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RESEARCH ARTICLE

DIVERSITY AND UTILISATION OF NON-TIMBER FOREST PRODUCTS OF TINSUKIA DISTRICT OF ASSAM, INDIA.

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Abstract

Tinsukia district of Assam (India) is rich in natural wealth. The district has total forest area about 1,55,97,900 hector which includes one Biosphere reserve, one National Park, two Wildlife Sanctuaries and thirty five Reserve Forests. A good number of villages are situated in and around these forests. Major part of the population of the district is dependent directly or indirectly on the forest resources. Non-Timber Forest Products (NTFPs) are remarkably contributing to livelihoods of the people living near the forest areas. They are collecting wild edible plants & plant's parts, fire wood, medicine, condiments, house building & thatching materials, broom, fiber, resin, fodder plants, etc. for their domestic use as well as for trade. NTFPs, like wild edible plants are of great demand, especially in the urban areas. This ever increasing demand of NTFPs is creating a potential threat of over exploitation to the forest resources. But, judicious use of NTFPs may provide a regular source of income & employment to a large section of the society across age group in the district.

Introduction:-

Forests have been providing timber as well as non-timber products to the mankind since time immemorial. These Non-timber Forest Products (NTFPs) include medicinal plants, wild edible plants & plant's parts, fuel wood, fodder & forage, house building & thatching materials, condiments, colouring materials, fibers, rubber, beverages & narcotics, latex, tannin, resin, etc. In developing countries, like India, Non-timber Forest Products are valuable resources for rural livelihood. According to FAO Report 1995, "Non-timber Forest Products (NTFPs) are important tools for addressing poverty issues for the marginalized, forest dependent communities, contributing to livelihoods, including food security, income, health and sustainable human development". Globally, an estimated 350million people mostly in developing countries depend on NTFPs as their primary source of income, food, nutrition and medicine (UNDP, 2004). Socio-economic importance and the value of NTFPs in the economics of tropical countries are now well recognized. In almost all tropical countries, the collection of NTFPs is a major economic activity (Ambrose, 2003) and about 500 million people living in or near forests being depended upon them for their livelihood needs (Alexander, et al., 2002). A report from the Ministry of Environment and Forests, in 2010- 2011, estimated that about 100 million people in India depend on various forest products other than timber, which in turn generates Rs 20 billion in government revenue (Dattagupta, et al., 2014). An estimated 50 million economically marginalized forest dwellers in India harvest large quantities of NTFPs for their subsistence as well as for trade

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(Hegde, et al., 1996). In India, 90% of the plants supplied to the international market are from wild stock (Mishra, et al., 2009).

Since the early 1990s the role of NTFPs for sustainable forest use and poverty alleviation has received increased attention (Peters, et al., 1989). Until 1980s, no proper studies had done to understand the importance of NTFPs in the sustainable development and livelihood needs of forest dependent communities. Last four decades, studies on NTFPs have drawn attention of many workers in India (Gupta & Guleria, 1982; Mahapatra & Mitchell, 1997; Nautiyal & Kaul, 2003; etc.). Although, few works are available on NTFPs in Assam (Nath, 2006; Dattagupta, 2010; Sarmah & Saikia, 2014; Dutta, et al., 2016; Sarma, 2016, etc.), but till date no intensive study has been done on the diversity and utilization of NTFPs and its impact on the livelihood of the people in Tinsukia district of Assam. The present work involves in the documentation of diversity and uses pattern of NTFPs by the people of the district.

Tinsukia district is located between 95°22' to 95°38'E longitude and 27°23' to 27°48'N latitude; elevation ranges from 143 to 124 meter. Total geographical area of the district is about 3790 sq.km. Total population is about 13, 16,948 (Census 2011). The district is bounded from north by Dhemaji District and Arunachal Pradesh, from south and east by Arunachal Pradesh and west by Dibrugarh district. Tinsukia district has four revenue circles (i.e., Tinsukia circle, Doomdoma circle, Sadiya Circle & Margherita circle) which are divided into three subdivisions; *viz*, Tinsukia, Sodiya and Margherita. The soil of the study area is mainly alluvial. The district is characterized by humid subtropical climate with summer, winter and monsoon forming the seasonal cycle. The maximum average temperature of about 35^0C and minimum of about 13^0C with average annual relative humidity of the district is about 75%. The vegetation of the district comprises grassland, swamp growth with an admixture of deciduous, semi evergreen and evergreen forests. Tinsukia district has total forest area about 1,55,77,900 hector, which includes one National Park and Biosphere Reserve (*viz.*Dibru-Saikhowa National Park and Biosphere Reserve), two Wildlife Sanctuaries (*viz*. Bherjan-Borajan-Padumoni and Dihing-Patkai) and thirty five Reserve Forests. More than hundred villages are situated in and around these forests.

