

Utilization of wetland resources by the rural people of Nagaon district, Assam

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Man's dependence and association with the wetlands is an important aspect, as people get benefited by using its resources. Nagaon district of Assam is located in the flood plains of the river Brahmaputra. The study has been conducted to assess the economic benefits derived from the wetland resources by the rural people of the district and also to assess their socio-religious and cultural attachment with these wetlands. Fifty three plant species were found to have utilization for various purposes like medicine (32), vegetables (9), fruits (6), fodder (9), biofertilizer (3), small scale industries (7), religious functions (5), etc. Nymphaeaceae was found to be the largest family containing maximum number of species having utilization of the people from the study area. The fishermen completely depend on fish resource of these wetlands. Such resourceful wetlands of the district have been found to degrade gradually due to anthropogenic activities like, encroachment, residential and commercial developments, dumping the garbage and wastes in the wetlands, etc. Therefore, appropriate measures should be adopted to conserve and save these important wetlands of the district.

Keywords: Wetland resources, Ethnomedicine, Assam.

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Man's dependence and association with the wetlands has been started since the beginning of civilization. Wetlands are the most productive important part of global ecosystem, which supports many valuable aquatic flora and fauna¹. The increasing world population and over exploitation of wetland resources demand for human habitation and permanent change of landscape could be identified as the inherited problems during the past few decades². As a consequence of this, the fragile wetland ecosystems have been gradually destroyed. Wetlands play great role in the environment to keep it in a balanced state. Wetlands are the multiple value ecosystems. They perform a number of vital functions in the maintenance of overall balance of nature, flood control, soil erosion control, water storage and purification, ground water recharge and discharge, protection and stabilization of storm by acting as natural barriers and recreation, besides providing outputs of commercial value and economic sustenance.

In Northeast India, the wetlands have rarely been evaluated and understood from the angle of the degree

of dependence of man on wetland except that of fishes. Nagaon district is situated in the central part of lying between the latitude 25°:47'N to 26°:42'N and longitude 92°:25' to 93°:19'E in the flood plains of river Brahmaputra and covers a geographical area of 4,435.3 sq km (Fig.1)³. The climate of the area is hot and humid and is influenced by Southwest monsoon during the rainy season extending from the month of April to September. Nagaon district contains 379 small and large natural wetlands, out of which 15 are found to be the largest having perennial water bodies, covering a total land area of 3,000ha^{4,5}. These are either oxbow or compact type of wetlands, such water bodies are locally known as *beel*⁶. The study covers 4 of the largest wetlands of the district covering a total area of 750 ha. These 4 wetlands are situated quite apart from one another and possess good number of aquatic plants. Some of these plants are being used by the people of the rural areas of the district for hundreds of years. The resources which the people collect are mainly for food, fodder, medicinal plants, thatch grasses, raw materials for small scale industries, etc. Besides, these wetlands are very rich in fish contents, as a result of which many populations

