

Original Research Article

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The Role of Non-Timber Forest Products (NTFPs) in Tribal Economy of Jharkhand, India

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ABSTRACT

This study examined the role of NTFPs in tribal economy of Bundu block in Ranchi district of Jharkhand, India. A multi-stage random sampling technique was employed to select sample villages (9) and households (164) for field survey. Data were collected through structured interviews and non-participant observations which were analysed using descriptive statistics *viz.*, frequency (f), percentage (%), mean (x) and range. Results revealed that average income earned from NTFPs was Rs. 4791.16 household⁻¹ annum⁻¹ which is differentiated as cottage industry (36.26%), fruit (13.49%), fuel wood (11.40%), tooth brush (8.55%), fodder (8.15%), *mahua* (*Madhuca latifolia*) flower (7.22%), oilseeds (6.74%), vegetables (4.31%) and ethno-medicine (0.88%). Among the NTFPs classes cottage industry accrued maximum (Rs. 1881.09) income while ethno-medicine procured lowest (Rs. 42.07) in the tribal households. Fuel wood represented highest (67) number of species followed by fodder (37), fruit (10), vegetable (7), oilseed (5), tooth brush (4), ethno-medicine (3), cottage industry (2) and *mahua* flower (1). Peak seasonality of NTFPs exploitation is limited for only 3-4 months only. Average gross annual income was Rs. 27894.20 household⁻¹ annum⁻¹ composed of agriculture (36.24%), NTFPs (17.18%), wage labour (9.75%), livestock (8.86%), business/ shop keeping (8.72%), timber (7.83%), service (6.78%) and others (4.63%). Sustainable exploitation, use and commercialization of NTFPs are the main drivers for socioeconomic development, poverty reduction and livelihood security of the tribes in the area.

Keywords

NTFPs,
Exploitation,
Livelihood,
Economy, Tribes,
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Introduction

Globally, more than two billion people are dwelling in forests, depending on forest resources for subsistence, income and livelihood security (Ahenkan and Boon, 2011). NTFPs are considered to be vital for sustaining rural livelihoods, reducing rural poverty, biodiversity conservation and facilitating rural economic growth (Maske *et al.*, 2011). The World Health Organization estimated that about 80% of the population of

the developing countries uses NTFPs to meet their health and nutritional needs (Olaniyi *et al.*, 2013). Additionally, several opportunities for improved rural development and standard of living are linked to NTFPs (Ajake and Enang, 2012; Islam *et al.*, 2013). NTFPs are in daily use throughout the tropics, commonly providing resources crucial to people where no other social security is provided by the state (Bharathkumar *et al.*, 2011). NTFPs

greatly influence the socioeconomic development in rural communities; enhance the quality of environment by influencing the life supporting system and play leading role in culture and civilization (Ghosal, 2011). The forest fringe communities use NTFPs for diverse purposes like medicinal, edible fruits, vegetables, oilseeds, ornamental, cottage industry, fuel wood, fodder, dyes, tannins, narcotic, drinks, housing materials, agricultural implements, weapons, fibers, furniture items, packing materials, matches, sports goods, lac, floss *etc.* (Saha and Sundriyal, 2012). NTFPs collection and sale is often viewed as a marginal activity, though in reality the trade of these products provides significant economic benefits to many rural households and communities (Chamberlain *et al.*, 2000). NTFPs play prominent roles in improving living standards through variant socioeconomic services such as source of food to households, income generation potentials, provision of safety-net or insurance in times of a tragedy, preservation of cultural heritage and spirituality and financial saving by households (Shackleton and Pandey, 2014).

India has about 16000 plant species; of which 3000 yield NTFPs providing 40% of forest revenues and 55% forest based employment (Shit and Pati, 2012). According to World Resource Institute, over 500 million people in India are dependent on NTFPs for their subsistence and cash income (Sarmah and Arunachalam, 2011). The income from sale of the NTFPs for households living in and around forest constitutes 40 to 60% of their total income (Nayak *et al.*, 2014). NTFPs are not only a source of subsistence income for millions of poor households but also provide employment to rural poor in the form of direct employment, self-employment and secondary employment (Prasad and Siddiqui, 2006). Livelihood contribution of NTFPs to rural households is uneven because it depends on diversity and availability of NTFPs, proximity

to forest, family labour, marketability of the resources, extent of rights and concessions conferred *etc.* (Melaku *et al.*, 2014). NTFPs based livelihood systems vary considerably between different regions and among the various ethnic groups, depending on ecological, historical, cultural, geo-climatic factors in India (Tewari, 2014).

