

Value chain study of income from trees and herbs

Bundelkhand Rural Poverty Alleviation Model- ABSSS Tikamgarh block, Tikamgarh district, MP



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Introduction

Akhil Bhartiya Samaj Sewa Sansthan (ABSSS) is implementing a 3-year (2011-13) “Bundelkhand Rural Poverty Alleviation Model” (BRPAM) development Project in 40 villages of Tikamgarh block of Tikamgarh district, MP, with support from Sir Dorabji Tata Trust and Allied Trust. The goal of the Project is to:

“enhance the livelihood security and wellbeing of marginalised poor and women through sustainable natural resource management & better access over rights & entitlements”

Specific objectives of the Project include:

- To form and build capacity of community organizations especially of women and marginalised social groups for democratic realisation of entitlements.
- To enhance participation, savings, role and decision-making power of women in household and community development.
- To enhance income & living standards of the people of target group from land and agriculture through scientific natural resource management and improved agricultural practices & animal husbandry

To realise the third objective, the Project needs to have a sound understanding of existing income-earning activities of the target community, particularly from land and other natural resources. Hence, in 2011-2012, two separate value chain studies were initiated, to :

- To understand economics of cultivation of major crops, and identify scope for value enhancement
- To understand economics of income from tree produce and herbs, and identify scope for value enhancement

The present study is the second of the above-mentioned two studies.

Objectives of the study

The objectives of the study were:

- to identify tree produce and parts of herbs (medicinal plants) that are collected and sold by target group communities
- to understand value chain of income-realisation from such collection and sale, key issues affecting higher value realisation
- to suggest measures for higher value realisation from collection and sale of tree produce and herbs in Project area

Methodology

The study was conducted through focused group discussions (FGDs) and intensive survey. To get data related to fruits and NTFP at the Project-area level, FGDs were conducted in all 20 villages that are selected under the Project for intensive intervention,.

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As only some ST families are involved in collection and sale of herbs (medicinal plants), an intensive survey of these families was done in one of three villages in the Project area, Sapon, which is predominantly habited by ST groups.

Project-level data was obtained from a number of sources, including:

- village-level workers of the Project
- select beneficiaries of Project
- leading farmers in Project villages
- middlemen/traders in and around Project villages, and in Tikamgarh town
- retail vendors of fruits

As income-generation from trees and medicinal plants is more a “collection” rather than a production activity in the Project area, and no value-addition is done, input suppliers and processors do not come in the picture. Hence, the value-chain actors covered by the study were:

Farmers ⇒ Traders/Wholesalers ⇒ Retailers

All data collected from different sources was analysed and results of the analysis were discussed internally, to identify grey areas, and possible errors in data collection. Particularly, the Project’s village-level workers were quick to identify some glaring errors and omissions. As necessary, data was re-collected and re-analysed.

The entire effort was conducted in February-March 2012 under the guidance of a development communications professional.

Earlier, the Project had conducted an exhaustive baseline survey, which provided information under broad heads about the Project area and the target group.

This report incorporates data from the baseline survey as well as the discussions and intensive survey conducted specifically for the purpose of this study.

Structure of the report

The following sections of the report are as below:

1. Project Area: brief description of physical environment and target group
2. Income from Trees and Herbs : major income-giving trees in Project villages, produce collected and sold by target group, selling method, income earned
3. Value Enhancement Possibilities from Trees and Herbs: measures for realising higher value in a sustainable way

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1. Project Area

Location

The 20 villages selected for intensive intervention under the Project are located in Tikamgarh block of Tikamgarh district, MP, at a distance of 20 to 40 km from Tikamgarh town, which is the headquarters of the district.

Physical environment

Tikamgarh district lies in the Bundelkhand plateau between Jamuni, a tributary of Betwa, and Dhasan rivers, in the northern part of MP. The northern part of Tikamgarh district is at height of about 200m above the mean sea level (amsl), while the southern part is at a height of around 300m. Thus, the district's topography is marked by a gentle slope from south towards north. According to geological formations, the district can be classified into two broad regions:

- Hill ranges rising to height of 200-400m above mean sea level.
- Inter-hill valleys

The hill ranges are made up of hard compact and resistant granite masses intruded by quartz reef. The valleys are covered by colluvial and detrital of parent rock along with organic material. The thickness of alluvial fill varies from 10-16 meters.