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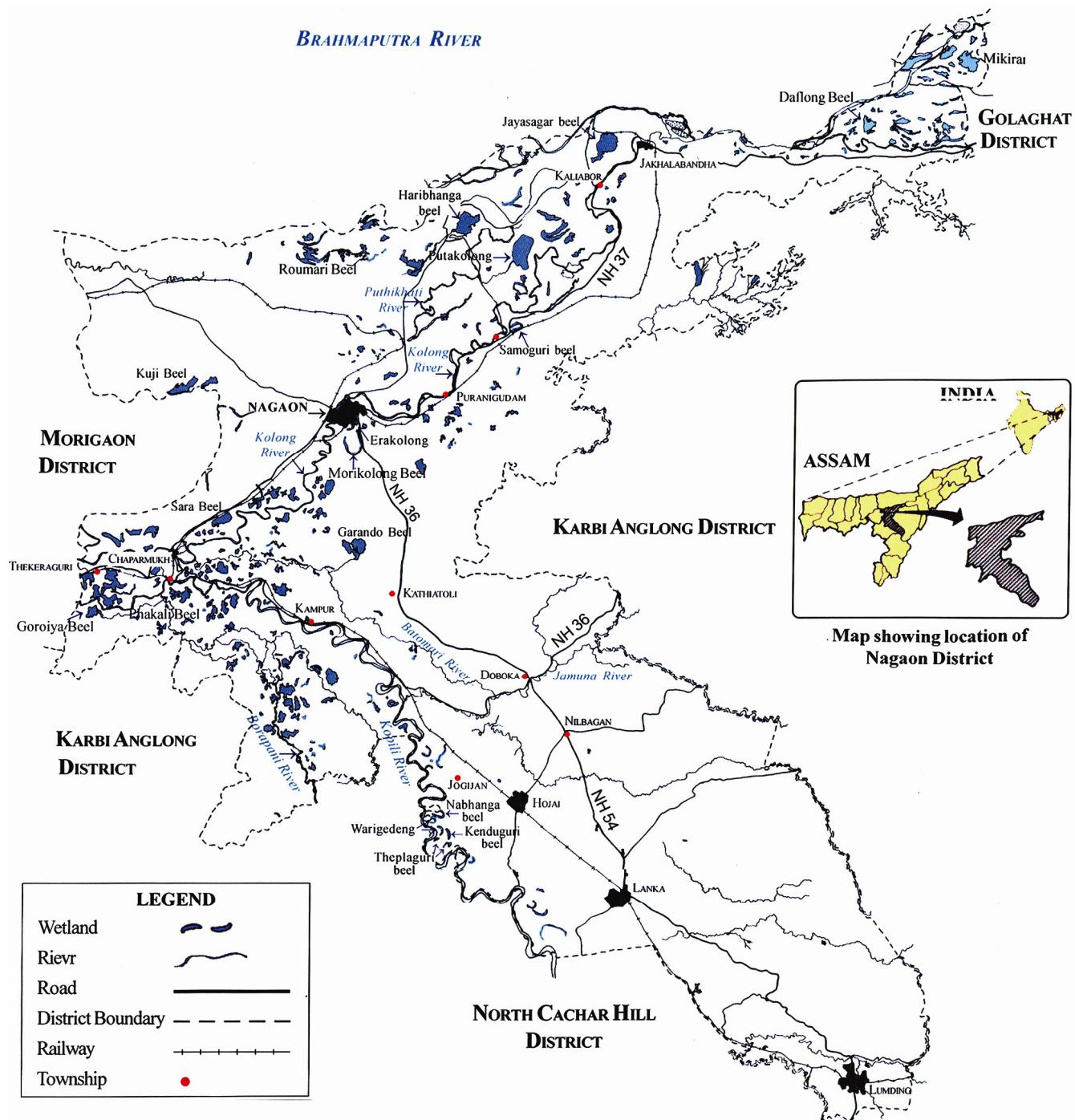


Fig. 1—Location map of study area

of fisherman community reside nearby these wetlands. The study has been carried out to record the wetland resources of Nagaon district of Assam, which provide supports to the rural people of the area for their sustenance.

Methodology

For the study conducted during January 2001–December 2002, the wetlands were visited very frequently. The aquatic macrophyte species identified by consulting the recognized Herbaria of the region⁷.

To find out the resources used by the rural people of the areas, sufficient numbers of people from different communities were interviewed. Questionnaires having the information regarding the various uses for plants and other resources were collected. Even people collecting the resources at the study sites were also interviewed.

Results and discussion

It has been found that most of the inhabitants around the study sites are from economically poor section and the communities are *Assamese*, *Bengali Hindu*, *Bengali Muslim*, *Bihari*, *Dimasa* (tribe), *Monipuri* (tribe and general castes) and *Nepali*. A major portion of these communities belong to fisherman families and their main occupations are fishing, agriculture, sericulture and cattle, goat and duck rearing, etc. Regarding the origin of these wetlands, the Morikolong and Samaguri *beels* were formed by the abandoned path of the river Kolong during course of time and the Nabhangha *beel* was formed from the abandoned path of the river Kopili, while the Haribhangha *beel* was formed due to the tectonic depression of earth surface. Large tree species are planted at its bank by the local people for the protection of this wetland from siltation. Some of the ritual and cultural practices associated with these wetlands of Nagaon district include bringing their cattle to the wetlands for bathing and washing during the month of April (*Bohag Bihu*), collect water for marriage ceremony, community fishing during the month of February (*Magh Bihu*), arrange *drama* during *Ras* festival in winter season on its banks, etc.

The abiotic resources have been extracted from these wetlands and utilized in various ways by the local residents. For instance, water from the wetlands is used to irrigate the nearby paddy fields during water scarcity. Some poor people of the rural areas have also found to use such water for drinking purposes by filtering through sand filters. Most people use these wetlands for bathing, washing clothes and also washing their domestic animals. Since, the wetlands are rich in plant and animal resources, people often visit to collect their traditional medicinal plant species, raw materials for small scale industries, vegetables, flowers, seeds, rhizomes, fodder, etc. (Fig. 2-11) Altogether, 53 plant species were found to have utilization for various purposes like medicine (32 species),

vegetables (9 species), fruits (6 species), fodder (9 species), biofertilizer (3 species), small scale industries (7 species), religious functions (5 species), etc. *Nymphaeaceae* is the largest family containing maximum number of species (5 species) having utilization of the people, which is followed by *Pontedariaceae* and *Cyperaceae* (4 species each), and others (Table 1).