Tribal communities inhabiting in and around the northern tropical dry deciduous forest of Bundu block in Ranchi district mainly depend on NTFPs for their subsistence livelihood and substantial income earnings (Islam *et al.*, 2015). Fuel, fodder, fruits, seeds, vegetables, medicines, fertilizer, fibre, floss, oilseed, ornaments *etc.* are the main NTFPs extracted by the tribes. The NTFPs play a central role in the socioeconomic, cultural and political systems of tribal societies and the entire lives and livelihoods of these people revolve around forests and forestry (Bedia, 2014). Modernization and unethical development in the block has created a marked decrease in NTFPs which is severely affecting the livelihoods of the forest fringe communities (Gharai and Chakrabarti, 2009). Understanding the livelihood dependency on NTFPs among tribal communities in rural areas can help policy makers design and implement effective strategies for poverty alleviation, livelihood improvement, conservation and sustainable NTFPs use. With this background the current research is contemplated to quantify and analyze the diversity of NTFPs and its livelihood contribution to the tribal households of sample villages in Bundu block of Ranchi district in Jharkhand, India.

Materials and Methods

The study area

The study was conducted in Bundu block (Fig. 1.) of Ranchi district in Jharkhand situated at 23⁰11' - 23⁰18' North latitude and

85°35' - 85°58' East longitude at an altitude of 337 meters above MSL. Total geographical area of the block is 25097 ha which is differentiated as: un-irrigated cultivable land (69.25%), forest (17.44%), irrigated cultivable land (8.41%), culturable wasteland (3.59%), unculturable wasteland (1.29%) and non-agricultural use (0.02%). The forest resource is predominantly covered by northern tropical dry deciduous forest (5B/C2) (Champion and Seth, 1968) falling under Bundu Range of Khunti Forest Division. The tropical climate is divisible into three different seasons, viz., rainy (mid June–September), winter (October–February) and summer (March–mid June). The average annual normal precipitation is 1413.60 mm, the mean minimum temperature is 24°C and mean maximum temperature is 37.2°C. According to the Census of India (2011), the total population of the block is 62509 (31624 males and 30885 females) living in 11495 households of 88 villages. The literates in the block are 23572 (16084 males and 7488 females) accounting 44.02% of the total population (Anon., 2009). Of the total population, 60.74% are ST (*Munda, Oraon* and *Lohara*), 4.76% are SC and rest 34.50% belongs to other social groups (Anon., 2009). The population density, family size and sex ratio are 249.07/ km², 5.44 and 978 female/1000 male, respectively. Agriculture and NTFPs collection are the main sources of subsistence livelihood.

Sample selection

Bundu block of Ranchi district was purposely chosen for the current study as a majority of the tribal households in the block are dependent on NTFPs considerably for livelihood security. A multi-stage random sampling technique (Ray and Mondol, 2004) was used for selection of villages and households. Nine (10%) sample villages viz., Korda, Jojoda, Husirhatu, Banaburu,

Nehalgara, Ghagrabera, Hesapiri, Roredih and Kuchidih were selected randomly from Bundu block. The sample was consisted of 164 (20%) randomly selected households from the sample villages comprising all categories of the land holders. The interviews were conducted with household heads or eldest members.

Data collection and analysis

Data on NTFPs exploitation by tribal households were collected through personal interviews of the respondents through a well-structured pre-tested interview schedule and non-participant observations (Mukherjee, 1993). The parameters included NTFP type, plant part, species name, plant habit, seasonality, usage, collection annum⁻¹, consumption annum⁻¹, sale rate, sale annum⁻¹ and income earned. Monetary values of NTFPs were calculated as per their local market rates. The annual household income consisted of various sources was also recorded. Simple descriptive statistics viz., frequency (f), percentage (%), mean (x) and range were used for analysis of the data (Snedecor and Cochran, 1967) and the results were displayed through tables and charts.

