ORIGINAL RESEARCH PAPER

Autrial of Research

PRESENT STATUS OF PLANTS FOUND IN THE WETLANDS OF BARPETA DISTRICT OF ASSAM, NORTH EAST INDIA.

KEY WORDS: beel, Barpeta district, plants, focus group discussion.

Economics

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Barpeta district of Assam, India is famous for its beel (wetlands). There are 32 beels in the district. Out of the those, 12 beels are important from the point of view of aquatic and terrestrial plants. Number of studies have been found on beels in Assam. Even the studies on Kapla beel, one of the important beels of Barpeta district, have been found. But most of the studies are related to one particular beel only. The present study has tried to fill this research gap by studying the status of plants found in important beels of Barpeta district of Assam. The study reveal that the beels have diversified plants. Besides, most of the plants have ethno medicinal use by the surrounding people of the beels. As per as the methodology is concerned, the author visited the beels many times, collected plants maintaining proper procedure and took focus group discussion.

INTRODUCTION:

ABSTRACT

Beels (Wetlands) are very important as these are the natural water reserver. These are the vital parts of the environment. The shape, nature, characteristics of water, geographical locations make the wetlands diverse in case of biodiversity. The terrestrial as well as the water bodies of the wetlands help to grow diversified terrestrial and aquatic plants. Higher the diversity, larger is the chance of getting diversified life form and fauna. Because the diversified aquatic plants are important source of food for the wetland based life form (Deka and Sarma, 2014). Of course the diversified terrestrial and aquatic plants are adquatic plants provide herbal medicine and also fulfil the needs of the surrounding people. Besides, the diversified aquatic plants are natural oxygen suppliers to the life form living in the wetlands.

Several studies have been carried out on wetlands, its aquatic diversity and the biodiversity formed in the wetlands. The important studies are discussed here:

Deka et al (2019) surveyed the wetlands of the Western Assam for searching medicinal plants. They have found that there were 31 species of medicinal plants belonging to 25 genera and 14 families. Out of 31 species nine are used in skin disease, six in jaundice, six in liver disease, four in fever, four in urinary problem and two in dysentery as well as in snake bite. Saikia (2019) studied the ecosystem of Deepar beel. The author focused on the threats coming from the development activities made by humen. She also enlisted the aquatic plants found in and around Deepar beel. Deka and Dutta (2018) did a case study on Kapla beel focusing on socio-economic dependency of the surrounding people on the beel. They found that Kapla beel is very important as a biodiversity spot and the beel is the source of livelihood for the surrounding people. Bashistha (2016) studied on the environmental impact of Deepar beel. The author focused the impact of industrialisation and urbanisation on Deepar beel. The author recommends for the conservation of the beel. Baishya et al (2015) did their study on forest based ethno medicinal plants of Assam. They reveal that ethno medicine are cost effective, have less side effect and are more reliable. They listed out different medicinal plants and described which plant is effective to what kind of disease. Haque and Devi (2015) did their study on plants of wetlands and rivers of Goalpara district of Assam. They encounter 132 species of aquatic macrophytes belonging to 107 genera and 46 families. The authors concerned regarding the rise of developmental construction undertaken in the wetland areas as such activities destroy the ecosystem of the beel. The study of Deka and Sarma (2014) accounted different plants available in the terrestrial as well as water available in the beels of the Nalbari district. They found 137 plants belonging to 115 genera and

