Name of the Project

Documentation on the Bio-resource based industries in Jharkhand and the Bio- resource utilized

Name & Designation of the Principal-Investigator

Sh. Binay Kumar Mishra

Dy. Conservator of Forest,

IFP, Ranchi

वन उत्पादकता संस्थान

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INSTITUTE OF FOREST PRODUCTIVITY

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION, DEHRADUN

Website: http//www.ifpranchi.org

Email:ifp@icfre.org

ifpranchi@hotmail.com

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Executive Summary

There is diversity of the bio-resource available on the planet Earth and Jharkhand is no exception to it. Since time immemorial the forest cover in this tract was much larger and today also it is approximately 1/3rd of the total geographical area of Jharkhand.

A variety of plant and animal resources are available in Jharkhand. Leaving apart agro bio-resources and concentrating upon the forest bio-resources, the Institute of Forest Productivity, Ranchi has encompassed the warps and woofs of the project entitled as ***"Documentation on Bio resource based industries in Jharkhand and the Bio-resources utilized" with the Objective of the study: - "Assessment of total number of industries/ units dependent upon bio-resources and thereby summing up the total quantum of bio-resources being used." Funded by Jharkhand Biodiversity Project, GOI-UNDP. SPU, Ranchi***

As the task entrusted for the complete documentation was quite large and all 24 districts of Jharkhand were to be covered within the limited time span of 3 months scheduled for this project hence special emphasis has been laid upon the documentation of data on forest based bio resources.

In order to have a realistic approach of requisite documentation, first of all the secondary data has been collected from the Central and State level Govt. and Non-Govt. Institutions located in the State Capital. After that all the district-level Institutions were visited and primary data with respect to the forest bio- resource and related industries has been collected. After procurement of required primary and secondary data necessary interrelation and interpolation has been achieved with the help of the standard statistical tools.

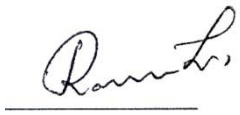
Secondary data of the following forest based industries has been collected at the primary and secondary level viz. Saw Mills used for the conversion of round Timber into Sawn Timber; oil extraction units yielding oil from mahua, karanj, kusum and other oil seeds; herbal industries basically located as small scale industries in certain pockets of remote forests; bidi industries based on kendu leaves and tobacco leaves wherein the poorest of the poor are engaged as labourers, sal leaves plates and Dona making units are situated in the villages adjoining the forest areas; and Bamboo based cottage industries. In all the districts of Jharkhand small scale

production of honey, jam & jelly can also be traced. Sericulture is being practiced in the 17 Districts of Jharkhand, which is the backbone of the forest based cottage industries.

People are quite aware about the utilization of bamboo in their day to day affairs. There are several species of bamboo found in the Jharkhand state but people usually use Rayati bamboo and Lathi bamboo for their basic needs. Rayati bamboo is quite widespread and there is not a single village where one cannot find groves of bamboo clumps. People use these bamboos for making beds, carpets, baskets, tokri, sup, hand-fans, prasad carriers for temples, packing cases for vegetables and fruits, as a fencing in the fields in order to protect the crops from grazing, hut making, roof making, thatching etc. Whereas Lathi bamboo is gregariously found in the forest areas on the hilly slopes of the plateau region. These bamboos are used by Paneris (bettle leaf growers) as a support system for the framework in the cultivation of bettle leaves. Furthermore, this type of Lathi bamboo is broadly used as lathis (stick) by the villagers, common men and the police personnel.

The future of sericulture, herbal industries and bamboo based industries is bright in Jharkhand. In Jharkhand there are altogether 405 Saw Mills spread over 24 districts having 74212.48m^3 of annual intake producing sawn Timber outturn of 129269.43$m^{3.}$ From forest area 6894.391 m^3 Timber was obtained having value of Rs. 250490.09.and 5110.8556m^3 firewood and charcoal obtained from the forest areas of the Jharkhand in the year 2008-09. Altogether 795875 standard bags of kendu leaves have been obtained from forest areas of Jharkhand in 2009-10.

All effects has been made to collect available secondary data and analyze them accordingly.



Rameshwar Das, *IFS*
Director
IFP, Ranchi

Chapter 1

Introduction

The world is inhibited by myriads of life forms, animals, and plants. These life forms are of great diversity, living in diverse habitats and possessing diverse qualities, which is themselves make very interesting studies. Moreover, these life forms are very vital to human survival as they provide food and other material, shelter, clothing, tools and medicines. The bio-resource of any area are interconnected. If one is influenced by the man or any other agency, other is automatically affected. In developing countries, people historically managed the natural resources collectively by mobilizing their social capital. But Development assistance has paid too little attention to how social capital affects environmental outcomes and ensures individual empowerment. Social capital comprises trust, reciprocity, institutional environment, social networks, leadership pattern, and community composition. Recent years have witnessed remarkable growth of community based resource management groups for forest, watershed, micro-finance, irrigation, integrated pest management, and farmers' research. Six case studies from India have revealed that when local communities were mobilized to activate their social capital, they efficiently managed the natural resources. The aftermath of such management led to individual economic development and sustainable resource management. External agencies like GO and NGO can accelerate the process of putting in operation the social capital for poverty alleviation where local leadership is in quiescent state.

As the state Jharkhand is related, bio resources are being utilized by the mankind in various ways viz., **Timber, fuel wood, food, medicinal plants, lac, cotton rearing, silk and other non Timber forest** uses. The bio resources in Jharkhand are mainly utilized in two ways;

1. One on commercial basis in the form of industries and
2. At local level by the tribal people.

The two types of industries has been recognized i.e. agriculture based and forest based. Rice, cotton and silk industries are the major agriculture based industries in Jharkhand.

Before the state's creation, the region used to play a major role in enabling undivided Bihar to contribute 50 per cent of the nation's total raw silk production. Mostly the tribal had been the rearers of silk worms before the bifurcation of Bihar, producing about 438 metric tones of **tasar silk** and about eight MT of mulberry silk every year - benefiting from natural races like laria, modia and sarihan in suitable agro climatic conditions of southern Bihar, now Jharkhand. It was largely because a total of 2,325 sq km area in the region is covered by tasar food plants, 90 per cent of which is Sal trees and the rest are Arjuna and Asan trees which attract silk worms - far behind of southern states like Tamil Nadu and Andhra Pradesh. The story has been different since its emergence as a separate state with the production of cocoons coming down to 9 MT and that of mulberry to 2 MT per annum, according to a report of the state sericulture directorate.

Jharkhand is renowned world over for its tussar and kuchai silk. The ethnic communities in the Kolhan, Kharsawan and Saraikela regions of West Singhbhum are engaged in cultivation of cocoons. Prior to creation of Jharkhand in 2000, big volume of cocoons were exported to weaving centres in Madhya Pradesh, West Bengal and Uttar Pradesh as the tribal's in Jharkhand who grew the silk cocoons were not acquainted with the techniques of spinning thread and weaving silk. During the era when Jharkhand used to be a part of Bihar (in 2000), in order to promote at international level, the Kuchai silk produced in Kharsawan, was patented. Of the entire production of cocoon world over, India contributes 60 percent of the same of which 60 percent comes from Jharkhand. Quality wise kosa silk produced in Chhattisgarh has been left behind by Jharkhand's cocoons.

Timber, lac and medicinal plants based industries are the main industries based on forest bio resources. Sal, Tassar, Gamhar, Mahua, Sisam, Kusum etc are the main timber species of the state. Ply wood and paper industries are less as compared to bio resource available, which has to be given attention. The state of Jharkhand covers 29% of forest area. Ranchi, Gumla, West Singhbhum, Simdega, Latehar, Palamau, Garhwa, Khunti and Hazaribagh are the main lac growing districts. Though three major lac host trees namely *palash*, *ber* and *kusum* are available in plenty but production is confined in these conventional areas. On an average, Jharkhand state contributes around 39% of national lac production. Out of seven main lac producing districts,

Ranchi is still producing the highest yield followed by Simdega, Gumla, West Singhbhum, Palamau, Garhwa, Latehar and others. Recently, lac production activity was successfully introduced in Dhanbad, Jamtara and Dumka districts also. A perusal of production data indicate that during the last four years (2006-07 to 2009-2010), there have been negative growth in lac production in Ranchi, Palamau, Garhwa, Latehar and a few other minor lac producing districts. The greatest setback recorded in Ranchi which witness 42.8% negative growth and this district alone contributed around 28.5%. Gumla, West Singhbhum and Simdega districts known for *kusmi* belt recorded growth ranging 6.3 to 29% and these three districts together contributed around 56% of the state total lac production. The analysis of data pertaining to period 2006-07 to 2008-09 showed that magnitude of negative growth rate witness during these three years came down appreciably during four years for only Ranchi district. Similar comparison between three and four years indicated that two districts namely West Singhbhum and Simdega which recorded negative growth during three years (2006-07 to 2008-09) recorded positive growth during four years (2006-07 to 2009-10) indicating substantial improvement for lac production during last year in these two districts. The districts of Latehar, Palamau and Garhwa which were most suffered during 2006-07 to 2008-09, further suffered during 2009-10 and magnitude of negative growth increased substantially. On estimates, around 110 Millions lac hosts are being exploited in the state. More than 4 lakhs families in the state are involved in lac cultivation activity resulting creation of 35-40 Million man-days per year. Forest department, Jharkhand have 16-broodlac farm of *kusum* and *palas* tree in Ranchi, Gumla, Saraikela, Hazaribagh, Palamau, Dhanbad, Bokaro, Godda and Chatra districts but in view of disturbances, these farms are more or less abandoned. Limited availability of broodlac, scattered lac host, poor inter-institution linkages, climate change and involvement of villagers in certain undesirable activities are the main concern which limits growth of lac production in these state. In the previous years, the state suffered a lot especially for rangeeni lac cultivation due to frequent mortality of rangeeni lac insect during February – March and April-May due to high temperature in the region. There is need to address ress these problems, so that farmer's confidence may return and again lac cultivation is taken up at a large scale.

Large numbers of commercially important medicinal plants are found in the forests of Jharkhand. Also some of the medicinal plants are grown by the farmers. There are some industries established who use medicinal plants as raw material, but on small scale. Jharkhand is lacking for big industries, hence medicinal plants are not utilized so commercially in Jharkhand. They are mainly supplied to the Industries in West Bengal.

Jharkhand is mainly dominated by tribals. The livelihood of tribal population heavily depends upon Non Timber Forest Products and other bio resources for their sustenance. Some of the bio resources are over-exploited and some are not being utilized at commercial basis. The data may be utilized by the researcher, foresters, Industrialists and other stakeholders of bio-resource. The present survey is with the objective “Assessment of total number of Industries/ Units dependent upon bio-resources. “

Chapter 2

Methodology of the project

2.1. Collection of Secondary Data:

A) First of all the secondary data of all the districts of the Jharkhand regarding the bio resource industry of Jharkhand and raw material used has been collected. These secondary data has been obtained from the following central / state level offices, institutions.

1. State level Directorate of industry under Industry Department of Jharkhand Govt.
2. State Level Directorate of Agriculture under Agriculture Department of Jharkhand Govt.
3. State level office of the Principal Chief Conservator of Forest, Jharkhand.
4. Office of Address itional Principal Chief Conservator of Forest-cum-Managing director, Jharkhand State Forest Development Corporation Ltd. Hinoo, Ranchi.
5. JHARCRAFT, Ranchi
6. Central Tasar Research Institute, Ranchi.
7. Indian Gum and Resin Research Institute, Ranchi.
8. Horticulture and Agro Forestry Research Program, (HARP), Plandu, Ranchi

B) At District level, information regarding the bio resource industries and raw materials being used has been collected from all the District Industry Centre of the Govt. of Jharkhand. In some of the new districts DIC is yet to be established. The available data has been collected from DIC of old district headquarters.

2.2Collection of Primary data:

To get more reliable data, in some cases primary data has been also collected.

The primary data has been collected from:

1. Private registered and non Registered Industries.
2. NGOs.
3. Survey of the different market /hats of various district, to collect information regarding bio-resources based raw materials and its value address ed products like bamboo- basket, Dona-Pattal etc.
4. Various nurseries and farms were visited in order to have the complete know how of the potential of the bio resource produced by the farmers at the primary level.
5. Visit to various registered and non-registered shops in local market at district level /block level to get information about raw materials for bio resource based cottage / small industries requirement and assess utilization potential of bio-resources.
6. Visit to Jharkhand Udyog Mela organized at Morabadi ground, Ranchi.

2.3 Analysis of data obtained:

On the basis of the primary data collected from the farmers, cultivators, NGOs and even labourers who are engaged in collecting the raw materials from forests, the average yield of raw materials utilized have been assessed.

Different statistical tools have been used to get more information regarding production potential, available raw materials etc from the collected data.

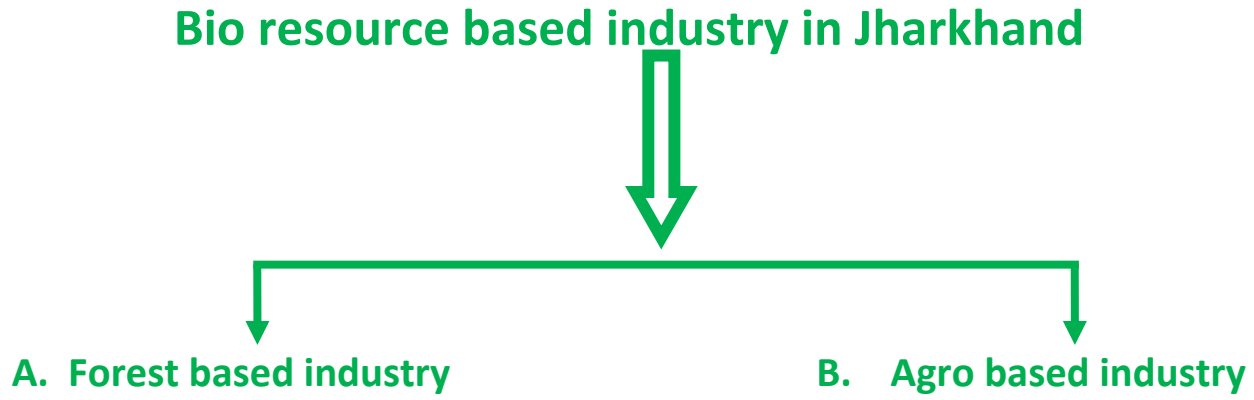
Chapter 3

DOCUMENTATION OF BIO RESOURCE BASED INDUSTRIES

All the bio resource based industries has been categorized under the two basic heading:

1. Forest Based Industry: The industries which are basically dependent on the bio-resources which may have the origin from the forests, have been grouped as Forest based industries.

2. Agro Based Industry: The industries which are basically dependent on the raw-materials and bio-resources which have got the origin from Agricultural sector, have been grouped as Agro-based industries. In Jharkhand, Apiculture has been grouped in the Agro-based Industry, since it has its commercial orgin outside the forests.



1. Saw Mills	1. Rice Mill
2. Oil Extraction units	2. Apiculture
3. Herbal Industry	3. Jam and Jelly industry
4. Bidi Industry	
5. Sal Leaves Plate making units	
6. Bamboo based cottage industries	
7. Sericulture	

3.1.1 Timber based Industry: Saw Mills

Table 1. District wise annual Intake and annual Sawn out turn in Jharkhand of Year 2008-2009

Sl. No	District	No of Saw Mill	Annual intake (m^3)	Annual Saw Outturn(m^3)
1	West Singhbhum	18	2725.99	1343.88
2	Saraikela Kharsawan	8	1700.82	158.88
3	East Singhbhum	72	16000.44	1351.69
4	Koderma	5	535.69	455.33
5	Chatra	1	155.63	119.71
6	Deoghar	21	395.10	395.10
7	Garhwa	Nil	Nil	Nil
8	Pakur	2	Nil	1.99
9	Simdega	6	278.20	330.54
10	Latehar	2	463.66	501.16
11	Bokaro	49	12696.91	10599.86
12	Giridih	7	610	610
13	Gumla	10	16.41	10.10
14	Medninagar	21	5301.51	2111.9
15	Hazaribagh	28	1174.21	1006.46
16	Dhanbad	39	6557.46	3829.41
17	Godda	Nil	Nil	Nil
18	Jamtara	8	234.92	94.17
19	Ranchi(Khunti)	55	15734.93	14427.98
20	Ramgarh	12	947.14	624.43
21	Lohardaga	5	52	28.00
22	Sahibganj	13	43.02	28700
23	Dumka	23	8588.36	62568.79
	TOTAL	405	74212.48	129269.43

Reference: Annual Administrative report 2008-2009 Dept. of forest and Environment, Govt. of Jharkhand.

