Cultivation and market studies of Selected medicinal plants of Jharkhand

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Abstract

The present investigation studied the cultivation and market of select medicinal plants of Jharkhand. "Non-timber forest products (NTFPs) are all resources that can be extracted from the forest, taking into account the importance of NTFPs in the economy. In homes, the current study" Non Timber Forest Products and Livelihood security. The term NTFP non-wood forest product includes all biological materials other than wood which are extracted from the forest for human use. They include fruits, vegetables, fish, resins of medicinal plants, essences, and a rage of bark and fiber such as bamboo, rattan and other palms. The term NTFP was coined by Beer and McDermott (1989). NTFP has both subsistence and commercial uses. The original idea on the potential of NTFPs was explained as a way to sustainable forest management that was primarily based on the assumption that commercial extraction of NTFPs from natural forests could simultaneously meet the goal of biodiversity conservation and poverty alleviation. Surveying the local market, it was observed that each market sells NTFPs products that have been collected from the forest on a regular basis. It shows the value of NTFPs in the rural population economy. Secondly, there is a lot of pressure on the forest for the collection of NTFPs which is causing the extinction of some important species. Therefore commercialization should be done in rural areas. Poshita reveals maximum laboratory germination, showing its cultivation on farmers' land. At the conclusion Experimental testing was determined using three different types of spacing. 0.75 m x 0.5 m, 0.75 m x 1 m and 0.75 m x 3 with seven random using random block design. The spacing 0.75 x 1 m achieved maximum values for all growth parameters and yielded 10 quintals of dry root per hectare.

Keywords- Non-timber Forest Products (NTFPs), medicinal plants, *Germination of Withania somnifera (L).*

Introduction

The original idea on the potential of NTFPs was explained as a way to sustainable forest management that was primarily based on the assumption that commercial extraction of NTFPs from natural forests could simultaneously meet the goal of biodiversity

conservation and poverty alleviation Huh. There is a growing belief that non-timber forest products (NTFPs) can meet important community needs and improve rural livelihoods. NTFP is defined as products of biological origin other than wood. Forestry is a productive sector that significantly impacts national socioeconomic and environmental functions as well as the improvement of rural livelihoods. The important roles played by the NTFP in the livelihoods of rural and urban households cannot be removed as do most rural households in developing countries, and a large proportion of urban households fulfill some part of their nutrition, health, home building Depending on the products, or other needs. A large number of families also generate some part of their income from trade in forest products. The World Health Organization (WHO 2003), estimates that the global market for herbal products includes medicines, health supplements, and herbal beauty and toiletry products exceeding USD 60 billion and growing at a rate of seven percent per year (Nagpal and Karki, 2004). .Fair benefits from the trade have not yet been initiated. These products provide a green social security to billions of people in the form of low-cost construction materials, income, fuel, food supplements and traditional medicines.

In some cases, revenue derived from NTFPs is the only source of cash income, increasing people's dependence on commercially interesting NTFP resources. Despite the rise in importance of NTFPs and the significant global interest surrounding them, many core definitions and conceptual issues remain unresolved. The term NTFP has proved difficult to define among forest experts, conservationists, development organizations, and pioneers of the concept because of some blurring boundaries between wood and non-wood products, the inherent difficulty in defining a forest and The emerging nature of the concept and the ability to bring together a diverse set of interests and experiences for the idea of integrated forest management.

Consequently, the term NTFP has generated much controversy regarding its meaning. The range of livelihood strategies includes both off-farm and land-based livelihood strategies, including the use of non-timber forest products (NTFPs) both for domestic consumption and for sale. The contribution of NTFPs to household income has been found to be substantial and comparable to other income sources, in some cases. In recent years with a growing focus on

poverty alleviation, NTFPs have been considered their role as a potential tool to reduce the impact of the crisis on rural families and to help households to get out of poverty. According to Wunder, there is growing evidence of natural resources serving as "the poor man's overcoat", providing natural insurance to rural families, which smoothes consumption and income. Many households in rural and forest areas around the world depend on NTFPs for survival.

The World Bank (2001) estimates that one in four poor people in the world depend directly or indirectly on forests for their livelihood. During the last decade, NTFP's interest and research has increased dramatically. This is due to the growing recognition of the fact that NTFPs can provide important community needs for better rural livelihoods, contribute to household food security and nutrition, help generate additional employment and income, NTFPs based enterprises Can provide opportunities for, contribute to foreign exchange income, and support biodiversity and other conservation objectives (FAO, 1995) Are involved. Forests are associated with the socio-economic and cultural life of rural residents in India. These people inhabit wide ecological and geo-climatic conditions at varying concentrations throughout the country.