Conclusion

Local people derived maximum economic benefits from the fish resources. The natural wetlands of the district are rich in fish fauna. But most of them have been gradually converted to commercial fisheries, and nurtures only the high yielding fish species. The indigenous and migratory aquatic birds and animals are illegally trapped or killed and eaten or sold in market at very high price. This is a major cause for which the diversity of local fauna and migratory aquatic birds has been alarmingly reduced in the wetlands of the district and in a gradual process of extinction. Besides these direct benefits, people also get benefited from these wetlands, as these have been used as sites for recreation. During the investigation, some threats and causes of degradation have been observed, which include extensive exploitation of fish resources and conversion of these natural wetlands into commercial fisheries, etc.; shrinkage of wetlands due to encroachment for residential and commercial developments, construction of roads and buildings, agricultural activities, etc.; the diversity of aquatic flora and fauna have gradually been decreased due to man made activities like hunting or poaching of aquatic birds and animals; and extensive grazing on the banks, edges or boundaries of the wetlands. Increasing population of the district is a major cause of shrinkage of the wetland areas as the people occupy and fill part of the wetlands for residential construction. It has been found that most of the people get benefited from the wetlands of study sites by utilizing the resources in their day to day life. But it has been observed that most of the natural wetlands of the district are gradually degraded due to anthropogenic activities. Therefore, conservational measures should be adopted to save these important wetlands upon which a major portion of local people depend for their day to day necessities and also for their livelihood.

Fig 2 *Hygrorhiza aristata*Fig 3 *Ipomoea aquatica*Fig 4 *Nymphoides indica*Fig 5 *Nelumbo nucifera*Fig 6 *Neptunia prostrata*Fig 9 *Ipomoea fistulosa*Fig 7 *Nymphaea lotus*Fig 8 *Nymphaea rubra*Fig 10 *Trapa natans* var. *bispinosa*Fig 11 *Schumannianthus dichotoma*

Table 1—Aquatic plant species and their uses from Nagaon district of Assam
(A= Assamese, BH= Bengali Hindu, BM= Bengali Muslim, B= Bihari, D= Dimasa, M= Monipuri, N= Nepali)