NB: The data pertaining to the saw-mills of Khunti (24 districts of Jharkhand) has been placed along with Ranchi district.

3.1.2 List of Saw Mill in Jharkhand (district wise)

District – East Singhbhum

Sl. No.	Name of block	Name and address ress of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
1	Potka	K.Z. Industries, Haldipokhar	7.04
2	Chakuliya	Ram Krishan Saw Mill, Chakuliya	00.33
3	Ghatshila	B.L. Agarwal, Ghatshila 832303	N/A
4	Golmuri.Jugsalai	Ashok Timber Tread, Jamshedpur 831003	85.56
5	Potka	Narayan Bhomic, Judi , Jamshedpur	5.61
6	Golmuri.Jugsalai	Lakjhami Timber Treads And Saw Mill, Mango, Jamshedpur 831012	52.53
7		Bhig Furniture House, Jamshedpur	N/A
8		Mo. Tifiudin, Jamshedpur	77.76
9		The Bihar Saw Mill, Jamshedpur	12.69
10		Kashmir Timber Treads, Jamshedpur	2672.13
11		Sardar Saw Mill, Mango, Jamshedpur 831012	42.66
12		Bhamra Saw Mill,, Mango, Jamshedpur 831012	96.42
13		Bhadani Saw Mill,T.M.G Area,Verma Mines, Jamshedpur	1265.14
14		Sahu Timber , Cinema Road, Jamshedpur	1422.70
15		Panesvar Saw Mill, Jamshedpur	19.62
16		Sahu And Company, Mango,Paradih Jamshedpur 831012	267.90
17		Bhadiya Brothers, Jamshedpur	85.05
18		Kamal Saw Mill, Patmada, Jamshedpur 832105	9.57
19		Lalit Saw Mill, Bhuieyadih, Agrigo, Jamshedpur 831009	39.33
20		Sri Ram Saw Mill, T.M.G Area Jamshedpur	126.16
21		S.K Treading , Jamshedpur	12.11
22		Sri Lakjhami Timber Treads And Saw Mill Mango, Jamshedpur 831012	2.37
23		Bharat Engineering Works, Musabin, Jamshedpur	126.53
24		R.K Timber Works, Bhuieyadih , Jamshedpur	152.49
25		Sanduurd Works, Jamshedpur	74.37
26		Chandra Timber, Bhuieyadih, Agrigo, Jamshedpur 831009	110.51
27		Veenita Urd Works, Ghatshila 832303	61.67
28		Shiv Saw Mill, Patel Nagar,Bhuiedih, Jamshedpur	187.37
29		Agarwal .R. Kramsala, Ghatshila 832303	N/A
30		Janta Furniture, Jugshalai Jamshedpur 831006	57.84
31		Durga Body Builders, Balighufa,Dimna Chowk, Jamshedpur 831012	41.80
32		Sondik Interprises, Mango, Jamshedpur 831012	809.17

Sl. No.	Name of block	Name and address of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
33	Golmuri.Jugsalai	Ashok Saw Mill, Verma Mines Jamshedpur 831007	241.81
34		S.K Timber , Mango, Jamshedpur 831012	40.10
35		Ankit Timber Works Mango, Jamshedpur831012	56.47
36		Sri Bajrag Saw Mill, Main Road ,Mango, Jamshedpur 831012	9.45
37		Avatar Saw Mill, Aajad Nagar, Mango, Jamshedpur 831012	10.54
38		Singh Saw Mill, Baliguffa, Jamshedpur	54.43
39		Sunil Ojha Saw Mill, Mango Jamshedpur 831012	8.85
40		Santhal Aara Kramshala, Kakdih Shol, Ghatshila	10.76
41		Sharma Saw Mill, Bhuieyadih, Agrigo, Jamshedpur	131.21
42		Mishra Saw Mill, Station Road, Jugshalaie, Jamshedpur	49.74
43		Sharswati Saw Mill, Verma Mines, Jamshedpur 831007	129.91
44		Mujamdar Saw Mill, Mills Area, Jamshedpur	144.98
45		Kunal Saw Mill, Agrigo Bhuieyadih Jamshedpur	229.99
46		Raja Saw Mill, Mill Area, Mango Jamshedpur 831012	489.23
47		S.K Timber ,Mango, Jamshedpur 831012	489.23
48		Ajit Saw Mill, Bhuieyadih, Jamshedpur	96.43
49		Jha And Sons , Mango, Jamshedpur 831012	14.30
50		Hind Timber Treading Company, Jugshalaie, Jamshedpur	4.89
51		Pahadi Saw Mill, Mango, Jamshedpur 831012	207.53
52		Das Saw Mill, Chota Gobindpur, Jamshedpur	8.78
53	Potka	Bhagat Samim, Gopalnagar	N/A
54	Golmuri.Jugsalai	Face Industries , Mango, Jamshedpur 831012	60.95
55		Gutam Saw Mill, Jamshedpur	0.24
56		R.S. Saw Mill, Mango, Jamshedpur 831012	137.30
57	Ghatshila	Rukuni Treaders, Nuaaghaw, Ghatshila	62.27
58	Golmuri.Jugsalai	Maa Lakjhami Treaders, Bhuieyadih, Jamshedpur	23.67
59		Prabhat Timber Tread, Mango, Jamshedpur 831012	112.67
60		Prakash Timber Tread Mango, Jamshedpur 831012	66.95
61		Kapil Timber Treads And Saw Mill, Dimna Chowk, Mango, Jamshedpur	27.23
62		Kherwal Saw Mill, Shenakhun, Jamshedpur	N/A
63		Ratan Interprises, Verma Mines, Jamshedpur 831007	2154.75
64		Raj Furniture House, Jamshedpur	0.28
65		Lakhjami Narayan Timber Tippo, Persudih, Jamshedpur	36.61
66		Khelash Timber ,Kakidih,Patmada, Jamshedpur	24.94

Sl. No.	Name of block	Name And Address Of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
67	Golmuri.Jugsalai	Takur Timber ,Ghodabanda, Jamshedpur	3.05
68		Maa Kali Enterprises, Belajudih, Jamshedpur	N/A
69		Durga Treads, Jamshedpur	N/A
70		Jidendar Furniture, Jamshedpur	53.92
71		Chantrkala Enterprises, Dorkasaie, Jamshedpur	22.09
72		Bhardawaj Timber ,Persudih, Jamshedpur	0.48

District – Koderma

Sl. No.	Name of block	Name and address of Saw Mills	Average quantity of Timber Sawn during 2003/04/05
1	Koderma	Ashok Saw Mill, Domchach- 825407	14.31
2		Mehta Timber Works, Thetariya Dih, Domchach - 825407	N/A
3		Ramesver Prasad Visvkerma, Jumritiliaya -825409	124.23
4		Ashok Kumar, Vasty Kumar Saw Mill, Jhumritiliaya- 825409	88.17
5		Manmohan Singh, Vasthy Manmohan Industries, Jumritiliya -825409	113.59
6		Anand Swaroop Aarya,Vasthy Aarya Timber Works, Jumritiliya- 825409	102.85
7		Rafik ,Vasthy Sara Furniture Works, Asanbadh	206.84

District – Hazaribagh

Sl. No.	Name of block	Name and address of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
1	Hazaribagh Sadar	B.K Patel, Bada Akhada Malviye Margh, Hazaribhag	**32.21**
2		R.K Jaiswal, Badam Bazar, Hazaribagh	**118.33**
3		M.P Jaiswal, Badkagahw Road, Hazaribagh	**17.51**
4		R.L. Dhiman, Budva Mahadev, Hazaribagh	**16.68**
5		Sri Patel Saw Mill, Bada Bazaar, Badka Gahw Road, Hazaribagh	**66.22**
6		Janta Saw Mill, New Area Okni, Hazaribagh	**29.25**
7		Desraj Saw Mill, Subhas Margh, Hazaribagh	**49.94**
8		R.N. Yadav Saw Mill, Bihar Durga Sadhan, Okni, Hazaribagh	**81.23**
9		Servsri Pradip Saw Mill, Paygoda Road Okni, Hazaribagh	**53.88**
10	Katakmansha Dih	Gangodri Kaasd Udyog, Khaperiyavar, Hazaribagh	**41.23**
11		Lakjhami Kast Udyog, Banadag, Hazaribagh	**5.40**
12	Barhi	Rana Saw Mill, Gaya Road, Barhi	**7.87**
13	Badkagahw	Ram Kesar Mahtho, Badka Gawh, Hazaribagh	**24.54**
14		Hulash Rana Saw Mill, Badkagawh, Hazaribagh	**41.47**
15	Ichak	Hari Nath Saw Mill, Kurha Ichak, Hazaribagh	**12.12**
16		Nagesaver Mahatho,Saw Mill, Kurha Ichak, Hazaribagh	**24.80**
17	Hazaribagh Sadar	Surrender Prasad Vasthy Servsri Shahu Timber , Daru, Hazaribagh	**31.13**
18	Chano	Sirswati Devi, Chano, Hazaribagh	**114.08**
19	Hazaribagh Sadar	Interjeet Kumar Sinha, Vasthy Servsri Sinha And Prasad Saw Mill, Daru, Hazaribagh	**3.74**
20		Bihar Udyog Products Private Limited Bavnavey, Hazaribagh	**261.68**
21		Sri Vijay Kumar Singh, Servsri Krishna Saw Mill, College Moad , Hranganj, Hazaribagh	**26.714**
22	Churchu	Sri Jagdish Rana, Vasthy M/S Sharma Enterprises, Revar, Hazaribagh	**6.22**
23	**Hazaribagh Sadar**	**Sri Kuldip Rana, Vaste M/S Kuldip Wooden and Saw Mill, Demoder, Hazaribagh**	**2.84**

District – Bokaro

Sl. No.	Name of block	Name and address of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
1	Jarandih	Sri Sanjay Kumar Singh, Gayetri Timber, Jainamore Bokaro	55.69
2		Sri Ranvijay Singh,Durga Saw Mill, Petarvar Bokaro	13.43
3		J.K.Timber, Bermo Road Jainamore Bokaro	618.92
4		Radha Timber, Jainamore Bokaro	133.13
5		Mishra Saw Mill, Tatmohanpur, Jainamoad Bokaro	6.05
6	Gomia	Ranjit Saw Mill Gomia, Bokaro	45.42
7	Jaridih	Siv Sanker Saw Mill,Porddag, Petarvar, Bokaro	28.61
8		Viswakarma Timber, Jainamore Bokaro	101.64
9		Prakash Timber , Gundu,Petarvar, Bokaro	43.53
10		Trimurti Saw Mill, Kherachatar,Kasmar ,Bokaro	35.18
11		Singh Timber, Tantmohanpur ,Jainamore, Bokaro	77.38
12		Bharat Still And Timber Sijining Plant, Jainamore Bokaro	37.40
13	Gomia	Dev Saw Mill, B .D Road ,Satvera,Gomia Bokaro	14.88
14	Jarandih	Bokaro Timber Tant Balidih, Bokaro	139.09
15		A.K Timber, Tautmohanpur ,Jaina Moad, Bokaro	41.63
16	Chas	Nav Bharat Kast Bhandar, Industrial Area, Bokaro	370.99
17		Sanker Saw Mill, Industrial Area , Bokaro	478.31

District – Ramgarh

Sl No.	Name of block	Name and address of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
1	Patratu	Baba Timber And Saw Mill,Bhurkunda	158.05
2		Om Timber Patel Nagar Bhurkunda	109.75
3	Ramgarh	M/S Chamunda Saw Mill, Ramgarh	0
4	Mandu	Sharma Saw Mill, Ramgarh	56.26
5	Ramgarh	R.K Enterprises, Ramgarh Kent, Ramgarh	763.18
6		Mahavir Timber Workers, Ramgarh	246.61
7	Mandu	Sri Sanker Timber Workers, Ramgarh	328.60
8	Patratu	Quem Ansari Saw Mill, Main Road Patratu	15.38
9	Mandu	Sri Sanker Saw Mill, Kuju, Ramgarh	108.42
10	Ramgarh	M/S Prakash Enterprises , Thana Chowk, Ramgarh	124.77

District – Ranchi

Sl. No.	Name of block	Name and address of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
1	Ranchi Sadar (Kanke)	Jalan Timber Workers, Lake Road, Ranchi	23.79
2		Dayal Timber Workers, Upper Bazaar, Ranchi	21.757
3		Orissa Saw Mill,Old H.B Road,,Ranchi	294.38
4		Ambika And Company ,Old H.B Road,Ranchi	1004.00
5		Commercial Timber Company,Purlia Road Ranchi	55.17
6		Sankar Vijay Saw Mill,Katatoli, Ranchi	312.40
7		H.K. Company ,Old H.B Road, Ranchi	71.94
8		Umiya Timber Workers, Sukla Colony, Hinoo,Ranchi	33.47
9		Gogari Timber ,Old H.B Road,Ranchi	230.29
10		Sarda Saw Mills, Circular Road,Ranchi	147.09
11		Hindustan Timber Supply,Lovadih Purlia Road, Ranchi	1171.4
12		Ranchi Timber , Kanta Toil , Ranchi	64.82
13		H.K Timber ,Old H.B Road ,Ranchi	6.52
14		Khanna Timber Supply Company,Piska Moad,Ranchi	62.85
15		Pawan Saw Mill,Pandar,Ranchi	122.85
16		Surekha Timber Workers, Hindpidi, Ranchi	32.22
17		Stander Timber ,Old H.B Road,Ranchi	98.23
18		Ram Valabh Timber Workers,Purulia Road	N/A
19		Bhagvati Balaji And Timber ,Purulia Road, Ranchi	38.77
20		Sri Mahavir Saw Mill, Dangra Toli Chowk, Purulia Road, Ranchi	85.54
21		Lakjhmi Timber, Purulia Road, Ranchi	23.97
22		India Timber And Sijining Plant,Old H.B Road, Ranchi	440.44
23		Balaji Timber,Purulia Road, Ranchi	361.31
24		Sri Saw Mill ,Old H.B Road, Ranchi	N/A
25		Delhi Timber,H.B. Road Kokar,Ranchi	77.48
26		G.T.Timber Mart,Piska More, Hehal Ranchi	55.50
27		Om Timber, Old H.B Road, Ranchi	128.05
28		Sri Bharat Saw Mill, Upper Bazaar, Ranchi	93.61
29		Tata Saw Mill, Lalpur Chowk, Ranchi	N/A

Sl. No.	Name of block	Name And Address Of Saw Mills	Average quantity of Timber Sawn during 2003/04/05 (in m^3)
30	Ranchi Sadar (kanke)	Shyam Timber , Old H.B Road, Ranchi	44.82
31		Sri Ram Saw Mill, Old H.B Road, Ranchi	N/A
32		Bihar Timber Treads, Hehal Ranchi	17.84
33		Sri Bajragbali Saw Mill,Old H.B Road,Ranchi	267.00
34		Sri Gita Saw Mill,H.B.Road, Kokar, Ranchi	49.04
35		Real And Boxage,Old H.B Road, Ranchi	71.77
36		Auto Craft India Hinu , Ranchi	39.81
37		Durga Saw Mill,Tiwari Tank Road, Ranchi	4.1
38		Krishna Saw Mill,Lalpur Chowk, Ranchi	30.61
39		Jadodiya Timber Lovadih, Purulia Road, Ranchi	153.81
40		Wonderful Workers Industries Area, Kokar, Ranchi	39.48
41		Vikram Saw Mill And Furniture, Hinoo, Ranchi	106.00
42		Jala Ram Saw Mill, Sukla Colony ,Hinoo, Ranchi	11.11
43		R.K. Timber ,Old H.B Road, Ranchi	310.09
44		Jay Shiv Saw Mill, Hinoo, Ranchi	69.37
45		Sri Bhagvati Saw Mill, Purulia Road, Ranchi	264.00
46	Bedro	Itki Saw Mill, Itki, Ranchi	4.9
47	Ratu	Jyoti Timber Mart, Circular Road , Ranchi	105.20
48	Namkum	Khalash Saw Mill, Tupudana, Ranchi	260.66
49		L.B.R Industries, Mahilong, Ranchi	329.33
50		Sri Sarita Viniyar Industries, Mahilog, Ranchi	76.78
51		Sri Bhawani Timber Supply Company, Ratu Road, Ranchi	499.23
52	Ratu	Dipak Timber, Ratu, Ranchi	28.05
53		Ashok Timber ,Ratu Ranchi	39.49
54	Ranchi Sadar (kanke)	Kanke Timber ,Kanke Road, Ranchi	88.29

3.1.3 Timber and Fuel (Firewood & Charcoal)

The existing rights entitle the right-holders to collect firewood free of cost from the forests. The right-holders exercise their right annually from the right- holder coupes. Distribution of firewood from the right holders coupes is done amongst the right-holders by the *mukhyia* of concern panchyat. In address ition to taking firewood from coupes, the villagers have the rights to collect dry and fallen firewood for their domestic use and not for sale or barter. It is estimated that 1.21 lakh tonnes of firewood is removed by the right-holders village from the forest of the

state. In address ition about 1.50 lakh tonnes of firewood are removed annually by head loads from forests.

