

Availability and Productivity of Important Non Timber Forest Products in Jharkhand

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Abstract: Non timber forest products have been recognized internationally as an important element in sustainable forestry as it provides green social security to billions of people in the form of food supplements, traditional medicines, fuel and fodder, low cost building materials and source of employment and income generation. Jharkhand being a forested state, lives and livelihoods of people are largely dependent upon forest and forestry activities. Forest based livelihoods mainly revolve around collection, processing and utilization/ selling of various NTFPs throughout the year along with some seasonal subsistence agriculture in the forest fringe areas. With perspective of exploring the wide range of NTFP availability in Jharkhand a study "Survey of Important Non-timber Forest Products and Estimation of Productivity and Production in Jharkhand" was undertaken. This paper attempts to enumerate six prioritized NTFPs resources and their production/ productivity potential in the state for developing comprehensive management strategies for sustainable development of the state.

Index Terms: NTFP, Availability, Productivity, Jharkhand

1. INTRODUCTION

Non-timber forest products (NTFPs) are goods of biological origin other than timber from natural, modified or managed forested landscapes. They include fruits and nuts, vegetables, medicinal plants, gum and resins, essences, bamboo, rattans and palms; fibres and flosses, grasses, leaves, seeds, mushrooms, honey and lac etc. The NTFPs can also be referred to as all the resources or products that may be extracted from forest ecosystem and are utilized within the household or are marketed or have social, cultural or religious significance [1]. The NTFPs play important roles in the livelihoods of millions of rural and urban people across the globe [2], [3], [4]. Majority of rural households in developing countries and a large proportion of urban households depend on the products to meet some part of their nutritional, health, house construction, or other needs [5]. The contribution of these daily net resources to livelihoods typically ranges from 10-60% of total household income [6], [7]. The NTFPs also provide many households with a means of income generation, either as supplementary income to other livelihood activities, or as the primary means of cash generation [8], [7], [9], [10], [11]. The NTFPs create high economic value and large-scale employment. The NTFPs have attracted global interest due to the increasing recognition of the fact that they can provide important community needs for improved rural livelihood [12], [13]. Globally, more than a billion people depend directly on forests for their livelihoods and the remaining six billion of us depend on forests for a variety of economic, social and environmental benefits such as the rainfall, biodiversity, pollinators, carbon storage and clean water they provide. Out of which NTFPs contribution is significant in providing adequate food, fuel, feed, health and fiber for growing populations. The importance of NTFPs in rural livelihoods in developing countries has become widely acknowledged. In India, NTFPs contribute an income equivalent to US \$ 2.7 billion per year and absorb 55% of the total employment in forestry sector. Moreover, 50% of forest revenues and 70% of forest based export income come from such resources [14], [15]. They provide 50% of the household income for approximately one third of India's rural population. Considering the importance of NTFPs in the livelihoods and wellbeing of local people, especially in the developing world, it is intriguing why the sector still receives so little attention in development policies and budgets as well as in programmes and budgets from relevant government departments, such as for forestry, agriculture, rural development, environment or energy [2].

Jharkhand being a forested state, here entire lives and livelihoods of a majority of the people around forest are dependent upon forest and forestry activities. Forest based livelihoods mainly revolve around collection, processing and utilization/ selling of various NTFPs throughout the year along with some seasonal subsistence agriculture in the forest fringe areas. The Tribal communities and forest dwellers of Jharkhand have lived in harmony with forest resources since ages. For them every aspect of life and livelihood is dependent on NTFPs be it feed they eat in the form of leaves (Katai sag, Putkal, Banskarerl), fruits (Mahua fruit, Kend fruit etc.), fibers and tubers, on derived from the seeds for fodder for their animals or the houses they live in or the medicines they use to cure themselves or the cloth and ornaments they wear. In most of the forested areas of Jharkhand, these forest produce have been supporting tribal for more than 6-8 month a year both in terms of subsistence and cash income. However the pertinent aspect of NTFP status, production /productivity, their role in livelihood, analysis of market trends and potentials, gap analysis and associated challenges have not been comprehensively studied. There exist significant knowledge gaps in regard to NTFP yield potential in different regions of Jharkhand, as well as in regard to harvesting practices adopted, patterns of local consumption and marketing methods followed. There is a voluminous list of NTFPs. But few of them like sal