Results and Discussion

Exploitation of NTFPs by the tribal households

The average income earned from NTFPs in the surveyed population was Rs. 4791.16 household⁻¹ annum⁻¹. The cottage industry fetched highest income per annum (Rs. 1881.09) among tribal households followed by fruit (Rs. 646.21), fuel wood (Rs. 546.34), tooth brush (Rs. 409.75), fodder (Rs. 390.24), *mahua* (*Madhuca latifolia*) flower (Rs. 346.09), oilseed (Rs. 322.70), vegetable (Rs. 206.61) and ethno-medicine (Rs. 42.07) (Table 1). Among indigenous use classes,

maximum (67) number of species were used for fuel wood followed by fodder (37), fruit (10), vegetable (7), oilseed (5), tooth brush (4), ethno-medicine (3), cottage industry (2) and *mahua* flower (1) (Fig. 2.).

Sal leaf plate making and *lac* cultivation are the prominent cottage industries of the tribal households contributing a sizeable share in their income. People collect *sal* leaves, process, stitch raw plates and sell in the local *haats* (weekly markets) earning sizeable income, however, there is a large demand of machine pressed *sal* leaf plates in urban areas and has the potential of bringing additional income to the people by value addition through mechanized moulding. *Lac* cultivation is practiced by the tribal people on all the three host plants viz., *palas* (*Butea monosperma*), *ber* (*Zizyphus mauritiana*), *kusum* (*Schleichera oleosa*) using both *rangeeni* and *kusmi* strains of *lac* insects. Mango (*Mangifera indica*), *jamun* (*Syzigium cumini*), *ber* (*Zizyphus mauritiana*), *imli* (*Tamarindus indica*), *bhelwa* (*Semecarpus anacardium*), *kendu* (*Diospyros melanoxylon*), *toont* (*Morus alba*), *bel* (*Aegle marmelos*), *kathal* (*Artocarpus heterophyllus*) and *barhar* (*Artocarpus lakoocha*) are the chief edible fruits collected, consumed and sold. These edible fruits are an indispensable source of diet, food, nutrition, health care and livelihood in tribal households. Fuel wood is tribal society's traditional source of energy constituting the mainstay of households cooking and heating energy besides meeting the fuel requirements for cottage industries, community functions, household rituals e.g. marriage, child birth, child christening, death, ancestral worship etc., religious functions namely, worship of God and Goddess, festivals, coercing of evil spirits and witchcraft etc. Collection and sale of tooth brushes of *sal* (*Shorea robusta*), *karanj* (*Derris indica*), *neem* (*Azadirachta indica*) and *mahua* (*Madhuca latifolia*) in local as

well as urban markets is a common business of tribal children and women fetching good returns.

Livestock production is an important component of tribal economy, which predominantly depends on quality and quantity of fodder availability. Forests in vicinity of the villages not only offer plenty of grazing lands with enough fodder availability for livestock rearing but also provide employment and income opportunities. Dried *mahua* (*Madhuca latifolia*) flowers are used for preparation of country liquor which is sold by the tribal women in make-shift shops in local weekly *haats* and consumed by the people almost in all functions, ceremonies and festivals. Thus, the sale of dried *mahua* flowers in nearby markets is an important NTFPs based self-employment for the tribal people earning a considerable income. Oilseeds of *chironji* (*Buchanania lanzan*), *mahua* (*Madhuca latifolia*), *kusum* (*Schleichera oleosa*), *sal* (*Madhuca latifolia*) and *karanj* (*Derris indica*) are collected and sold seasonally in good quantity for extracting oil consumed in cooking, lighting, massage, medicinal or lubrication and the residue oilseed cake is consumed as cattle feed or medicine. *Koinar* (*Bauhinia purpuria*) leaf, bamboo (*Bambusa arundinacea*) corn, *kachnar* (*Bauhinia variegata*) flower, *phutkal* (*Ficus glabella*) leaf, *jirhul* (*Indigofera arborea*) flower, *rugra* (*Lycoperdon spp.*) basidiocarp and *khukhri* (*Agaricus campestris*) basidiocarp are important vegetables for the local population collected and sold for earnings. Vegetables ripe, unripe, green, dried, cooked or uncooked are consumed by the local people after preparing sauce, pickle, soar, roasted or boiled stuff. *Chirayita* (*Swertia angustifolia*), *harra* (*Terminalia chebula*) and *bahera* (*Terminalia belerica*) are the well-known medicinal items collected, dried and sold by the tribal people in local as well as urban markets. NTFPs

collected and sold by the tribal people throughout the year in local *haats* as well as in nearby urban markets which fetches handsome earnings to the vendors. Collection and marketing of NTFPs varies with the types of resources, household consumption, availability and market price and socioeconomic condition of the people (Islam and Quli, 2015). NTFPs play a potent role in the livelihood support of tribal and forest dwellers in terms of subsistence, income and employment generation (Singh and Quli, 2011). The tribal people possess the traditional skill base, have access to the resource base and have supportive government policies on NTFPs management and trade (Bedia, 2014).