Table 2. Total out turn of Timber and their values from 2000-01 to 2008-09

Sl.No	Year	Timber	
		Qty (m^3)	Value ₹.
1	2000-01	4848.8086	373154.23
2	2001-02	5601.6477	348224.49
3	2002-03	5092.2694	301232.93
4	2003-04	2574.1416	134927.35
5	2004-05	2426.9179	110500.37
6	2005-06	3383.0783	173726.98
7	2006-07	562.0758	54671.87
8	2007-08	3145.371	170730.35
9	2008-09	6894.391	250490.09

Reference: Annual Administrative report 2008-2009 Dept. of forest and Environment, Govt. of Jharkhand

The table 2 gives details of year wise (2000-09) out turn of timber in m^3 and the monetary value in Jharkhand state. The relative data is collected from department of forest, govt of Jharkhand.

N.B.: The data related to the subsequent years were not available .

Table 3. Total out turn of fuel and their values from 2000-01 to 2008-09

Sl.No	Year	Fuel (Firewood & Charcoal)	
		Qty (m^3)	Value ₹.
1	2000-01	1324.1533	5025.35
2	2001-02	2285.866	6015.44
3	2002-03	669.6448	3057.15
4	2003-04	432.4026	1456.96
5	2004-05	116.4825	50.34
6	2005-06	961.4159	3660.31
7	2006-07	32.2	137.68
8	2007-08	2549.788	8002.52
9	2008-09	5110.8556	16027.05

Reference: Annual Administrative report 2008-2009 Dept. of forest and Environment, Govt. of Jharkhand

The table 3 gives details of year wise (2000-09) out turn of fuel in m^3 and the monetary value in Jharkhand state. Fuel included firewood and charcoal .The relative data has been collected from department of forest, Govt of jharkhand

N.B.: The data related to the subsequent years were not available.

3.2 Bidi Industry

Among all minor forest produce, only kendu leaves are harvested in Jharkhand state by Jharkhand Forest Development Corporation in systematic and organized manner, so the data could be made available by the corporation.

Kendu (tendu) leaf is being produced from *Diospyros melanoxylon Roxb*. (Family: Ebenaceae) tree. Tendu leaf is one of the most important non-wood forest products and is also a nationalized product. The leaves are used for wrapping bidis popular as country cigarettes especially among poor natives. Here it is of high economic value. It is being collected mainly from Madhya Pradesh, Chhattisgarh, Orissa, Andhra Pradesh, Jharkhand, Gujarat and Maharashtra. Throughout India the work of collection of kendu leaves and manufacturing of bidis are estimated to provide 106 Million person days of employment in collecting activities and 675 Million person days in secondary operation of the processing. Kendu is a nationally listed non Timber Forest Product , which means that all its marketing must be done through State Forest Department , associated forest marketing corporation, or licensed traders operating on behalf of the state .

Jharkhand accounts for 3.4% of the total forest cover of the country and ranks 10th among all states. The percentage of forest area to geographical area in Jharkhand is 29.61. Kendu leaves are collected from the forest area in all the district of Jharkhand.

SUITABILITY IN BIDI INDUSTRY

Diospyros melanoxylon leaf is considered the most suitable wrapper on account of the ease with which it can be rolled and its wide availability. Leaves of many other plants like *Butea monosperma, Shorea robusta and Bauhinia vahlii* also find use as bidi wrappers in different parts of the country but the texture, flavour and workability of kendu leaves are unmatchable.

The wide-scale use of *Diospyros melanoxylon* leaves in bidi industry is mainly based on their enormous production , agreeable flavour, flexibility, resistance to decay and capacity to retain fires the broad morphological characters on which leaves, are selected and categorized for bidi making are their size, thickness of leaves, texture, relative thickness of midrib and lateral veins.

Bidi rolling is the primary job which is very simple and can be done at any place at any time. It is a source of subsidiary occupation and supplementary income to lakhs of poor rural folk. Bidi industry provides employment to the rural population during off season for collection of bidi leaves. Obviously, bidi industry has a vital role in rural welfare and in promoting rural economy.

Table 4. Production of Kendu leaf in 2009-10 (District wise)

Sl.no	Name of the District	Notified yield of Kendu leaves(in St.bags)
1.	West Singhbhum	44300
2.	Saraikela-Kharsavan	24150
3.	East Singhbhum	33950
4.	Lohardaga	9200
5.	Ranchi	8350
6.	Khunti	16450
7.	Gumla	8350
8.	Simdega	37350
9.	Latehar	66050
10.	Daltonganj	85500
11.	Garhwa	139875
12.	Hazaribagh	47400
13.	Ramgarh	2950
14.	Bokaro	27500
15.	Koderma	17300
16.	Chatra	107700
17.	Giridih	47250
18.	Dhanbad	4250
19.	Sahebganj	24800
20.	Pakur	9200
21.	Deoghar	4600
22.	Dumka	15900
23.	Godda	9750
24.	Jamtara	3650
TOTAL		7,95875

Reference: Jharkhand Forest Development Corporation

Table 4 gives district wise related information of kendu leaves. It shows the production of kendu leaves in different district of the Jharkhand in year (2009-10) The data is in standard bag. Related information has been taken from Jharkhand forest Department Corporation.

Table 5. Total Kendu Leaves Collected, their collection cost and revenue generated in 2007-08, and 2008-09

Sl. no	Name of Division	Kendu leaves		
		Quantity collected (inM.T/Std bgs)	Collection Cost (₹ in Lac)	Market value of Collected quantity (₹. in Lac)
2007				
1	M.F.P Division, Ranchi	101106	475.70	282.04
	M.F.P Division, Dhalbhum	76100	357.67	210.85
	M.F.P Division, Hazaribagh	184444	866.90	207.18
	M.F.P Division, Giridih	64528	303.28	128.94
	M.F.P Division, Daltonganj	154488	726.90	271.74
	M.F.P Division, Garhwa	169035	794.46	729.12
	Total	**749701**	**3524.91**	**1529.87**
2008				
2	M.F.P Division, Ranchi	76991	384.95	243.18
	M.F.P Division, Dhalbhum	46832	234.16	117.45
	M.F.P Division, Hazaribagh	136088	680.44	189.72
	M.F.P Division, Giridih	42380	211.9	89.27
	M.F.P Division, Daltonganj	127435	637.17	330.29
	M.F.P Division, Garhwa	135662	678.31	541.63
	Total	**565388**	**2826.93**	**1511.54**

Reference Annual Administrative report 2008-2009 Dept. of forest and Environment, Govt. of Jharkhand

Information included the collection, collection cost and market value of the kendu leaves. The data of collection, collection cost market value is in standard bag & lakh respectively.

N.B.: The data related to the subsequent years were not available.

3.3. Tasar based industry

Tasar related data has been obtained from **Industry department, Central Tasar Research and Training Institute, Ranchi** In address ition data has been also collected from some **NGOs.**

From total Forest area of 31 lakh ha and Non Forest area of 1270 ha total production of Tasar is 716.3 mt as per the available data of Industry department, Government of Jharkhand.

Table 6. Production of Tasar in 2010-2011 in Jharkhand

Sl. No	District	No. of Tasar rearers	No cocoon(in lack)	Raw Silk (MtTon)	No of beberá	No. of projet center	No. of Cocoon bank
1	Saraikela -Kharsawan	6570	595.68	65.52	900	3	5
2	West Singhbhum	15925	2096.36	230.60	180	9	3
3	East singhbhum	2301	55.73	6.13	270	2	2
4	Dumka	13800	1868.63	205.55	0	7	0
5	Sahebganj	2000	172.53	18.98	450	2	2
6	Pakur	2000	192.89	21.22	0	2	0
7	Godda	4000	300.32	33.04	210	1	3
8	Giridih/Chatra/Hazaribagh	9986	969.52	106.65	60	5	1
9	Dhanbad	2198	102.84	11.31	60	1	0
10	Garhwa	1000	26.78	2.95	30	1	0
11	Palamu	1235	83.28	9.16	30	1	0
12	Ranchi/Khunti/ Gumla	1831	6.35	0.70	150	4	1
13	Simdega	700	15.83	1.74	30	1	0
14	Lohardaga	1567	25.14	2.76	0	1	0
	Total	**65113**	**6511.87**	**716.31**	**2370**	**40**	**17**

Reference: Industry Department, Ranchi

The table 6 gives district wise information of tasar rearing , cocoon , raw silk , bebra , no. of project centres and no. of cocoon bank of JHARKRAFT in year (2010-11). The information has been provided by Mr. Dhirendra Kumar, IFS, Director, JHARKRAFT, Ranchi.

N.B.:

- Production of Tasar in Jharkhand in the year 2010-11 has been reported in 18 districts.
- No. of Tasar rearers is maximum in the Singhbhum district and minimum in Simdega district.
- No. of bebera and cocoon bank is maximum in Saraikela- Kharsawan district.

Table 7. Tasar utilized by different NGOs of Jharkhand

Sl. No.	District	Name and Address eress	Total Qty. of Tasar (Total no. Of Cacoon)	Source
1	Ranchi	1.Kasturba Gandhi Gram Udyog Sansthan (Ngo) Muri Ranchi	25 lakh	**Jharkhand Udyog Mela 2011**
		2. Angada Aadim Jati Samgrah, Vikas Mukesh Prasad Singh, Ranchi / 09234394638	20 Lakh	**Jharkhand Udyog Mela 2011**
		3.Patel Khadi Gram Udyog Dilip Kumar Singh, Ranchi / 0763101424	17 to 18 lakh	**Jharkhand Udyog Mela 2011**
		4.Ranchi Jeela Vanvasi Khadi Gram Udyog Vikas Sanstha	20-15 lakh	**Jharkhand Udyog Mela 2011**
		5. Jharkhand Khadi Gram Udyog Board Gour Krisan Das /767760846, 0954708350	200-300 Lakh	**Jharkhand Udyog Mela 2011**
2	Chaibasa	1.Singhbhum Khadi Gram Udyog Sansta, Chaibasa Dananjay Singh 9955406069	40 lakh	**Jharkhand Udyog Mela 2011**
3	Godda	1. Aktar Handloom Industries	5 lakh	**DIC, Godda.**
		2. Maa Kali Silk Handloom, Mazikpur Mgaina, Thakurgadi, Godda	5.5 lakh	**DIC, Godda.**
		3. Silk Industries, Manikpur, Godda	2 lakh	**DIC, Godda.**
		4. Sha Silk Handloom,Kudhvazak, Thakurgadi, Godda	10 lakh	**DIC, Godda.**
		5. Janki Handloom Fabrication, Heerakuthari , Godda	11 lakh	**DIC, Godda.**
4	Pakur	1.Chotanagpur Roap Workers Pvt. Limited Sri Sridard Jhawar Rao And Sri Anurag Jhawar, Mahilong, Ranchi	10 lakh	**Jharkhand Udyog Mela 2011**
		1 Creators Prop C. Manish Keshric.Qr No.CD /260/Sector-2, Durva, Ranchi	12 lakh	**Jharkhand Udyog Mela 2011**

Reference: Jharkhand Udyog Mela 2011, Ranchi And DIC of concerning District.

The table 7 gives the detail of utilization of tasar by the different NGOs in Jharkhand. The data is collected from Jharkhand trade fair 2011, held in Ranchi.

- In 4 districts of Jharkhand namely Ranchi, Chaibasa, Godda & Pakur some NGOs are utilizing Tasar.

- Singhbhum Khadi Gram Udyog Sansthan, Chaibasa is the maximum utilizer of Tasar

3.4 Lac and shellac based Industry

Lac is a natural resin produced by tiny insect , *Kerria lacca* (kerr) , which is cultured on shoots of several tree species, mainly Palas, Kusum and Ber and a shrub species namely Flemingia Semialata and F. macrophylla. Lac cultivation is a subsidiary source of income for a large no of farmers mainly in Jharkhand, Chhattisgarh, West Bengal, Orissa, Uttar Pradesh, Maharashtra, Gujarat, Assam, Andhra Pradesh, Meghalaya, and other parts of the country. India, which is one of the highest producers of lac, contributes around 55% of the total world requirement. Jharkhand can rightly be termed as the "Lac State" which alone contributes about 60 % of the national production .It is also to be observed that about half of the total lac host tree are still lying exploited for lac cultivation in lac growing areas . There are vast areas where in spite of presence of large no. of host trees, lac cultivation is not being carried out at all. If these lac hosts could be utilized for cultivation of lac, it would help greatly in increasing the national production of lac and address to the income of the farmers. This will also help prevent indiscriminate felling of trees for fuel and Timber purposes.

Nucleus Brood Lac Farms

For demonstration of improved methods of lac cultivation and supply of quality brood lac to the needy cultivators the Institute of Forest Productivity, Ranchi presently maintains two nucleus brood Lac farms (N.B Farms) cum demonstration centres in Jharkhand state located at:

1. Turhamu (Chandwa) in Latehar district
2. Hesadih in Ranchi district

Turhamu in Latehar district

Details	**Rangeeni farm catering to Rangeeni yield of lac**
Situation	75 km from Ranchi on Daltonganj road , near Chandwa more.
Area	17 Hectares
Details of Species	Palas *(Butea monosperma)* – 2855 trees Ber *(Ziziphus jujuba)* – 310 trees Galwang *(Moghania macrophylla*) – 500 trees

Reference: Annual Lac Bulletin, Institute of Forest Productivity.

Hesadih in Ranchi district of Jharkhand

Details	Kusumi farm catering to Kusumi yield of lac
Situation	55 km from Ranchi on Ranchi Purulia road.
Area	127 Hectares
Details of Species	Kusum *(Schleichera oleosa)* – 400 trees

Reference: Annual Lac Bulletin, Institute of Forest Productivity (2009-10)

List of market in Jharkhand from where the lac data has been collected.

Sl No.	District	Location of market
1	Ranchi	Bundu
2	Khunti	Khunti, Murhu, Saiko
3	Gumla	Gumla
4	Hazaribagh	Gola
5	Bokaro	Petrawar
6	Simdega	Simdega
7	West Singhbhum	Chaibasa, Bandgaon, Chakradharpur
8	Latehar	Latehar,Chandwa, Manika
9	Palamu	Panki, Satbarwa,Lesliganj,Daltonganj
10	Garhwa	Garhwa, Ranka
11	Chatra	Chatra

Reference: Annual Lac Bulletin, Institute of Forest Productivity, (2009-10)

Table 8. Data of Lac crop-production (in ton) during 2009-2010

Sl No.	State	District	Quantity of raw material Produced(total in ton)
1	Jharkhand	Bokaro	**69.21**
		Garhwa	**57.50**
		Gumla	**670.00**
		Latehar	**34.50**
		Palamu	**343.00**
		Ranchi	**302.12**
		Khunti	**1461.50**
		Simdega	**1031.70**
		West Singhbhum	**1477.50**

Reference: Annual Lac Bulletin, Institute of Forest Productivity (2009-10)

This table 8 gives detail of state wise lac crop-production (in ton) during 2009-2010 in Jharkhand.

N.B.: Lac crop production has been reported in 9 districts of Jharkhand.

West Singhbhum and Khunti districts rank first and second respectively in the quantity of raw material production. Simdega ranks 3rd and Gumla 4th. Latehar is the last ranker.