The substrata of the entire district is composed of Bundelkhand granite and gneisses, which are profusely intruded by quartz reefs and pegmatites. Soils derived from parent rocks are of four types:

- coarse-grained reddish brown soils known locally as Rakar
- coarse-grained grey to greyish brown soils known as Parua
- clay loam black soils known as Kabar
- clayey-black soils known as Mar

Around 75% of the soil found in the district and the Project villages is of the Parua or Rakar variety. Soil tests conducted in the Project villages show that soil has normal pH and EC, low to medium organic-carbon content, low phosphorous content and low to medium potash content.

The climate of the area is characterized by a hot summer and general dryness except during the southwest monsoon season. The normal maximum temperature during the month of May is 41.8° C and minimum during the month of January is 7.0°C.

The normal annual rainfall received is 1057.1 mm. However, in 8 out of 9 years before the start of the Project (2002 to 2010), rainfall was below normal, and in one year (2007), it was 50% below normal. Maximum rainfall (about 90%) is received during southwest monsoon period from June to September.

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Land use

Tikamgarh is a predominantly rural district with urban population restricted to 30% of total population. Data on land use in Tikamgarh block reported in the 2006-07 District Statistical Handbook shows (Table 1.1) that nearly 60% of the land is cultivated, and of this, over 50% is under double cropping. Only 5% of the land is under different categories of forestland.

Table 1.1: Land use in Tikamgarh block

Category	Area (ha)
Total	86631
Forest	4551
Land not available for cultivation	21103
Net sown area	48966
Double cropped area	25349

Forests

Tikamgarh district has a dry deciduous type of forest. While timber forest can be found along the banks of the Betwa and Jamuni rivers, the non-timber forest consists of tendu, seja, dhawa, gunja salai, mahuwa, baheda, palash, amla, bel and bamboo trees, along with some medicinal plants. In Sapon, one of the three Adivasi villages covered by the Project, the forestland is much in excess of the cultivated land.

Table 1.2: Designated forest areas in Project area

Gram panchayat	Type of forest	Forest area in hectares
Dari	Protected	101.98
Dari	Protected	125.94
Laar	Protected	87.50
Bhainsawari	Reserved	621.29
Bhainswariss	Protected	104.25
Antaura	Protected	139.13
Sapon and Dunda	Reserved	523.68
Sapon	Protected	97.16
Ajnor	Reserved	283.58
Samarra	Protected	41.52
Amarpur	Protected	66.13
Ramnagar	protected	2.59
Gopalpur	Protected	169.41

Forestlands fall under the category of protected or reserved forests. In reserved forests, the local community has no right to conduct any activity like hunting and grazing, unless

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allowed by specific orders. Forest areas under both categories in the Project area are as shown in Table 1.2.

Demographics

A total of 2565 families live in the 20 villages/hamlets covered intensively by the Project. Of these, 30% belong to SC groups, 14% belong to ST groups and 56% belong to OBC groups. The main SC groups are: Ahirwar, Vanshkar, Chadar and Khangar. The main ST groups are Saur and Gond. The main OBC groups are: Lodhi, Yadav, Kushwaha, Vishwakarma, Rai, Sahu, Raikwar, Napit and Patel. The general population (less than 1% of total) consists of a few Thakur, Jain and Brahmin families.

Half the villages have a significant ST population, and in 3 villages (Sapon, Sauryana, Basiyan Khera) and Haidarpur adivasi basti, the ST population is predominant.

Land ownership

Barring 6% of the total families in the 20 villages, all families own some agricultural land. However, 44% of the total families own less than 2.5 acres (1 ha) and another 38% own between 2.5 to 5 acres (1 to 2 ha). Thus 80% of the population comprises marginal and small farmers.