NTFPs contribute to livelihoods for the large proportion of poor living in forests of developing countries (Opaluwa *et al.*, 2011). NTFPs based incomes vary across tribal households depending upon the degree of effort expended and contribute significantly to the total household income (Islam *et al.*, 2015). The findings are not unusual and a significant number of studies (Salehi *et al.*, 2010; Opaluwa *et al.*, 2011; Singh and Quli, 2011; Saha and Sundriyal, 2012; Olaniyi *et al.*, 2013; Bedia, 2014; Sharma *et al.*, 2015;

Islam and Quli, 2015; Shrey *et al.*, 2017) across the world have demonstrated the dependency of forest dwellers on NTFPs for both subsistence and cash income.

NTFP based income composition

Among the NTFPs categories, cottage industry procured maximum (36.26%) income followed by fruit (13.49%), fuel wood (11.40%), tooth brush (8.55%), fodder (8.15%), *mahua* (*Madhuca latifolia*) flower (7.22%), oilseeds (6.74%), vegetables (4.31%) and ethno-medicine (0.88%) (Fig. 3.). *Sal* leaf plate making and *lac* cultivation were the major cottage industries contributing maximum share to the NTFPs based annual income. Skillfully stitched *Sal* leaf plates have local, national as well as global markets due to cheap, disposable, bio-degradable, hygienic and ecological substitute for thermocol and plastic plates, chiefly used locally to serve and pack food in the grocery shops, petty hotels, temples, marriage, festivals, ceremonies *etc.* and to make offerings to Hindu Gods. *Lac* cultivation is a subsidiary source of income for a large number of tribal households playing a potent role in their socioeconomy.

Table.1 Household exploitation of NTFPs by the tribal people

NTFPs	Collection (kg annum ⁻¹)	Consumption (kg annum ⁻¹)	Marketing (kg annum ⁻¹)	Rate (Rs. kg ⁻¹)	Income (Rs. annum ⁻¹)
Fuel wood	3759.26	3650.00	109.26	5.00	546.34
Fodder	17300.91	17222.86	78.04	5.00	390.24
<i>Cottage industry</i>					
Sal leaf plate	34176.82 ^Ω	2469.51 ^Ω	31707.31	0.32 plate ⁻¹	1268.29
Lac	4.08	0.00	4.08	150.00	612.80
<i>Fruit</i>					
Fruits (kg)	76.42	23.87	52.54	5.00-20.00	627.98
Bel (no.)	6.99 ^Ω	0.91 ^Ω	6.07 ^Ω	3.00 ^Ω -1	18.23
Vegetable	26.81	7.68	19.12	10.00-25.00	206.61
Oilseeds	19.63	2.10	17.53	10.00-150.00	322.70
Ethno-medicine	0.51	0.00	0.51	50.00-140.00	42.07
Tooth brush	64.97 [§]	24.00 [§]	40.97 [§]	10.00 [§] -1	409.75
Mahua flower	40.64	6.03	40.60	10.00	346.09
Total	-	-	-	-	4791.16

