

Ethnobotanical notes of the *Rabha* community in Mataikhar reserve forest of Kamrup district, Assam, India

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Available online at: www.isca.in, www.isca.me

Received 29th September 2013, revised 21st November 2013, accepted 10th December 2013

Abstract

The pattern of interactions between people and forest constitutes key issue for conservation of protected areas. Ethnobotanical knowledge of the Rabha ethnic group residing in fringe area of Mataikhar reserve forest in Kamrup district, Assam is presented here. Field study design included Rapid Ethnobotanical Appraisal method; village walks and walk along forest transect with key informants, group discussion with women and interview of traditional healers. Though agriculture is the mainstay of the forest Rabhas wild plant resources collected from Mataikhar reserve forest is indispensable for food security, medicines and socio-cultural well-being. Their cultural practices of resource utilization and beliefs have elements of sustainability which acted as natural deterrents against over exploitation. Value addition of local products can contribute to food security, health and well-being of rural mass and forest people. Studies on people-forest interactions must incorporate the role of women because despite being active users of biodiversity their invaluable contribution remained neglected in many instances.

Keywords: Rabha tribe, mataikhar forest, plant resources, cultural practices, conservation.

Introduction

Plant-human interactions has been in existence since antiquity but recognition of such relationship as a distinct field of study was realized only in 1895 with the introduction of the term "Ethnobotany" by Dr John Harshberger, University of Pennsylvania, in his address to the University Archaeological Association. He suggested Ethnobotany to describe "the study of plants used by aboriginal people"¹. Since then the scope of the subject has expanded tremendously and today ethnobotany is related with almost all field of studies. Ethnobotany has been variously defined and interpreted by subsequent workers; in the present paper we preferred to use the definitions of ethnobotany provided Jain and Wickens^{2,3}. Ethnobotany has many subdisciplines within the subject (ethnomycology, ethnoalgebra, ethnobotany, ethnochemistry, ethnoecology, ethnoentomology, ethnoepidemiology, ethnoethnobotany, ethnoethnobotany, ethnoethnobotany, ethnoethnobotany, ethnoethnobotany, etc) and at the same time interdisciplinary in nature (ethnopharmacology, ethnomedicine, ethnotoxicology, Ethnomusicology, Archaeoethnobotany and many more). Spiritual relationship of man with his environment is also studied under the broad realm of ethnobotany.

The North-Eastern region of India with diverse ethnicity and cultural diversity is a natural laboratory for ethnobotanical research. The present paper on ethnobotanical knowledge of the Rabha ethnic group in Mataikhar reserve forest of Kamrup district (25^o43' - 26^o51' N and 90^o36' - 92^o12' E), Assam is a contribution to the ethnobotany of the region. Mataikhar forest (figure-1) falls within the Loharghat forest range under West Kamrup forest division. The vegetation is broadly classified into

semi-evergreen, evergreen and deciduous types. Considerable area of Mataikhar reserve forest (180 sq km) is covered by *sal* (*Shorea robusta* Gaertn.f.) vegetation which along with trees like *Dillenia*, *Terminalia*, etc form top canopy. The continuity of *sal* vegetation is interrupted by deciduous trees and bamboo stands. Important timber species are *Terminalia myriacarpa* Van Heurck & Müll. Arg., *Dalbergia sissoo* Roxb. ex DC. while bamboo species include *Bambusa tulda* Roxb., *B. pallida* Munro and *Dendrocalamus hamiltonii* Nees et Arn. ex Munro. The forest support wide range of fauna that includes leopard, show loris, Assamese macaque, elephants, variety of butterflies, moths, and other insects. During walks along forest transects we recorded 12 vulture nests on the top of *sal* (*S. robusta*) trees; this is encouraging as vulture population is fast declining from natural habitat.