leaf (*Shorea robusta*), Mahua (*Madhuca indica*) flower/seed, Chiraunzi (*Buchanania lanzan*), Mango (*Mangifera indica*), Tamarind, imli (*Tamarindus indica*), Ber (*Ziziphus mauritiana*), Jamun (*Syzygium cumini*), Bamboo corn, Kachnar (*Bauhinia variegata*) flower, Karanj (*Pongamia pinnata*) seeds, Gum Karaya (*Sterculia urens*), Kusum (*Schleichera oleosa*) seed, Chiraita (*Swertia perennis*) Tendu (*Diospyros melanoxylon*) fruit, Jackfruit (*Artocarpus heterophyllus*) are an integral part of day-to-day livelihood activities and traditional lifestyles of tribal society in this state.

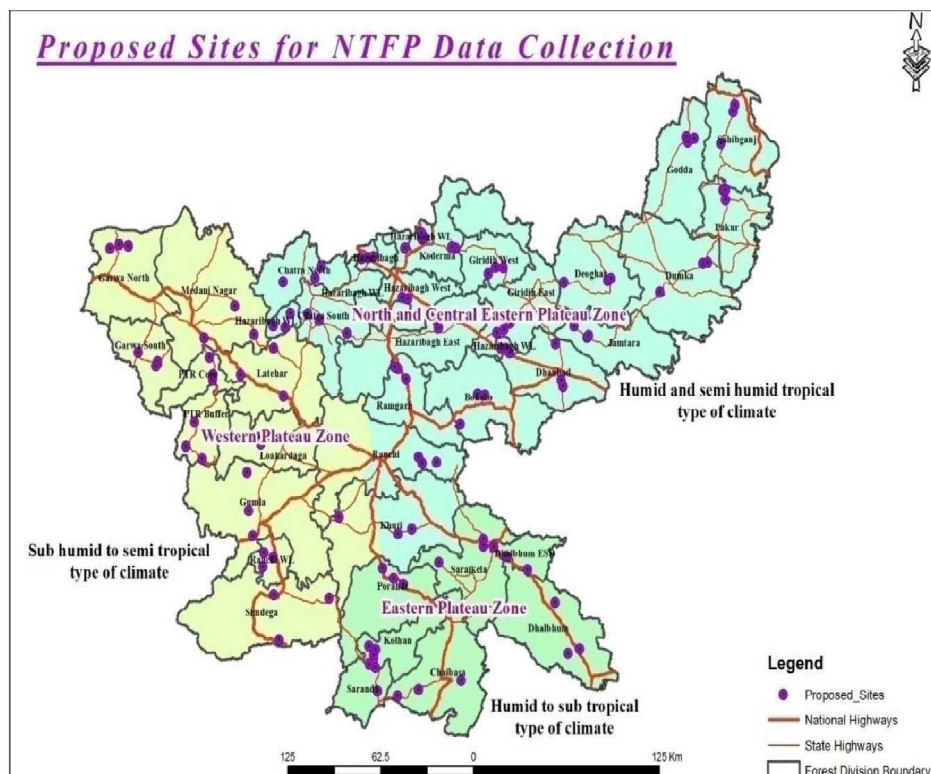
In this perspective a study “Survey of Important Non-timber Forest Produces and Estimation of Productivity and Production in Jharkhand” was undertaken by state silviculturist wing of Forest Environment and Climate Change Department, Government of Jharkhand to enumerate six prioritized NTFPs resources and their production/ productivity potential in the Jharkhand state for developing a comprehensive state strategy for their management and accruing economic benefit to folklores of the region by sustainable collection of NTFPs. Following objectives were addressed in this study

1. To survey the existing populations of NTFP Species like Karanj (*Pongamia pinnata*), Mahua (*Madhuca indica*), Sal (*Shorea robusta*), Imli (*Tamarindus indica*), Gum Karaya (*Sterculia urens*), and Chiraunzi (*Buchanania lanzan*) in different agro-climatic zones of Jharkhand state.
2. To estimate production of seeds and/or leaves of individual species under varying growing Conditions.

Above mentioned six species of NTFPs were prioritized on the basis of criterions like a. Number of depots trading in that species b. Conservation status and c. The bulk of trade through all the depots.