Note: Ω = pieces; § = bundles

Fig.1 Location map of the study area

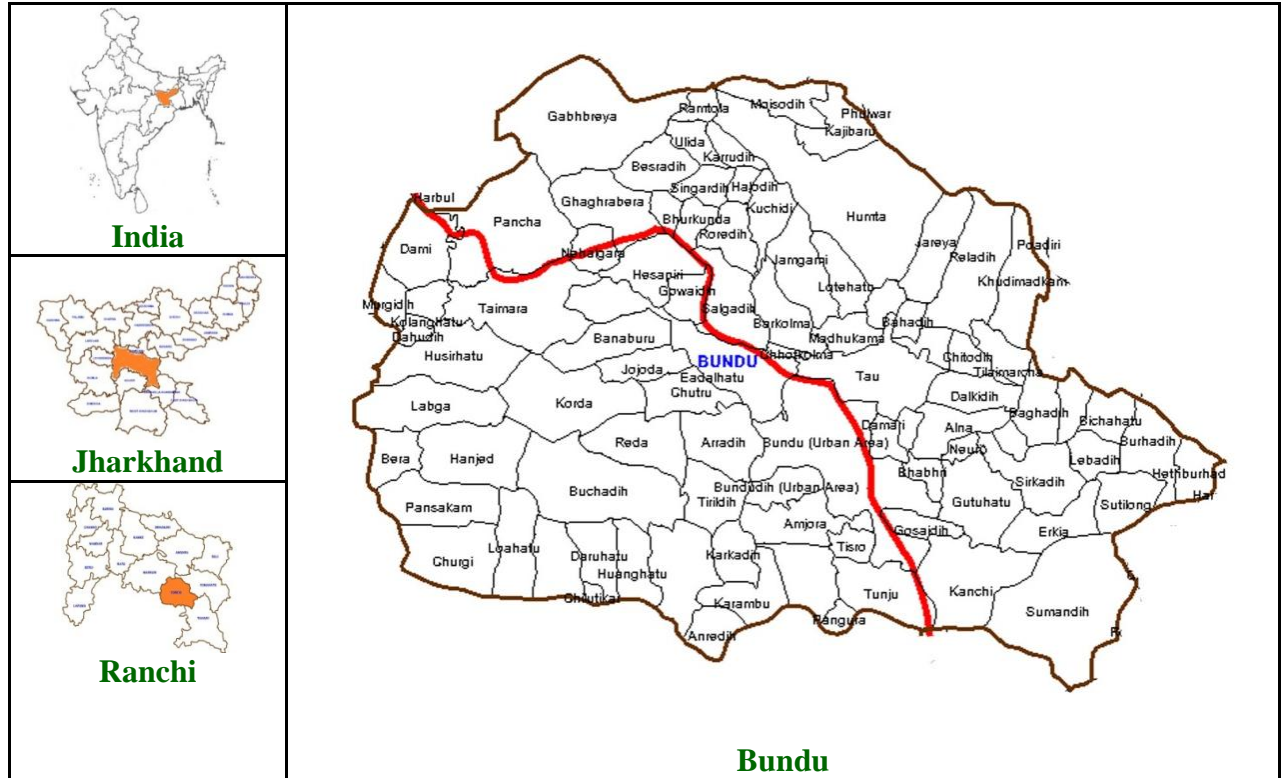


Fig.2 Species composition under different use category

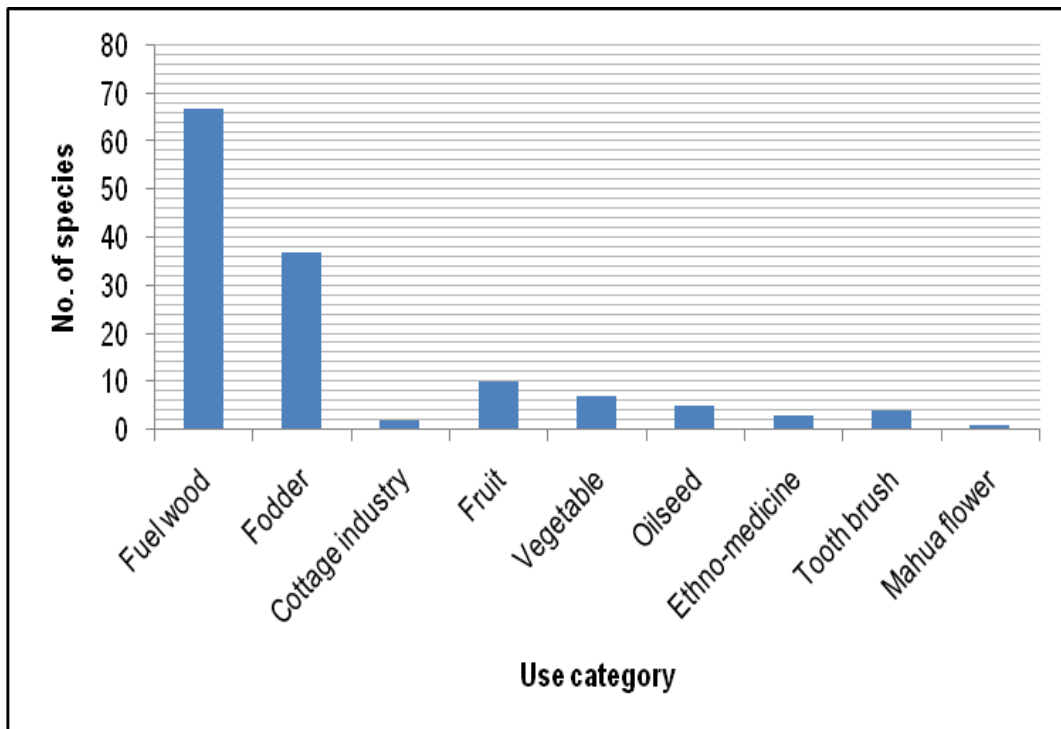


Fig.3 NTFPs based income composition in tribal households

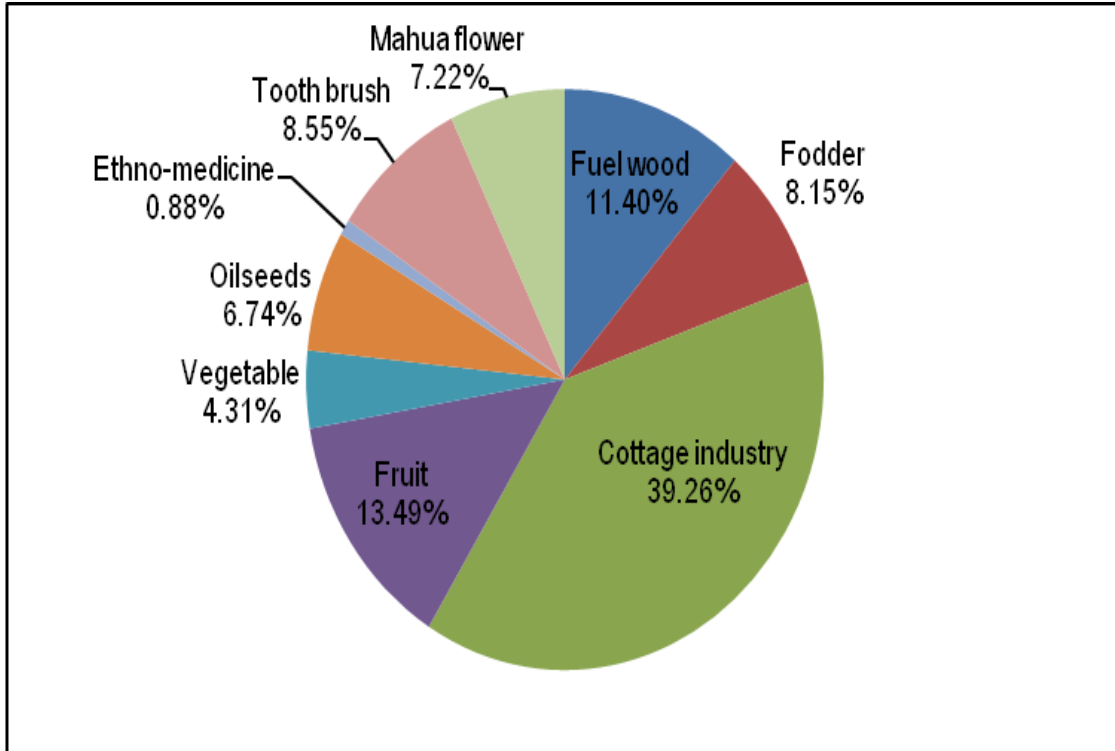


Fig.4 Seasonality of NTFPs extraction in the tribal households

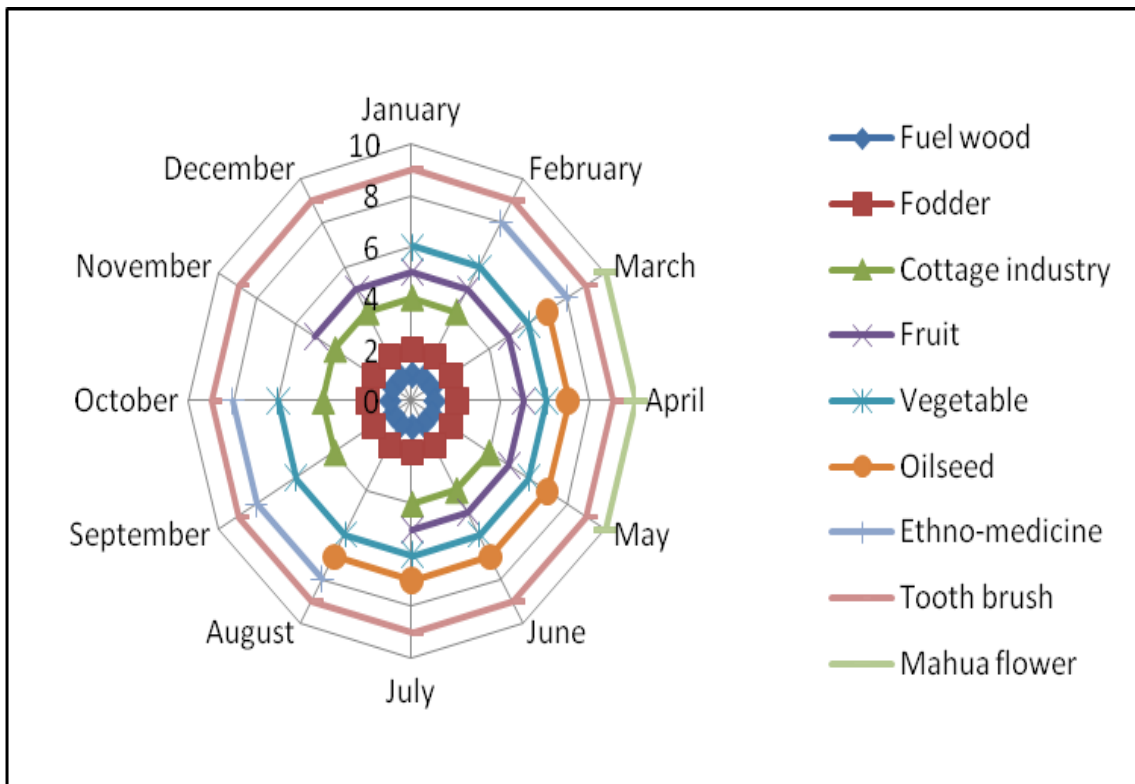