The collection of NTFPs by rural dwellers was mainly to meet their subsistence needs. Over time, these NTFPs gained commercial value as a result of heavy business transactions and income levels due to increasing demand. Trade in NTFPs can act as an incentive for forest protection by providing a source of income from resources that might otherwise reveal very low financial value. Withania somnifera (L.) Dunal of the Solanaceae family is a highly prestigious plant of the Indian traditional system of Drugs. The medicinal properties of the medicinal plant have been attributed to the presence of a group of steroidal lactones, known as withenolides present in leaves and roots (Sangwan et al., 2004).

Callus induction, root organ culture, plantlet regeneration, and withenolides production have been reported in many shoots and roots, however, efforts to detect withenolides in callus and suspension cultures have not been successful so far. We report here the in vitro synthesis of bioactive withenolides from multiple shoots, and root culture directly from the rhizogenesis of single cell suspension culture of leaves,

callus tissue, and W. somnifera. To our knowledge, this is the first report where withenolides have been detected in chromosomal and quantitative terms from callus, suspension culture, and other plant tissues. In Ayurveda, ashwagandha is considered a powerful 'Rasayana' herb. This means that it is rejuvenation and promotes vitality and longevity. If a person has a high metabolism, traditional Ayurvedic doctors generally avoid consuming ashwagandha.

The herb is also considered a 'Medhya Rasayana', which means that it will rejuvenate all three ayurvedic aspects of the mind, namely understanding, memory and remembrance. One of the many favorite uses of ashwagandha in Ayurvedic practice helps a person improve his mental function and strength. In Ayurveda, 'Rasayana' is also similar to Agni; therefore increasing a person's chemistry is the same as increasing their internal fire.

For this, ashwagandha is commonly used in Ayurveda along with other herbs. In short, the use of ashwagandha is not recommended and should be administered with other herbs that counter its strong rejuvenating properties. For example, ashwagandha is most often used for chronic fatigue such as asparagus, amla, licorice, calcium and magnesium along with other herbs and minerals. Ashwagandha benefits our health in many ways. The plant is believed to improve memory, support the immune system and generally assist in the adaptation of the body's physiological functions. While it has been thought to work in a non-specific way to improve general health, it has several specific features that deserve attention. There is evidence that ashwagandha has anti-inflammatory and anti-tumor properties. It also possesses anti-stress properties and the compounds found within the herb are anti-oxidants. Historically the herb has also been used as a sex-enhancing tonic as its aphrodisiac activity. Ashwagandha has a broader character, which has given it the name 'Indian ginseng', as it has played a central role in India in the same way as ginseng has historically been in China.

Oroxylum indicum (Bignoniaceae), also known as Sonapatha or Shyonaka, is a commonly used herbal medicine in the Ayurvedic system. The roots, leaves and stems of Oroxylum indicum have been used as a medicine or as a component of some compound medicine preparations in the Indian Ayurvedic system for the treatment of certain disorders and also as a tonic and chemical medicine. It contains flavonoids such as chrysine, baicalein and oroxylin-A.

Various studies have indicated that sonapatha has mainly anticancer, antioxidant, hepatoprotective and immunomodulaory properties. Several other effects such as the antibacterial, analgesic, and gastroprotective properties of sonapatha have also been reported. It is a tree usually found in moist area. The present review attempts to compile and critically analyze various published reports on Oroxylum indicum. This herbal plant is found to have anti-inflammatory, diuretic, astringent, expectorant, anti-arthritic, antipyretic, aphrodisiac antifungal and antibacterial activity and is also believed to contain antitumor components, and is often used because of these properties goes.

1. Decoction of its leaves have good use internally to increase appetite.
2. Leaves of *Oroxylum indicum* herb can be directly applied hot on the skin to treat an enlarged spleen.
3. The decoction of its root is useful against diarrhea and dysentery
4. Root is also good to be used in Anorexia.
5. Root is even found useful in Rheumatoid Arthritis.
6. Root of this herb has beneficial effects in cough, cold and fever.
7. The seeds of this plant contain a purgative agent that makes it to be an effective remedy for constipation.
8. Paste of seed when applied can treat boils and wounds
9. The paste made of the bark powder is applied for as a remedy for diseases such as mouth cancer, scabies and other skin diseases in some part of the world.
10. Use of the powdered seeds can increase the chances of conception
11. It is usually found that people apply the paste of bark in the neck and throat area for quick relief of tonsil pain.
12. The Fruit part of the tree is useful to improve the taste
13. Fruit is very good for skin, cleansing the wounds and it also detoxifies the blood,
14. Fruit is useful in gynecological disorders and even in case of childhood psychological disorders
15. Fruit is even beneficial for Heart
16. The bitter bark of the root is astringent, blood purifier and tonic

Materials and Methods

In this dissertation following aspects has been covered**.**

A. Market survey of Non- timber Forest Product: To meet the objectives of the present study, both primary as well as secondary data were collected.