2. STUDY SITE

Jharkhand largely comprises forest tracts of Chotanagpur plateau and Santhal Pargana. The whole state is mountainous regions covered with dense growth of forest. About 29% land is covered by forest areas containing vast resource and minerals. The Forest cover in the state, based on interpretation of satellite data in FSI report, is 22,977 km² which is 28.82% of the state’s geographical area. In terms of forest canopy density classes, the state has 2,590 km² area under very dense forest, 9,917 km² area under moderately dense forest and dense forest and 10,470 km² area under open forest. The assessment was carried out across as many as 108 sites purposively selected out of 36 forest divisions within different agro climatic zone and forest types of state. (Figure 1).



3. METHODOLOGY

3.1 Data Collection

Data Collection was done through questionnaires based household surveys, discussions and interview with collectors/ harvesters & traders involved in NTFPs trading. Secondary data consisting of an estimate of the volumes of NTFPs traded during the 2010-2014 period were collected from Jhamcofed, JFDC, Jhascolamps, Forest Department, and local mandies of different districts like Ranchi, Palamu, Dumka, Jamshedpur and Chaibasa. Standard quadrant sampling method of FSI was used to estimate the total population of prioritized species in the area.

3.2 Identification of landscapes

Stratified Random Sampling approach was followed within three Agro-climatic zones of the State, viz. Central & Western Plateau Zone, Western Plateau Zone and Southeastern Plateau Zone (as per Planning Commission) and then further consideration was carried upon the three forest types, viz. tropical moist deciduous, tropical dry deciduous and subtropical broad leaved hill forests. At least three sites per division (three sample plots lying in each division) were identified for the execution of study .Each sample plot consisted 5 quadrants are laid out in a Sample plot. One laid in centre and other four in each direction. Dimension of each quadrant was 50 m X 50 m at a distance of 500 m from the centre. This study covers a survey intensity of 0.47 % (1.27 % in Very Dense, 0.33 % moderate & 0.31 % in Open forest) in the states forest.

3.3 Formulation :

- Production of individual species were calculated by using formula-
Estimated Production of individual = (Individual Productivity/ ha X Total Forest Area in Ha) /1000 MT.
- Productivity of individual species was calculated by using formula
Average Yield = Total yield / no. of tree (in a study site)
Productivity/ ha = Average Yield in study Are/Average area

4. Observation

On the basis of primary and secondary data it was found that in Jharkhand there are major 26 NTFP species found in adequate amount .Top producing NTFPs among them are Sal Seeds (*Shorea robusta*) more than 100000 M.T annually, Mahua Flower (*Madhuca longifolia*) more than 100000 M.T annually, Chakvar (*Cassia tora*) 50000 M.T annually , Tamarind (*Tamarindus indica*) 50000 M.T annually, whereas NTFPs such as Sarpagandha (*Rauwolfia serpentine*) 10-20 M.T annually , Aswagandha (*Withania somnifera*) 50-60 M.T annually, Madhu/ Honey Bee sap 5-10 M.T annually, were found least producing. Also collection season variations of selected species of NTFP for study was marked (chart 1).

Chart 1: Collection season of selected NTFP

No.	Produce	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Tamarind												
2	Sal Seeds												
3	Mahua Flower												
4	Karanj												
5	Chiraunji												
6	Gum Karaya												