53 families. They found that the environment of the wetlands have been degenerating due to man-made and natural activities for which the diversity of the fishes have been decreasing. Deka et al (2014) did their study in Kapla beel of Barpeta district. The main objective of the study was to find out the diversity of the aquatic plants available in Kapla beel. They found 68 aquatic plants belong to 49 genus and 28 families. They have found in their study that maximum diversity has been seen during the summer season. Degeneration of the aquatic plants is mater of concern, they feared. Therefore, they suggested to conserve the plants. A study carried out by Kalita and Kalita (2014) identified some important ethno medicinal plants those are used to treat pneumonia. The authors claimed that those ethno medicinal plants will be alternative source of future medicine for treatment of pneumonia. Deka et al (2012) reported in their study that Kapla beel has 36 species of aquatic plants belonging to 24 families. They also found that 13 plants have medicinal properties. They suggested to conserve the beel as well as the medicinal plants. Sen and Ghosh (2011) did ethno botanical studies of some pteridophytes in Assam. They identified the plants and their uses. Sarma and Saikia (2010) studied regarding the entire aquatic plants found in the beels of Nalbari district. They enlisted the aquatic plants, the scientific name, the families and the uses of those plants. A study undertaken by Gogoi (2007) on Deepor Beel reveals that about 435 species of plants have been found in Deepor Beel which are belonging to 305 genera and 103 families. Due to human activities, the biological resources have been depleting. Though the beel has been declared as Ramsar Site and Wildlife Sanctuary, the situation has not been improved. Patiri and Borah (2007) worked on wild edible plants of Assam. The authors did an extensive study and focused on the uses of the plants.

Thus, it is seen that number of studies have been undertaken on aquatic and terrestrial plants found in the beels, rivers and other places in Assam. Some researchers identified medicinal plants and usefulness in different diseases. However most of the studies are concentrated in a single beel or river. The studies undertaken on aquatic plants of beel under Barpeta district are concentrated only in Kapla beel of the district. The present study has identified this research gap and has focused on identification of the aquatic and terrestrial plants in the important beels of Barpeta district. Besides, the present study will identify the plants those are used as ethno medicine in surrounding villages of the study areas. There are 12 beel fisheries in Barpeta district as per the record of Assam Fisheries Development Corporation Ltd. (2016). The study has covered all these 12 beels. The study has been carried out for documentation of aquatic and terrestrial plants and to identify the ethno medicinal plants out of those plants.

MATERIAL AND METHODS:

Barpeta district is one of the flood prone areas of the state. The district is located in the North West sides of the state. The district is away about 65 km from the state capital, Guwahati. Barpeta is surrounded by Baksa in the North, Kokrajhar and Bangaigaon in the West, Nalbari in the East and River Brahmaputra in the South. The district is under the Lower Brahmaputra Valley Agro-Climatic Zone. Barpeta is the fifth largest district of Assam in terms of population.

The average temperature in the district is 24.6 °C. The average annual rainfall is around 1975 mm or 77.8 inch per year. The distric is covered with rivers, beels, ponds, low lying water logged areas, rice field, char area, reserve area for which diversity has been found in the plants.

There are 23 registered beels in Barpeta district. However 12 beels have been selected for the study as these 12 beels have been leased for fisheries by Assam Fisheries Development Corporation Ltd. The Table 1 shows the list of the beels with the covering area:

		1
Sl No	Name of Beels	Covering area(Ha)
1	Bhuatava	48.00
2	Sagmara	36.00
3	Kukarjan	110.00
4	Kharsutha	30.00
5	Sorbhog	34.00
6	Beria	31.00
7	Kapla	61.00
8	Singra	10.00
9	Pahumara	168.00
10	Fingua-Parua	112.00
11	Chilochi	40.00
12	Borkana	85.00

Table 1: The Beels where the study conducted

Source: Assam Fisheries Development Corporation Ltd. (2016)

The present study has been done during January 2019 to December 2019. The study adapted methodology of Deka and Sarma (2014) as model. The author of this article visited all the 12 beels for collecting data. The unit of the data is aquatic and terrestrial plants in and around all the beels as mentioned in the Table : 1. The plants are photographed, collected, washed properly, packed in polythene bags to make those dried. Specimens were rapped with the old news paper for preservation. The newspapers were changed timely. The dried specimens were poisoned through saturated solution of mercuric chloride in absolute ethyl alcohol. These are mounted on herbarium sheets. Specimens were preserved in Formalin Aceto Alcohol (FAA). The specimens were identified with the help of existing literature and with the assistance of the Department of Botany, B.B.K.College, Nagaon (Barpeta), Assam. For identification of the plants which are used as ethno medicine in the surrounding villages of the study areas, the author of this article formed a focus group discussion. The group consisted the mahaldars of the beels, the village kabiraaj (practitioners of the ethno medicine), and an academician from the Department of Botany, B.B.K. College, Nagaon (Barpeta), Assam. The focused group identified the plants those have ethno medicinal value or those have not been known whether there is any ethno medicinal value or not.