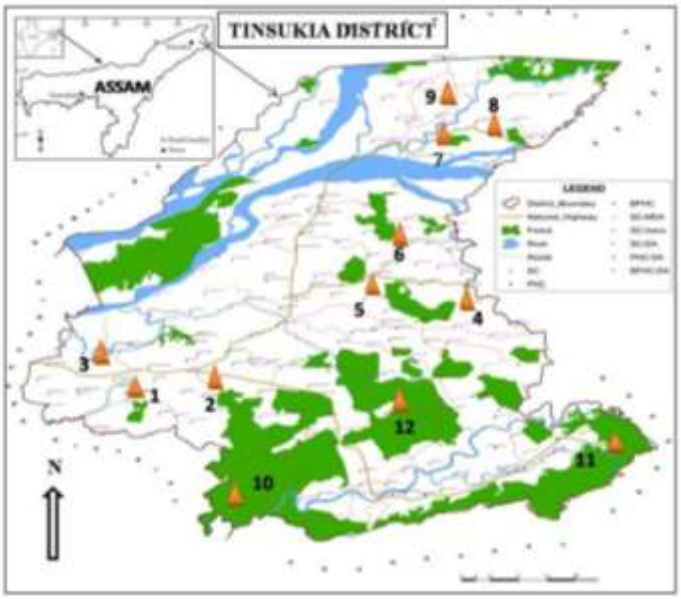

Fig 1: Map of the study area
(Numbers 1-12 are the sampling sites)

Methodology:-

The study is based on field survey in different seasons from April, 2016 to May, 2018. Three forest fringe villages from each revenue circle were randomly selected for the study. Information on NTFPs such as local name, purpose of use, parts used, etc. from each selected village were collected with the help of semi structured questionnaires. The respondents were the village headmen (Gaon Burha), other knowledgeable persons, NTFP collectors, traders, traditional medicinal practitioners (Bez - Bezoni), and house wives (Martin, 1995; Huntington, 2000). All information received was cross-checked with at least two additional interviewees. Market survey was also done in

some selected areas to find out the commercial potentialities of NTFPs of the district. NTFP yielding plant species was collected and processed to put up on the herbarium sheets by following standard method (Jain & Rao, 1976). Photography was done in the field whenever possible. Specimens like mushroom, was preserved in 4% formaldehyde solution. Plant specimens were identified using standard literatures (Kanjilal, et al., 1934-40; Hooker, 1872-97) and by consulting experts of Botanical Survey of India, Arunachal Pradesh Regional Centre, Itanagar.

Results and Discussion:-

Agriculture was the major source of livelihood economy in the study areas. Beside this, a section of the dwellers also earn their livelihood as tea garden workers, NTFP collection and trade, traditional medicine, wage labour, livestock rearing, etc. NTFPs play a significant role in their daily life. Altogether, 176 numbers of NTFPs (168 species of plants and 8 species of Fungi) were commonly used by the local people for domestic as well as commercial purposes (Table: 3, 4, 5 & 6). Among the plants, Dicotyledons 99 species (58.93%), Monocotyledons 62 species (36.90%) and Pteridophytes 7 species (4.16%); while Fungi consist of 1 species of Ascomycetes and 7 species of Basidiomycetes. Diversity of NTFPs in the sampling sites is represented below (Table-1).

Table 1:- NTFPs diversity in the sampling sites.

Revenue Circle	Places (Sl. no. depicting the sampling sites in the map of study area.)	Geographical Locations		Recorded NTFPs (In No.)			
		Latitude	Longitude	Dicot	Mono -cot	Fern	Fungi
Tinsukia	1. BarbhetaBongaliGoan	27°44′*N*	95°36′ *E*	51	35	3	2
	2. Tingrai Forest Village	27°45′*N*	95°53′ *E*	77	53	5	4
	3. PadumoniGoan	27°53′*N*	95°31′ *E*	52	29	4	2
Doomdoma	4. Namhollong Block Gaon	27°57′*N*	95°76′ *E*	82	56	4	3
	5. KachijanGaon	27°61′*N*	95°70′ *E*	82	53	5	2
	6. Hanhkhati	27°70′*N*	95°69′ *E*	68	43	4	2
Sadiya	7. Doom Pathar	27°83′*N*	95°75′ *E*	62	33	4	3
	8. Dolapani	27°84′*N*	95°82′ *E*	65	34	4	3
	9. Chapakhowa	27°91′*N*	95°76′ *E*	42	31	3	2
Margherita	10. CharaiPung Forest Village	27°29′*N*	95°44′ *E*	91	62	6	6
	11. Namphoi Forest village	27°36′*N*	95°97′ *E*	90	59	5	7
	12. BhimPather	27°41′*N*	95°65′ *E*	87	56	5	5