Figure-1

A view of Mataikhar reserve forest in Kamrup district, Assam

Rabhas are one of the scheduled tribes of Assam. They are largely concentrated in Goalpara, Kamrup and Darrang districts and also scattered in the neighbouring states of Meghalaya and West Bengal. Rabhas belong to the Indo-Mongoloid group of people and have similarities with other members of Bodo group such as Garo, Kachari, Mech, Koch, Hajong and others⁴. The Rabha society is matriarchal, so the family lineage is traced through the female members. Their traditional religion is animistic with rituals as its integral part. Diseases and sometimes natural calamities are considered as manifestations of gods or deities; rituals are performed to invoke these deities and in a few cases require blood sacrifice of domestic animals like poultry fowls, pigs or goat. Their traditional religion also believes in immortality of soul and rebirth. However, today many Rabhas have embraced Christianity. Influence of mainstream Hinduism can be observed among the Rabhas living in the plains. Traditional religion is more prevalent among the Rabhas in the hills (also referred as forest Rabhas). Marriage is clan exogamy which prohibits marriage between a boy and a girl from the same clan. The village economy is based on agriculture and both men and women work in the fields. Weaving is also another important occupation but it is exclusive domain of women folk. Rabhas of Mataikhar reserve forest is largely dependent on agriculture for their sustenance. We hypothesized 'the Rabhas developed valuable ethnobotanical knowledge base for sustainable utilization of plant resources which sustained their population for many decades, despite insufficient agricultural land'. People-forest interaction in protected area is important area of ethnobotanical investigation around the world⁵⁻¹³. Ethnobotanical studies have already provided leads to discovery of many useful drugs¹⁴. The present investigation gains importance as ethnobotanical report of the Rabhas is scarce; besides inclination towards biomedicines and synthetic products threatens their traditional knowledge systems. The ethnobotany of the Rabhas did not receive much scientific investigation as compared to other cultures in Assam except a few mentions of their plant knowledge in some reports¹⁵⁻¹⁸. The present paper is an ethnobotanical appraisal and also as reference to researchers who wish to undertake further investigation on ethnobotany of the Rabhas and plant-people interactions in protected areas.

Material and Methods

Field study was undertaken among the forest Rabhas in the fringe area of Mataikhar reserve forest during October 2011 to May 2013. The forest folks are settled in about 150 households organized into three forest villages of Deopani, Kanapana and Hanapana. Verbal consent of community elders was obtained in accordance with ethics of ethnobiological research¹⁹. The study design included Rapid Ethnobotanical Appraisal method and involved informants of different age groups, to make an inventory of plant knowledge and use pattern among the community²⁰. The technique also included village walks and walk along forest transects with key informants. Group discussion with women was arranged to document gender

specific ethnobotanical knowledge while traditional healers (*Ojas* and *Bezas*) were consulted to record folk healing practices and ethnomedicines. Information collected as above was substantiated through personal observations by camping in the study area and by attending social and religious occasions. All information (local names, parts used, preparation or processing, taboos, rituals, and other relevant data) were recorded in field diary during the study. Plant specimens reported by the informants were collected from local environment and forest for botanical identification and then prepared into voucher specimens²¹⁻²³.

Results and Discussion

Ethnobotanical data of the Rabha ethnic group is scattered in a few ethnobotanical reports. Forest Rabhas in the fringe area of Mataikhar reserve forest have been practicing sustainable utilization of natural resources from the protected area and that enabled their sustenance despite insufficient agricultural land. Agriculture still constitutes the main source of economy but forest resources are indispensable for food security, medicines and socio-cultural well-being of the forest Rabhas. Wild plants and cultivated species supplement their diet and nutrition and to a lesser extent their economy. *Amaranthus viridis* L. and *Diplazium esculentum* (Retz.) Swartz stand out among the well known plant foods collected by members of all age groups. *Oxalis corniculata* L. is common food from agricultural fields and forest edges; *Catimbiium malaccense* (Burm. f.) Holtt., *Ipomea aquatica* Forst. and *Colocasia esculenta* (L.) Schott are resources often collected from wetlands; fruits and mushrooms are collected from forest. We have not observed specific practices for conservation of natural resources but their cultural practices and beliefs have elements of sustainability which acted as natural deterrents against over exploitation. Domestication can be a good option in creating more resources to meet the ever increasing demands. Future studies on people-forest interactions must take into account the role of women in biodiversity utilization and conservation; despite being active users of biodiversity their invaluable contribution remained neglected in many instances.