Table 9. Data related to the List of lac Industries of Jharkhand

Sl No.	District	Name & address ress
1	Ranchi	**1. M/S Nalanda Enterprises, Behind Telephone Exchange, Seva Sadan Road, Ranchi.**
		2.Srikant Jaiswal, Chotanagpur Shellac Factory, Thana Toli , Bundu, Ranchi
		3. M/S R.K. Lac, Block Road, Bundu, Ranchi.
		4. Sri Vinay Kumar Gupta, Gupta Brothers (Shellac) Bazar Tar, Bundu, Ranchi.
		5. Shri Kali Gupta ,Gupta Shellac Factory, N.H. Road, Ranchi.
		6. M/S Bradhan Brothers, Shellac Pvt .Ltd, Murhu, Ranchi.
2	Khunti	**1. M/S Parvati Lac Udyog, Khunti, Ranchi.**
		2.M/S Tajna Shellac Factory , Khunti , Ranchi
3	Garhwa	**1. M/S Rajesh Lac Factory, C/O Shri Satish Prasad Gupta, At- Tandwa, P.O – Garhwa, Palamu**
4	Medininagar (Palamu)	**1. M/S Uday Shellac Udyog, Belwaticker, Daltonganj, Palamu.**
		2. Md. Sarfuddin Ansari, Mali Mohala Road, Daltonganj , Palamu

Reference: Institute of Forest Productivity.Ranchi

Table 9 contains list of lac industries placed in different district in Jharkhand.

3.5 Oil Extraction Industry

Collection of the seeds of oil-bearing plants provide an address itional source of remuneration to the tribal and other rural people. The oil produced from the seeds are largely used in soap, paint and varnish industries. Some of them like Mustard oil is used for edible purpose, and few of the oil basically Mahua, Karanj & Kusum oil is used for commercial purposes for manufacture of soap, paint, Varnish etc.

Table 10. Total Quantity of Oil Extracted from the oil seed in Jharkhand

Sl.No.	District	Name & address ress, Contact	Type of bio–resource utilized	Quantity of oil Extracted.
1	Ranchi	*1.Oil Extraction Unit Nagdi, 09631759111,9835223418, 9334703309	Mahua Seed, Karanj Seeds, Kusum Seeds	**30000 kg** **21000 kg** **15000 kg**
		*2 Pallavi Anchal Mill Main Road, Katitad, Ratu Road, Ranchi	Mustard Seed Karanj Seed Kusum Seed	**6000 kg** **4000 kg** **2500 kg**
		*3. Sahu Vachal Mill Ram Gahan Sahu, Kanke	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**5000 kg** **2000 kg** **1000 kg** **1000 kg**
2	Khunti	*1. Shayam Gram Udyog, Gobindpur, Kunti.	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**10000 kg** **5000 kg** **5000 kg** **4000 kg**
3	Deoghar	*1.Trivedi Oil Mill,Prof Shiv Shambhu Prasad Sha, New Mina Bazaar, Deoghar	Mustard Seed Kranj Seed	**16000 kg** **10000 kg**
4	Sahebganj	1. Shabhikul Tail Mill, Udyog, Katalbadi, Sahebganj.	Mustard Seed Karanj Seed Kusum Seed	**8000 kg** **5000 kg** **3000 kg**
		2. Sandip Oil Mill, Bhdera	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**15000 kg** **3000 kg** **8000 kg** **2000 kg**
		*3. Sangam Kispotta Oil Mill, Sahebganj	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**2000 kg** **1000 kg** **1000 kg** **800 kg**
		4. Ganesh Oil Mill, Sahebganj.	Mustard Seed Karanj Seed Kusum Seed	**5000 kg** **1000 kg** **500kg**

Sl. No.	District	Name & address ress, Contact	Type of bio–resource utilized	Quantity of oil Extracted.
		*5. Chorasiya Oil Mill, Main Road, Sahebganj	Mustard Seed Karanj Seed Kusum Seed	**6000 kg** **3000 kg** **1000 kg**
		6. Rahman Tail Mill, Rajmahal, Sahebganj	Mustard Seed Karanj Seed Kusum Seed	**2000kg** **500kg** **500 kg**
		7. Hina Tail Mill, Amanat , Sahebganj	Mustard Seed Karanj Seed Kusum Seed	**3500kg** **1500 kg** **1000 kg**
5	Godda	Manoj Oil Mill Gobindpur Godda	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**7000 kg** **1500 kg** **3500 kg** **2000 kg**
		* 2. Mahavir Oil Mill, Godda	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**7000 kg** **5000 kg** **5000 kg** **3000 kg**
6	Pakur	1. Gupta Oil Mil Po+Ps- Maheshpur, Pakur	Mustard Seed Karanj Seed Kusum Seed	**10000 kg** **6000 kg** **3000 kg**
		*2. Mini Power Ghani Unit Po+Ps – Amrapada, Pakur	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**12000 kg** **3000 kg** **5000 kg** **3500 kg**
		3. Bharat Oil Mil Udyog Bus Stand, Amrapada Pakur	Mustard Seed Karanj Seed Kusum Seed	**8000 kg** **3000 kg** **1500 kg**
		4. Bhagat Oil Mill Baliya Dagal Mara Road, Amrapada , Pakur	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**9000 kg** **400 kg** **1500 kg** **550 kg**
		* 5. Netaji Oil Mil Prithwinagar ,Pakur	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	**5500 kg** **1000 kg** **2500 kg** **890 kg**
		*** 6. Ekteramuddin Dyal Oil Mil , Alampur , Pakur**	**Mustard Seed Mahua Seed Karanj Seed Kusum Seed**	**4000 kg 500 kg 2500 kg 600 kg**

Sl. No.	District	Name & address ress, Contact	Type of bio–resource utilized	Quantity of oil Extracted.
		7. Mohijuddin Oil And Flourd Mill , Mohanpur Pakur	Mustard Seed Karanj Seed Kusum Seed	5000 kg 3000 kg 1500 kg
		8.Bharti Tel Udyogn Amrapada., Pakur	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	8000 kg 1500 kg 5000 kg 1000 kg
		* 9. Sahil Oil Mill Maheshpur. Pakur	Mustard Seed Karanj Seed Kusum Seed	15000 kg 10000 kg 2500 kg
		10. Palavi Oil Mill Amrapada , Pakur	Mustard Seed Karanj Seed Kusum Seed	6000 kg 4000 kg 2000 kg
		* 11. Nitin Tel Mill Amrapada , Pakur	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	8500 kg 1000 kg 5500 kg 3000 kg
		12. Jai Bajrang Oil Mill Maheshpur Pakur	Mustard Seed Karanj Seed Kusum Seed	10000 kg 4000 kg 3000 kg
		* 13. Maa Durga Oil Mill Amrapada, Pakur	Musterd Seed Mahua Seed	8000 kg 1000 kg

			Karanj Seed Kusum Seed	3000 kg 2000 kg
		14 Saah Alam Oil Mil Prithwinagar, Pakur	Mustard Seed	10000 kg
		15. Raja Oil Mill Amrapada , Pakur	Mustard Seed Karanj Seed	7000 kg 3000 kg
7	**Chatra**	1. Prasad Oil Mill, New Petrol Pump, Main Road , Chatra	Mustard Seed Mahua Seed Karanj Seed	5000 kg 2500 kg 4000 kg
8	**Lohardaga**	1.Lakshmi Udyog Kinder, College Road , Lohardaga	Mustard Seed Karanj Seed	8000 kg 4000 kg
		2. Kunal Oil Mill, Mahavir Chock, Lohardaga.	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	15000kg 1000 kg 3000 kg 2000 kg

Sl. No.	District	Name & address ress, Contact	Type of bio–resource utilized	Quantity of oil Extracted.
		3. Kumar Power Ganj , Agerwal Mahalla, Lohardaga	Mustard Seed	18000 kg
		*4. Ric Oil Mill, Kairo Kuru, Lohardaga.	Mustard Seed Karanj Seed	20000 kg 3000 kg

			Kusum Seed	1000 kg
		5. Kamlesh Oil Mill And Traders, Upper Bazar, Lohardaga	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	10000 kg 1000 kg 1000 kg 1000 kg
		*6. Raga Oil, Gumla Road,	Mustard Seed Karanj Seed Kusum Seed	5000 kg 2000 kg 1000 kg
		7. Sahu Tel Udyog, Main Road, Lohardaga	Mustard Seed	8000 kg
		8. Kamla Oil Mill,Patra Toli, Lohardaga	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	10000 kg 1000 kg 2000 kg 800 kg
9	**Hazaribagh**	*** 1.**New Mahivir Flaour And Oil Producer, Ichak. Bazar Hazaribagh	Mustard Seed Karanj Seed	30000 kg 5000 kg
10	**Giridih**	1. M.R Kevikals, Sri Masher Husen	Mustard Seed Karanj Seed Kusum Seed	15000 kg 3000 kg 2000 kg
		2. Shayam Oil Mill, Gujiyedih, Giridih, Sri Gopal Kumar Gupta	Mustard Seed Karanj Seed	8000 kg 3000 kg
		*3. K.G.S Oil Mill,	Mustard Seed	7000 kg

		Jova, Prop, Mo. Zakir Khan		
		* 4.Kabir Kutir Udyog, Koldiha, Giridih Sri Gulitkumar	Mustard Seed Mahua Seed Karanj Seed Kusum Seed	10000 kg 2000 kg 4500 kg 1800 kg
		Total	**Mustard Seed** **Mahua Seed** **Karanj Seed** **Kusum Seed**	**317000 kg** **33400 kg** **162000 kg** **70940 kg**

Reference: District Industry Center of concerning District

Table 10 gives detail of quantity of extracted oil from different oil units registered in concerning DIC

Table 11. Collection of Karanj seed (in M.T.) in Jharkhand in year 1989 to 1993

Sl.No	District	Collection 1989-90	Collection 1990-91	Collection 1991-92	Collection 1992-93
1	Ranchi	134	1	…..	…..
2	Gumla	86	12	…..	…..
3	Singhbhum	53	…..	…..	…..
4	Dhalbhum	…..	…..	…..	…..
5	Hazaribagh	14	3	…..	…..
6	Chatra	…..	3	…..	…..
7	Daltonganj	…..	…..	…..	…..
8	Garhwa	…..	…..	…..	…..
9	Giridih	14	9	…..	…..
10	Deoghar	…..	…..	…..	…..

Reference: Annual Administration report for the year 1989-90---1992-93

The district of Ranchi, Gumla and Singhbhum has potential number of Karanj trees.

Table 11 gives detail of collection of karanj seed (inM.T.) in Jharkhand in year 1989to1993

Table 12. Collection of Mahua seed (in M.T.) In Jharkhand in year 1989 to 1993

Sl.no	District	Collection 1989-90	Collection 1990 -91	Collection 1991-92	Collection 1992-93
1	Ranchi	22	….	…..	….
2	Gumla	19	5	…..	…..
3	Singhbhum	4	…..	…..	…..
4	Dhalbhum	…..	…..	…..	…..
5	Hazaribagh	3	….	…..	…..
6	Chatra	1	2	…..	…..
7	Daltonganj	4	…..	…..	…..
8	Garhwa	…..	…..	…..	…..
9	Giridih	6	7	…..	…..
10	Deoghar	2	2	…..	…..

Reference: Annual Administration report for the year 1989-90---1992

Ranchi and Gumla district has potential number of trees of Mahua.

Table 12 gives detail of collection of Mahua seed (inM.T.) in Jharkhand in year 1989 to 1993

Table 13. Collection of Bahera seed (inM.T.) in Jharkhand in year 1989 to 1993

Sl.no	District	Collection 1989-90	Collection 1990-91	Collection 1991-92	Collection 1992-93
1	Ranchi	3	14	…..	….
2	Gumla	10	35	…..	…..
3	Singhbhum	13	70	…..	…..
4	Dhalbhum	…..	25	…..	…..
5	Hazaribagh	…..	2	…..	…..
Sl.no	**District**	**Collection 1989-90**	**Collection 1990-91**	**Collection 1991-92**	**Collection 1992-93**
6	Chatra	2	15	…..	…..
7	Daltonganj	7	29	…..	…..
8	Garhwa	…..	9	…..	…..
9	Giridih	…..	8	…..	…..
10	Deoghar	…..	…..	…..	…..

Reference: Annual Administration report for the year 1989-90---1992-93

Table 13 gives detail of collection of Bahera seed (inM.T.) in Jharkhand in year 1989 to 1993

Gumla, Singhbhum and Daltonganj districts have potential number of trees of Behera.

Table 14. Collection of Saalseed seed (in M.T.) in Jharkhand in year 1989 to 1993

Sl.no	District	Collection 1989-90	Collection 1990-91	Collection 1991-92	Collection 199293
1	Ranchi	3065	65	…..	….
2	Gumla	11900	98	…..	…..
3	Singhbhum	4080	70	…..	…..
4	Dhalbhum	…..	14	…..	…..
5	Hazaribagh	1843	79	…..	…..
6	Chatra	543	29	…..	…..
7	Daltonganj	1645	6	…..	…..
8	Garhwa	1022	29	…..	…..
9	Giridih	366	43	…..	…..
10	Deoghar	30	3	…..	…..

Reference: Annual Administration report for the year 1989-90---1992-93

Table 14 gives detail of collection of Sal seed seed (inM.T.) in Jharkhand in year 1989to1993

Gumla, Singhbhum and Ranchi districts are the main production districts of Sal seed.

Table 15. Collection of HarraNut (in M.T.) in Jharkhand in year 1989 to 1993

Sl. No	District	Collection 1989-90	Collection 1990-91	Collection 1991-1992	Collection 1992-1993
1	Ranchi5	8	134	…..	….
2	Gumla	71	650	…..	…..
3	Singhbhum	6	145	…..	…..
4	Dhalbhum	85	156	…..	…..
5	Hazaribagh	…..	5	…..	…..
6	Chatra	0.196	400	…..	…..
7	Daltonganj	175	26	…..	…..
8	Garhwa	…..	16	…..	…..
9	Giridih	6	15	…..	…..

Reference: Annual Administration report for the year 1989-90---1992-93

Gumla, Daltonganj, Dhalbhum, Singhbhum and Ranchi Districts are top rankers in the collection of Harra nuts.

NOTES: The data related with the collection of Bahera, Sal, Harra seeds were available for the year 1989-90 to 1990-93 only. After 1991, no related data regarding collection of these seeds could be obtained due to unavailability at secondary level institutions.

Table 15 gives detail of collection of Harra Nut (in M.T.) in Jharkhand in year 1989 to 1993

3.6 Herbal Industry

The history of traditional medicine system, which incorporates plant materials as its main constituent, traced back in the middle Paleolithic age. Millions of households have been traditionally using medicinal plants for cure of human and animal diseases and also as food supplement. About 8000 species of medicinal plants are used by 4635 ethnic communities, which include one Million folk healers. It is a matter of great concern that the folk medical culture and practices are vanishing day by day due to economic, political and cultural reasons. The plant-based medicines are highly diversified subject to drug discovery that involves observation, description and clinical investigation for required medicinal properties from indigenous drugs. The old folk remedies to determine the active ingredients in concoction have led to discovery of Dioxin from Foxgloves which is used in treatment of heart failure. Hence plant can serve as possible source of new drugs and many chemicals derived from various parts of the plant lead to structure for synthetic modification and optimization of bioactivity. The starting material for many life saving drugs of daily use come from natural source. The need of hour is to take concrete step to conserve and propagate medicinal plant resource for meeting the needs and aspiration of present and future generation.

The World Conservation Union Medicinal Plant Specialist Group has globally assessed 270000 plant species out of which 33,798 species identified as being at risk of extinction and 380 plant species are registered as extinct in the wild. In present scenario the pressure on forest wealth of medicinal plant is too much because epidemiological surveys show preferences by pharmaceutical companies, practitioner and consumers for wild gathered species on the belief that wild plants are more powerful. To ease the existing pressure on traditional forest it is significant to do monitoring of abundance and distribution, assessment of annual yields and records of the harvest practices. The scientifically improved harvesting techniques will lead to better prices for cultivator and also allow recovery time of plants and trees for future harvests. At present juncture a very few cultivators are totally dedicated to medicinal plant cultivation. Many of them oscillate from medicinal plants to conventional crops and vice-versa depending on the market situation and profitability. Sizeable number of medicinal plant cultivators has also lost money in investing in the medicinal plantation due to inadequate understanding of volatile

dynamics of herbal industry. Assessment of crude herbal demand in the market has become an extremely difficult task, which requires pre-planned strategies and methods, after involving several possibilities including government policies, public perceptions, product efficacy based on scientific basis and building excellent organizational structures. The finished product herbal preparations have very competitive market and hence the product should be acceptable to the consumers, professional medicinal practitioners and also to the environmentalists. For this purposes the knowledge of scientific improved agricultural procedures, ecological aspects, marketing methodologies and the international regulations are necessary.