RESULT AND DISCUSSION:

The survey reveals that there are 40 families and 85 species of plants found in the study area. Out of the 40 families, the most dominant family is Asteraceae having 8 species followed by Amaranthaceae (7 species), Araceae (6 species), Poaceae and *Cyperaceae* (5 species each) Fabaceae and Nymphaeaceae(4 species each). Out of the 85 species 71 plants have been used as ethno medicine for treating www.worldwidejournals.com different diseases by the surrounding village health practitioners, specially, *Kabiraj*. The *Kabirajs* donot have any knowledge if there is any medicinal benefits of remaining 14 species or not. The table 2 reveals the name of the family, scientific name, common names of the plants available in the beels. Accordingly, the table also shows the plants having medicinal value and the plants which are not known whether there is any medicinal value or not.

Table 2: List of plants found in *Beels* of Barpeta District

Sl No./Family/Scientific name/Common name/Ethnomedicinal use

- Acanthaceae/Hygrophila polysperma (Roxb.) T.Anders./Indian hygrophila/Yes
- 2. Amaranthaceae/Alternanthera sessilis (L.) R. Br. ex D/Sessile joyweed/Yes
- 3. Amaranthaceae/Amaranthus viridis L./green amaranth/Yes
- 4. Amaranthaceae/Alternanthera sessilis (L.) R.Br.ex DC./tangle mat/Yes
- 5. Amaranthaceae/Alternanthera philoxeroides (Mar) Grisep./Alligatorweed/Notknown
- 6. Amaranthaceae/*Amaranthus virides* L./slender amaranth or green amaranth/Yes
- 7. Amaranthaceae/Amaranthus spinosus L./Spiny Amaranth/Yes
- 8. Amaranthaceae/Achyranthes aspera-L/chaff-flower/Yes
- 9. Apiaceae/Hydrocotyl sibthorpioides Lmmk./Water Pennywort, Lawn marshpennywort/Yes
- 10. Apiaceae/*Centella asiatica* (L.) Urban /Indian pennywort, Asiatic pennywort or gotukola or Thankuni/Yes
- 11. Apiaceae/Alocasia indica (Lour) Koch/giant taro/Yes
- Apiaceae/Colocasia esculenta (L.) Schott./coco yam, wild taro/Yes
- 13. Apiaceae/Commelina benghalensis L/Benghal dayflower, tropical spiderwort, or wandering Jew/Yes
- 14. Apiaceae/Pistia stratiotes L./water cabbage, water lettuce,Nilecabbage,orshellflower./Yes
- 15. Araceae/Alocasia indica (Lour) Koch/giant taro/Yes
- Asteraceae/Ageratum conyzoides L /Billygoat-weed, chick weed, goatweed, whiteweed/Yes
- 17. Asteraceae/Parthenium hysterophorus L./feverfew/Yes
- Asteraceae/Mikania micrantha Willd./ bitter vine, Mile-aminute weed, climbing hemp weed/Yes
- Asteraceae/Eclipta prostrata (L.) L./False Daisy, Bhringraj/Yes
- 20. Asteraceae/Xanthium strumarium L/Burweed /Yes
- 21. Asteraceae/Vernonia cinerea (L.) Lees./Tridax daisy/Yes
- 22. Asteraceae/Enhydra *fluctuans/*Marsh herb, Water cress/Yes
- 23. Asteraceae/Parthenium hysterophorus L/Parthenium weed/NotKnown
- 24. Azollaceae/Azolla pinnata R.Br./Mosquitofern, feathered mosquitofern and water velvet./Not Known
- 25. Boraginaceae/Heliotropium indicum/Indian heliotrope/ Yes
- 26. Caesalpiniaceae/*Cassia tora L.*/Sickle Senna or Sickle Wild sensitive-plant./NotKnown
- 27. Cannabinaceae/Canabis sativa L./Marijuana/Yes
- Cannaceae/Canna indicaL./Indian shot, African arrowroot, edible canna, purple arrowroot, Sierra Leone arrowroot/ Yes
- 29. Ceratophyllaceae/Ceratophyllum demersum L./Hornwort, rigid hornwort, coontail, or coon's tail/Yes
- 30. Convolvulaceae/Ipomoea aquatica/Water spinach, river spinach, water morning glory, water convolvulus/Yes
- Convolvulaceae/Ipomoea aquatica Forssk./Swamp morning-glory/Yes
- 32. Cyperaceae/Cyperus brecifolius/Shortleaaf/Yes
- 33. Cyperaceae/Cyperus bulbosus Vahl./Wild onion/Yes
- Cyperaceae/C. corymbosus Rottb./Jointed flatsedge, Priprioca, Piripiri/Yes