1 Primary data– The primary data were collected with the aid of structured and comprehensive questionnaire exclusively prepared for the study. The data collected included information on NTFPs collected and their quantities, together with demographic information of the collectors (age, gender, literacy level, land holding, livestock, total annual earnings, collection timings and availability). The data were collected through a personal interview method from the selected households and traders in the study area during the year 2014-15.

2 Secondary Data– Secondary data were collected from the records of the Forest Department for a period of ten years (2004-05 to 2013-14). The secondary data on quantity supplied, prices and export permit fee levied by the forest department on medicinal plants were selected.

Germination of *Withania somnifera (L)* (Ashwagandha): Seed of *Withania somnifera* was taken into a bucket and washed with the water to remove the contaminants from the seed. The seed was then left in the room temperature under the fan to get dry. Then the sample from these seed has taken to prepare the 5 replica plate of each variety, and germination test was carried out. Petri plate was filled with cotton followed with filter paper in which seed was placed. Then the seed was moist with the water to allow the moisture to get inside the seed and the plates were put into the germination chamber for germination. Reading or germination growth was observed after when the seed started germinating and we have to take the growth rate continuously. Temperature of germination chamber was maintained at 22-25degree C^0. Following parameters have been calculated:

Germination percentage: -It was calculated by formula given as under:
Germination percentage = (Seed germinated)/ (Seed sown) X 100**,**
Germination Value:-Germination value was recorded according to the method prescribed by Czabator (1962).

GV = PV X MDG, Where, GV = Germination Value, PV = Peak value of Germination, MDG = Mean daily germination

Spacing trial of *Oroxylum indicum:* The root of *Oroxylum indicum* was dug out from the ground. Total number of branches, its height, root weight and its diameter all records were being taken. Root weight was measured and then it was left in a dark place away from the sunlight to allow them to get dry and then their dry weight was measured.

Results and Discussion

1.DHURWA SECTOR -2

1. Name of market – Shalimar
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Dhurwa
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 180 – 220 Vendors

Table 1.1 DETAIL INFORMATION OF MARKET PRODUCTS

Sl.NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Rugda	*Rudga pattice*	Root	40	15-20 kg	Forest
02	Sakhua	*Shorea robusta*	Small branches	10 bundle	40-50 kg	Forest
03	Bans (sandhna)	*Bamboosa aridinarifolia*	Shoot	30	280-300 kg	Forest
04	Datun karanch	*Millettia pinnata*	Branch	10-20/bundle	50-60 bundles	Forest
05	Beng sag	*Cantella asitica*	Leaves	10-15/ bundle	8-10 kg	Forest
06	Mushroom	*Ajaricus bispores*	Whole plant	70-120	5-6 kg	Forest
07	Imli	*Tamarindus*	Fruit	20-25	45-50 packets	Forest

2. NAMKUM BAZAR

1. Name of market – Namkum
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Namkum
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 110 – 140 Vendors

Table 1.2 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Karanj datum	*Millettis pinnatta*	Branch	8-10/ bundle	30-35 bundles	Forest
02	Sakhua datum	*Shorea robusta*	Small branches	8-10/ bundle	70-75 bundles	Forest
03	Mushroom	*Ajaricus bispores*	Whole plant	150-200	100- 120 kg	Forest
04	Sadhana	*Bamboosa aridinarifola*	Shoot	80-100	150 kg	Forest
05	Kacchu leaf	*Colocasia*	Leaf	10-15	8-10 kg	Forest

3.RAMPUR BAZAR

1. Name of market – Rampur
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Rampur
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 70– 80 Vendors

Table 1.3 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Sakhua datum	*Shorea robusta*	Branch	10/bundle	70-80 bundle	Forest
02	Karanj datum	*Millettis pinnatta*	Branch	10/bundle	50 bundle	Forest
03	Mushroom	*Ajaricus bispores*	Whole pant	120-150/kg	40-50 kg	Forest
04	Sadhana	*Bamboosa aridinarifola*	Shoot	70-80/kg	100	Forest
05	Ben sag	*Cantella asitica*	Leaves	10-15/kg	20 kg	Forest
06	Kacchu sag	*Colocasia*	Leaves	8-10/kg	30 kg	Forest
07	Honey	*Comvtrtum indicum*	Madhu	90/bottle	8 bottle	Forest