Five strategic areas have been identified for global herbal market such as Pharmaceuticals, Botanical medicinal extracts, Neutraciticals, Cosmeceuticals and Herbal raw materials. The medicinal plants required in crude form for above industries can be procured either from forest or by cultivation outside the forest on large scale. Due to unorganized herbal market the middleman play key role in procuring the raw plant material from forest to meet 90% of their total demand. Only 10% of the herbal plant material demand is met from cultivation. This situation must be changed by promoting cultivation of medicinal plants on large scale by extending various incentives and subsidies to the farmers and also by creating awareness about it. This will lead to check on depleting forest resources and also exploitation of tribal people who actually gather raw plant material from wild.

Indian system of medicine has documented 1800 species of medicinal value in which nearly 880 species are being traded in India. Out of these 880 species 538 (61%) are procured from forest, 88 species (10%) are from cultivation, 212 species (25%) are sourced both from forest as well as cultivation and 42 species (4%) are imported from different countries. Only 42 species are exported from India. The World Health Organisation has estimated that the herbal market will grow upto 5 trillion dollars by 2050 A.D. at growth rate of 20% per annum from present level of 76 billion dollar. Out of this, European Union accounts for about 50%, Japan 16% and USA 11% of share. Asian countries together share is only 19% in which India accounts for less than 0.3% of total herbal medicines market. At present about 8000 species of plants are used in local health cultures for human, veterinary and agriculture for controlling different diseases and pests. Following are the 10 top highly traded plants in Jharkhand:

1. *Asparagus racemosus (Satawar)*
2. *Aegle marmelos (Bel)*
3. *Adhatoda vasica (Vasa)*
4. *Bacopa monnieri (Brahmi)*
5. *Cassia angustifolia (Senna)*
6. *Terminalia chebula (Harar)*
7. *Piper longum (Pippali)*
8. *Saraca asoca (Asoka)*
9. *Emblica officinalis (Amla)*
10. *Withania somnifera (Ashwagandha)*

Export of Ayurvedic, Unani, Homeopathic and Alkaloide

Years	Ayurvedic & Unani		Homeopathic		Alkaloide	
	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹
1996 & 1997	12986-70	15503-58	56-32	128-53	154-80	**179-39**
1997 & 1998	8939-52	6499-84	51-99	309-51	271-49	**1989-65**
1998 & 1999	10898-79	7451-59	32-56	37-47	73-18	**613-11**
1999 & 2000	**10399-20**	**5474-00**	**121-96**	**67-39**	**122-45**	**899-04**

Import of Ayurvedic, Unani, Homeopathic and Alkaloide

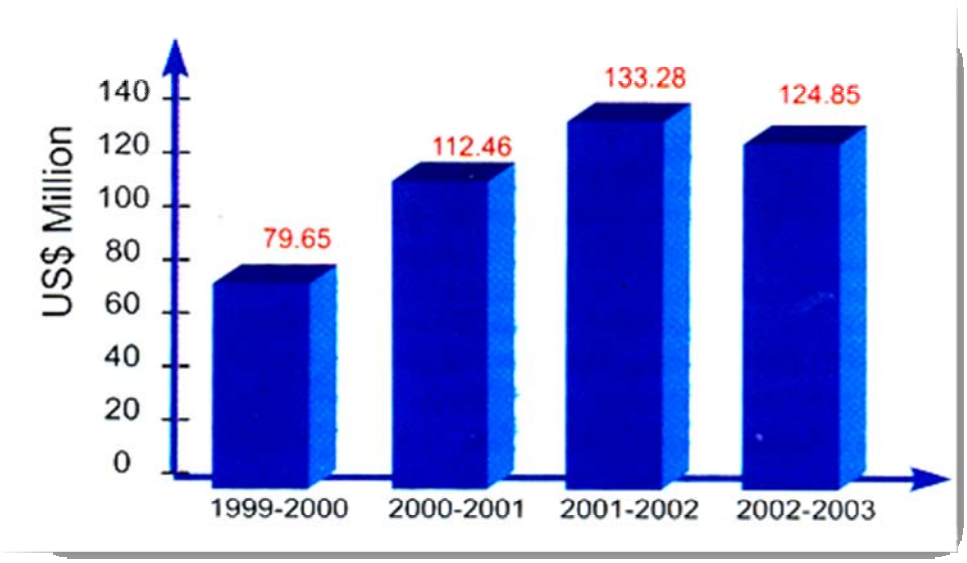
Years	Ayurvedic & Unani		Homeopathic		Alkaloide	
	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹
1996 & 1997	3640-05	3395-02	126-21	496-96	_	_
1997 & 1998	1637-19	507-04	102-13	572-49	6-41	**97-94**
1998 & 1999	3761-57	1863-54	171-63	936-42	0-63	**53-99**
1999 & 2000	**3934-49**	**3956-77**	**146-06**	**799-69**	**0-07**	**0-27**

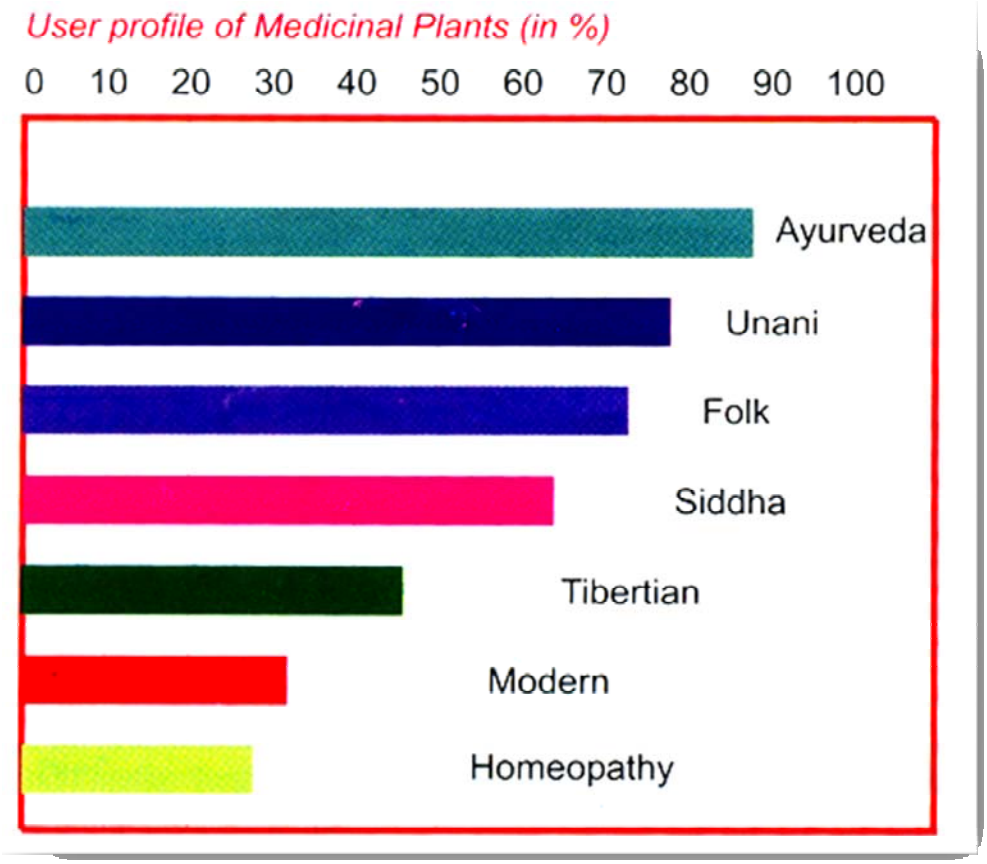
Export of Major Crude Drugs from 1996-97 to 1999-2000

Crude Drug Item	1996-97		1997-98		1998-99		1999-2000	
	Qty. (in Ton)	Value (in Lakh) ₹	Qty. (in Ton)	Value (in Lakh) ₹	Qty. (in Ton)	Value (in Lakh) ₹	Qty. (in Ton)	Value (in Lakh) ₹
***Glycyrrhiza* (Roots)**	0.01	0.02	9.51	8.35	3.42	9.22	70.39	**81.93**
***Alpinia* sp. (Rhizomes)**	64.30	12.8	29.00	6.59	75.42	29.62	201.53	**74.94**
***Curcuma zedoaria* (Roots)**	31.70	5.02	37.23	6.38	43.17	7.42	36.15	**8.04**
***Rauvolfia sepentina* (Roots)**	-	-	NA	NA	0.19	0.17	9.03	**5.70**
***Saussurea costus* (Roots)**	-	-	NA	NA	NA	NA	-	**-**
***Panax ginseng* (Roots)**	2768.38	2074.05	3787.40	2399.29	4470.56	2995.34	1379.46	**1015.14**
***Atropa belladonna* (Roots & leaves)**	99.35	21.31	5.83	1.29	44.27	18.52	22.74	**8.19**
***Plantago psyllium* (Husk & Roots)**	17842.63	13697.52	20634.25	15884.62	14782.76	13742.48	15295.31	**10815.18**
***Swertia chirayita* (Whole plant)**	45.03	33.1	16.24	4.65	1.62	0.50	50.29	**37.74**
***Cassia angustifolia* (Pods & leaves)**	5948.61	1380.82	5011.84	1377.31	5180.58	2070.82	7466.33	**2254.20**
***Tamarindus indica* (Seeds & Powder)**	2415.76	222.16	1174.36	138.95	1179.03	166.71	2763.08	**423.98**
***Catharanthus roseus* (Roots & leaves)**	24.57	7.85	-	-	277.71	104.42	541.54	**213.19**
***Hemidesmus indicus* (Roots)**	11.69	3.07	23.14	4.19	32.02	27.22	14.71	**6.22**
***Ziziphus mauritiana* (Fruits)**	38	30.01	-	-	81.90	58.65	35.90	**15.25**
***Vitis vinifera* (Water)**	104.85	59.21	61.04	34.75	84.708	61.16	66.91	**49.63**
***Ricinus communis* (Oil)**	11.89	12.38	124.79	51.92	270.29	97.26	136.50	**78.49**
***Humulus lupulus* (Dry leaves)**	0.02	0.04	-	-	-	-	20.00	**3.41**
***Piper longum* (Fruits)**	348.780	204.930	611.00	354.80	272.66	395.47	319.23	**660.22**
***Piper nigrum* (Garbled/ Ungarbled/ Dehydrated/Crushed)**	46904.56	40865.36	34632.32	483035.27	32798.39	59055.42	33908.33	**66816.66**
***Cinnamomum zeylanicum* (Bark)**	9.930	8.180	111.53	62.24	3.31	2.69	-	**-**
***Syzygium aromaticum* (Buds)**	83.09	24.04	-	-	1.25	5.56	310.73	**384.77**
***Myristica fragrans* (Fruits)**	5.25	4.61	31.40	5.69	2.81	6.09	130.58	**83.99**
Other Medicinal Products	**-**	**-**	**3062.69**	**1430.32**	**4736.34**	**2333.74**	**2734.60**	**1136.40**

Source: Monthly Statistics of the foreign trade of India Vol. I (Export) (1991-2000)

Export Performance of medicinal plants in India





Import of Major Crude Drugs from 1996-97 to 1999-2000

Crude Drug Item	1996-97		1997-98		1998-99		1999-2000	
	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹	Quantity (in Ton)	Value (in Lakh) ₹
***Glycyrrhiza* (Roots)**	1622.96	167.12	594.68	70.73	1077.74	157.34	1106.63	**178.45**
***Alpinia* sp. (Rhizomes)**	92.81	14.31	55.18	10.19	48.49	9.76	65.00	**24.29**
Curcuma zedoaria (Roots)	-	-	-	-	-	-	9.00	**1.64**
***Rauvolfia serpentina* (Roots)**	-	-	27.96	5.14	-	-	25.80	**4.86**
***Saussurea costus* (Roots)**	245.00	18.94	194.15	26.60	147.10	31.78	266.31	**43.16**
***Panax ginseng* (Roots)**	62.85	32.19	24.47	10.07	46.79	36.11	15.27	**13.07**
***Plantago psyllium* (Husk & Roots)**	-	-	3.28	5.72	1.73	2.31	-	**-**
***Swertia chirayata* (Whole plant)**	52.10	12.29	271.63	22.82	47.49	11.75	53.87	**15.41**
***Cassia angustifolia* (Pods & leaves)**	-	-	-	-	29.39	46.03	-	**-**
***Catharanthus roseus* (Roots & leaves)**	4.50	0.24	-	-	0.38	8.40	-	**-**
***Hemidesmus indicus* (Roots)**	1.03	0.28	8.53	1.80	2.90	0.63	-	**-**
***Ziziphus mauritiana* (Fruits)**	8.2	0.68	187.44	34.36	97.60	24.97	-	**-**
***Humulus lupulus* (Dried leaves)**	61.64	277.41	137.97	192.54	159.18	248.28	106.72	**211.15**
Rosa water	0.01	0.66	0.12	3.03	0.006	0.04	-	**-**
Resinoids	60.18	255.41	50.76	263.39	97.73	278.35	-	**-**
Other Medicinal Plants	**-**	**-**	**588.53**	**203.15**	**956.85**	**617.97**	**1017.12**	**659.23**

Source: Monthly Statistics of the foreign trade of India Vol. II (Import) (1991-2000)

Two plants based drugs of Indian origin derived from *Cantheranthus roseus* and *Phyllanthus arnus* are now a days globally accepted for treatment against Cancer and HIV. Likewise there is need to develop such more inventories and effective herbal remedies in the field where the modern medicine has no cure. The range of plants are very wide with specific medicinal properties but lack of authentic knowledge handicap to develop herbal medicines of proper validation and standardization before release into market for general use. Hence good manufacturing practices, authentic raw material and extraction process, proper harvesting season, nonuse of chemical fertilizers and pesticide with certification is necessary.

BIODIVERSITY OF MEDICINAL PLANT SPECIES AND THEIR STATUS IN THE PALAMU, DALTONGANJ & GARHWA AREA.

Nature of Species: Tree

Sr. No.	*Name of Species (Botanical Name)*	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Acacia arabica*	Mimosaceae	Babul	✓					June-Dec.
2	*Acacia catechu*	Mimosaceae	Khair	✓				✓	Sept.- Jan.
3	*Acacia torta*	Mimocaceae		✓					Dec.- March
4	*Adina cordifolia*	Rubiaceae	Karam	✓				✓	June- Feb.
5	*Aegle marmelos*	Rutaceae	Bel	✓				✓	May-Aug.
6	*Ailanthus excelsa*	Simarubaceae	Ghorkaranj	✓				✓	Jan-May
7	*Alangium salvifolium*	Alangeaceae	Akola	✓					March-July
8	*Albizzia lebbeck*	Mimosaceae	Siris	✓					March-July
9	*Albizzia procera*	Mimosaceae	Safed siris	✓					Aug.-May
10	*Anacardium occidentale*	Anacardiaceae	Kaju	✓				✓	
11	*Annona reticulate*	Annonaceae	Aanta	✓					Sept.-Jan.
12	*Annona squamosa*	Annonaceae	Saripha	✓				✓	March-Sept.
13	*Anogeissus latifolia*	Combretaceae	Dhaura	✓					Jan.-March
14	*Anthocephalus indicus*	Rubiaceae	Kadam	✓					May-Oct
15	*Artocarpus lakocha*	Moraceae	Barhar, Dahu	✓					April-Nov.
16	*Azadirachta indica*	Meliaceae	Neem	✓					Mar.-July
17	*Balanites aegyptiaca*	Linaceae	Hingan	✓					Fl (Nov.-Dec.) Fr. (Feb-March)
18	*Bauhinia purpurea*	Leguminoceae	Koinar	✓					Sept.-Feb.
19	*Bauhinia retusa*	Leguminoceae	Kanla, Katmauli	✓					Sept.-March
20	*Bauhinia variegate*	Leguminoceae	Kachnar	✓					Oct.-Feb.
21	*Biophytum reinwardii*	Giraniaceae	Hingan	✓					Aug.-Dec.
22	*Bombax ceiba*	Malvaceae	Semul	✓				✓	Jan.-March
23	*Boswellia serrata*	Berseraceae	Salai	✓					Jan.-March
24	*Bridelia montana*	Euphorbiaceae	Khaja	✓					Aug.-Dec.
25	*Bridelia retusa*	Euphorbiaceae	Kaj	✓					Fl (Aug-Oct) Fr.(Nov.-June)
26	*Broussonetia papyrifera*	Moraceae	Janglitut	✓					March-July
27	*Buchnania lanzan*	Anacardiaceae	Piar	✓					Jan.-May
28	*Butea monosperm*	Leguminoceae	Palas	✓					Jan.-April
29	*Careya arborea*	Lecythidaceae	Kumbhi	✓					March-July
30	*Casearia graveolens*	Flacourtiaceae	Chilla, Nuri	✓					May-July
31	*Cassia fistula*	Leguminoceae	Amaltas	✓					Fl (May-Aug) Fr.(Whole year)
32	*Cassine glauca*	Olacaceae	Chauri, Dhebri	✓					Feb.-July, Fr. (Whole year)
33	*Chloroxylon swietenia*	Clindersiaceae	Bharhul	✓					April-July