Agricultural practices: Rabhas of Mataikhar forest are mainly agriculturists and practice *jhum* (slash and burn) in forest and wet cultivation in their limited arable land. Both *Ahu* (summer paddy) and *sali* (winter paddy) paddy is cultivated. Cultivation practice is non-mechanised; they use locally prepared wooden implement called *nangal* as plough being driven by a pair of oxen or buffaloes. *Cedrela toona* Roxb. ex Rottler and Willd., *Alsotonia scholaris* (L.) R. Br. and *Bauhinia purpurea* L. are common plants for agricultural tools. Rabha folk also cultivate jute (*Corchorus olerarius* L.) for domestic needs and for commercial purpose. In homestead gardens they grow maize, pulses (*Cajanus cajan* (L.) Millsp., *Vigna mungo* (L.) Hepper and *Pisum sativum* L.), cucurbits, mustard, radish, brinjal, chili, tomato and many more to supplement their food basket. Many families do not achieve sufficient produce from agriculture to

feed the whole year and this demands utilization of forest resources for subsistence. To meet food security some youths engage in manual labors in other villages and nearby towns. Some sell produce of home gardens in local markets to generate cash income while still some collect wild foods from agricultural fields and forest, and then sell them in markets. Plain Rabhas have settled agriculture with good production and do not encounter food insecurity of the intensity that Rabhas in the present study area face. Rabhas are fond of fish which form an indispensable part of their meal. Fishing implements like *jakhoi*, *khole*, *thoha*, *polo* and *sepa* are made from bamboo.

Ethnobotanical knowledge of food plants: Cultivated as well as wild plants are consumed during different times of the year as food or as herbal preparations. Among the prominent families of food plants are Solanaceae, Cucurbitaceae, Brassicaceae and Araceae. Common vegetables for example tomato, lady's finger, coriander, brinjal, aroids, ginger and turmeric are grown in kitchen gardens. But plant produce in homestead gardens do not last for the whole year and people had to gather wild edible plants during the lean season. Mataikhar forest supplies wide variety of wild foods that include largely angiosperm families and a few cryptogams like mushrooms and ferns. Almost all parts are gathered for consumption- leaves, shoots, flowers, fruits, seeds, tubers and roots. Wild plants are also foraged to diversify their diet and nutrition but pattern of utilization is highly varied. Generally oil is seldom used in cooking leafy greens; instead salt and garlic is first fried and then plants are added and cooked. Plants like aroids required specific method of cooking to process calcium oxalate crystals which is highly irritating. Roots and tubers gathered for consumption belong to the families- Araceae (species of *Colocasia* and *Alocasia*) and Dioscoreaceae (*Dioscorea* species). Many farmer varieties of *Colocasia esculenta* (L.) Schott is cultivated by the folk while many wild varieties are also collected for consumption. Musaceae and Araceae are common source of edible flowers from managed gardens as well as wild habitats. Inflorescence of *Musa* fetch good commercial value in markets. *Amaranthus viridis* L. and *Diplazium esculentum* (Retz.) Sw. stand out among the well known plant foods collected by members of all age groups. *Oxalis corniculata* L. forms common food from agricultural fields and forest edges; *Catimbiium malacense* (Burm. f.) Holtt., *Ipomea aquatica* Forst. and *Colocasia esculenta* (L.) Schott are resources often collected from wetlands; fruits and mushrooms are collected from forest. *Artocarpus heterophyllus* Lamk., *Dillenia indica* L., *Annona squamosa* L. and *Musa* sp. are fruits gathered from the forest. Wild seeds form potential source of diet and nutrition and during period of food scarcity as famine food. The families Sterculiaceae, Moraceae, Nymphaeaceae and Anacardiaceae are noted for edible seeds found in primary as well as secondary forests. An inventory of food plants used by the Rabhas of Mataithar forest is supplemented in table- 1. Among the use category that may be considered as food is rice-based alcoholic beverage locally referred as *Apong*. The latter is consumed not only is religious festivals, death, birth and marriage occasions

