

## **NON-TIMBER FOREST PRODUCTS (NTFPs) SUPPORTING FOOD SECURITY IN TRIBAL JHARKHAND**

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This study seeks to document the diversity, distribution, and pattern of utilization of edible non-timber forest products (NTFPs) among the tribes of Bundu block in Ranchi district of Jharkhand, India. The results reveal that the sample population consumes 59 edible NTFPs belonging to 39 genera and 45 species under 29 families. Of the edible NTFPs, fruit represents the highest (26) followed by leaf (10), seed (7), flower (6), tuber (3), gum (2), mushroom (2), entire plant (2) and rhizome (1). The growth form of the species includes trees (30) followed by herbs (5), shrubs (4), climbers (3), fungi (2) and bamboo (1). Edible NTFPs constitute the main source of diet, nutrition, economy and health of the people, however, the availability of edible NTFPs is on the decline while population and market pressures are growing, agricultural development is slow, and economic growth is likely to bypass rural areas. With these trends, many rural families will likely continue to face food insecurity. To keep the safety-net function of forest foods available for them as a coping strategy, it is vital that forest management be linked to rural development and food security strategies.

### **Introduction**

Definition of the term “non-timber forest products” (NTFPs) continues to be debated and there is still no universally accepted definition. Literally, NTFPs are defined as “all products that are derived from forests with the exception of timber” (Ahenkan & Boon, p. 3). Mathur and Shiva define NTFPs as “all products obtained from plants of forest origin and host plant species yielding products in association with insects and animals or their parts and items of mineral origin except timber” (1996, as cited in Ahenkan & Bonn, 2011, p. 3).

NTFPs have gained global attention due to their contribution to household livelihood and food security, poverty reduction and biodiversity conservation (Ahenkan & Boon, 2011; Opaluwa, Onuche, & Sale, 2011). Nweze and Igbokwe reported that NTFPs fulfill the health and nutritional needs of about 80% of the population of developing countries (2000, as cited in Opaluwa, Onuche, & Sale, 2011). Overall, edible NTFPs are an indispensable source of diet, food, nutrition, health care and livelihood in different parts of the

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world (Saha & Sundriyal, 2012). Diversity of edible NTFPs offers variety in diets and contributes to household food security (Sharma, Tiwari, Chaturvedi, & Diengdoh, 2015). Some edible NTFPs are even reported to be more nutritious than conventionally eaten crops (Tewari, 2014). Besides food and nutrition, utilization of edible NTFPs as coping strategies during scarcity is prevalent, particularly in developing countries where food insecurity is acute (Olaniyi, Akintonde, & Adetumbi, 2013).

The forests of Bundu block are the common thread in all aspects of life of the tribal communities, whether it is birth, marriage, livelihood or death. The forests include a considerable wealth of edible NTFPs constituting an important source of food, nutrition and livelihood security among tribal people (Singh & Quli, 2011; Islam & Quli, 2015). Tribal people collect the edible NTFPs in considerable quantities and in most cases on a daily basis, because they are needed for their livelihood, income, food and medicine (Islam, Quli, Rai, & Sofi, 2013; Bedia, 2014). Their collection activities have often led to the over exploitation of the edible NTFPs without paying corresponding attention to the sustainability and continued supply of these resources (Gharai & Chakrabarti, 2009; Islam, Quli, Sofi, Bhat, & Malik, 2015).

The promotion of a sustainable management mechanism for edible NTFPs could lead to poverty reduction, biodiversity conservation and human development besides an uninterrupted supply of these resources for the future generation of forest depending communities (Prasad & Siddiqui, 2006). Furthermore, the commercialization of edible NTFPs has the potential to generate additional employment and income and offer opportunities for NTFP based enterprises by increasing the value of forest resources (Sivaji, 2009). NTFP-based development has thus emerged as an economically acceptable ecological option for socioeconomic development and livelihood security of the tribal people subsisting in and around forests (Islam, Quli, Rai, & Ali, 2014). Keeping these facts under consideration, the present study documents vital information on the diversity, distribution and pattern of utilization of edible NTFPs.