Sr. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
34	*Cleistenthus collinus*	Euphorbiaceae	Karngali	✓					
35	*Cochlospermum religiosum*	Cochlospermaceae	Galgal, Kumbhi, Hopo	✓					Jan.-June
36	*Cordia dichotoma*	Ehretiaceae	Lasora	✓					Mar.-July
37	*Dalbergia sissoo*	Leguminoceae	Shishum	✓					March-Sept.
38	*Diospyros malabarica*	Ebenaceae	Tendu	✓					April-July
39	*Ehretia laevis*	Ehretiaceae	Chamror	✓					Whole year
40	*Embilica officinalis*	Euphorbiaceae	Amla	✓				✓	March-Dec.
41	*Erythrina variegata*	Fabaceae	Farhad	✓					March-June
42	*Ficus benghalensis*	Moraceae	Bargad	✓					Dec.-March
43	*Ficus lacor*	Moraceae	Pakar	✓					Dec.-April
44	*Ficus racemosa*	Moraceae	Gular, Dumar	✓					Mar.-July
45	*Ficus religiosa*	Moraceae	Peepal	✓					May.-Sept.
46	*Ficus retusa*	Moraceae	Kamrup	✓					
47	*Ficus semicordata*	Moraceae	Hor-podo	✓					Feb.-July
48	*Flacourtia jagnomas*	Flacourtiaceae	Panialah	✓					July-Dec.
49	*Flacourtia ramontchi*	Flacourtiaceae	Katachi	✓					Dec.-May
50	*Gardenia gummifera*	Rubiaceae	Dekamali	✓					
51	*Gardenia turgida*	Rubiaceae	Dharuk karhar	✓					
52	*Garuga pinnata*	Burceraceae	Kekar	✓					Mar.-Aug.
53	*Gmelina arborea*	Verbenaceae	Gamhar	✓				✓	March-June
54	*Grewia tiliefolia*	Tiliaceae	Dhamani	✓					May-Sept.
55	*Holoptelea integrifolia*	Ulmaceae	Chilbil	✓					April-Dec.
56	*Hymenodictyon excelsum*	Rubiaceae	Bhurkund	✓					Aug.-Jan.
57	*Lannea coromandelica*	Anacardiaceae	Dokeo (Gizan)	✓					March-June
58	*Limonia acidissimma*	Rutaceae	Beli	✓					June-Dec.
59	*Litsea glutinosa*	Lauraceae	Maida Lakri	✓					June-Nov.
60	*Litsea polyantha*	Lauraceae	Meda pojo	✓					
61	*Madhuca longifolia*	Sapotaceae	Mahua	✓				✓	March-July
62	*Mallotus phillipensis*	Euphorbiaceae	Rori	✓					Nov.-March
63	*Mangifera indica*	Anacardiaceae	Aaam	✓				✓	Feb.-July
64	*Melia azedarach*	Meliaceae	Bakain	✓					May-Dec.
65	*Michelia champaca*	Magnoliaceae	Champa	✓		✓			
66	*Mitragyna parvifolia*	Rubiaceae	Guri-karam	✓					May-June
67	*Morinda citrifolia*	Rubiaceae	Ach	✓					
68	*Nyctanthes arbortristis*	Oleaceae	Harsing-harrtfgvb	✓					Sept.-Dec.
69	*Oroxylum indicum*	Bignoniaceae	Sona, (Futkal)	✓		✓			July-March
70	*Ougeinia oojeinensis*	Papilionaceae	Sandan	✓					May-Feb.
71	*Pongamia pinnata*	Leguminoceae	Karanj	✓				✓	May-Dec.

Sr. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
72	*Pterocarpus marsupium*	Leguminoceae	Paisar, Bija, Marga	✓				✓	**Oct.-Feb.**
73	*Salix tetrasperma*	Salicaceae	Vait	✓					
74	*Saraca indica*	Leguminoceae	Sita-ashok	✓					
75	*Schleichera oleosa*	Sapindaceae	Kusumilk	✓					**Feb.-Aug.**
76	*Semecarpus anacardium*	Anacardiaceae	Bhelwa	✓					**July-Dec.**
77	*Shorea robusta*	Dipterocarpaceae	Sal	✓					**May-July**
78	*Soymida febrifuga*	Meliaceae	Rohan	✓					**April-June**
79	*Spondias pinnata*	Anacardiaceae	Amra	✓					**Feb.-May**
80	*Sterculia urens*	Sterculiaceae	Keonjhi	✓					**Dec.-April**
81	*Stereospermum suaveolens*	Bignoniaceae	Paper	✓					**Fl (April-May) Fr.(Oct.-Feb)**
82	*Streblus asper*	Moraceae	Seora	✓					**Feb.-April**
83	*Syzygium cumini*	Myrtaceae	Jamun	✓					**April-July**
84	*Tamarindus indica*	Coesalpiniaceae	Imli	✓					**April-Dec.**
85	*Tectona grandis*	Verbenaceae	Sagwan	✓					**July-Dec.**
86	*Terminalia alata*	Combretaceae	Asan	✓					**Aug.-May**
87	*Terminalia arjuna*	Combretaceae	Arjun, Kahua	✓					**Whole year**
88	*Terminalia belerica*	Combretaceae	Bachera	✓					**Oct.-May**
89	*Terminalia chebula*	Combretaceae	Harra	✓					**Nov.-Feb.**
90	*Trema orientalis*	Ulmaceae	Gioc	✓					**Feb.-May**
91	*Wrightia tintoria*	Apocynacea	Indraja	✓					**April-Jan.**
92	*Ziziphus mauritiana*	Rhamnaceae	Ber	✓				✓	**Nov.-Feb.**
93	***Kydia calycina***	**Malvaceae**	**Pula, Beranga**	✓					**Sept.-Jan.**

Nature of Species: Shrubs

Sl. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Abutilon indicum*	Malvaceae	kanghi	✓					**Aug. - Jan.**
2	*Adhatoda vasica*	Acanthaceae	Vasaka	✓		✓			
3	*Ardisia solenacea*	Myrsinaceae	Gara-boi	✓					
4	Baliospermum montenum	Euphorbiaceae	Danti	✓					**Oct.-April**
5	*Barleria cristata*	Acanthaceae	Jhinti	✓					**Nov-March**
6	*Barleria prionitis*	Acanthaceae	Katsar	✓					**Dec.-June**
7	*Berberis asiatica*	Berberidaceae	samlu	✓					
8	*Calastrus paniculatus*		Malkagni	✓					**April-Jan**
9	Callicarpa candicans	Verbenaceae	Arusha	✓					**In rainy season**

Sl. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered Endemic	Cultivable	Flowering and Fruiting Time
10	*Calotropis gigantea*	Asclepidoaceae	Madarakona	✓				**Fl (Dec.-July) Fr.(Feb.-June)**
11	*Calotropis procera*	Asclepidoaceae	Akawan	✓				**Whole year (spl.Oct-Jan)**
12	*Capparis zeylanica*	Capparaceae	Ardanda	✓				**March-May**
13	Carissa carandas	Apocynaceae	Karaundha	✓				**May-Nov.**
14	*Casearia tomentosa*	Flacourtiaceae	Churchu	✓				**March-May**
15	*Cassia sophera*	Caesalpiniaceae	Kasaunda (Chakunda)	✓				**Aug-Dec**
16	*Clerodendrom indicum*	Verbenaceae	Bharanghih	✓				**June-Nov.**
17	*Clerodendrom serratum*	Verbenaceae	Barangi	✓				**April-Nov.**
18	*Clerodendron infortunatum*	Verbenaceae	Bhant	✓				**Dec.-May**
19	*Colebrookea oppositifolia*	Lamiaceae	Bhainsa	✓				**Dec.-March**
20	*Croton oblongifolius*	Euphorbiaceae	Putri	✓				**Jan.-May**
1	*2*	3	4	✓	6	7	8	9	**10**
21	*Cryptolepis buchananii*	Periplocaceae	Karanta	✓				**Fl (June-Aug) Fr.(Oct.-Dec.)**
22	*Dalbergia volubillis*	Leguminoceae	Nari-siris	✓				**March-May**
23	*Datura metel*	Solanaceae	Dhatura (White)	✓			✓	**Sept.-Dec.**
24	*Desmodium gangeticum*	Fabaceae	Salpani	✓				**Whole year**
25	*Desmodium pulchellum*	Fabaceae	Birkapi	✓				**Sept.-Jan.**
26	*Euphorbia antiquorum*	Eophorbiaceae	Tidhra	✓				
27	*Euphorbia nerrifolia*	Eophorbiaceae		✓				
28	Ficus tinctoria	Moraceae	Koen	✓				**Feb.-April**
29	*Flacourti indica*	Flacourtiaceae	Katahi	✓				**March-Sept.**
30	Glochidion velutinum	Euphorbiaceae		✓				**April-Aug.**
31	*Glycosmis pentaphylla*	Rutaceae	Ban-nimbu		✓			**Oct-Feb.**
32	*Hamiltonia suaveolens*		Selauli		✓			
33	*Helicteres isora*	Sterculiaceae	Aintha	✓				**May-Jan.**
34	*Holarrhena phubescence*	Apocynaceae	Dudh-koraiya	✓				**May-Jan.**
35	*Indigofera tinctoria*	Fabaceae	Nil	✓				
36	*Jasminum arborescens*	Oleaceae	Chameli	✓				**April-July**
37	*Jasminum multiflorum*	Oleaceae	Mogra	✓				
38	*Lantana camara*	Verbenaceae	Putus	✓				**Whole year**
39	*Leea robusta*	Ampelidaceae	Gallni	✓		✓		**July-Nov.**
40	*Mimosa pudica*	Leguminoceae	Lajvanti	✓				**Whole year**
41	*Olax scandens*	Olacaceae	Hund	✓	✓			**Nov.-Feb.**
42	*Randia dumetorum*	Rubiaceae	Mainphal	✓				
43	*Rauvolfia serpentina*	Apocynaceae	Sarpgandha	✓			✓	**June-Dec.**
44	*Sida acuta*	Malvaceae	Bariara	✓				**Aug.-Dec.**
45	*Sida cordifolia*	Malvaceae	Kungyi	✓				**Aug.-Jan.**
46	*Tamarix ericoides*	Tamaricaceae	Pisula	✓	✓			**Aug.-Feb.**

Sl . No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
47	*Tephrosia purpurea*	Fabaceae	Sarphomka	✓				✓	**Whole year**
48	*Thespesia lampas*	malvaceae	Jungli bhindi, Van kapas	✓					**Aug-Dec.**
49	*Vitex negundo*	Verbenaceae	Sinduar	✓					**Jan.-July**
50	*Vitex peduncularis*	Verbenaceae	Nagbel	✓		✓			**May-Sept.**
51	*Waltheria indica*	Sterculiaceae	Khardudhi	✓					**Jan.-March**
52	*Withania somnifera*	Solanaceae	Ashwagandha	✓		✓		✓	
53	*Woodfordia fruiticosa*	Lythraceae	Dhawai	✓					**Jan.-May**
54	*Ziziphus oenoplia*	Rhamnaceae	Makai	✓					**June-Dec.**
55	***Ziziphus rugosa***	**Rhamnaceae**	**Churna**	✓					**Feb.-March**

Nature of Species: Herbs

Sl . No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Achyranthes bedentata*	Amaranthaceae	Bankhat	✓					**Sept.- Dec.**
2	*Achyranthus aspera*	Amaranthaceae	Chirchiri	✓					**Oct.- Jan.**
3	*Acrocephalus hispidus*	Lamiaceae		✓					**Oct.- Jan.**
4	*Ageratum conyzoides*	Aesteraceae	Uchuinti	✓					**March-June**
5	*Anagallis arvensis*	Perimulaceae	Jankmari	✓					**Dec.- March**
6	*Andrographis paniculata*	Acanthaceae	Kalmegh	✓		✓		✓	**Nov.-May**
7	*Anisochilus carnosus*	Lamiaceae		✓					**Oct.- Jan.**
8	*Argemone mexicana*	Papaveraceae	Bharband	✓					**Jan-June**
9	*Arisaema tortuosum*	Araceae	Tuya-jodra	✓		✓		✓	**June-Nov.**
10	*Artemisia japonica*	Asteraceae		✓					**Oct.- Feb.**
11	*Arundinella brasilliensis*	Poaceae		✓	✓			✓	
12	*Bacopa monnieri*	Scrophulariaceae	Brahmi	✓					**June-Dec.**
13	*Beera arvensis*	Asteraceae	Kataila	✓					
14	*Blumea fistulosa*	Asteraceae		✓					**Dec.-April**
15	*Byttneria herbacea*	Steculiaceae	Kambraj	✓					**June.-Dec.**
16	*Cassia tora*	Caesalpiniaceae	Chakora	✓					**Sept.-Dec.**
17	*Centella asiatica*	Umbelliferae	Beng-sag	✓					**Whole year**
18	*Centratherum anthelminticum*	Compositae	Somraj	✓					**Jan.-March**
19	*Chlorophytum arundinaceum*	Liliaceae	Safed musli	✓		✓		✓	**Nov.-Feb.**
20	*Cleome gynandra*	Cleomaceae	Swethurhuri	✓					**July-Dec.**
21	*Cleome viscosa*	Cleomaceae	Harhara	✓					**Jan.-June**
22	*Connyza canadensis*	Asteraceae		✓	✓				**March-May**

Sl . No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered Endemic	Cultivable	Flowering and Fruiting Time
23	*Corchorus aestauans*	Tiliaceae	Titapat	✓				Aug.-Dec.
				✓				
24	*Corchorus capsularis*	Tiliaceae	Koskomarau	✓			✓	Aug.-Oct.
25	*Corex royleana*	Cyperaceae		✓				
26	*Costus spacious*	Zingiberaceae	Ken	✓				Aug.-Dec.
27	*Curculigo orchioides*	Hypoxidaceae	Mushali	✓				May-Aug.
28	*Curcuma amada*	Zingiberaceae	Ama-haldi	✓				July-Sept.
29	*Curcuma augustifolia*	Zingiberaceae	Tikur	✓				
30	*Cymbidium macrorhizum*	Orchidaceae			✓			June-Sept.
31	*Datura stramonium*	Solanaceae	Dhatura (Black)		✓		✓	Sept.-Dec.
32	*Digera muricata*	Amranthaceae	Karigandhari					Feb.-July
33	*Echinops echinatus*	Asteraceae	Gokru	✓				May-Nov.
34	*Eclipta alba*	Asteraceae	Bhringraj	✓			✓	
35	*Eclipta prostrata*	Asteraceae	Babri	✓				Aug.-Jan.
36	*Elephantopus scaber*	Compositae	Samdulan	✓				Sept.-Dec.
37	*Eulopia nuda*	Orchidaceae						May-June
38	*Euphorbia hirta*	Euphorbiaceae	Dudhi	✓				Whole year
39	*Fumaria indica*	Fumariaceae	Pitpapra	✓				Nov.-March
40	*Globba marantina*	Zingiberaceae		✓				June-Aug.
41	*Gnaphalium polycaulon*	Asteraceae		✓				Dec.-May
42	*Hybanthus enneaspermus*	Violaceae	Ratanpuras	✓				Aug.-Dec.
43	*Hyptis suaveolens*	Lamiaceae	Ganga tulsi		✓			Dec.-March
44	*Ipomoea sinensis*	Convolvulaceae			✓			Aug-Nov.
45	*Lasia aculeata*	Araceae	Kanta-saru		✓	✓		
46	*Launea sarmentosa*	Asteraceae			✓			June-Sept.
47	*Leucas aspera aspreng*	Lamiaceae	Chotahalkusa	✓				Jan.-June
48	*Marsilia minuta*	Marsiliaceae	Sunsuniya Saag	✓				
49	*Martynia annua*	Martyniaceae	Hathjori	✓				Aug.-Nov.
50	*Mikania micrantha*	Asteraceae	Mile-a-minute	✓				Oct.-March
51	*Nervillia aragoana*	Orchidaceae	Sthalapadma		✓			June-Sept.
52	*Nervillia prainiana*	Orchidaceae			✓			June-Aug.
53	*Oxalis corniculata*	Oxialidaceae	Amrul Sak	✓				Whole year
54	*Phyllanthus maderaspatensis*	Euphorbiaceae		✓				Aug.-Dec.
55	*Phyllanthus urinaria*	Euphorbiaceae	Hazarmani	✓				July-Dec.
56	*Plecranthus stocksii*	Lamiaceae			✓		✓	Nov.Marh
57	*Polygala arvensis*	Polygalaceae	Merandu, Gaighura	✓				Aug.-Feb.
58	*Psoralia corylifolia*	Papilionaceae	Bakuchi	✓	✓			Nov.-March
59	*Rungia repens*	Acanthaceae	Kharmor	✓				Sept.-Dec.