4. DORANDA BAZAR

1. Name of market – Doranda
2. Nature of market (Temporary/Permanent) – Permanent
3. Name of block – Doranda
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 140– 150 Vendors

Table 1.4 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Chirauta	*Androganphi spaniculata*	Leaf	10/kg	20 kg	Forest
02	Karanch datum	*Millettis pinnatta*	Branch	5/bundle	100 bundles	Forest

03	Mushroom	*Ajaricus bispores*	Whole plant	130-150/kg	40 kg	Forest
04	Sandhana	*Bamboosa aridinarifola*	Shoot	70-80/kg	120	Forest
05	Imli	*Tamarindus*	Fruit	20-25/pac	60-70 pac	Forest
05	Kachu	*Colocasia*	Rhizome	15-20/kg	50	Forest
06	Kachu leaf	*Colocasia*	Leaf	10/kg	20	Forest

5. JONHA BAZAR

1. Name of market –Jonha
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Jonha
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 40– 50 Vendors

Table 1.5 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	**Common name**	**Scientific name**	**Edible part**	**Price (kg)**	**Quantity(kg)**	**Source of collection**
01	Karanj datum	*Millettis pinnatta*	Branch	5/bundle	70	Forest
02	Sandhana	*Bmboosa aridinarifolia*	Shoot	60-70/kg	100	Forest
03	Kachu	*Colocasia*	Rhizome	15-20/kg	30	Forest
04	Dalchini	*Cinnamomum verum*	Trunk	280-300/kg	3	Forest
05	Ritha	*Sapondus mukorossi*	Fruit	150-185/kg	10-12	Forest
06	Lajwani	*Mimosa pidica*	Seed	400/kg	2-3	Forest
07	Kachu leaf	*Colocasia*	Leaf	10-12/kg	10-15	Forest

6.GUDLI POKHAR BAZAR

1. Name of market – Gudli pokhar
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Tatisilwai
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 60– 70 Vendors

Table 1.6 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Sandhana	*Bmboosa aridinarifolia*	Shoot	90-100/kg	70-80 kg	Forest
02	Kachu	*Colocasia*	Rhizome	15-20/kg	40-45 kg	Forest
03	Honey	*Comvtrtum indicum*	Madhu	100/bottle	2 bottle	Forest
04	Dalchini	*Cinnamomum verum*	Trunk	300/kg	3-4 kg	Forest
05	Ritha	*Sapondus mukorossi*	Fruit	150/kg	10 kg	Forest
06	Lajwani	*Mimosa pidica*	Branch	350/kg	2 -5 kg	Forest
07	Mushroom	*Ajaricus bispores*	Whole plant	120-140/kg	20-25 kg	Forest

7. SILLI BAZAR

1. Name of market – Silli
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Silli
4. Name of district – Ranchi

5. Name of state – Jharkhand
6. Market size (No. of shops) – 60– 70 Vendors
7. No. OF NTFP shop – 15- 20 Vendors

Table 1.7 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Imli	*Tamarindus*	Fruit	40/kg	30	Forest
02	Sandhana	*Bmboosa aridinarifolia*	Shoot	100/kg	100	Forest
03	Ben sag	*Cantella asitica*	Leaf	12-15/kg	10	Forest
04	Ritha	*Sapondus mukorossi*	Fruit	150/kg	10-12	Forest
05	Honey	*Comvtrtum indicum*	Madhu	50/bottle	3 bottle	Forest
06	Kachu	*Colocasia*	Rhizome	15-20/kg	30-40	Forest
07	Chiraita	*Androganphi spaniculata*	Leaf	12-15/kg	6-7	Forest

8.RATU BAZAR

1. Name of market – Ratu
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Ratu
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 50– 70 Vendors

Table 1.8 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Imli	*Tamarindus*	Fruit	40/kg	30	Forest

02	Sandhana	*Bamboosa aridinarifola*	Shoot	80-100/kg	100	Forest
03	Ben sag	*Cantella asitica*	Leaf	12-15/kg	20 kg	Forest
04	Ritha		Fruit	170/kg	7-8 kg	Forest
05	Honey	*Comvtrtum indicum*	Madhu	70/bottle	5 bottle	Forest
06	Chiraita	*Androganphi spaniculata*	Leaf	12-15/kg	10 kg	Forest
07	Karanj datum	*Millettis pinnatta*	Branch	5/bundle	50/bundle	Forest

9.BIT MESRA BAZAR

1. Name of market – BIT Mesra
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – BIT Mesra
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 40-50 Vendors