## **Materials and Methods**

### **Study Locale and the People**

The study was undertaken in Bundu block of Ranchi district, located to the south-east of the state capital Ranchi, at an altitude of 337 meters (1105 feet) (Government of Jharkhand, 2009). Bundu block has a total geographic area of 25,097 ha which is differentiated as

un-irrigated cultivable land (69.3%), forest (17.4%), irrigated cultivable land (8.4%), culturable wasteland (3.6%), and unculturable wasteland (1.3%) (Government of Jharkhand, 2009). 62,509 people (31,624 males and 30,885 females) are living in 11,495 households, in 88 revenue villages, inhabit Bundu block, according to the Census of India (2011). Of the total population, 60.7% are scheduled tribe (*Munda, Oraon and Lohara*), 4.8% scheduled caste, while the remaining 34.5% belong to other social groups (Government of Jharkhand, 2009). The population density, number of persons per family and sex ratio are 249/km<sup>2</sup>, 5.4 and 978 female/1000 male, respectively. The literates in the block are 23,572 (16,084 males and 7,488 females), accounting for 44.0% of the total population (Islam, Quli, Rai, & Sofi, 2013). Agriculture and NTFPs collection are the main sources of subsistence livelihood.

### Sampling, Data collection and Analysis

Multi-stage random sampling technique was undertaken to select the villages and respondents (Ray and Mondol, 2004). Nine sample villages namely, Korda, Jojoda, Husirhatu, Banaburu, Nehalgar, Ghagrabera, Hesapiri, Roredih and Kuchidih with 10% sampling intensity of the block were selected. The household survey sample consisted of 164 respondents (20% of the total number of households) comprising all categories of land holders. Household heads or eldest persons were treated as the respondents (Islam, Quli, Rai, & Sofi, 2013). The data on edible NTFPs collected and consumed for household food security by local people were gathered by personal interviews using a well-structured pre-tested interview schedule, personal observations and participatory rural appraisal (PRA) tools, i.e. semi-structured interview with key informants and focus group discussion. The information documented includes the common/vernacular name of the species, the botanical name, the family name, as well as the part used and uses (Table 1). Simple statistical tools, as per Snedecor and Cochran (1967), viz. frequency (f) and percentage (%) were used for analysis of the data (Islam, Quli, Rai, & Sofi, 2013).

### Results and Discussion

The study documented 59 edible NTFPs belonging to 39 genera and 45 species under 29 families (Table 1). The family Moraceae had the highest representation of edible NTFPs with six species followed by Anacardiaceae (5), Caesalpiniaceae (4), Agaricaceae (2), Euphorbiaceae (2), Rubiaceae (2), Combretaceae (2), Sapindaceae (2), Acanthaceae (1), Alangiaceae (1), Annonaceae (1), Apiaceae (1), Apocynaceae (1), Araceae (1), Arecaceae (1), Cucurbitaceae (1),

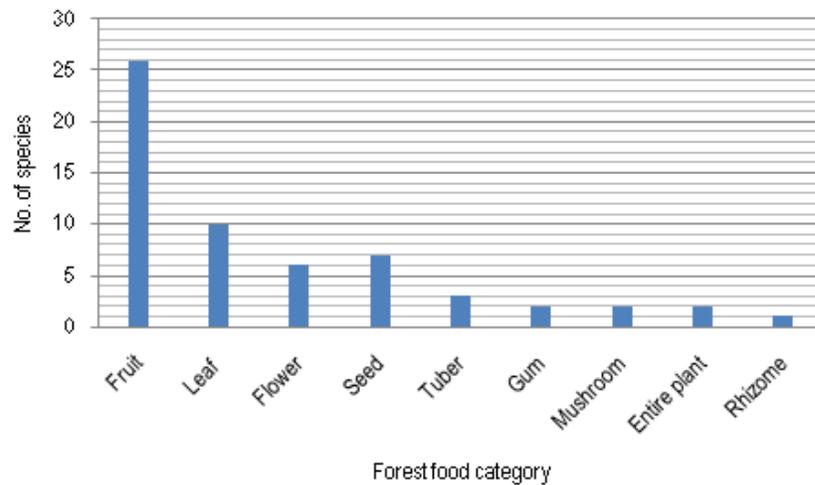
Dilleniaceae (1), Dioscoreaceae (1), Dipterocarpaceae (1), Ebenaceae (1), Euphorbiaceae (1), Lecythidaceae (1), Meliaceae (1), Myrtaceae (1), Nymphaeaceae (1), Papilionaceae (1), Poaceae (1), Rhamnaceae (1), Verbenaceae (1). Almost, all the parts, *viz.*, fruit (26), leaf (10), seed (7), flower (6), tuber (3), gum (2), mushroom (2), entire plant (2) and rhizome (1), were extensively collected and consumed by the tribal households to meet their daily food needs (Figure 1). The edible NTFPs collected by the tribal people were mostly derivatives of trees (30), followed by herbs (5), shrubs (4), climbers (3), fungi (2) and bamboo (1) (Figure 2).