Plant name/ Family	Local name	Uses
<i>Acorus calamus</i> Linn. Araceae	<i>Boss</i>	Rhizome is used in diarrhoea, inflammation, fever, bronchitis and epilepsy of children. Its juice is applied in rat biting and in ear problem (D). Leaf aroma is given inhaled by children during cold (A).
<i>Aeschynomene aspera</i> Linn. Liguminosae	<i>Kuhila</i>	The soft pith (locally known as <i>Kuhila</i>) is used in making cork, hats, corks, toys, and fishing apparatus (A, BM).
<i>Aeschynomene indica</i> Linn. Liguminosae	<i>Kuhila</i>	Low quality soft pith is used in making hats, corks, toys, etc. (BM, N).
<i>Alpinia galanga</i> (L.) Willd. Zingiberaceae	<i>Tora</i>	Rhizome is used as condiment and seeds as spice (D, N).
<i>Alocasia fornicata</i> (Roxb.) Schott. Araceae	<i>Kola kochu</i>	Consumed as vegetable. Petioles are used in ear problems (A).
<i>Alternanthera philoxeroides</i> (Mart.) Griseb. Amaranthaceae	<i>Tita helonci</i>	Juice of younger twigs is given to cure worm problem and paste is applied on wounds of cattle (N). It is also consumed as vegetable (A). Twigs are given in jaundice and liver problems. It is also a very tasty vegetable (A).
<i>Alternanthera sessilis</i> (L.) DC. Amaranthaceae	<i>Mati kanduri</i>	Used as biofertilizer (A, BM).
<i>Azolla pinnata</i> R.Br. Azollaceae	<i>Guri puni</i>	Rhizome is used in marriage ceremony (D).
<i>Carex muricata</i> Linn. Cyperaceae	<i>Biyani bon</i>	Paste is used as a cooling agent and eaten in biliousness and also applied in scorpion biting (BM). Fruits are eaten by wild ducks.
<i>Cerratophyllum demarsum</i> Linn. Cerratophyllaceae	<i>Sial bhabora</i>	Used as fodder. Stem juice is applied to stop bleeding of cuts and eyelid sore. Roots are given in fever, bilious affection, snakebite and leprosy (A).
<i>Commelina benghalensis</i> Linn. Commelinaceae	<i>Kona simolu</i>	Stem juice is applied to stop bleeding of wounds, cuts, etc. (A). Also used as good fodder.
<i>Commelina diffusa</i> Burm. Commelinaceae	<i>Kona simolu</i>	Stem is used for making mats (A, BH).
<i>Cyperus corymbosus</i> Rottb. Cyperaceae	<i>Uria bon</i>	Stem is used for making fine mats (A).
<i>Cyperus pilosus</i> Vahl. Cyperaceae	<i>Sereka bon</i>	Leaf juice is used as ink, dye hairs, applied on wounds and skin disease of cattle (A). Fresh leaves are given in elephantiasis and jaundice (D). Tender shoots are consumed as vegetable (A).
<i>Eclipta prostrata</i> (L.) Linn. Asteraceae	<i>Keheraj</i>	It is used as manure in potato fields (A).
<i>Eichhornia crassipes</i> (Mart.) Solm. Pontederiaceae	<i>Bih meteka</i>	Tender shoots as vegetable; for worms, stomach trouble and skin diseases (BH). Juice taken with milk is good for controlling blood pressure (A).
<i>Enhydra fluctans</i> Lour. Asteraceae	<i>Helesi saak</i>	Fruits are eaten (A); roasted seeds (<i>Makhana</i>) used in religious purposes and eaten. Powdered seeds are mixed with flour to make breads (BH).
<i>Euryale ferox</i> Salib. Nymphaeaceae	<i>Nikori</i>	Leaf juice is used as poultice for callous ulcers, as antiseptic and to wash the wounds (D).
<i>Hydroclea zeylenica</i> (L.) Vahl. Hydrophylaceae	<i>Hilotra</i>	A good fodder. Seeds are used as cooling agent; an astringent to urinary tract (A, D).
<i>Hygrorhiza aristata</i> (Retz.) Nees. Poaceae	<i>Petuli dol</i>	Used as fodder for cattle, buffalos, etc. (A, BH,B,BM).
<i>Hymenechne assamica</i> Hith. Poaceae	<i>Dol ghah</i>	Twigs eaten as vegetable; leaf juice is given for blood purification (A).
<i>Ipomoea aquatica</i> Forsk. Convolvulaceae	<i>Kolmou</i>	Stems are dried and used as fire wood (B, BH, BM).
<i>Ipomoea fistulosa</i> Mart.ex Choisy. Convolvulaceae	<i>Amar lata</i>	Used as fodder (A).
<i>Leersia hexandra</i> Swartz. Poaceae	<i>Erali bon</i>	Food for fish and ducks; as green manure in paddy fields (A).
<i>Lemna perpusilla</i> Torrey. Lemnaceae	<i>Soru puni</i>	Plant is used as antiseptic and used in elephantiasis (BM).
<i>Limnophila chinensis</i> (Osb.) Merrill. Scrophulariaceae	<i>Jumoni</i>	

Contd.

Table 1—Aquatic plant species and their uses from Nagaon district of Assam—(Contd.)
 (A= Assamese, BH= Bengali Hindu, BM= Bengali Muslim, B= Bihar, D= Dimasa, M= Monipuri, N= Nepali)