Table 1.9 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	Common name	Scientific name	Edible part	Price (kg)	Quantity(kg)	Source of collection
01	Imli	*Tamarindus*	Fruit	40/kg	30	Forest
02	Sandhana	*Bamboosa aridinarifola*	Shoot	80-100/kg	100	Forest
03	Ben sag	*Cantella asitica*	Leaf	12-15/kg	20 kg	Forest
04	Ritha		Fruit	170/kg	7-8 kg	Forest
05	Honey	*Comvtrtum indicum*	Madhu	70/bottle	5 bottle	Forest
06	Chiraita	*Androganphi*	Leaf	12-15/kg	10 kg	Forest

		spaniculata				
07	Karanj datum	*Millettis pinnatta*	Branch	5/bundle	50/bundle	Forest
08.	Dalchini	*Cinnamomum verum*	Trunk	250-300/kg	2 kg	Forest
09.	Mushroom	*Ajaricus bispores*	Whole plant	120-140/kg	15-20 kg	Forest

ANGARA BAZAR

1. Name of market – Angara Bazar
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Angara prangan
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 40-50 Vendors

Table 1.10 DETAIL INFORMATION OF MARKET PRODUCTS

Sl. NO.	**Common name**	**Scientific name**	**Edible part**	**Price (kg)**	**Quantity(kg)**	**Source of collection**
01	Imli	*Tamarindus*	Fruit	40/kg	30/ kg	Forest
02	Sandhana	*Bamboosa aridinarifola*	Shoot	80-100/kg	100/ kg	Forest
03	Chiraita	*Androganphi spaniculata*	Leaf	12-15/kg	10 kg	Forest
04	Karanj datum	*Millettis pinnatta*	Branch	5/bundle	50/bundle	Forest
05.	Dalchini	*Cinnamomum verum*	Trunk	250-300/kg	2 kg	Forest
06.	Mushroom	*Ajaricus bispores*	Whole plant	120-140/kg	15-20 kg	Forest

11.BHARNO BAZAR

1. Name of market – Bharno

2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Bharno
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 80-90 Vendors

Table 1.11 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity	Source of Collection
1	Sandhana	Bambesoidae	Root	60	120-150	Forest
2	Mushroom	Agarlcus bisporus	All	180	8-9	Forest
3	Mahua	Madhuca longifolia	Fruit Seeds	30	200-300 Kg	Forest
4	Chirauta	Swerfia chirayalta	Leaf	80	5-6 Kg	Forest

12.MANDAR

1.Name of market – Mandar

2.Nature of market (Temporary/Permanent) – Temporary
3.Name of block – Mandar
4.Name of district – Ranchi
5.Name of state – Jharkhand
6.Market size (No. of shops) – 100-150 Vendors

Table 1.12 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity	Source of Collection
1	Sandhana	Bambesoidae	Root	60	50-60	Forest
2	Mushroom	Agarlcus bisporus	All	150	5-6	Forest
3	Mahua	Madhuca longifolia	Fruit Seeds	30	200-250Kg	Forest

4	Chirauta	Swerfia chirayalta	Leaf	80	5-6 Kg	Forest

13. NAGRI BAZAR

1. Name of market – Nagri
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Nagri
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 200-250 Vendors

Table 1.13 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	**Common Name**	**Scientific Name**	**Part used**	**Price (Rs.)**	**Quantity**	**Source of Collection**
1	Shatavari	Asparagus racemosus	Root	280	8kg	Forest
2	Reetha	Sapindus mukorossi	Fruit	80	10-15kg	Forest
3	Chiritha	Swertia chirayaita	Stem	200	2-3kg	Forest
4	Sandhana	Bambusoideae	Root	60	40-50kg	Forest

14.ITKI BAZAR

1. Name of market – Itki
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Itki
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 200-250 Vendors

Table 1.14 DETAIL INFORMATION OF MARKET PRODUCTS

SI.	**Common**	**Scientific**	**Part used**	**Price**	**Quantity**	**Source of**

No.	Name	Name		(Rs.)		Collection
1	Sandhana	Bambusodeae	Root	60	50-60	Forest
2	Mushroom	Agarlcus bisporus	Ajaricus bispores	300	5-10	Forest
3	Honey	Apis mellifera	Comvretum indicum	300	4-5	Forest
4	Mahua	Madhuca longifolia	Seeds	30	90-150	Forest
5	Chirata	Swetia chirayaita	Leaf,Steam	100	5-6	Forest

15.BERO BAZAR

1. Name of market – Bero
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Bero
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 150-180 Vendors