**Table - 1. Edible NTFPs for household food security of tribal people (N=164)**

Sl. No.	Local name	Botanical name	Family	Part used	Uses
1.	<i>Dhela</i>	<i>Alangium salvifolium</i> Linn.	Alangiaceae	Fruit	Ripe pulp-edible
2.	<i>Kathar</i>	<i>Artocarpus heterophyllus</i> Lamk.	Moraceae	Fruit/ Seed	Ripe fruit- edible, unripe fruit-pickle, vegetable, roasted/boiled seed- edible
3.	<i>Dahu</i>	<i>Artocarpus lakoocha</i> Roxb.	Moraceae	Fruit/ Flower	Ripe fruit- edible, unripe fruit-vegetable, flowers-vegetable
4.	<i>Neem</i>	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Fruit/ Flower	Ripe fruit- pulp is edible, dried flower- vegetable
5.	<i>Koemar</i>	<i>Bauhinia purpuria</i> Linn.	Caesalpiniaceae	Leaf/ Flower	Vegetable
6.	<i>Kachnar</i>	<i>Bauhinia variegata</i> Linn.	Caesalpiniaceae	Flower/ Leaf	Vegetable
7.	<i>Pithwar</i>	<i>Buchanania angustifolia</i> Roxb.	Anacardiaceae	Fruit	Ripe fruit pulp is edible
8.	<i>Piar</i>	<i>Buchanania lanzan</i> Spreng.	Anacardiaceae	Fruit/ Kernel	Ripe fruit-pulp edible, kernel-confectionary
9.	<i>Kumbhi</i>	<i>Careya arborea</i> Roxb.	Lecythidaceae	Fruit	Edible
10.	<i>Korkot</i>	<i>Dillenia indica</i> Linn.	Dilleniaceae	Fruit	Ripe fruit- edible, green fruit- pickle
11.	<i>Tiril</i>	<i>Diospyros melanoxylon</i> Roxb.	Ebenaceae	Fruit	Ripe fruit- edible
12.	<i>Meral</i>	<i>Emblica officinalis</i> Gaertn.	Euphorbiaceae	Fruit	Edible, pickle
13.	<i>Phutkal</i>	<i>Ficus glabella</i> Blume	Moraceae	Leaf buds	Vegetable, pickle
14.	<i>Loa</i>	<i>Ficus glomerata</i> Roxb.	Moraceae	Fruit	Ripe fruit- edible, unripe fruit-vegetable
15.	<i>Pakar</i>	<i>Ficus infectoria</i> Roxb.	Moraceae	Fruit	Edible
16.	<i>Papra</i>	<i>Gardenia latifolia</i> Aiton.	Rubiaceae	Fruit	Edible
17.	<i>Mahua</i>	<i>Madhuca latifolia</i> Mach.	Sapindaceae	Flower/ Seed	Flowers-vegetable, dried flower- wine preparation, seed-edible oil