but also in day to day life as refreshing drink. To prepare *apong*, cooked rice is fermented with locally prepared *bakhor* or starter cakes and the beer so produced is consumed; *apong* is also served to guests as mark of honor and respect. Plants used and method of preparation of starter cakes and fermentation of rice was discussed by Deka and Sarma⁷. Another form of alcoholic beverage locally referred as *saimod* is also produced, but to a lesser extent than the general *apong*. In this process ash of partially burnt paddy straw is mixed with cooked rice and starter cake and the whole mass is placed in a container for fermentation. After 3-4 days beer of straw color is produced. *Saimod* is prepared only on special occasion of rituals and religious festivals during which important guests are entertained by offering this unique local *saimod*. The nomenclature *saimod* refers to the addition of ash (*sai* in Rabha dialect) to the substrate for fermentation. Some unconventional foods are gathered and consumed during period when staple food (i.e., rice) is exhausted. This group of food plants fits into the definition of famine foods; use of such wild foods is common in resource poor rural Rabha setting in Mataikhar forest. Among the wild plants consumed during famine include mainly yams; cultivated species include aroids, banana, maize, cucurbits, jack fruits and yams. The period during June to September is hungry months when granary of poor families is exhausted. Folks even engage in unconventional jobs in return for food. Natural calamities like less rain, and pests also compel forest Rabhas to look for alternative source of food other than from the forest.

Plant used in festivals and magico-religious practices: Religious festivals are elaborate among the Rabhas, including those in Mataikhar forest, which have been inherited from their forefathers. The *Rongdani* and *Maitory* Rabhas celebrate *Baikhoo* or *Khoksi* religious festival during *Baisakhi*. Plants like *Ocimum sanctum* L. (*Tulsi*), *Aegle marmelos* (L.) Corr. (*Bel*), *Cynadon dactylon* (L.) Pers. (*Dubori bon*), *Piper betel* L. (*pan*), etc are used in various festivals. *Tulsi* (*O. sanctum* L.), as in every Hindu households, is the most sacred plant of the Rabha people and said to be related to the god *Bishnu*. This plant is used in almost all worship and rituals. Forest Rabhas observe various festivals and ceremonies in connection with child birth, wedding, death and agricultural activities. *Pati* Rabha, a social clan of the Rabhas of South-East Kamrup district observes *Maraipuja* or *Merepuja* ritual to propitiate Goddess *Manase*. The *Hasong Puja* is performed in the month of October or November before paddy harvesting to offer prayer and extend thanks to the deity of crops. During *Hasong Puja*, offerings are made to the local deities *Laxmi*, *Langer*, *Tara Kanchu*, *Lakhi* and *Darmong* with sacrificial offerings like poultry fowls, goat, pig, and tortoise (figure-2). The *Grimbuda puja* is observed before the summer paddy (*Ahu*) blooms in the fields. *Baikhoo Puja* in the greatest festivals of the Rabhas which is performed during the full moon *Jeth Rangne* or popularly the *Jeth Purnima* (full moon night of *Jeth* month). Another religious festival is connected with the propitiation of *Kachai Khaiti* or the protector of all humanity. Some *Pati* Rabhas hold this festival simultaneously with the *Langa puja* also known as *Dinga puja*.

These festivals, which involve invoking of local deities, have of folk songs and traditional music (figure- 3). great cultural values; people make merry by dancing to the tune

Table-1
Inventory of food plants used by the Rabhas in Mataithar reserve forest, Kamrup district, Assam