Table 1.15 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity	Source of Collection
1	Reetha	Sapindus mukorossi	Fruit	70	30-35	FOREST
2	Sandhana	Bambusoideae	Root	50-60	20-30	FOREST
3	Mahua	Madhuca longifolia	Seeds	30	100-150	FOREST
4	Mushroom	Agaricus bisporus	All Part	120	5-7	FOREST

16. SISAI

1. Name of market – Sisai
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Sisai
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 250-300 Vendors

Table 1.16 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity	Source of Collection
1	Reetha	Sapindus mukorossi	Fruit	85	10-12	Forest
2	Chirata	Swertia chirayaita	Stem	100	5-6	Forest
3	Sandhana	Bambus Oideae	Root	50	80-90	Forest
4	Mushroom	Bisporus apis	All	100	5-10	Forest
5	Mahua	Madhuca Longifolia	Fruit	32	100-120	Forest

17. KHUNTI

1. Name of market – Khunti
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Khunti
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 100-200 Vendors

Table 1.17 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity (Kg.)	Source of Collection
1	Reetha	Sapindus	Fruit	60/-	20-25	Forest

		mukorossi				
2	Chirata	Swertia chirayaita	Stem	80/-	5-6	Forest
3	Sandhana	Bambus Oideae	Root	30/-	100-200	Forest
4	Mushroom	Bisporus apis	All	60/-	10-15	Forest
5	Mahua	Madhuca Longifolia	Fruit	25/-	300-600	Forest

18. KURGI

1. Name of market – Kurgi
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Kurgi
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 100-200 Vendors

Table 1.18 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity	Source of Collection
1	Reetha	Sapindus mukorossi	Fruit	85	10-12	Forest
2	Chirata	Swertia chirayaita	Stem	100	5-6	Forest
3	Sandhana	Bambus Oideae	Root	50	80-90	Forest
4	Mushroom	Bisporus apis	All	100	5-10	Forest

19. PURNAPANI

1. Name of market – Purnapani
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Purnapani

4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 80-100 Vendors

Table 1.19 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity (Kg.)	Source of Collection
1	Reetha	Sapindus mukorossi	Fruit	60	10-12	Forest
2	Chirata	Swertia chirayaita	Stem	80	5-6	Forest
3	Sandhana	Bambus Oideae	Root	30	100-200	Forest
4	Mushroom	Bisporus apis	All	60	10-15	Forest
5	Mahua	Madhuca Longifolia	Fruit	25	100-400	Forest

20. GARGAON

1. Name of market – Gargaon
2. Nature of market (Temporary/Permanent) – Temporary
3. Name of block – Gargaon
4. Name of district – Ranchi
5. Name of state – Jharkhand
6. Market size (No. of shops) – 80-120 Vendors

Table 1.20 DETAIL INFORMATION OF MARKET PRODUCTS

SI. No.	Common Name	Scientific Name	Part used	Price (Rs.)	Quantity (Kg.)	Source of Collection
1	Reetha	Sapindus mukorossi	Fruit	60/-	10-12	Forest
2	Chirata	Swertia chirayaita	Stem	80/-	5-6	Forest
3	Honey	Apis mellifera	Honey	300/-	2-5 bot.	Forest

4	Mushroom	Bisporus apis	All	60/-	10-15	Forest
5	Mahua	Madhuca Longifolia	Fruit	25/-	100-400	Forest

Laboratory germination of *Withania somnifera*:-

Germination Percentage: - Five replication per variety have been taken in with 100 seeds. Poshita (86.2%) depicted the maximum germination percentage and Nibrili (53.6%) the lowest.

Table 1.21 *Germination Value:*-Poshita (53.66) depicted the maximum germination value.

Species Name	Germination percentage	Germination Value
Poshita	86.2	53.66
Nibrili	53.6	44.87
Jawahar-134	68	17.28
Jawahar-20	74	15.30

Spacing Trial of *Oroxylum indicum*

Table 1.22 *Oroxylum indicum* plantlets were raised in a different spacing so as to standardize the spacing for commercial cultivation.