During the study, it was found that eight different parts of plants were using by the people as NTFPs of the study areas for various purposes (Fig 2). It was also observed that the maximum number of NTFPs (i.e. 62.34%) was harvested only for domestic consumption, where medicinal plants comprised the highest number of 91 species (51.70%). About 37.66% of NTFPs including plants and fungi were collected for trade in local and regional markets. Utilization pattern of NTFPs of Tinsukia district was found to have 22 different types (Table 2).

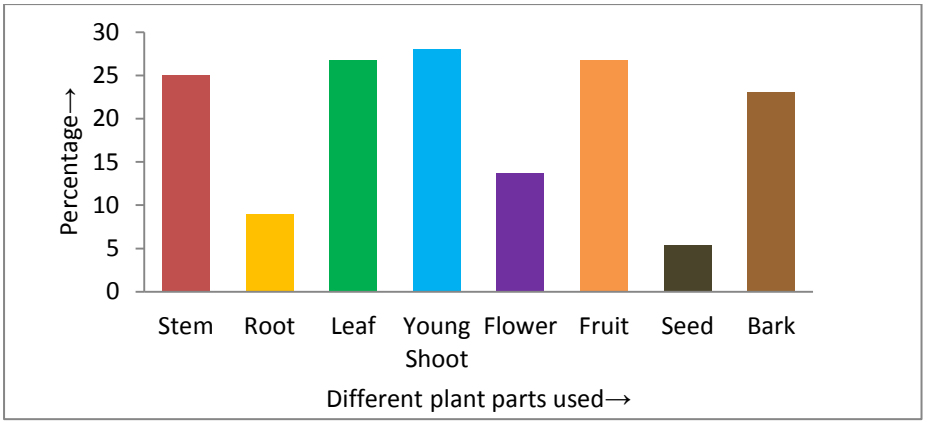

Fig 2:- Plant's parts used as NTFPs in Tinsukia District

Table 2:- Types of utilization of NTFPs in Tinsukia district

Sl. No.	Purposes	Number of Species	% of total
1	Medicine	91	51.70
2	Edible	76	43.18
3	Cultural & religion	21	11.93
4	Ornamental	16	9.09
5	Fodder	11	6.25
6	Condiment	8	4.55
7	Rope	7	3.98
8	Fencing	6	3.40
9	House construction	6	3.40
10	Fiber	5	2.84
11	Fish poisoning	5	2.84
12	Furniture making	5	2.84
13	Agricultural tools	4	2.27
14	Broom	4	2.27
15	Fire wood	4	2.27
16	Handle	4	2.27
17	Thatching	4	2.27
18	Tooth Brush	4	2.27
19	Dye	3	1.70
20	Packing material	2	1.13
21	Natural shampoo	1	0.57
22	Resin	1	0.57

Fig. 3:-Photographs of NTFPs of Tinsukia district of Assam (India) and their utilization.

Conclusion:-

With the increasing health consciousness among the people, they become creasy to have the food from natural origin. This is encouraging large scale collection and commercialization of edible NTFPs. Since most of the edible NTFPs consist of reproductive parts like flowers, fruits, seeds, underground stem, culm, etc., it is harmfully affecting the regeneration process of NTFP sources. Over exploitation of NTFPs is creating a major threat of their existence and hampering the conservation process. But, judicious use of NTFPs may provide a regular source of

income and employment to a large section of the society across age group in the district. Hence, awareness among the all concern stakeholders for sustainable utilization of these NTFPs is the need of hour.

Table 3:- Diversity and Utilization of Non-Timber Forest Products (Dicotyledons) of Tinsukia district of Assam