Local Name	Botanical Name	Family	Uses
Bel	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Ripe fruits are taken raw
Man Kochu	<i>Alocasia macrorrhiza</i> (L.) Schott	Araceae	Rolled young leaves eaten cooked as vegetables
Khutura	<i>Amaranthus viridis</i> L.	Amaranthaceae	Young shoots eaten cooked
Bonoroi ada	<i>Amomum dealbatum</i> Roxb.	Zingiberaceae	Ripe fruits are taken
Anaros	<i>Ananas comosus</i> (L.) Merr.	Bromeliaceae	Tender shoots and leaves are used as vegetables
Ala Phol	<i>Annona squamosa</i> L.	Annonaceae	Ripe fruits are taken raw
Kathal	<i>Artocarpus heterophyllus</i> Lamk.	Moraceae	Fruit are taken raw; seeds eaten roasted
Kordoi	<i>Averrhoa carambola</i> L.	Averrhoaceae	Tender shoots as vegetables
Jati Banh	<i>Bambusa tulda</i> Roxb.	Poaceae	Tender succulent shoots are sliced into small pieces, cooked and taken.
Tara	<i>Catibium malaccense</i> (Burm. f.) Holtt.	Zingiberaceae	Young stem taken as vegetable or salad
Tezpat	<i>Cinnamomum tamala</i> Nees.	Lauraceae	Leaves used for flavouring curry
Kaghzi lebu	<i>Citrus aurantifolia</i> (Christm. & Panzer) Swingle	Rutaceae	Fruits are eaten raw
Gol lebu	<i>Citrus limon</i> Burm. f.	Rutaceae	Ripe and unripe fruits are taken raw
Bonoroi Kachu	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Rhizome and leaf stalks are cooked and taken.
Dhunia	<i>Coriandrum sativum</i> L.	Apiaceae	Tender leaves and fruits are used as condition
Gajor	<i>Daucus carota</i> L.	Apiaceae	Fruit are cooked or fried and taken
Outenga	<i>Dillenia indica</i> L.	Dilleniaceae	used as vegetable
Kath alu	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Tubers boiled for snacks or cooked and used as vegetables.
Gas alu	<i>Dioscorea haniltonii</i> Hk. f.	Dioscoreaceae	Bulbils are bitter but cooked for vegetables
Dhekia	<i>Diplazium esculentum</i> (Retz.) Sw.	Athyriaceae	Tender leaves eaten boiled or fried.
Thekra	<i>Garcinia pedunculata</i> Roxb.	Clusiaceae	Fruits are eaten raw
Gamari	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Flowers eaten cooked; bitter in taste
Kholmo	<i>Ipomea aquatic</i> Forst.	Convolvulaceae	Tender shoots fried and eaten
Lesu	<i>Litchi sinensis</i> Sonn.	Sapindaceae	Fruits are eaten raw
Bhol	<i>Luffa cylindrica</i> (L.) Roem.	Cucurbitaceae	Fruits are cooked and taken as vegetables
Poduma	<i>Mentha viridis</i> L.	Laminaceae	Aerial parts are used as <i>chutney</i>
Titakakiral	<i>Monordia charantia</i> L.	Cucurbitaceae	Fruit are cooked or fried and taken
Sajna	<i>Moringa oleifera</i> Lam	Moringaceae	Flowers cooked for vegetables
Bhim kal	<i>Musa balbisiana</i> Colla	Musaceae	Fruits eaten raw
Malbhog Kal	<i>Musa paradisiaca</i> AAB group	Musaceae	Ripe fruits taken raw
Kashkal	<i>Musa sapientum</i> L.	Musaceae	Green fruits used as vegetables
Tengesi tenga	<i>Oxalis corniculata</i> L.	Oxalidaceae	Aerial parts eaten boiled or as salad
Bhedalota	<i>Paederia scandens</i> (Lour.) Merr.	Rubiaceae	Tender shoots are cooked and used as vegetables
Khejur	<i>Phoenix dactylifera</i> L.	Araceae	Ripe fruits are taken raw
Pan	<i>Piper betel</i> L.	Piperaceae	Leaves are chewed with betel nut.
Madhuriam	<i>Psidium guajava</i> L.	Myrtaceae	Fruit are eaten; common fruits in village
Komona	<i>Pueraria tuberosa</i> (Willd.) DC.	Fabaceae	Used as vegetables
Dalim	<i>Punica granatum</i> L.	Punicaceae	Fruits are eaten raw
Tita Bhekri	<i>Solanum integrifolium</i> Poir.	Solanaceae	Bitter fruits cooked as vegetables
	<i>Sterculia villosa</i> Roxb.	Sterculiaceae	Seeds eaten rosated
Jam	<i>Syzygium cuminii</i> (L.) Skeels	Myrtaceae	Fruits are eaten raw
Tetli	<i>Tamarindus indica</i> L.	Caesalpiniaceae	Sour fruits are taken raw; tender shoots eaten cooked
Amra	<i>Terminalia tomentosa</i> Wt. & Arn.	Combretaceae	Ripe acidic fruits eaten raw
Ada	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Rhizome for flavouring curry and vegetables
Bogori	<i>Zizphus mauritiana</i> Lamk.	Rhamnaceae	Both ripe and unripe fruits eaten raw



Figure-2

Rabhas perform *Hasong* ritual to offer prayer to the deity of crops; the altar is made from *Saccharum* sp. and bamboo



Figure-3

Rabha youths performing traditional dance

Dye yielding plants and dyeing garments and yarns:

Extraction of dyes from natural resources and techniques of dyeing yarns and garments with diverse shades has been known to Rabha women since long. The traditional attires of the Rabhas are weaved on simple looms (today many families use improved looms). Rhizome of *Curcuma longa* L. is the most common source of yellow dye. *Ruphan*, traditional attire of women typically bright yellow is dyed with turmeric. Leaves of *Jetuka* (*Lawsonia inermis* L.) yield an orange dye. The leaves are grinded bright orange dye for coloring yarns is extracted by boiling in water. Yellow dye is extracted from calyxes of *Polash* (*Butea monosperma* (Lam.) Kuntze) for colouring yarns and cloth. The bark of *Bokal* (*Mimusops elengi* L.) yields brown color on boiling which is used for dyeing clothes.

Ethnomedicinal and Ethnoveterinary plants: The Mataikhar forest constitutes a repository of wild medicinal plants to local Rabha folk; medicinal plants used by them are enumerated in table- 2. Local ethnomedicinal prescriptions contain plants as major component which is used for treatment of various diseases. Elders take pride in possessing ethnomedicinal knowledge as such quality gives them status in the society. Bulk of medicinal plant knowledge is preserved by *bej* (medicine man) and *bejas* (medicine women) who prescribe cure for

almost all ailments. Being resource poor, forest Rabhas prefer traditional medicine as means of primary healthcare. They consider local medicines safe as the medicine men are from the same community and locality; but borrowing medicines from other communities is not uncommon. Common forms of herbal prescriptions include extract, powder, amulet and charms. Animal-based medicines are also practiced; for some ailments minerals are prescribed. The practice of traditional medicine is usually hereditary (though not mandatory) as the healer pass the knowledge to selective members of his or her family. The use of ichthyotoxic plants to stupefy fishes is part and parcel of fishing practice of the Rabhas; plant parts are pounded and immersed in water of shallow streams and small river water to stupefy fishes. *Bish Dhekia* (*Amphineuron* sp.) is the most common plant used for stupefying fish; the plant is locally available which grow as weeds along road sides, wastelands, wetlands and valleys.

In the present time, Rabha folk in the Mataikhar forest are dependent on modern medicines for treating cattle and diseases of other domestic animals. When asked to narrate history of animal rearing during group discussion, a few elders however, reported the use of plant medicines for treating animal ailments but the practice gradually declined particularly due to non-transfer of the knowledge; access to modern medicines almost put an end to traditional animal care practices. In the present time only a few medicinal plants for animal is in practice. Extract of leaves of *Musa sapientum* L. (*kal*) is given for dysentery; rhizome paste of *Curcuma longa* L. (*haldi*) is applied and bandaged in bone fracture, and sprains; inflammations are treated with leaf paste of *Lycopodium cernuum* L. (*badinglai*).

Plants used in construction: Rabhas of Mataikhar forest does not have much choice to select plants for construction purposes and for crafts particularly due to restrictions imposed by forest department. The construction patterns for houses are very simple; it is of rectangular shape and the posts may be from durable timbers (*Shorea*, *Terminalia*, *Gmelina*, etc) or mature bamboo stems. At the beginning four bamboo sticks each of 1.5 feet long are marked at four corners of the boundary. This is a preliminary work for ascertaining correctness of the angles. Other materials like *Sterculia* species (*Odal*), jute and stems of wild climbers are sources of cordages used for binding. The roof is thatched with grass; *Imperata cylindrica* (L.) P. Beauv. and *Saccharum spontaneum* L. are commonly used for this purpose. Walls are made mainly from *Phragmites kakra* (Retz.) Trin. ex Steud., *Saccharum* sp, *Panicum* sp, *Arundo donax* L. and bamboo splits. Wall is plastered with mixture of mud and cow dung. Villagers assist each other in building their houses without any remuneration. One invites his neighbors to help him in building house on co-operative basis which is known as *Saori*. This is unique co-operative system still prevalent in Rabha society. Commonly used plants for construction are *Artocarpus heterophyllus* Lam. (door and windows panels), *Cassia fistula* L. (preferred for post, very durable), *Cedrela toona* Roxb. (for posts and beams), *Dalbergia sissoo* Roxb. ex DC. (posts, door and windows panels), *Garcinia cowa* Roxb. ex

DC. (used as posts), *Gmelina arborea* Roxb. (preferred wood for plank, doors and windows panels), *Shorea robusta* Gaertn. f. (posts, plank and beams), and *Trema orientalis* (L.) Blume (cordage from bark). Among bamboo species *Bambusa tulda* Roxb. and *B. balcooa* Roxb. are common plant resources for construction.