Sl . No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
60	*Saussurea heteromella*	Asteraceae		✓					March-May
61	*Sida alba*	Malvaceae	Jangalimenthi		✓				Sept.-Dec.
62	*Sida cordata*	Malvaceae	Bhiunli	✓					Whole year
63	*Solanum nigrum*	Solanaceae	Makoi	✓				✓	Whole year
64	*Solanum xanthocarpum*	Solanaceae	Kateeli	✓					Dec.-June
65	*Tribulus terrestris*	Zygophyllaceae	Chota gokhuru			✓			Aug.-Nov.
66	*Trichodesma zezlanicum*	Boraginaceae		✓					Dec.-Aug.
67	*Urginea indica*	Liliaceae	Jangli-piyaj			✓			May-July
68	*Vernonia cinerea*	Compositae	Sadodi	✓					Whole year
69	*Vernonia divergens*	Asteraceae		✓					Nov.-March
70	***Xanthium indicum***	**Asteraceae**	**Ban-okra**	✓					Jan.-April

Nature of Species: Climbers

Sl. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Acacia pennata*	Mimosaceae	Arar	✓					June- Dec.
2	*Ampelocissus latifolia*	Vitaceae	Panibel	✓					July-Nov.
3	*Ampelocissus tomentosa*	Vitaceae	Ghoralidi	✓					July-Nov.
4	*Asparagus racemosus*	Liliaceae	Satawar			✓		✓	Aug.-Jan.
5	*Bauhinia vahlii*	Leguminoceae	Mahulan	✓					April-June
6	*Cissus quadrangularis*	Vilaceae	Harjor		✓				Aug.-Dec.
7	*Cocculus hirsutus*	Menispermaceae	Jamtikibel	✓					Nov.-April
8	*Dioscorea bulbifera*	Diosocoreaceae	Ratalu	✓					Aug.-Oct.
9	*Dioscorea pentafallia*	Diosocoreaceae	Kanta-alu (Gainthi)	✓					Aug-Dec.
10	*Discorea glabra*	Discoreaceae	Baiyang	✓					Sept.-March
11	*Discorea oppositifolia*	Discoreaceae	Yam (chinese potato)	✓					Aug.-March
12	*Discorea pentaphylla*	Discoreaceae	Bhusan	✓					Sept.-Dec.
13	*Gloriosa superba*	Liliaceae	Karihar	✓		✓		✓	July-Nov.
14	*Gouania filiaefolia*	Rhamnaceae	Munjni	✓					Jan.-May
15	*Gymnema sylvestre*	Asclepiadaceae	Gurmar	✓				✓	Aug.-March
16	*Paedaria foetide*	Rubuaceae	Gandh-bail	✓					Aug.-Dec.
17	*Porana paniculata*	Convolvulaceae	Panjotnari	✓					Oct.-Jan.
18	*Premna herbacea*	Verbeneaceae	Bharangi	✓					May-July
19	*Pueraria tuberosa*	Leguminoceae	Siali	✓		✓			Feb.-May
20	*Smilax ovalifolia*	Liliaceae	Ramdatuvan	✓					May-June
21	*Smilax perfoliata*	Liliaceae	Kumarika	✓					Nov.-April
22	*Stephania japonica*	Anacardiaceae	Akandi	✓					May-Dec.
23	*Telosma pallida*	Asclepiadaceae	Kongat	✓					July-Nov.
24	***Vertiveria denticulata***	**Rhmnaceae**	**Bonga sarjom**	✓					Feb.-April

Nature of Species: Creepers

Sl. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Abrus precatorius*	Fabaceae	Rati	✓					Aug. - Dec.
2	*Argyreia speciosa*	Convolvulaceae	Tamesher	✓					
3	*Cissampelos pereira*	Menispermaceae	Akanadi	✓					Aug.-March
4	*Hemidesmus indicus*	Periplocaceae	Anantmul			✓		✓	Aug.-Nov.
5	*Inchnocarpus frutescens*	Apocynaceae	Kali-dudhi	✓					Sept.-April
6	*Mucuna prurita*	Leguminosae	Kavanch			✓		✓	Sept.-April
7	*Rubia cordifolia*	Rubiaceae	Mangit		✓				Sept.-Dec.
8	*Tinospora cordifolia*	Menispermaceae	Guarach		✓				Nov.-April
9	***Vallaris solanacea***	**Apocynameae**	**Kokur-botur**	✓					Dec.-April

Nature of Species: Grasses

Sr. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Cymbopogon martini*	Poaceae	Rusa-ghas	✓			✓	✓	Oct-March
2	*Cynodon dactylon*	Poaceae	Dubi	✓					Whole year
3	*Saccharum munja*	Poaceae	Munj	✓					Aug-Sept.
4	*Saccharum spontaneum*	Poaceae	Kaans	✓					Aug-Sept.
5	*Vetiveria zizaniodes*	Poaceae	Khas-khas	✓				✓	Aug.-Jan.
6	*Eleusine indica*	Poaceae	Mondla	✓					Sept.-Dec.
7	*Hetropogon contortus*	Poaceae	Kher	✓					July-Jan
8	*Oplisonenus burmannii*	Poaceae	Nini	✓					Sept.-Jan.
9	*Pennisetum pedicellatum*	Poaceae		✓	✓				Oct.-Nov.
10	*Pennisetum setosum*	Poaceae	Swati	✓					Oct.-Dec.
11	*Rottboellia exaltata*	Poaceae		✓	✓				Sept.-Dec.
12	*Apluda mutica*	Poaceae	Dudhia souri	✓					Sept.-Dec.
13	*Arundo donax*	Poaceae	Narkat	✓	✓				Oct.-March
14	*Bothriochloa bladhii*	Poaceae	Sandhor	✓					Sept.-Jan.
15	*Chionachne koenigii*	Poaceae		✓					Jan-Aug.
16	*Chloris fulvus*	Poaceae		✓					Oct.-Dec.
17	*Chloris virgata*	Poaceae		✓					Aug.-Jan.
18	*Sporobolus indicus*	Poaceae		✓					July-Dec.
19	*Themeda triandra*	Poaceae		✓					Sept.-Jan.
20	***Thysanolaena maxima***	**Poaceae**	**Phulijharughas**	✓					Dec.-May

Nature of Species: Bamboo

Sl. No.	Name of Species (Botanical Name)	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	***Dendrocalamus strictus***	**Gramni**	**Bamboo**	✓				✓	

Nature of Species: Twiner & Weeds

Sr. No.	*Name of Species (Botanical Name)*	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Dolichos biflorus*	Papalionaceae	Jungli kulthi	✓ ✓				✓	Oct-Dec.
2	*Marsdenia tenacissima*	Asclepiadaceae	Siti	✓					Jan.-March
3	*Cassia occidentalis*	Caesalpiniaceae	Kasandi	✓					Sept.-Dec.
4	***Cyperus rotundus***	**Cyperaceae**	**Mutha**	✓				✓	**Aug.-Dec.**

Nature of Species: Parasites and Semi-Parasite

Sl. No.	*Name of Species (Botanical Name)*	Name of Family	Vernacular Name	Very Common	Rare	Endangered	Endemic	Cultivable	Flowering and Fruiting Time
1	*Cassytha filiformis*	Lauraceae	Amar-beli		✓				
2	*Cuscuta reflexa*	Convovulacea e	Amar-bel	✓					Oct.-Jan.
3	*Dendrophtoe falcata*	Loranthaceae	Banda	✓					Dec.-March
4	*Viscum articulatum*	Loranthaceae	Bandala						Feb.-April

(SOURCE: MEDICINAL PLANT SURVEY OF LATEHAR, PALAMAU AND GARHWA DISTRICTS OF JHARKHAND IN THE YEAR 2003-04 BY RESOURCE SURVEY FOREST DIVISION OF JHARKHAND

Table 16. Annual exploitation of the following medicinal plants in Jharkhand (in kg)

State	Meditional plant	Annual Quqantity utilized
1. Jharkhand	Arjun bark (*Terminialia arjuna*)	**4992 kg**
	Ashok bark (*Saraca ashoka*)	**4498 kg**
	Gathia jari (*Discorea deltoidea*)	**5304 kg**
	Maida chal (*Litsea glutinosa*)	**6500 kg**
	Nageshwar flowe (*Mesua nagassarium*)	**2132 kg**
	Nagarmotha (*Cyperus sacariosus*)	**3224 kg**

This table mentions the data of annual exploitation of six most used species of meditational plant in Jharkhand .Quantity is in kg

Table 17. Data of Different herbal based Industries registered in DIC s of concerning district utilizinging different medicinal plants

Reference: District Industry Center of concerning District

Sl No.	Districts	Name & Address	Name of Plant species used	Quantity
	Giridih	1. Baba Jharkhand Nath Udyog, Sri Mandih Dasrodih, Barotand, Rajdnager Sri Nageder Pandey	Medicinal plant , Neem Amla Sikakai Sarpgandha Heena	**300 kg** **200 kg** **250 kg** **150 kg** **200 kg** **100 kg**
	Khunti	1 Shiv Shakti Jadi Butti Aaurvedic, Mohana Toli, Ranchi	Meditiona plant, Amla Neem Heena Satawar	**1000 kg** **550 kg** **600 kg** **200 kg** **350 kg**
	Koderma	3.Sumita Charan Pahadi, Pharmaceutical, Jhumri, Karma , Koderma	Medicinal plant , Neem Amla Sikakai Sarpgandha	**500 kg** **350 kg** **200 kg** **100 kg** **200 kg**
		5. D L Farsha , Sri Narender Prasad, Bypass Road, Koderma	Medicinal plant , Neem Amla Sikakai	**800 kg** **400 kg** **150 kg** **250 kg**
	Ranchi	1. Ranu boomers aayurvedig Soluyyan. Prof. Sri Sonimal Bosh 10 Hindpidi ,Ranchi	Medicinal plant , Neem Amla Sikakai Sarpgandha Aswgandha Alovera satavar	**1500 kg** **800 kg** **650 kg** **650 kg** **400 kg** **300 kg** **500 kg** **350 kg**
		2. Navratan Jadi Butti Udyog Prof. Iddris ,Sos chanoh, Ranchi	**Medicinal plant , Amla Sikakai Sarpgandha Aswgandha Alovera satavar**	**300 kg 200 kg 250 kg 150 kg 200 kg 100 kg 50 kg**

Table 17 contains the list of herbal-based industries registered in concerning DIC and the name of species of meditational plant and their utilization in kg.

3.7 Sal plates manufacturing Industry

Making of dona pattals from the sal leaves collected from the forests is an age-old custom of tribal/rural population. It has been enimated that apporximatly 30-40 dona and 15-20 pattals can be prepared from 100 collected leaves. For joining purpse one small bamboo stick is also required.

Table18. Data of Industry Registered in DIC's of different district using Sal leafs for manufacturing sal plates etc

Sl.no.	District	Name & address , Contact	Quantity of raw material (No. of kg in ton)
1	Lohardaga	1. Gobind plate industry, Lohardaga	**15000**
2	Deoghar	1. Shiv patta plate industries,Prof.Rathneshaver kumar, Bayjnathpur,near asha drug distributer	**28000**
		2. Vijay kumar das, Khoripan.	**30500**
		3. Ijrael ansari, Khoripan	**25000**
3	Sahebganj	1. Sumani pattal plate, mirja chocki, Sahebganj.	**24000**
		2. Kumar patta plate Udyog.Parijoriya. Sahebganj.	**16500**
		3.Inamul hak Patta plate Industrie,Borimo, Sahebganj.	**4000**
4	Bokaro	1. Verma enterprises, Bokaro,09937857055	**85000**
6	Hazaribagh	1. Sanjay Sahu, near mahavir mandir, Hazaribagh. 983551681	**1,90000 (aprox.)**
		2. Vinood Sahu, Passa, Hazaribagh	**1,40000**
		3. Santosh Sahu, paasa, Hazaribagh	**95,000**
		TOTAL	**6,88,200**

Reference: District Industry Center of concerning District

Table 18 contains data related to utilization of sal leaves in sal plates manufacturing industries registered in concerning DICs.

3.8 Handicraft, Handloom, Bamboo based Industries

Rayati bamboo is quite widespread in Jharkhand and there is not a single village where one cannot find groves of bamboo clumps. People use these bamboos for making beds, carpets, baskets, tokri, sup, hand-fans, prasad carriers for temples, packing cases for vegetables and fruits, as a fencing in the fields in order to protect the crops from grazing, hut making, roof making, thatching etc whereas, Lathi bamboo is gregariously found in the forest areas on the hilly slopes of the plateau region. These bamboos are used by Paneris (bettle leaf growers) as a support system for the framework in the cultivation of bettle leaves. Furthermore, this type of Lathi bamboo is broadly used as lathis (stick) by the villagers, common men and the police personnels.

Although the documentation of the quantity of Rayati bamboo has not been done, nonetheless an effort for primary documentation has been made on the basis of the transit permits issued by various forest divisions in a calendar year.

SL.No.	NAME OF FOREST DIVISION	No. of transit permits issued in a calendar year for one truck load
1	DHALBHUM FOREST DIVISION	3500
2.	SARAIKELA FOREST DIVISION	1500
3.	PORAHAT FOREST DIVISION	1500
4	KOLHAN FOREST DIVISION	2000
5.	SARANDA FOREST DIVISION	1500
6.	CHAIBASA SOUTH FOREST DIVISION	2000
7.	HAZARIBAGH WEST FOREST DIVISION	2000
8.	HAZARIBAGH EAST FOREST DIVISION	1500
9.	CHATRA SOUTH FOREST DIVISION	2000
10.	CHATRA NORTH FOREST DIVISION	2500
11.	BOKARO FOREST DIVISION	1000
12.	DHANBAD FOREST DIVISION	500
13.	KODARMA FOREST DIVISION	2500
14.	RAMGARH FOREST DIVISION	1500
15.	SAHIBGANJ FOREST DIVISION	2500
16.	PAKUR FOREST DIVISION	1500
17.	JAMTARA FOREST DIVISION	1000
18.	GODDA FOREST DIVISION	1000
19.	GIRIDIH FOREST DIVISION	2000
20.	DEOGARH FOREST DIVISION	2500
21.	DUMKA FOREST DIVISION	2,500
22.	LATEHAR FOREST DIVISION	2000
23.	GARHWA SOUTH FOREST DIVISION	1500
24.	GARHWA NORTH FOREST DIVISION	1000
25.	DALTONGANJ NORTH FOREST DIVISION	1500

26.	DALTONGANJ SOUTH FOREST DIVISION	1500
27.	LOHARDAGA FOREST DIVISION	2000
28.	SIMDEGA FOREST DIVISION	1000
29.	KHUNTI FOREST DIVISION	1000
30.	GUMLA FOREST DIVISION	1500
31.	RANCHI EAST FOREST DIVISION	500
	TOTAL	52000

The lathi small bamboo available in the forest areas are not of good quality and the felling of bamboo has not been prescribed in the respective working plans of the concerned forest divisions. So, in case of Jharkhand, the bamboo used for various purposes are derived from the Ryati bamboos whose approximate quantity is 50,000 truck loads per annum which are either sent to other neighbouring states of Jharkhand and a part is being utilized in the state itself in the preparation of bamboo handicrafts, bamboo gabions etc.