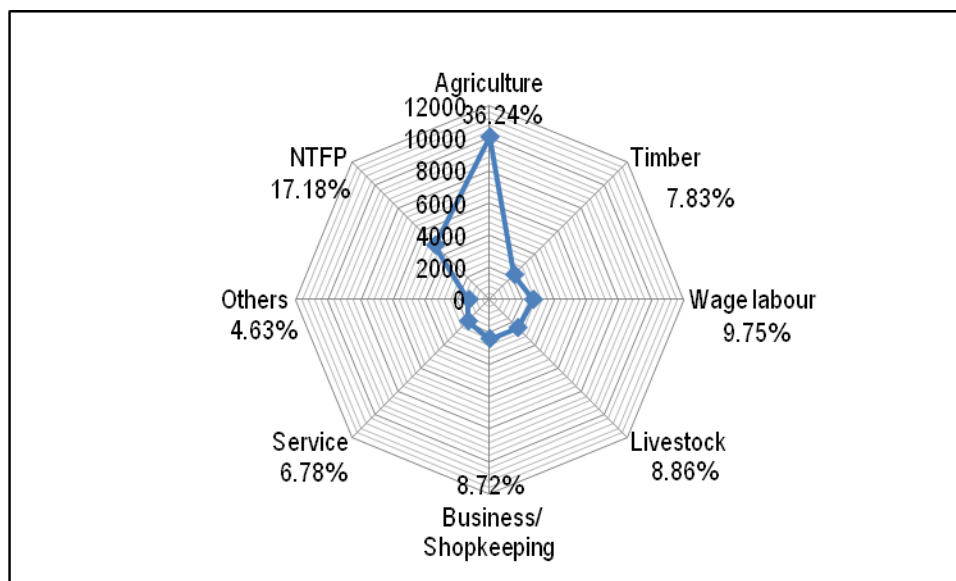


Fig.5 Contribution of NTFPs to the household income (Rs. annum⁻¹)



Fruits were the next important income generating NTFPs accounting a considerable share in the NTFPs based annual income. Fruits fulfill the food, health and nutritional needs of tribal communities to a considerable extent, hence, collection and sale of fruits is a promising business among them. Fuel wood collection and sale is a productive economic activity because the fuel wood is the principal source of energy constituting maximum share in total bio-fuels consumption among the tribal households. The collection and marketing of tooth brush, fodder, *mahua* (*Madhuca latifolia*) flower, oilseeds, vegetables and ethno-medicine comparatively generated less income for the tribal households due to low unit price or the limited market demand.