Family	Scientific Name	Common Name	Habit	Part(s) Used
Ranunculaceae	1. *Naravelia zeylanica* (L.)DC.	Gorapasoi	Climber	Young shoot - tooth brush; Leaf & root – as medicinal
Dilleniaceae	2. *Dillenia indica* L.	Owtenga	Tree	Fruit's fleshy calyx- as vegetable, Mucilaginous seed - as natural shampoo.
Magnoliaceae	3. *Magnolia hodgsonii* (Hook.f. & Thomson) H. Keng	Barhamthury	Tree	Wood- as handle of instruments and fire wood, Tender bud - dye preparation
Menispermaceae	4. *Cissampelos pareira* L.	Tubukilata	Climber	Young shoot tip – as medicine
	5. *Tinospora cordifolia* (Willd.) Hook. f. & Th	Shagunilata	Climber	Stem – as medicine
Nymphaeaceae	6. *Nymphaea nouchali* Burm.f.	BagaVetphul	Aquatic Herb	Flower bud- as vegetable
Nelumbonaceae	7. *Nelumbo nucifera* Gaertn.	Padumphul	Aquatic Herb	Flower petals & seeds are edible ; Leaves – as wrapper & religious
Capparaceae	8. *Crataeva religiosa* G. Forst.	Barun	Tree	Leaves & fruits – as medicine
Flacourtiaceae	9. *Flacortia cataphracta* Roxb. ex Willd	Ponial	Tree	Fruit - Edible
	10. *Gynocardia odorata* R.Br.	Lemtem	Tree	Seed oil – as medicine
	11. *Hydnocarpus kurzii* (King) Warb	Salmugura	Tree	Seed oil – as medicine
Carryophyllaceae	12. *Drymaria cordata* (L.)Willd. ex Schult	Laizabori	Herb	Young shoot – as vegetables, medicine
Clusiaceae	13. *Garcinia cowa* Roxb. ex Choisy	KawriThekera	Small Tree	Fruit– as medicine
	14. *Garcinia lanceaefolia* Roxb.	RupahiThekera	Small Tree	Fruit– edible & medicine
	15. *Garcinia morella* (Gaertn.) Desr.	KujiThekera	Small Tree	Fruit– edible & medicine,
	16. *Garcinia pedunculata* Roxb. ex Buch.- Ham.	Bar Thekera	Tree	Fruit–edible , cultural & medicine
	17. *Garcinia xanthochymus*Hook. f. ex T. Anderson	TeporTenga	Tree	Fruit– edible & medicine
	18. *Mesua ferrea* L.	Nahar	Tree	Leaf – as cultural use; Stem – as fire wood; Flower- Ornamental
Malvaceae	19. *Abutilon indicum* (L.) Sweet	Japapatori	Herb	Root – as medicine
	20. *Sida cordifolia* L.	Sunborial	Shrub	Bark – as fiber;

				Root – as medicine
	21. *Urena lobata* L.	Sunborolowa	Shrub	Root – as medicine
Bombacaceae	22. *Bombax ceiba* L.	Simalo	Tree	Bark – as medicine; Fruit – as fiber
Sterculiaceae	23. *Abroma augusta* (L.)L.f.	Gorokhia Koroi	Small Tree	Root – as medicine
	24. *Sterculia villosa* Roxb.	Udal	Tree	Bark – as rope; Fruit – as medicine
	25. *Byttneria aspera* Collebr. ex Wall	TikoniBaruah	Climber	Young Shoot - as vegetable & medicine
Tiliaceae	26. *Grewia asiatica* L.	Sowra	Small Tree	Leaves & fruits – medicine; Young branch – tooth brush
	27. *Grewia hirsute* Vahl.	Kukurhuta	Tree	Bark – as fiber; Leaves & Seeds – as medicine
Elaeocapaceae	28. *Elaeocarpus floribundus* Blume	Jalfai	Tree	Fruit – edible
	29. *Elaeocarpus serratus* L.	Rudrakhya	Tree	Fruit –as medicine & religious use
Rutaceae	30. *Citrus medica* L.	JaraTenga	Shrub	Fruit - edible
	31. *Glycosmis pentaphylla* (Retz.)DC.	Senglodi	Shrub	Young branch- as tooth brush; Fruit – edible
	32. *Zanthozylum nitidum* (Roxb.)DC.	Tezmuee	Shrub	Fruit & bark – as fish poisoning; Root – as medicine Young branches – tooth brush; Young shoot- condiment
Burseraceae	33. *Canarium bengalense* Roxb.	Dhuna	Tree	Latex - as resin
	34. *Garuga pinnata* Roxb.	Rahimola	Tree	Leaves – as fodder
Meliaceae	35. *Walsura robusta* Roxb.	Lali	Tree	Fruit & bark- as fish poisoning
Rhamnaceae	36. *Rhamnus nepalensis* (Wall.) M. A. Lowson	Biringuti	Shrub	Fruit – edible; Bark – as medicine
	37. *Zizyphus jujube* Mill.	Bagari	Small Tree	Fruit – edible; Young shoot- cultural
Vitaceae	38. *Vitis quadrangularis* (L.)Wall. ex Wight	Harjura Lata	Climber	Young Shoot –as vegetable; Leaf & Stem - as Medicine
Leeaceae	39. *Leea guineensis* G. Don	Owlata	Climber	Stem- as rope in house building
Hippocastanacea	40. *Aesculus assamica* Griff	Ramanbih	Small Tree	Seed – as medicine; Leaf & bark - as fish poisoning
Anacardiaceae	41. *Mangifera sylvatica* Roxb.	Ban Aam	Tree	Fruit – edible; Bark- as Medicine; Leaf- Cultural use
	42. *Rhus chinensis* Mill.	Naga Tenga	Small Tree	Fruit – edible & medicinal
	43. *Spondias pinnata* (L.f.) Kurz.	Amara	Tree	Fruit & young leaf- edible & medicine; Bark – as medicine