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- 35. Cyperaceae/C.rotundus L./nut grass/Yes
- 36. Cyperaceae/Kyllinga monocephela Roxb./Mutha/Yes
- 37. Dryopteridaceae/Dryopteris sp./Wood ferns/Not Known
- Euphorbiaceae/Acalypha-indica-l/Vaichikato, Dadaro, Indian Acalypha./Yes
- 39. Euphorbiaceae/Euphorbia hirta L./Asthma herb/Yes
- 40. Fabaceae/Desmodium triflorum (L.) DC./Three-flower beggarweed, Three-flower tick-trefoil/Not known
- 41. Fabaceae/Aeschynomene aspera/Sola pith plant, pith plant/Yes
- 42. Fabaceae/Solanum nigrum/Black nightshade or blackberry nightshade/Yes
- 43. Fabaceae/*Mimosa pudica L.* /Sensitive plant, humble plant, shameplant, and touch-me-not./Yes
- 44. Hydrocharitaceae/Hydrilla verticillata (L.f.) Royle./Waterthyme/Yes
- 45. Lamiaceae/Clerodendrum viscosum/Hill glory bower//Yes
- 46. Lamiaceae/Leucas longifolia/Long-Leaf Leucas/Yes
- 47. Lamiaceae/Leucas aspera Link/Thumbai/Yes
- Lemnaceae/Vallisneria spiralis L./Tape grass, or eel grass/Yes
- 49. Lemnaceae/Lemna purpusilla Torrey/Duck weed Plantae/Yes
- 50. Lemnaceae/Lemna minor L. /Common duckweed or lesser duckweed/Yes
- 51. Linderniaceae/Linderniasp/IndianLindernia/Yes
- 52. Lythraceae/Rotala densiflora Koehne/Densely flowered rotala/Yes
- 53. Lythraceae/Trapa Natans/Water chest nut./Yes
- 54. Malvaceae/Urena lobata L./Caesarweed or Congo jute/Yes
- 55. Marseliaceae/Marsalia quadrifolia L./Water Clover, Europeanwaterclover/Yes
- Najadaceae/Najas minor All./Brittle naiad or brittle waternymph/Yes
- 57. Nyctaginaceae/Boerhavia diffusa/Punarnava, red spiderling, spreading hogweed, tarvine./Yes
- Nymphaeaceae/N.indica (L.) Kuntze/Banana plant, robust marshwort, and water snowflake/Yes
- 59. Nymphaeaceae/*N.nouchali Burm.f.*/Indian blue water lily / Indian water lily/Not known
- 60. Nymphaeaceae/Nymphaea alba L./White Water Lily, European white waterlily/Yes
- 61. Nymphaeaceae/Nelumbo nucifera Geartn./Indian lotus, sacred lotus, bean of India//Yes
- Oxalidaceae/Oxlis corniculata L./Creeping woodsorrel, procumbent yellow sorrel/Yes
- 63. Papilionaceae/Aeschynomene aspera L./Sola pith plant, pith plant/Not known
- 64. Papilionaceae/A. *indica L.* /Indian camphorweed, Indian fleabane, and Indian pluchea./Yes
- 65. Perkariaceae/Ceratopteris thalictroides Brogn/Water sprite, Indian fern, Water fern, Oriental waterfern, Water hornfern/Yes
- 66. Poaceae/Auxonopus compressus (Sw.) P. Beauv./Blanket grass/Notknown
- 67. Poaceae/Cynodon dactylon/Bermuda grass/Yes
- Poaceae/Panicum repens L./Orpedograss, creeping panic, panic rampant, couch panicum, wainaku grass, quack grass, dog-tooth grass, and bullet grass/Not known
- Poaceae/Oplismenus compositus Beauv./Running mountaingrass/Not known
- Poaceae/Imperata cyllindrica (L.) P. Beauv./Cogongrass Cogon Grass Japgrass/Not known
- Polygonaceae/P. hydropipper L./Water pepper or marshpepper knotwee/Yes
- 72. Polygonaceae/Polygonum barbatum L./Joint Weed/Yes
- 73. Polygonaceae/*Rumex dentatus L*/Toothed dock, Aegean dock/Not known
- 74. Pontederiaceae/Eichhornia crassipes (Mart.) S.L./Common water hyacinth/Not known
- 75. Pteridaceae/Diplazium esculentum(Retz.)Sw. ex Schard/