Seasonality of NTFPs exploitation

Seasonality of NTFPs exploitation (Fig. 4.) revealed that fuel wood, fodder and tooth brush are collected and marketed throughout the year while *sal* leaf plates, *lac*, fruits and vegetables are sold for 9-10 months by the tribes. Oilseeds and ethno-medicine are vended for 5-6 months whereas *mahua*

(*Madhuca latifolia*) flower is traded only for 3 months.

NTFPs have inconsistent abundance according to season and the marketing of these resources differs with the seasonal livelihood avenues of the tribal people. All the main NTFPs are available for around 6 months excluding fuel wood, fodder, *sal* leaf, *lac* and tooth brush and peak trade is limited for only 3-4 months. Summer, spring and autumn seasons witness a large quantum of NTFPs influx as against the rainy season, where availability of NTFPs is least. Engagement in agriculture and difficulties in collection and storage of NTFPs causes decline in the quantity of NTFPs in the monsoon. Thus, the NTFPs explicitly provide livelihood support to the tribes throughout the year.

Contribution of NTFPs to the tribal economy

Average gross income consisted of various on-farm and off-farm sources was Rs. 27894.20 household⁻¹ annum⁻¹ with a breakup of agriculture (36.24%), NTFPs (17.18%),

wage labour (9.75%), livestock (8.86%), business/ shop keeping (8.72%), timber (7.83%), service (6.78%) and others (4.63%) (Fig. 5.). Hence, the NTFPs are the 2nd chief contributor to the total income streams in the tribal households.

NTFPs accord viable livelihood support for subsistence, cash income and safety-net among the tribes due to scarcity of alternative options, small size of land holding for agriculture and marginal agricultural returns (Maske *et al.*, 2011; Langat *et al.*, 2016.). Collection and sale of NTFPs is not a main livelihood source in tribal households but is a supplementary job either on a part-time or full-time basis (Bhatia and Yousuf, 2013; Islam *et al.*, 2016). Households engaged in agriculture and livestock production were consuming more quantity of NTFPs than households not engaged in farming activities. Similarly, the poorer households use greater quantity of NTFPs for earnings than wealthier households. Nonetheless, the income from NTFPs is somewhat little; involvement in the trade is traditional source of self-esteem, pride and sovereignty for the tribes (Usman *et al.*, 2016). Incomes earned from NTFPs are variable across tribal households since it is directly related to the availability of labour force and work force expended. Earnings from the NTFPs are spent to meet household basic needs besides securing other livelihood perspectives like education of children, wedding, marriage, agricultural investment, savings for household vocations, economic buffer in adverse times *etc.* Studies (Gharai and Chakrabarti, 2009; Singh *et al.*, 2009; Salehi *et al.*, 2010; Sarmah and Arunachalam, 2011; Singh and Quli, 2011; Alex and Vidyasagan, 2016; Amusa *et al.*, 2017) on NTFPs exploitation advocated that the NTFPs have significant contribution to the total livelihoods in tribal populace.

The foregoing discussion led to conclude that the tribes of the Bundu block exploit diverse

NTFPs substantially to support their livelihoods. Wealthier households exploit the NTFPs on a regular basis and in meaningful quantities for direct household consumption to support agriculture and livestock rearing. The poorer households having limited farms and livestock exploit the NTFPs in large scale for their subsistence, income and safety-net in adverse times. Poverty, immense unemployment and lack of alternative occupations are the major driving forces responsible for the over-exploitation of NTFPs. This study deduces the fact that the tribal livelihood was by and large dependent on the status of the NTFPs, underlining the relevance of forest conservation for improvement of tribal livelihoods on sustainable basis. The encouraging support of goods from NTFPs to the tribal households can be used as a key motivational factor for securing the highly demanded large scale afforestation and reforestation on participatory basis, to achieve the targets of greening India mission, which in turn would back up the greening the earth mission. The gainful inference of this proto-type study would rapidly spread far and wide for endorsement of the global mission of *Reducing Emissions from Forest Degradation and Deforestations* (REDD⁺) from developing countries for *Clean Development Mechanism* (CDM) as envisaged by Kyoto Protocol of IPCC, 2007. Further this would also facilitate in achieving the *poverty eradication* and *environmental sustainability* targets of the United Nation's *Millennium Development Goals* (MDGs). The exploration reflected the high potentials of NTFPs for prosperity of the tribes which needs to be mobilized effectively to curb the deleterious extremist activities and migration from the rural areas.

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