A class of people called Turias (scheduled caste) has got the customary concession from the govt. to take green bamboos for basket making at a concession rate of Rs. 3.12 per hundred depending upon their requirement. Bamboo is also supplied to right-holders from current bamboo coupes. For this purpose $1/5^{th}$ of the bamboo coupe is set apart and it is given to the local right-holders free of cost on the recommendation of the concerned mukhiya. Bamboo kept in Departmental depots is sold to the villagers for their domestic use.

The Data related to handicraft and handloom has been taken from JHARCRAFT, Ranchi which is a government undertaking Jharkhand formed to promote the tasar, handloom, Handicraft, and to revive the unique culture expression of the state and its people.

HANDICRAFTS : Like wise Department of industries has taken steps for promoting handicrafts like Dhokra , Wooden Craft , Lac Bangles , Pyatkar , Sohari, Kohvar, and Jadopatia paintings ,jute craft, Grass mat Weaving etc. Bamboo based furniture project is being also implemented.

WOODCRAFT: Woodcraft and wooden industries have prosper in the state due to vast forest areas. Various clusters have emerged in the state which produce wood craft and furnitured.

Various type of wood used for this woodcraft are - Gambhar, Black shisham, Teak wood, Bamboo and Cane. Clusters of woodcraft have been developed mainly in Ranchi and Khunti.

Other than the Jharcraft, some small scale industries (registered in DIC of concerning district) use bamboo for making baskets ,toys, wall hangings, showpieces etc.

Table 19. Handicraft and Handlooms used by JHARCRAFT

Sl.no.	District	No. of Handicraft	No of Handloom cluster	No of Handloom Group
1	Koderma	1870	Nil	**Nil**
2	Hazaribagh	12510	Nil	**05**
3	Lohardaga	700	01	**01**
4	Gumla	615	Nil	**01**
5	Simdega	305	01	**Nil**
6	West Singhbhum	120	Nil	**01**
7	East Singhbhum	240	01	**01**
8	Ranchi	3685	07	**37**
9	Sariekela	1340	Nil	**Nil**
10	Lathehar	125	01	**03**
11	Dhanbad	180	Nil	**01**
12	Ramgarh	1275	01	**18**
13	Chatra	70	Nil	**Nil**
14	Deoghar	195	05	**Nil**
15	Dumka	370	01	**02**
16	Godda	100	07	**13**
17	Khunti	150	01	**01**
18	Jamtada	160	Nil	**Nil**
19	Palamu	880	04	**02**
20	Giridih	610	Nil	**Nil**
21	Sahebganj	Nil	03	**01**
22	Garhwa	Nil	01	**Nil**
23	Pakur	Nil	01	**Nil**
24	Bokaro	Nil	Nil	**04**
	Total	**25500**	**35**	**90**

Reference: Industry department, Ranchi, JHARCREFT

Table 19 gives the information regarding the handicraft and handloom manufactured by the Jharcraft

Table 20. Industries Registered under various District Industries Centers

l. no.	District	Name & address, Contact	Type of bio – resource utilized	Quantity of raw material (yearly)
1	Ranchi	1. Kalindi Beath Bans Kala Kendra, Sri Shahdev Kalindi Gram Lapung, Sili, Ranchi	Bamboo	**18000 quintal**
		2. Hast silp Udyog Kendra Prop.-Sri Mahavir Mahli,Dahu Ormanji Ranchi	Bamboo	**11000 quintal**
2	Dhanbad	1.Bamboo Made Craft, Department of Industry, Dhanbad 9204503518	Bamboo	**13000 quintal**
		2.Jut Craft, Shiv Mandir Road, Gandi Nagar, Dhanbad, 9204534017	Bamboo	**12000 quintal**
3	Deoghar	1. AnukulChandra, Koriyas, Satsang Gate, Mohanpur, Deoghar ,	Bamboo	**15000. quintal**
		2.Handicraft, State Bank, Jaishadi	Bamboo	**8000. quintal**
4	Sahebganj	1. Viren Baas Tokri Udyog, Utter Colony, Sahebganj	Bamboo	
5	Koderma	Basant Enterprises, Sri Ravinder Kumar basanth.,Koderma	Bamboo	**16000 quintal**

Reference: District Industry Centers of the concerning district

Table 20 shows potential of outturn (m^3) of Timber and fuel of various forest region of Jharkhand Rather than the jharkraft, other small-scale industries (registered in DIC) utilized the bamboo or related with handicraft and handloom. The following table shows the detail of concerning industries.

3.9 Other Industry

3.9.1 Agerbati Industry

Table 21. Agerbati manufacturing industries utilizing the bio-resource

Sl no	District	Name and address of industry	Type of bio resources utilized	Quantity of raw materials
1	Ranchi	1. Sivshakti Dhup Factory, Friends Colony, Pandra, Ranchi	Charcoal Bamboo sticks Gobar Soil Perfume	**2000 kg** **1200 kg** **700 kg** **600 kg** **6 ltr**
		2. Jaimahamaya Industry, Jayasur, Papuriya, Jaridih, Bokaro Mob.- 09308335366	Charcoal Bamboo sticks Gobar Soil Perfume	**100 kg** **2000 kg** **500kg** **1000kg** **5 ltr.**
2	Chatra	1. Kundan Agerbati Nirman, Chatra	Bamboo strip Gobar Soil perfume	**100 kg** **500 kg** **500 kg** **6 ltr**
		2. Gopal Visvkarma, Madhunalla, Chatra	Bamboo strip Gobar Soil perfume	**110 kg** **450 kg** **500 kg** **5 ltr.**
3	Dhanbad	1. Shobha Enterprises Sendra Dhanbad Mob.- 09304105526	Charcoal Bamboo sticks Gobar Soil Perfume	**100 kg** **150 kg** **500 kg** **400kg** **5 ltr.**
		2. Raja Agerbati Product, Chandmari Dhanbad Mob.- 9304807525	Charcoal Bamboo sticks Gobar Soil Perfume	**750 kg** **160 kg** **450 kg** **300kg** **4 ltr.**
		3. Kesri Agarbati, Fathehpur Lane, Jalaram Mandir Jhariye Mob.- 9204128548	Charcoal Bamboo sticks Gobar Soil Perfume	**100 kg** **200 kg** **600kg** **300 kg** **3 ltr.**

Sl no	District	Name and address of industry	Type of bio resources utilized	Quantity of raw materials
4	Hazaribah	1. Bhadrkali Agerbati Kasiyedih, Dadpur, Hazaribagh Prof. Nand Kishor Prasad	Charcoal Bamboo sticks Gobar Perfume	**100 kg** **500 kg** **500kg** **5 ltr.**
		2. Sabita Kutir Udyog, Berhidih, post Berhi , Hazaribagh Prop. Sitaram Raja	Charcoal Bamboo sticks Gobar Perfume	**200 kg** **650 kg** **650kg** **6 ltr.**
		3. R.S. Industries Kumhar Toil, Parnala, Hazaribagh	Charcoal Bamboo sticks Gobar Perfume	**150 kg** **300 kg** **400kg** **3 ltr.**
		4. Saba Agerbati Workers,Kerkmsadih, Hazaribagh Mob.- 09905152459	Charcoal Bamboo sticks Gobar Soil Perfume	**200 kg** **400 kg** **500kg** **400 kg** **3.5 ltr.**
5	Kodrma	1. Rodrik and Sons , Kharkhar Nawal Shahi, Koderma	Charcoal Bamboo sticks Gobar Soil Perfume	**1500 kg** **100 kg** **450 kg** **200 kg** **4 ltr**
6	Pakur	1. Yadav Interprises Navinpur , Bagarnabi , Pakur	Other comical Charcoal Bamboo sticks Gobar Perfume	**200 quintal** **500 kg** **100 kg** **1000 kg** **7 ltr**
7	Sahibganj	1. Mahmud Agerbati Udyog, Kotal Pokhra, Sahebganj	Charcoal Bamboo sticks Gobar Soil Perfume	**5000 kg** **200 quintal** **500 kg** **1000 kg** **7 ltr**

Reference: District Industry Centers of the concerning district

Table 21 gives detail of agarbatti manufacturing industries, utilizing the bioresource product used in making of agarbati.

3.9.2 Jam and jelly Industry

Table 22. Jam and jelly manufacturing industries utilizing the bioresource

Sl no	District	Name and address of industry	Type of bio resources utilized	Quantity of raw materials
1	Ranchi	1. Khana Khajana Prop. Mrs. Ruby Singh Sukhdev Nagar Ratu Road Ranchi	Tomato Pine apple Guava Banana Amla Mango Potato	**2500 kg** **1000 kg** **1200 kg** **1500 kg** **300 kg** **3000 kg** **1200 kg**
2	Giridih	1. Ganpati Food Processing Kali Badi, Main Road Giridih Prof Rano Srivastava	Tomato Pine apple Guava Banana Amla Mango Potato	**1000 kg** **500 kg** **1000 kg** **1500 kg** **500 kg** **1200 kg** **500 kg**
3	Hazaribagh	1. Hazaribagh Agro Industry, Mashipidi Hazaribagh	Tomato Pine apple Guava Banana Amla Mango Potato	**1000 kg** **500 kg** **1000 kg** **1500 kg** **500 kg** **1000 kg** **500 kg**

Reference: District Industry Centers of the concerning district

Table 22 gives details of Jam and Jelly manufacturing industries, type of bio-resources utilized Quentity of saw materials used.

CHAPTER -4

Result and Discussion

Bio-resources are utilized by the mankind in every sphere of life. In course of the survey for the documentation on bio-resources based industries in Jharkhand it became evident that there is unavailability of primary data of bio-resources being used in various bio-resources based units. Hence there was a need for collecting and assessing the secondary data available at Central and State level Government/Non-Government Organizations. Main focus has been the documentation of forest based bio-resources being utilized in various small scale industries. Secondary data of Timber, fuel wood, charcoal, bamboo, lac and shellac, kendu leaves, medicinal plants, oil yielding seeds of mahwa, karanj. Kusum, sal leaves being used in the respective industries have been procured and interpolation / extrapolation of the data have been made on the basis of the standard statistical tools.

There was problem in collecting data. The data were not updated regularly. So the available secondary data has been utilized. Collection of primary data is not within the perview of the project.

In Jharkhand there are 405 no. of Saw Mills for the conversion of round Timber into Sawn Timber having annual intake of 74212.48m^3. From forest, area alone 6894.391m^3 Timber and 5110.8556m^3 of fuel wood (including charcoal) was obtained in the year 2008-09. In the year 2009-10 altogether 795875 standard bags of kendu leaves have been collected which is used in the Bidi industries spread all over India. In the year 2010-11, there were altogether 65113 tassar rearers producing 6511.87 lakh cocoons in the 14 districts of Jharkhand.

The rural population of Jharkhand is utilizing forest bamboo as well as Raiyati bamboo for making different handicrafts which are being used locally as well as exported to other states also. Similarly, people of Jharkhand are engaged in the preparation of various herbal medicines from the medicinal plants, leaf plates and leaf bowls from the leaves of sal trees. Collection of various minor forest produce like gums, resins, flowers, fruits, leaves, bark, roots etc. are being done, but in all cases there seems a lack of documentation of primary data.

The future of sericulture, herbal industries, and bamboo based industries appears promising. As the procedure of procurement of primary data will take a lot of time and the door-to-door survey of each and every village is required, an effective plan for such documentation should be formulated keeping in view the need of transforming these small-scale industries into an organized sector. Once such coveted transformation will be brought into effect, it will bring an phenomenal change in the socio-economic conditions of the rural population thereby bringing them in the mainstream of development.

Institute of Forest Productivity wishes to participate in this programme and will ever render all its help in strengthening the planning strategies for the empowerment of the rural population especially the tribal folk who are the sole-owner of the natural resources and the masterminds of preservation and sustained utilization of the bio-resources available in their neighborhood.

The present study undertaken by the Institute provides valuable insight over bio-resource based industries and utilization pattern of bioresourcess in the state of Jharkhand. However, intensive & comprehensive evaluation of the same needs to be carried out in future.

Annexure 1 : Methodology for the quantification of oil extracted

Methodology for the quantification of oil extracted from various seeds of each unit. Based upon the classification and discussion made with the laborers and industrialist.

[a] Raw materials

Mahua Seeds per Session (5 Month of session)

Total seeds are used Approx 10 Truck,

Where 1 Truck consider 10 tons, therefore total seeds used is per session is

10 x 10 = 100 tons

In Kilograms

1 ton = 907 kg (in std. unit)

1 ton = 1000 Kg

Total no of seeds in kg is 100 x 1,000 kg

= 1, 00,000 kg.

[b] Production of oil,

Quantity of oil Extracted = 30% of total oil seed

Similarly,

Total seeds of karanj are 7 trucks

That is, 70 ton or

70000 kg.

Total production of oil is 21000 lit.

Kusum seeds are 50000 kg, 5 trucks or 50 ton

Oil comes 15000 lit. approx.

Annexure 2 : Photographs
Pictures and Images Kendu leaves

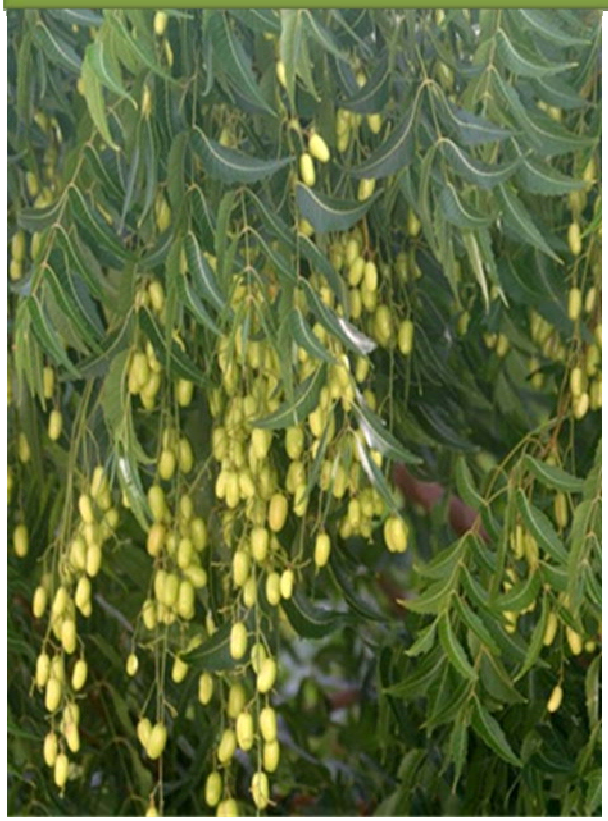
Fig 2: various steps in Oil Extraction

Fig 3: A herbal medicine seller

Fig 4: Steps in Lac Processing

Fig 5: Bamboo- based products made by rural artisans

PHOTOGRAPHS OF SOME IMPORTANT MEDICINAL PLANTS OF JHARKHAND



Azadirachta indica

Semecarpus anacardium

Erythrina variegata

Solanum nigrum

Terminalia chebula

Terminalia arjuna

Cassia tora

Coccinia grandis

Agave americana

Cuscuta reflexa

Argimone maxcicana

Acorus calamus

Butea monosperma

Centella asiatica

Cassia fistula

Holarrhena antidysenterica

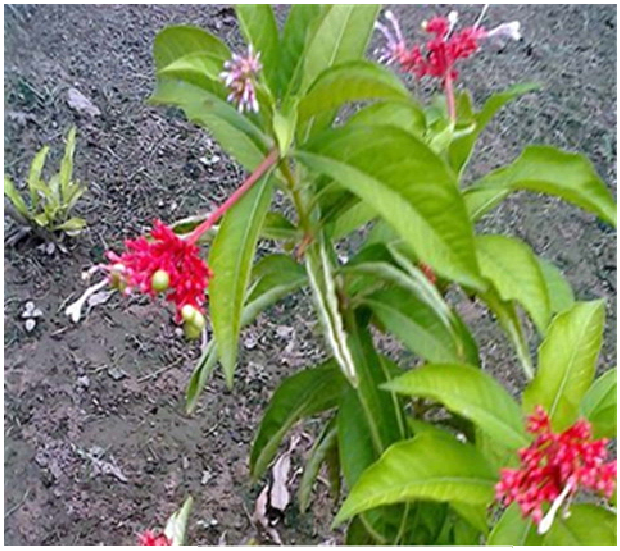
Orozylum indicum

Asparagus racemosus

Calotropis procera

Datura alba

Mimosa pudica



Rauwolfia serpentina

Eclipta alba

Costus speciosus

Abutilon indicum

Vitex negundo

Andrographis paniculata

Artemisia vulgaris