Caesalpiniaceae	44. *Caesalpinia bonduc* (L.)Roxb.	Letaguti	Straggling shrub	Young leaf &Fruit – as medicine
	45. *Cassia alata* L.	Kharpat	Shrub	Young leaves- as medicine
Papilionaceae	46. *Abrus precatorius* L.	Latumoni	Climber	Fruit & root – as medicine
	47. *Butea monosperma* (Lam.)Taub	Palakh	Tree	Bark – as medicine; Flower – Ornamental
	48. *Dalbergia pinnata* (Lour.) Prain	Lalengchali	Liana	Bark – as condiment
	49. *Pongamia pinnata* (L.)Pierre.	Karash	Tree	Leaves- as fodder; Seed – as medicine
	50. *Erythrina variegata* L.	Madar	Tree	Root, Bark & leaves- medicine; Flower – Ornamental
	51. *Flemingia strobilifera* (L.)W.T.Aiton	Makhioty	Small Tree	Root & Bark – as medicine; Young shoot – cultural use
	52. *Mellettia pachycarpa* Benth.	Bakal Bih	Climber	Root – as poison for fishing
Rosaceae	53. *Prunus jenkinsii* Hook. f. & Thomson	TherejuTenga	Tree	Fruit – edible; Shoot – as firewood
	54. *Rubus ellipticus* Sm.	Jutulipaka	Straggling shrub	Fruit – edible; Young Shoot – as medicine
	55. *Rubus lucens* Focke	Jezeru Paka	Liana	Fruit – edible
Combretaceae	56. *Terminalia bellirica* (Gaertn.)Roxb.	Bhumura	Tree	Fruit – as medicine
	57. *Terminalia chebula* Ritz.	Hilikha	Tree	Fruit – as medicine; Bark– source of dye
Myrtaceae	58. *Syzygium balsameum* (Wight) Wall. ex Walp.	Jaldubuli	Tree	Young shoot – as medicine; Mature Shoot – as firewood & handle
	59. *Syzygium cumini* (L.)Skeels	Kala Jamu	Tree	Fruit – edible; Bark – source of dye; Seed- as medicine
	60. *Syzygium fruticosum* DC.	Kuthi Jamu	Tree	Fruit - edible
	61. *Syzygium kurzii* (Duthie) N.P.Balakr	Boga Jamu	Tree	Fruit - edible
Melastomaceae	62. *Melastoma malabathricum* L.	Fuhtukola	Shrub	Fruit – edible; Shoot- as broom
Lythraceae	63. *Lagerstroemia speciosa* (L.)Pers	Ajar	Tree	Flower &Dry fruit – Ornamental
Cucurbitaceae	64. *Citrullus colocynthis* (L.)Schrad.	Kuabhaturi	Climber	Fruit- as medicine
Apiaceae	65. *Centella asiatica* (L.)Urb.	Barmanimuni	Herb	Shoot – as vegetable & medicine
	66. *Hydrocotyle sibthorpioides* Lam.	Harumanimuni	Herb	Shoot – as vegetable & medicine
Rubiaceae	67. *Catunaregam spinosa* (Thunb.) Tirveng.	Bihmana	Small Tree	Fruit – as fish poison & medicine
	68. *Meyna spinosa* Roxb. ex Link	Kutkura	Small Tree	Fruit- edible; Young Shoot – as medicine
	69. *Paederia foetida* L.	Vedailota	Climber	Young Shoot – as vegetable & medicine

