birds, 14 species of miscellaneous fauna and 73 species of fish could be recorded at the study area. Contribution of biodiversity to the local people was mainly for food, although they used plant species as wood for making furniture, fuel wood, medicinal purpose, etc. The main cause of decreasing indigenous fish species was over exploitation of fish due to over population, other causes were agricultural pollution, diseases, flood, etc. There was inadequate staff for maintaining the National Park. This clearly indicated the need for more attention from the Government to take practical endeavors for proper management of the Park and thereby conserve its biodiversity.

References

Banglapedia. 2006. National Encyclopedia of Bangladesh. Asiatic Society of Bangladesh.

HUDA, K. S. 2008. Co-management of protected areas in Bangladesh: A strategy for establishing an institutional framework. Nishorgo Support Project, Bangladesh Forest Department (BFD), Ministry of Environment and Forest, Government of Bangladesh. Availableathttp://www.nishorgo.org/reference_center.asp.

IRG (International Resources Group). 2004. Assessment of the Forest Department's institutional organization and capacity to manage the protected area system of Bangladesh. Nishorgo Support Project Contract No. 388-c-00-03-00050-00, International Resources Group (IRG), 1211 Connecticut Avenue, Washington DC 20036, USA.

Islam, M. S. 2006. Biodiversity of Jamuna Bridge of the surrounding area, M.S. thesis, Department of ENVS, BAU, Maymensingh, Bangladesh. Page No. 9-15.

Islam, S. 2001. The status of Bhawal National Park: are the objectives of protected areas being met? Technical Report, Independent University, Bangladesh.

Rahman, A. K. A. 1989. Fresh Water Fisheries of Bangladesh. Bangladesh Zoological Society, Department of Fisheries, Dhaka, Bangladesh. Page No. 364.

Rashid, M. 1990. Fuler Chash Bangla Academy, Dhaka, Bangladesh. Page No. 34-172

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