18.	<i>Uli</i>	<i>Mangifera indica</i> Linn.	Anacardiaceae	Fruit	Ripe fruit- edible, green fruit- pickle, dried slices of green fruit ( <i>Amsi</i> )-sour preparation, dried pulp of ripe fruit ( <i>Amthi</i> )- an important article of trade
19.	<i>Toont</i>	<i>Morus alba</i> Linn.	Moraceae	Fruit	Edible
20.	<i>Piurar</i>	<i>Randia uliginosa</i> DC.	Rubiaceae	Fruit	Edible
21.	<i>Kusum</i>	<i>Schleichera oleosa</i> (Lour.) Oken	Sapindaceae	Fruit/ Seed	Ripe fruit- edible, seed- edible oil
22.	<i>Soso</i>	<i>Semecarpus anacardium</i> Linn.	Anacardiaceae	Fruit	Edible
23.	<i>Sarjom</i>	<i>Shorea robusta</i> C. F. Gaertn.	Dipterocarpaceae	Seed	Edible oil
24.	<i>Ambru</i>	<i>Spondias mangifera</i> Willd.	Anacardiaceae	Fruit/ leaf	Fruit –Pickle, leaf-sauce
25.	<i>Kund</i>	<i>Syzygium cumini</i> (Linn.) Skeels	Myrtaceae	Fruit	Ripe fruit- edible, ripe fruit pulp- vinegar ( <i>Sirka</i> )
26.	<i>Jojo</i>	<i>Tamarindus indica</i> Linn.	Caesalpiniaceae	Leaf/ Fruit/ Seed	Tender leaves/ fruit pulp- sauce, fruit pulp- pickle, soar preparation, roasted seed-edible
27.	<i>Bahera</i>	<i>Terminalia belerica</i> Roxb.	Combretaceae	Gum	Edible.
28.	<i>Madar</i>	<i>Annona squamosa</i> L.	Annonaceae	Fruit	Edible
29.	<i>Asan</i>	<i>Terminalia tomentosa</i> (Roxb.) Wight & Arn.	Combretaceae	Gum	Edible
30.	<i>Bakra/ Koir</i>	<i>Zizyphus mauritiana</i> Lamk.	Rhamnaceae	Fruit	Ripe fruit- edible, pickle
31.	<i>Matha/ Matasura</i>	<i>Antidesma diandrum</i> (Roxb.) Roth.	Euphorbiaceae	Leaf	Vegetable
32.	<i>Kanwar</i>	<i>Carissa carandus</i> Linn.	Apocynaceae	Fruit	Ripe fruit- edible, unripe fruit- pickle
33.	<i>Hutar</i>	<i>Indigofera arborea</i> Roxb.	Papilionaceae	Flower	Vegetable
34.	<i>Kita</i>	<i>Phoenix acaulis</i> Roxb. ex Buch.	Arecaceae	Fruit	Ripe fruit- edible
35.	<i>Chakor</i>	<i>Cassia tora</i> Linn.	Caesalpiniaceae	Leaf	Vegetable
36.	<i>Beng saag</i>	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Leaf	Vegetable
37.	<i>Pelko saag</i>	<i>Colocasia antiquorum</i> Schott.	Araceae	Tuber/ Leaf	Vegetable
38.	<i>Kamal</i>	<i>Nelumbo nucifera</i> Gaertn.	Nymphaeaceae	Seed	Edible
39.	<i>Bhadli saag</i>	<i>Vitex peduncularis</i> Wall.	Verbenaceae	Leaf	Vegetable
40.	<i>Bergeria kanda</i>	<i>Barleria prionitis</i> Linn.	Acanthaceae	Tuber	Edible
41.	<i>Gaithi</i>	<i>Dioscorea bellophyla</i> Linn.	Dioscoreaceae	Tuber	Edible
42.	<i>Khaksa</i>	<i>Momordia dioica</i> Roxb.	Cucurbitaceae	Fruit	Vegetable
43.	<i>Hatu mat</i>	<i>Bambusa arudinacea</i> (Retz.) Willd.	Poaceae	Rhizome	Young culms ( <i>Karla</i> )- pickle
44.	<i>Khukhri</i>	<i>Agaricus campestris</i> Linn.	Agaricaceae	Entire plant	Vegetable
45.	<i>Rugra</i>	<i>Lycoperdon spp.</i> Linn.	Agaricaceae	Entire plant	Vegetable

The diversity of consumed edible NTFPs reflects the rich forest biodiversity of the rural landscape. Edible NTFPs form the main component of the tribal people's food basket. Food security is an acute concern for most of the families in the block; hence, all families in the villages collect and consume a great variety of forest foods on a regular basis. NTFPs contribute in two ways to food security i.e. direct consumption of forest foods next to grains, and selling of NTFPs to buy grains in times of shortage. As the diet of the poorest tribals is seriously deficient in carbohydrates, protein, fats, sugar, vitamins, minerals, etc., the forest foods are an important source for meeting their daily diet requirements. Low income and meager returns from farm products compel many families to trade edible NTFPs in the local weekly markets (*haats*) (Islam, Quli, Sofi, Bhat, & Malik, 2015). The market value of edible NTFPs is not regulated and vendors generally get trivial earnings not remunerative to their labour used. Sale of NTFPs (Plate 1 to Plate 4) contributes considerable cash income to the household annual income, which is then mostly used to buy grains. The NTFPs are therefore, the rural poor's most important safety net or key coping strategy to combat food shortages.