Asteraceae	70. *Enydra fluctuans* Lour.	Helonchi	Herb	Young Shoot – as vegetable & medicine
	71. *Wedelia calendulacea* (L.)Less.	Bhimraj	Herb	Young leaf – as medicine
Plumbaginaceae	72. *Plumbago zeylanica* L.	Agyashit	Herb	Young Shoot – as medicine
Ebenaceae	73. *Diospyros malabarica* (Desr.) Kostel.	Kendu	Tree	Fruit – edible; Seed – as medicine
Apocynaceae	74. *Alostonia scholaris* (L.) R. Br.	Sotiana	Tree	Bark – as medicine
	75. *Ichnocarpus frutescens* (L.) W.T.Aiton	Gakhirlata	Climber	Young leaves – as medicine
Convolvulaceae	76. *Ichnocarpus frutescens* (L.) W.T.Aiton	Lakhmanlata	Climber	Young shoot – as medicine
Solanaceae	77.*Solanum indicum* L.	Titavekuri	Herb	Fruit – as vegetable & medicine
	78. *Solanum trilobatum* L.	Lata Tita	Shrub	Fruit- as medicine
Bignoniaceae	79. *Oroxylum indicum* (L.)Kurz	Bhat Ghila	Tree	Young fruit, Bark & Root – as medicine
Acanthaceae	80. *Justicia adhatoda* L.	BagaBahak	Shrub	Young leaves – as medicine
	81. *Phlogocanthus thrysiflorus* Nees.	RangaBahak	Shrub	Flower – as vegetable & medicine
Verbenaceae	82. *Callicarpa macrophylla*Vahl.	Tangloti	Shrub	Bark – as medicine
	83. *Clerodendrum glandulosum* Lindl.	Nephafu	Shrub	Young leaf – as medicine
	84. *Vitex negundo* L.	Pasatia	Shrub	Young leaf – as medicine
Lemiaceae	85. *Pogostemon benghalensis* (Burm.f.) Kuntze	Hukloti	Herb	Young leaf – as vegetable & medicine
Piperaceae	86. *Piper longum* L.	Pipoli	Climber	Inflorescence – as medicine
	87. *Piper thomsonii*(C.DC)Hook.f.	Aunipan	Climber	Leaf - edible
Lauraceae	88. *Cinamomum bejolghota* (Buch.-Ham.) Sweet	Naga Dalcini	Tree	Bark – as condiment
	89. *Cinamomum verum* J. Presl	Dalcini	Tree	Bark – as condiment
	90. *Cinamomum tamala* (Buch.-Ham) T.Nees. & Eberm	Tezpat	Tree	Leaf – as condiment
	91. *Litsea salicifolia* (J. Roxb. ex Nees) Hook. f.	Dighloti	Shrub	Young branch – cultural use
Euphorbiaceae	92. *Baccaurea remiflora* Lour.	Leteku	Tree	Fruit - edible
	93. *Croton joufera* Roxb.	Mahudi	Shrub	Fruit & leaf – as medicine
Urticaceae	94. *Boehmeria macrophylla* Hornem.	Ban Riha	Shrub	Bark – as source of fiber
	95. *Sarcochlamys pulcherrima* Gaudich	Mesaki	Small Tree	Leaf – as vegetable & condiment
Moraceae	96. *Artocarpous chama* Buch.-Ham.	Cham Kathal	Tree	Fruit – edible
	97. *Ficus benghalensis* L.	Bargas	Tree	Young branch tip – cultural use
	98. *Ficus racemosa* L.	Jagya Dimoru	Tree	Young branch – cultural use
Cannabaceae	99. *Cannabis sativa* L.	Bhang	Herb	Leaf – as medicinal

				& cultural use

Table 4:- Diversity and Utilization of Non-Timber Forest Products (Monocotyledons) of Tinsukia district of Assam.