Plant name/ Family	Local name	Uses
<i>Lindernia crustacea</i> (L.) F. Muller.	<i>Hikota</i>	Leaf juice is given in dysentery and ringworm infection (BH).
Scrophulariaceae		
<i>Ludwigia adscens</i> (L.) Hara.	<i>Pani khutura</i>	Leaf juice is given in jaundice and skin disease (A,D).
Onagraceae		
<i>Ludwigia octovalvis</i> (Jack.) Raven.	<i>Pani long</i>	Leaf juice is given to expel intestinal worm; jaundice and liver problems. Plant extract with milk is given for dysentery and viral fever (A).
Onagraceae		
<i>Ludwigia perennis</i> Linn.	<i>Pani long</i>	Plant boiled with coconut oil is applied externally for reducing fever (BM).
Onagraceae		
<i>Marsilea quadrifolia</i> Linn.	<i>Pani tengesi</i>	Tender shoots are used as vegetable (D).
Marseliaceae		
<i>Monochoria hastata</i> (L.) Solm.	<i>Kar meteka</i>	A cooling agent; leaf juice is used for curing boils (A).
Pontederiaceae		
<i>Monochoria vaginalis</i> (Burm. f.) Presl.	<i>Pani meteka</i>	Roots are used in toothache and stomach trouble. Bark is eaten with sugar in asthma (A).
Pontederiaceae		
<i>Monochoria vaginalis</i> var. <i>Plantaginea</i> Solm.	<i>Bhat meteka</i>	Used as manure in paddy fields; tender leaves are used as vegetable (A).
Pontederiaceae		
<i>Murdannia loriformis</i> (Hassk.) Rao & Kam.	<i>Dighali kona</i>	Juice of the plant is laxative; used in eyelid boils (A). Plant is used as fodder.
Commelinaceae		
<i>Najas indica</i> (Willd.) Cham.	<i>Pani likosi</i>	Important food plant for fish and used as packing material (A, BM).
Najadaceae		
<i>Nelumbo nucifera</i> Gaertn.	<i>Podum</i>	Leaves and flowers used in religious and cultural purposes; tender leaves used as vegetable; milky sweet seeds are eaten. Roots are given in small pox and dysentery (A,BH,D).
Nymphaeaceae		
<i>Neptunia prostrata</i> (Lamk.) Baillon.	<i>Pani lajuki</i>	It is used in curries and also as salad (<i>Chatni</i>) with dry fishes (M).
Mimosaceae		
<i>Nymphaea lotus</i> Linn.	<i>Boga bhet</i>	Flowers in religious purposes; rootstocks and seeds are edible; roots are given in piles (A,BH).
Nymphaeaceae		
<i>Nymphaea rubra</i> Roxb. Ex Salib.	<i>Ronga bhet</i>	Cultivated as an ornamental plant. Flowers in religious purposes. Roots are given against vomiting (A, BH).
Nymphaeaceae		
<i>Nymphaea stellata</i> Willd.	<i>Bhet</i>	Rhizome juice is given as cardiotonic (A).
Nymphaeaceae		
<i>Nymphoides cristatum</i> (Roxb.) O. Kuntze.	<i>Pan chuli</i>	Leaf juice is given in jaundice and skin infections (A, BH).
Hydrocharitaceae		
<i>Nymphoides indicum</i> (L) O. Kuntze.	<i>Bora chuli</i>	Plant is used as antiscorbutic. Leaf juice is given in jaundice and skin infections (A, BH).
Hydrocharitaceae		
<i>Pistia stratiotes</i> Linn.	<i>Bor puni</i>	Leaf juice boiled in coconut oil is used in chronic skin diseases; juice with sugar is given for asthma and cough. Ashes are applied to the ring worm of the scalp (A, BM).
Araceae		
<i>Polygonum orientale</i> Linn.	<i>Bihlongoni</i>	Leaf juice is applied to cure wounds, to poison fish in the ponds (A,BM, D).
Polygonaceae		
<i>Polygonum hydropiper</i> Linn.	<i>Pothorua</i>	Leaf juice is used in skin diseases and in uterine disorder (A).
Polygonaceae	<i>bihlongoni</i>	
<i>Ranunculus sceleratus</i> Linn.	<i>Leheti</i>	Plant juice is used in rheumatism, sciatica, asthma and to expel intestinal worms (A).
Ranunculaceae		
<i>Rumex nepalensis</i> Spreng.	<i>Bon paleng</i>	Leaf paste is applied in burnings (A, BH).
Polygonaceae		
<i>Scirpus grossus</i> Linn.	<i>Ghugol</i>	Stem is used in making fine mats; hard ropes are made of the dried stems to tie different goods (A, BH).
Cyperaceae		
<i>Schumannianthus dichotoma</i> (Roxb.) Gagneb.	<i>Pati doi</i>	Fine mats (locally known as <i>Sitol pati</i>) are prepared from stem (A, BH).
Marantaceae		
<i>Spilenthes clava</i> DC.	<i>Suhoni</i>	Flowers are chewed to get relief from tonsillitis and toothache (A, BH).
Asteraceae		
<i>Trapa natans</i> (L) var. <i>bispinosa</i> Roxb.	<i>Singori</i>	Seeds are eaten raw as they are rich in starch (A, BH).
Trapaceae		
<i>Vallisneria natans</i> (Lour.) Hara.	<i>Pata ghah</i>	Used as a stomachic and for leucorrhoea (BM). Also used as food for fishes.
Hydrocharitaceae		

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