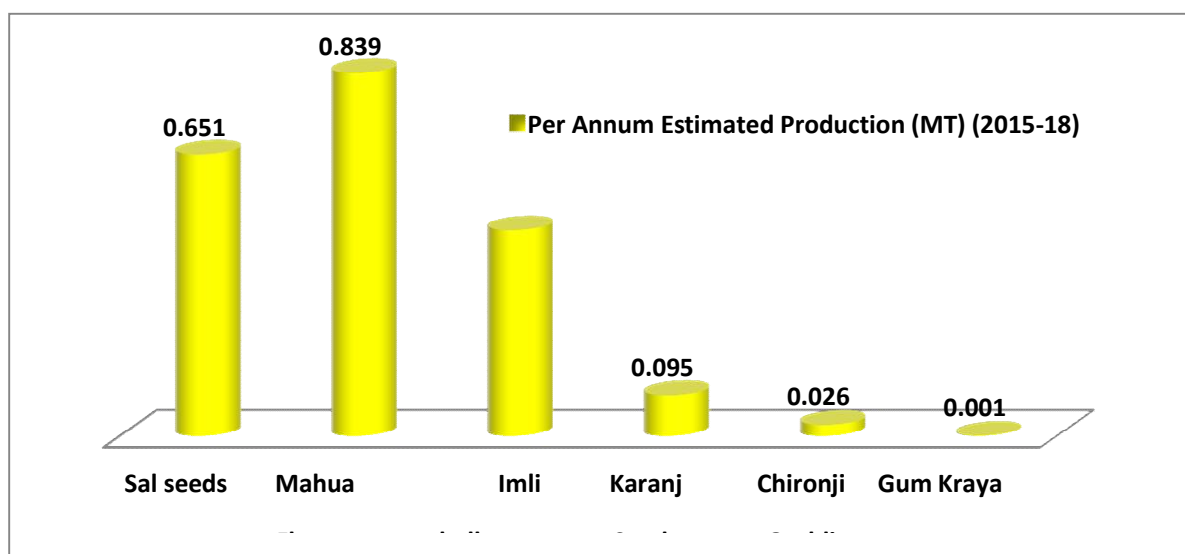
In this study total 108 sample forest villages were surveyed all over the state on the basis of which availability of average number of trees per hectare and productivity per hectare for all 36 divisions were also estimated. (Table I). Species wise productivity estimation of 6 selected species in Jharkhand forest were estimated for year 2015 to 2018 conferring the following average figures- Sal Seeds 534.21 kg/ hec, Mahua 684.02 kg per ha, Imli with shell 388.46 kg per ha, Karanj 77.28 kg Per ha, Chironji 21.54 and Gum Karaya 0.98 kg per ha.

Table I: Division wise Summary of Available Trees and its productivity / ha

S.No	Division	Availability of Trees / Ha						Productivity / ha in Sample locations					
		Sal	Mahua	Imli	Karanj	Chironji	Gamkaraya	Sal seeds	Mahua Flower	Imli	Karanj Seeds	Chironji Guthli	Gum Karaya
1	Chatra North	108	15	1	2	4	0	355.95	384.09	198.61	35.66	6.95	0.00
2	Chatra South	108	22	1	3	2	0	310.38	687.29	120.23	59.48	3.94	0.00
3	Hazaribagh West	129	17	7	1	2	0	274.59	540.30	1010.14	28.37	4.50	0.00
4	Hazaribagh East	365	33	4	3	1	0	804.74	1002.84	468.85	60.44	1.51	0.00
5	Ramgarh	250	26	1	1	5	1	486.19	870.25	206.45	14.38	10.01	0.67
6	Gumla	421	43	2		13	1	772.54	1598.36	398.92	498.06	36.04	0.50
7	Simdega	336	53	7	23	22	2	654.33	1887.57	939.31	518.44	57.60	1.23
8	Khunti	325	18	18	38	35	3	632.17	695.40	2087.86	856.80	72.34	1.84
9	Ranchi	314	8	1	1	17	1	533.23	228.61	203.40	17.39	26.66	0.60
10	Bokaro	234	16	0	1	5	1	420.08	425.06	39.97	13.87	9.40	0.70
11	Dhanbad	21	7	3	2	4	1	65.96	257.81	425.86	44.41	4.10	0.23
12	Jamtara	124	137	6	0	25	2	299.87	1923.71	608.16	0.00	46.68	0.72
13	Dumka	223	30	7	1	23	5	487.24	880.16	961.41	15.98	43.73	1.34
14	Pakur	143	87	1	0	1	6	414.69	1748.20	67.51	6.52	2.20	3.13
15	Sahibganj	45	0	2	1	4	2	131.22	0.00	227.72	15.57	7.34	1.30
16	Godda	165	26	3	1	18	5	305.04	555.68	399.07	24.22	33.47	3.43
17	Deoghar	460	31	2	2	12	0	786.61	826.88	313.37	34.11	24.41	0.00
18	Giridih East	362	26	1	1	10	1	705.67	853.04	164.02	16.94	20.66	0.66
19	Giridih West	283	21	5	0	19	1	550.15	727.62	654.75	6.06	38.59	0.71
20	Koderma	248	17	2	3	11	2	508.94	558.28	216.89	55.37	18.51	1.53
21	Garhwa North	287	24	2	1	6	2	654.39	892.34	255.34	21.55	11.95	1.10
22	Garhwa South	309	23	1	1	1	2	665.05	654.58	175.14	14.60	1.22	1.07
23	PTR Buffer	277	20	1	1	11	1	678.03	616.73	100.50	19.88	22.19	0.44
24	PTR Core	84	10	2	1	4	2	240.37	296.62	328.15	13.48	6.79	1.46
25	Latehar	133	14	2	2	7	3	389.66	663.68	237.62	37.80	13.01	2.53
26	Medininagar	200	9	3	0	11	2	547.18	316.38	333.21	5.97	19.99	1.14
27	Lohardaga	268	10	1	4	8	1	800.68	289.11	116.32	70.42	19.06	0.89
28	Saranda	217	1	3	1	20	2	526.75	40.22	383.12	14.71	50.45	1.34
29	Chaibasa	171	5	2	2	11	1	493.80	95.06	253.40	26.55	24.38	0.48
30	Kolhan	245	19	2	0	12	2	726.36	627.13	343.13	4.33	28.37	1.10
31	Porahat	307	7	1	1	8	4	819.32	266.29	304.97	23.84	15.54	1.93
32	Dhalbhum	205	6	1	1	11	2	649.29	218.82	103.45	14.27	20.91	1.01
33	Saraikela	132	33	3	2	16	0	387.14	896.45	555.09	39.13	33.33	0.00
34	Dalma WLS	140	8	1	1	3	1	371.24	250.72	178.91	26.93	5.89	0.52
35	Palkot WLS	325	12	3	3	10	3	708.79	435.14	417.24	72.66	23.20	1.50
36	Lawalong WLS	387	7	1	3	6	0	977.11	248.52	186.44	53.77	10.62	0.22
	Average	231.89	23.35	2.92	2.99	10.55	1.77	531.52	684.97	388.46	77.28	21.54	0.98