**Figure 1.** Distribution of plant species in different food category



Plate 1. Mushroom, fruits and bamboo corn



Plate 2. Green and dried wild vegetables



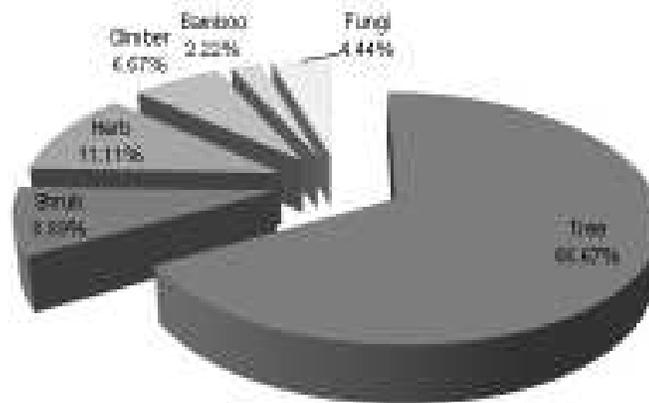
Plate 3. Wild fruits



Plate 4. Wild vegetables

The edible NTFPs of the block face threats from various anthropogenic activities. Respondents reported a decline in the availability of edible NTFPs resources. The main reasons for this decline are increased market pressures on edible NTFPs, loss of forests due to conversion to agriculture, rapid population growth, massive unemployment stress, and ample scope for NTFPs based livelihood opportunities. Yet, it is critical that communities maintain their access to edible NTFPs resources. Hence, forest resources conservation through alternative interventions is imperative to keep pace with the current developments and future challenges. This can be achieved by securing access rights to forests for villagers and capacity building for villagers to manage forest resources in a sustainable manner, supporting plantations of forest foods and increasing their productivity by improved seed selection and management, and strengthening producer groups and micro-enterprises for the production and marketing of forest food products for income generation (Foppes & Ketphanh, 2004). The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is crucial to the rights and concessions of millions of tribals and other forest dwellers as it provides scope and opportunity for integrating forest resources conservation and the

livelihood security of poor people. One decade after the act was passed, efforts to implement it have been half hearted in Jharkhand. Raising awareness on the part of the beneficiaries has been left to NGOs such as the *Jharkhand Jangal Bachao Andolan* (AJAM, 2015). To make the act effective and supportive, it is suggested that a mechanism for monitoring of its proper implementation should be developed and short term extension and training programmes for capacity building and empowerment of stakeholders be conducted. The locally demanded NTFP species should be preferred in both afforestation as well as reforestation plantations, for ensuring sustainable productions of the NTFPs.



**Fig. 2.** Percentage of species under various plant habits

### Conclusion

The presented inventory of edible NTFPs resources helps in documentation of plant diversity, distribution and pattern of utilization. Balanced interaction between the people and forest ecosystem is the key for success of conservation and sustainable management of edible NTFPs. Domestication of economically and culturally important plants can contribute to conservation, because this will ease extraction pressure on wild plant populations. Evolving participatory strategies for multiplication of the species, which have shown recessions in their qualitative and quantitative status, using a common shared understanding, can contribute towards sustainable development. The lustful and opportunity driven exploitation of resources require sensible checks to ensure the sustainability of the forest resources. If implemented robustly, the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 will be instrumental in capacity building and empowerment of

stakeholders, strengthening local self governance, conservation and management of the forest resources, and ensuring sustained productions of the NTFPs. Awareness-cum-trainings camps and capacity building programmes needs to be organized, involving the State Agricultural Universities, government line agencies, NGOs, community based organisations (CBOs) and other competent sectors, for effective implementation and execution of the Act. Additionally, the chemical analysis of edible NTFPs will provide nutritional and photochemical profiles that could be useful for assessing the health benefits of such foods.

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