Table-2
Enumeration of medicinal plants used by the Rabhas of Mataikhar forest

Local Name	Botanical Name	Family	Disease and Applications
Raisung	<i>Allium cepa</i> L.	Liliaceae	Leaf is warmed with mustard oil and applied on the forehead to relieve headache and cough in children.
Raisung bakai	<i>Allium sativum</i> L.	Liliaceae	Leaves are warmed in mustard oil and massaged over the body and throat for cough in children
Neem	<i>Azadirachta indica</i> Juss.	Meliaceae	Affected parts are massaged with neem oil in rheumatic pain and taken orally for worms
Akon	<i>Calotropis gigantea</i> (L.) Br.	Asclepiadaceae	Leaves given for Mumps and also to improve memory
Mothopho	<i>Carica papaya</i> L.	Caricaceae	Decoction of leaves is taken in case of muscle pain and jaundice
Manimuni	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Leaves are boiled and taken to improved poor memory
Kaghzi lebu	<i>Citrus aurantifolia</i> (Chr.) Sw.	Rutaceae	Lime juice is applied for sprains of legs and hands.
Nanikal	<i>Cocos nucifera</i> L.	Arecaceae	Tender coconut water and milk extract are taken for stomach ulcer
Dhania	<i>Coriandrum sativum</i> L.	Apiaceae	Seeds are given in abdominal pain and diarrhea
Haldi	<i>Curcuma longa</i> L.	Zingiberaceae	Paste of ginger and turmeric is warmed and applied on sprains; fresh rhizome of turmeric is given for anemia
Dhatura	<i>Datura stramonium</i> L.	Solanaceae	Paste of fruits is applied locally in canine bites.
Gajor	<i>Daucus carota</i> L.	Apiaceae	Root is taken raw; it is said to increase eyesight.
Jam	<i>Syzygium cuminii</i> (L.) Skeels	Myrtaceae	Powder of dried fruit pulp with sugar is given in blood dysentery
Thekra	<i>Garcinia pedunculata</i> Roxb.	Clusiaceae	Dried slices of fruits are soaked in water and the juice is given in blood dysentery
Jobaphol	<i>Hibisus rosa-sinensis</i> L.	Malvaceae	Boiled juice of flowers is mixed with honey and taken for heart problem
Sajona	<i>Moringa oleifera</i> Lam.	Moringaceae	Juice of leaves are applied frequently to remove black head pimples
Poduma	<i>Mentha arvensis</i> L.	Lamiaceae	Leaf juice are used in abdominal pains, fever, heart burn, jaundice and poor digestion
Nahar	<i>Mesua ferrea</i> L.	Clusiaceae	Paste of flowers applied on cuts to stop bleeding; also used in piles
Kaljira	<i>Nigella sativa</i> L.	Ranunculaceae	Seeds for piles, headache, inflammations
Tulsi	<i>Ocimum sanctum</i> L.	Lamiaceae	Paste of fresh leaves rubbed over infected skin
Kal tulsi	<i>Ocimum basilicum</i> L.	Lamiaceae	Paste of feaf applied in Acne and pimples
Paduni lewa	<i>Paederia scandens</i> (Lour.) Merr.	Rubiaceae	Extract of leaves given orally to patients for chronic dysentery
Khejur	<i>Phoenix dactylifera</i> L.	Arecaceae	Fruits take in indigestion and cough
Pan	<i>Piper betel</i> L.	Piperaceae	Castor oil is smeared on leaves, warmed and applied on affected areas for arthritis, cold, cough and headache
Debdaru	<i>Polyalthia longifolia</i> Sonn.	Annonaceae	Bark given during menstrual disorders
Dalim	<i>Punica granatum</i> L.	Punicaceae	Seed are mixed with ghee and taken in dysenteny
Golap	<i>Rosa centifolia</i> L.	Rosaceae	Seeds are boiled in a water, stained and taken in anemia
Chirata tita	<i>Swertia chirayita</i> (Roxb. ex. Flem.)	Gentianaceae	Juice of leaves or infusion of the dried part given in fever, indigestion, skin disease
Laung	<i>Syzygium aromaticum</i> L.	Myrtaceae	Powder of fried seeds taken with water for nausea, cholera, gas problems
Orjun gos	<i>Terminalia arjuna</i> (Roxb. ex. DC.) Wt. & Arn.	Combretaceae	Bark is immersed in a glass of water for overnight and the extract is taken in diabetes.