Treatment	Growth Parameter				
	Plant height (Cm)	Collar diameter(cm)	Number of Branches(Nos.	Fresh Root weight(gm)	Dry Root weight(gm)
T1	174.00	1.59	9.12	586.8	246.99
T2	181.28	1.28	10.16	740.43	288.12
Mean	177.64	1.435	9.64	663.61	267.55

Conclusions

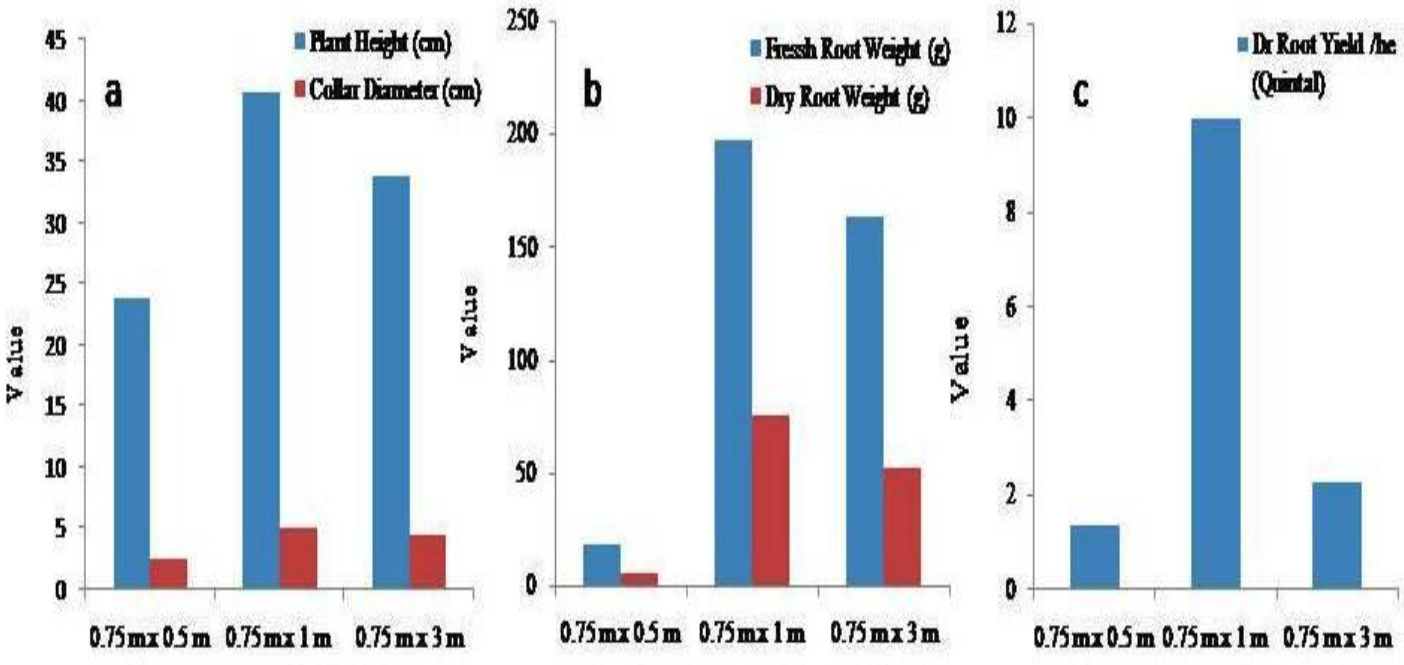

Fig. Experimental trial using three different types of spacing

Non-timber Forest Products (NTFPs) are all resources that are extractable from forest, keeping in view the significance of NTFPs in the economy of the households, present study "Non-Timber Forest Products and Livelihood Security. By performing the survey of local bazar, it was observed that in every mandi there is selling of NTFPs products which have been collected from the forest on the regular basis. It depicts the value of NTFPs in the economy of the rural population. Secondly, there is great pressure on the forest for the collection of NTFPs which is giving rise to extinct of some of the important species. Hence must be commercialized at rural areas. Poshita revealed the maximum laboratory germination, depicted its cultivation on farmers land. Experimental trial was laid down using three different types of spacing viz., 0.75 m x 0.5 m, 0.75 m x 1 m and 0.75 m x 3 m using randomized block design with seven replications. The spacing 0.75 x 1 m obtained the maximum values for all the growth parameters and yielded 10 Quintals of dry root per hectare.