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- Vegetable fern/Not known 76. Rubiaceae/Dentella repens Forst./Creeping lickstoop/Not known
- Rubiaceae/Oldenlindia corymbosa L./Flat-top mille graines/Yes
- Rubiaceae/Paederia foetida/Skunkvine, stinkvine, Chinese fever vine/Yes
- 79. Rutaceae/Murraya koenigii/Curry leaf tree/Yes
- 80. Scrophulariaceae/Bacopa monnieri (L.) Penn/Thyme leaved graticula./Yes
- 81. Solanaceae/D. metelL./Devil's trumpet/Yes
- 82. Thelypteridaceac/Sphaerostephanos unitus L./Tuberous sword fern, tuber ladder fern, erect sword fern, narrow sword fern and ladder fern, and herringbone fern/Yes
- Urticaceae/Pouzolzia zeylanica (L.)Benn./Graceful pouzolzsbush/Yes
- Verbenaceae/Phyla nodiflora (L.) Greene/Turkey tangle fogfruit/Yes
- Zingiberaceae/Alpinia allughas (Retz.)Rosc./Bambooleaved Galanga/Yes

Barpeta is known for its natural beels. One of the legends of naming the place Barpeta, itself means that the place has 'Bar pit' means 'big pits' (large natural ponds and beels). The natural ponds and beels have created an environment for unique biodiversity. The beels have natural beauty and source of abundant aquatic resources. Though beels have enough natural resources, sufficient studies have not been found. A little studies has been done only on Kapla Beel. A study covering all significant beels is needed to understand diversified bio-resources. The present study has been done to fill this gap. The study is a contribution to the existing literature related to beels' bio-resources. The study also hepls to understand the peculiarity of the nature of the beels.

However, some limitations are found in the study. Firstly, due to limited time, the author hurried to collect the plants. This has increased the chance of omission of some important plants of the study area. Though, the study identified some ethno medicinal plants, the author fails to go into the details. Further study may be done on ethno medicinal use of the plants found in the beels. There is a potentiality to extent the study to the avifaunal as well as the zoological aspects. More study can be done covering these two aspects too. The study also reveals that the beels are not out of danger from aquatic weeds and human interference. The rapid urbanisation, illegal human settlement have destroyed the eco-system of the beels and natural water reserver. Therefore, the district has to suffer more during flood as compared to the past. Increase of awareness among the people of the neighbouring villages of the beels may save the natural environment. The authority can think about the development of eco-tourism in the beels so that the surrounding people's dependence on the beels can be minimised.

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