Family	Scientific Name	Common Name	Habit	Part(s) Used
Orchidaceae	1. *Cymbidium aloefolium* Blume	Mata Kapowphul	Epiphytic	Flower - as Ornamental & Cultural
	2. Dendrobium aphyllum (Roxb.) C. E. C. Fisch.	Bhatowphul	Epiphytic	Flower- as Ornamental
	3. Dendrobium fimbriatum Hook.	Hokhiyotiphul	Epiphytic	Flower- as Ornamental
	4. Dendrobium lituiflorum Lindl.	Bhatowphul	Epiphytic	Flower- as Ornamental
	5. Dendrobium moschatum (Buch.-Ham.) Sw.	Bhatowphul	Epiphytic	Flower- as Ornamental
	6. Dendrobium transparens Wall. *Ex* Lindl.	Bhatowphul	Epiphytic	Flower- as Ornamental
	7. *Papilionanthe teres* (Roxb.) Schltr.	Bhatowphul	Epiphytic	Flower- as Ornamental & Cultural
	8. Phaius tankervilleae (Banks) Blume.	Mati kapowphul	Terrestrial	Flower- as Ornamental
	9. Rhyncostylis retusa (L.) Blume	Kapowphul	Epiphytic	Flower- as Ornamental & Cultural; Leaf- as medicine
Zingiberaceae	10. *Alpinia nigra* (Gaertn.)Burtt	Tora	Herb	Leaf sheath – as rope Young Shoot & rhizome – as medicine
	11. *Alpinia galanga* (L.) Willd.	ToraBaghini	Herb	Young Shoot & rhizome – as vegetable & medicine
	12. *Curcuma aromatica* Salisb.	Keturi	Herb	Rhizome – as medicine
	13. *Curcuma caesia* Roxb.	Kala Halodhi	Herb	Rhizome – as medicine
	14. *Curcuma amada* Roxb.	Amada	Herb	Rhizome – as medicine & condiment
	15. Etlingera loroglossa (Gagnep.) R.M.Sm.	Karphul	Herb	Rhizome– as condiment & medicinal
	16. *Kaempferia galanga* L.	Gathiyon	Herb	Rhizome – medicine; YoungShoot– vegetables; Flower- ornamental
	17. *Kaempferia rotunda* L.	Bhumi Champa	Herb	Rhizome – as medicinal
	18. *Zingiber officinale* Roscoe.	Moran Ada	Herb	Rhizome – as condiment & medicinal
Musacese	19. *Musa aurantiaca* G.Mann ex Baker	Banaria Kal	Herb	Inflorescence - edible
	20. *Musa itinerans* Cheesman	Banaria Kal	Herb	Inflorescence - edible
	21. *Musa nagensium* Prain	Banaria Kal	Herb	Inflorescence – edible
Marantaceae	22. *Maranta arundinacea* L.	Toraalu	Herb	Rhizome - edible
	23. *Phrynium pubinerve* Blume	Kawpat	Herb	Leaf - wrapper & plate
	24. *Schumannianthus dichotomous* (Roxb.)Gagnep	Patidoi	Herb	Stem- as rope
Amaryllidaceae	25. *Crinum asiaticum* L.	Ban Naharu	Herb	Leaf & bulb - medicine
Dioscoreaceae	26. *Dioscorea alata* var. *globosa* (Roxb.)Prain	Sapara Alo	Climber	Underground Stem - edible
	27. *Dioscorea esculenta* (Lour.) Burkill	Gos Alu	Climber	Underground Stem - edible
	28. *Dioscorea pentaphylla* L.	Paspotia Alu	Climber	Underground Stem - edible

	29. *Dioscorea villosa* L.	Kath Alu	Climber	Underground Stem – edible & medicine
Liliaceae	30. *Asparagus recemosus*Willd.	Shatamul	Climber	Fasciculated root - medicine
Smilacaceae	31. *Smilax ovalifolia* Roxb.ex D. Don	BaghansuraLata	Climber	Root - medicine
Pontederiaceae	32. *Monochoria* hastate (L.) Solms	PaniMateka	Herb	Young shoot - vegetable
Commelinaceae	33. *Commelina benghalensis* L.	Kanahimalu	Herb	Young shoot - medicine
Arecaceae	34. *Arenga pinnata* (Wurmb) Merr.	MamoiTamul	Palm	Stem & leaves sheath – as cultural
	35. *Calamus flagellum* Griff.ex Mart.	Raiding Bet	Rattan	Cane – manufacture furniture, stick;Young stem tip – as vegetable
	36. *Calamus gracilies* Roxb.	Suli Bet	Rattan	Cane –as rope
	37. *Calamus tenuis* Roxb.	Jati Bet	Rattan	Cane –furniture & house construction Young stem tip – as vegetable
	38. *Caryota urens* L.	SewaTamul	Palm	Stem – House construction, fencing, handle, agricultural tools; Fruit – edible & medicine
	39. *Licuala peltata* Roxb.ex Buch.- Ham.	Jengu Pat	Palm	Leaf – as thatching material; Fruit – edible
	40. *Livistona jenkinsiana* Griff.	TakowTamul	Palm	Leaf – as thatching material; Fruit – edible
Araceae	41. *Acorus calamus* L.	Bos	Herb	Corm - medicine
	42. *Alocasia fornicata* (Roxb.) Schott	BejKasu	Herb	Corm – as vegetable
	43. *Alocasia macrorrhizos* (L.) G. Don	Man Kasu	Herb	Corm – as vegetable, Petiole – as vegetable & Medicine
	44. *Alocasia odora* (Lind.)K. Koch	Dahi Kasu	Herb	Petiole - as vegetable
	45. *Amorphophallus bulbifer* (Roxb.) Blume	Ul Kasu	Herb	Corm – as vegetable
	46. *Colocasia esculenta* (L) Schott.	Kola Kasu	Herb	Petiole & Sub-aerial Stem – as vegetable
	47. *Homalomena aromatic* (Spreng.) Schott	Gandha Kasu	Herb	Leaf & petiole – as medicine
	48. *Laisia* spinosa (L.)Thwaites.	Shengmara	Herb	Youngshoot – as vegetable & medicine
Cyperaceae	49. *Schoenoplectiella articulata* (L.) Lye	Sesu Ban	Grass	Underground Stem – edible
Poaceae	50. *Arundo donax* L.	Nal	Grass	Young Shoot - as fodder
	51. *Bambusa nutans* Wall. Ex Munro	MakalBanh	Bamboo	Young Shoot - as vegetables;Mature stem – house construction, fencing, agricultural tools, furniture
	52. *Saccharum ravennae (L.) L.*	Ekara	Grass	Young shoot – as fodder