Species wise Average productivity per tree ≥ 10 cms of 6 selected NTFP species in Jharkhand forest has been estimated in Table II from three year average (2015-16 to 2017-18) where as sal seeds 2.46 kg, Mahua 31.15 kg, Imli with shell 138.53 kg, Karanj 19.06 kg, Chironji 1.97 and Gum Karaya 0.47 kg. Production potential of all three years and productive area of Jharkhand is also estimated the study. (Table II). It was observed that best producing in these selected NTFP species is Mahua (*Madhucalongifolia*) followed by sal (*Shorea robusta*) seeds and Imli (*Tamarindus indica*).

NTFP	Average Enumerated Tree (Ha ⁻¹)	Average Estimated Productivity Kg (Ha ⁻¹)	Productive Area of Jharkhand (Ha)	Extrapolated Production per annum (MT)
1	2	3	4	5
Sal Seeds with Wing	232	531.52	1225400	0.6513
Mahua Flower	23	684.97		0.8394
Imli with Shell	3	388.46		0.4760
Karanj Seeds	3	77.28		0.0947
Chironji Guthli	11	21.54		0.0264
Gum Karaya	2	0.98		0.0012



5. Conclusion

From the study and during field survey it was found that the non-timber forest produce of Jharkhand is of great interest from both inter and intra state markets. Wildly collected materials were sold directly to local buyers/ mate or many times to JHAMCOFED through cooperative societies like: Primary Agriculture Credit Society (PACS), Vyapar Mandal Shayog Samiti (VMSS), Primary Minor Forest Produce Cooperative Societies (PMFPCS), Women SHG or Reputed NGOs. Local traders either sells it to district level buyers or in bigger mandies in the districts like Chaibasa, Jamshedpur, Ranchi, Dumka, Koderma and Palamu. It is evident to mention that chironji (*Buchanania lanzan*) seeds from Simdega, Chaibasa and Khunti areas of state are directly sold to buyers of Kanpur. Rampur haat (West Bengal) is nearest available market for Sal (*Shorea robusta*,) leaves and seeds from Dumka. Tamerind (*Tamarindus indica*) of entire state are channelized by traders of Ranchi district to various Indian states. Paharia community which cultivates Lobia (beans seeds) in wild areas under Kuraon practice in Pakur and Sahebganj, are exported to gulf countries through Maharashtra based traders. Therefore from the above discussions it is visible that States NTFPs are not only utilized locally but are also sold to regional traders from Uttar Pradesh, Orissa, West Bengal, Bihar and Delhi NCR nationally and gulf countries internationally.

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