References

1. **Barwick, Margaret and Anton van der Schans (2004).** Tropical and Subtropical Trees - An Encyclopedia. Portland: *Timber Press*. p. 304.
2. **Doshi, K; Ilanchezhian, R; Acharya, R; Patel, B. R.; Ravishankar, B (2012).** "Anti-inflammatory activity of root bark and stem bark of Shyonaka". *Journal of Ayurveda and Integrative Medicine*. 3 (4): 194–197. PMC 3545239 . doi:10.4103/0975-9476.104434.
3. **Ghate, Rucha, Mehra, Deepshika and Nagendra, Harini. (2009).** Local Institution as mediators of the impact of markets on NTFPs extraction in central India. *Environmental Conservation.*36(1):51- 61.
4. **Gu, Qiang, Luo, Hongli Zheng, Wen; Liu, Zhiheng; Huang, Ying (2006).**"Pseudonocardia oroxyli sp. nov., a novel actinomycete isolated from surface-sterilized Oroxylum indicum root". *Int. J. Syst. Evol. Microbiol.* 56 (Pt 9): 2193 2197. PMID 16957120. doi:10.1099/ijs.0.64385-0.
5. **Gunatilake, H.M, Senaratne, Dmah. (1993).** Role of NTPFs in the economy of peripheral communities of Knuckles National Wilderness area of Srilanka : A farming system approach. *Journal of Economic botany* . 47(3):275- 281.
6. **Jayaweera, D.M.A. (1981).** Medicinal Plants (Indigenous and Exotic) Used in Ceylon.
7. **Kumar, Sudeep and Choudhury, Ankita. (2016).** Enhancement of livelihood activities through NTFPs in Ranchi, Jharkhand. *Journal of Development and Management Studies.* 14: 6919-6930.
8. **Lim,H.F.,Jeffery, Vinent and Woon, W.C.(1994).** Markets for NTPFs in the vicinity of pasoh Forest Reserve Malaysia. *Journal of Tropical Forest Science*.6(4):502-507.
9. **Mahapatra , Ajay Kumar, Tewari, D.D. (2005).** Importance of NTPFs in the economic valuation of dry deciduous forests of India. 7(3): 455-467.

10. **Mehta C. R. and Mehta T. P., (1959)**. *Journal of the Indian ChemicalSociety* 36:468
11. **Mirjalili, M. H.; Moyano, E.; Bonfill, M.; Cusido, R. M.; Palazón, J. (2009).** "Steroidal Lactones from Withania somnifera, an Ancient Plant for Novel Medicine". *Molecules*. 7:23732393. PMID 19633611. doi:10.3390/molecules14072373
12. **Mishra, Amrita, Mishra, Arun K. and Jha, Shivesh. (2011).** Pharmacognostical,
13. **Murail, K.S., Shankar, Uma, Ganeshaiah, K.N. and bawa, K.S. (1996).** Extraction of NTPFs in the Forests of Biligiri Ranagan Hills and Impact of NTPFs extraction on regeneration, population Structure and species composition. *Journal of Economic botany*
14. **Nair, A. G. Ramachandran; Joshi, B. S.(year)** "Oroxindin—A new flavone glucuronide from Oroxylum indicum Vent". *Proc. Indian Acad. Sci (Chem. Sci.).* 88 (5): 323 327. doi:10.1007/BF02844710
15. **Ondoye,M., R perez and Eyebe, A. (2016).** The markets of NTFPs in the humid forest Zone of Cameron. Rural Development Forestry Network.
16. **Oroxylum indicum (L.) Kurz"(2016).** WorldChecklist of Selected Plant Families (WCSP). Royal Botanic Gardens, Kew. via The Plant List.
17. **Pandey, A.K. and Mandal, A.K. (2008).** Cultivation of Andrographis paniculata. *Journal* of *Tropical Medicinal Plants.* Vol.-9. Pg.: 83-87.
18. **Pandit, S.; Chang, K.-W.; Jeon, J.-G. (2013).** "Effects of Withania somnifera on the growth and virulence properties of Streptococcus mutants and Streptococcus sobrinus at sub-MIC levels". *Anaerobe*. 19: 1–8. doi:10.1016/j.anaerobe.2012.10.007
Part I (Acanthaceae – Burseraceae). National Science Council of Sri Lanka, Colombo
Physicochemical and phytochemical studies of some marketed samples of roots used in
19. **Sharma, Meenu and Sharma, R.G. (2013).** Identification, Purification and Quantification of Andrographolide from Andrographis paniculata (Burm.f.) Nees by

HPTLC at Different Stages of Life Cycle of Crop. *Journal of Current Chemial and pharmaceutical sciences*. 3(1):23-32.

20. **Sheeja k., kuttan G. & Shishab P.K. (2008)** Cultivation of Tropical Medicinal Plants. Vol. – 9. pg.: 83-87.2008
21. **Stearn, W. T. (1995).** Botanical Latin: History, Grammar, Syntax, Terminology and Vocabulary (4th ed.).*Timber Press*.ISBN0-8892-321-4.
22. **Theobald, W.L. (1981).** Bignoniace. In: Dassanayake, M.D. and Fosberg, F.R. (Eds.). A Revised Handbook to the Flora of Ceylon. Amerind Publishing Co. Pvt. Ltd., New Delhi.