	53. *Hygroryza aristata* (Retz.) Nees ex Weight &Arn.	Dalghanh	Grass	Young shoot – as fodder
	54. *Imperata cylindrica* (L.) Raeusch	Ulu Kher	Grass	Young shoot –fodder; Young root –medicine Mature shoot – as thatching material
	55. *Leersia hexandra* Sw.	Erali	Grass	Young shoot -fodder
	56. *Ophiuros megaphyllus* Stapf ex Hains	Banhpatia Ban	Grass	Young shoot - fodder
	57. *Phragmites karka* (Retz.) Trin. ex Steud.	Khagori	Grass	Young shoot – fodder; Mature stem - house construction & fencing
	58. *Saccharum spontaneum* L.	Kanhua	Grass	Young shoot – fodder; Mature shoot – as thatching material; Flower - ornamental
	59. *Schizostachyum dullooa (Gamble) R.B.Majumdar*	DolooBanh	Bamboo	Young Shoot - vegetables; Young stem – cultural & making rope; Mature stem - house construction, fencing, broom, tools, furniture
	60. *Pseudostachyum polymorphum* Munro	Nal Banh	Bamboo	Young Shoot - edible; Mature stem - house construction, fencing, tools, furniture
	61. *Thysanolaena latifolia* (Rox.ex Hornem.) Honda	Jaru Ban	Grass	Young Shoot - as fodder; Mature stem - as fencing; Mature flower – as broom
	62. *Chrysopogon zizanioides* (L.) Roberty	Birina	Grass	Leaf – as fodder; Root – as medicine

Table 5:- Diversity and Utilization of Non-Timber Forest Products (Pteridophytes) of Tinsukia district of Assam.

Family	Scientific Name	Common Name	Habit	Part(s) Used
Athyriaceae	1. *Diplazium esculantum* (Retz.)Sw.	Dhekia Shak	Herb	Young leaf – as vegetable
Blechnaceae	2. *Stenochlaena palustris* (Burn.f.) Bedd	Dhekia Lata	Climber	Young leaf – edible; Mature stem – as rope
Drynariaceae	3. *Drynaria quercifolia* (L.) J. Sm.	Hukan Dhekia	Epiphytic	Mature leaf – as ornamental
Gleicheniaceae	*4. Dicranopteris linearis (Burm. f.) Underw.*	KalamDhekia	Terrestrial Herb	Leaf petiole – as cultural
Lygodiaceae	*5. Lygodium flexuosum* (L.) Sw.	KapowDhekia	Climber	Young Leaf – as cultural
Dennstaedtiaceae	6. *Pteridium aquilinum* (L.) Kuhn.	DhekiaShak	Herb	Young leaf – as vegetable
Thelypteridaceae	*7. Christella parasitica* H. Lev.	Bihlongoni	Herb	Leaf – as medicine and cultural use

Table 6:- Diversity and Utilization of Non-Timber Forest Products (Fungi) of Tinsukia district of Assam.

Class	Scientific Name	Common Name	Habitat	Part(s) Used
Ascomycetes	*1. Morchella esculanta*	Kathphula	Rotten wood	Fruiting body – as

				vegetable
Basidiomycetes	*2.* *Agaricus bisporus*	Beng-Sata	Grassland	Fruiting body – as vegetable
	3. *Auricularia auricul*	Kathphula	Moist wood	Fruiting body – as vegetable
	4. *Ganoderma sp.*	Kathphula	Rotten wood	Fruiting body – as vegetable
	5. *Lycoperdon sp.*	Kathphula	Grassland	Fruiting body – as vegetable & medicine
	6. *Pluteus cervinus*	Kathphula	Rotten wood	Fruiting body – as vegetable
	7. *Schizophyllum commune*	Kathphula	Rotten wood	Fruiting body – as vegetable
	8. *Termitomyces sp.*	Kathphula	Rotten wood	Fruiting body – as vegetable

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