Medicinal plants used for gynaecological problems: Rabhas of Mataikhar forest, and their counterpart in the plain areas, is concerned about women reproductive health. Irregular menstruation, miscarriage, poor lactation, family planning and post natal complications are commonly encountered gynaecological problems. Though they have access to modern medicine poor households have to depend on ethnomedicines and cultural practices to manage women health. *Abrus precatorius* Gaertn. f., *Ricinus communis* L. and *Amaranthus spinosus* L. are common botanical medicines for birth control. Powder of seeds of *A. precatorius* is mixed with the crushed seeds of *R. communis* and the mixture is diluted with water and taken orally during menstruation. Leaf extract of *A. spinosus* is mixed with the root juice of *Musa paradisiaca* L. taken orally as abortifacient.

Carica papaya L. is a common remedy to increase flow of breast milk. Powder of the root bark is taken orally or unripe fruits is cut into pieces and boiled with little salt and consumed to increase lactation. For post natal wounds the Rabhas depend on the natural healing capacity of the body as medicines are seldom used for the purpose. Juice of poultry meat cooked with *Piper nigrum* L. is often given to mother to regain strength. We suspect informants have withheld some information regarding botanical medicines for gynaecological problems. Because during group discussion, some women claimed to possess complete gynaecological knowledge but were hesitant to describe certain major practices on the pretext of taboo or referred to women who have expired recently. This may be a mechanism to protect their cultural knowledge; they fear disclosing secrets will render them less important, they also fear the information may be misappropriated.

Conservation of plants resources: We have not observed specific mechanism for conservation of biodiversity but their cultural practices and beliefs have elements of sustainability. There are wide range of animistic conceptions associated with vegetation, sacred plants and forest worship among the forest Rabha community. They believed in supernatural power and consider unique vegetation, unnatural grove, forest with rare plant, etc are the dwelling place of supernatural powers and ancestral souls. And any injury to these plants brings incurable disease which may lead to death. As a result some trees are not harmed for which the plants grow till its natural death. Such cultural beliefs thus, indirectly helped in conservation of certain species in their locality. Some example of such plants under fetishism is *Dillenia indica* L., *Mangifera indica* L. and *Ficus benghalensis* L. People take pride in presence of large trees in the vicinity of village and even name the place in honor of such tree, a unique culture of mankind. Medicine men never uproot or pluck the whole plant or gather the medicinal parts from single population; this gives ample scope for regeneration of plants. A common practice among the Rabha medicine men is they do not introduce the medicinal plants to common people with the pretext that the latter lack knowledge of sustainable collection/harvesting and conservation ethics; this contribute

towards conservation of important medicinal plants particularly rare and endangered species. Certain plants (food, medicines, etc) which have rare distribution in the wild are planted in home gardens to ensure regular supply of medicines and do away the need to travel to forest frequently; such practice can lead to domestication and ease pressure on Mataikhar forest, the only repository of wild plants for local forest Rabhas.

Conclusion

The nature of people interactions with forests is critical for sustainability and conservation. In many instances the intensity of exploitation exceeds beyond the carrying capacity of the natural ecosystems. The present study in the fringe area of Mataikhar forest reflect sustainable and optimum utilization of resources by the forest Rabhas. Value addition of local products can contribute to food security, health and well-being of rural mass and forest people. Mechanism of transmission of traditional knowledge of plant use in traditional societies is an interesting area worth investigating. Further, studies on people-forest interactions must incorporate the role of women because despite being active users of biodiversity, their invaluable contribution remained neglected in many instances. It may be mentioned that, men folk remains outside the house for most part of the time and women take care of the needs of the family. In doing so, women had developed knowledge of plant use; they are exposed to more diversity of natural resources than their male counterpart and so obviously have superior knowledge of plant use. Cultural practices of resource utilization should be encouraged among forest dwellers; such practices have elements of sustainability and also act as natural deterrents against over exploitation.

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