Irrigation facilities

Groundwater tapped through dug wells is the main source of irrigation in the entire Tikamgarh district, and the situation is the same in the 20 Project villages. Of the total 6823 acres of cultivable land, around 60% (4037 acres) is irrigated, and of this, around 67% is irrigated by privately-owned dug wells. Around 15% of the irrigated land is irrigated by tubewells, and 13% of the irrigated land is irrigated by lifting water from nallas or rivers.

Livelihood-related facilities

Livelihood-related facilities available within and near the 20 villages are shown in Table 1.3.

Table 1.3: Distribution of facilities across 20 villages

Facility	No. of villages in which facility is available	No. of villages in which facility is available within 5 km
Pukka road	4	16
Electricity	19	1
Bus service	4	16
Bank	0	8
Weekly market	1	15
Shop for seeds/fertilisers	0	12
Flour mill	5	14
Oil expeller	3	11

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As can be seen, the villages are well-connected by road. Electricity is available in almost all villages, but supply is erratic. Weekly markets near villages are the main outlets for sale and purchase of produce. Near the Project area there are two large villages, Laar and Badagaon, with traders for all crop and tree produce. That apart, most villages are regularly visited by a total of around half a dozen middlemen who purchase different items like foodgrains, fruits, and mahua flowers. The middlemen also advance loans. Thus, producers/collectors in the Project area do not face significant hurdle in raising funds or marketing for livelihood-related activities. However, the terms of trade for finance or produce are grossly stacked in favour of the middlemen.

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2. Income from Trees and Herbs

Households (HHs) earn income from trees on their own lands and/or trees and herbs on public and forest lands. The latter is done mainly by ST HHs and some SC HHs. The MP government's policy and regulation regime for non timber forest produce (NTFP), explained briefly in the Appendix, does not affect income generation from any NTFP produce other than tendu leaves in the Project area.

Income-providing trees on private lands

Many farmers in the Project area have a variety of trees on their own lands, which yield some income, apart from providing other benefits like timber for house construction, shade and soil protection.

Income from trees is mainly from collection and sale of edible fruits. There are also a number of palas (*Butia Monosperma*) trees in the Project area, in private and public lands. Gum secreted by the trees is collected and sold for its medicinal value.

Table 2.1 shows the population of edible fruit-bearing trees in the 20 Project villages. As can be seen there are over 6500 ber trees, or roughly one ber tree per acre of cultivated land (6823 acres). There are also around 1400 mango trees and 1700 mahua trees on private and public lands. The population of other edible fruit-bearing trees is not significant in relation to the size of the total area.

Table 2.1: Edible fruit-bearing trees in 20 Project villages

Tree	No. of trees	No. of HHs having trees on their own lands
Mango	1352	617
Guava	387	177
Ber	6553	1537
Lemon	180	180
Jamun	212	212
Mahua	1657	757
Tamarind	33	23
Amla (Aonla)	84	46
Bel	77	26
Custard apple	358	126

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It is seen from Table 2.1 that around 60% of HHs have ber trees, and around 25% HHs have mango trees on their lands, with average number of ber trees per HH being four, and average number of mango trees per HH being two.

Apart from the edible fruit-bearing trees, there around 6000 palas and 4000 neem trees in private and public lands. However, comparatively few HHs derive any income from these trees.

No HH generates income from collection and sale of chironji (*Buchanania lanjan*) although there are a number of these plants in common and forest areas.

Households getting income from trees

Apart from SC HHs that get income from tendu leaf collection, HHs get income mainly from five species of trees: mango, ber, neem, palas and mahua. Potentially 60% HHs having ber trees on their lands, and 25% HHs having mango trees on their lands (the two categories of HHs are overlapping) can get income from these trees. However, it is seen that a considerable amount of fruit is collected only for home consumption. Also, the output varies by year, and saleable quantities are not available for all HHs every year. Nevertheless, ber and mango are seen as trees with good income-potential. This is attested by the fact that around 270 HHs have planted mango saplings in the last five years, and around 170 HHs have planted ber saplings.

Around 1000 HHs, including all ST HHs and most SC HHs, are involved in mahua collection. Neem fruit/seed is collected mostly by children of mostly poor HHs and sold by their parents.

Around 470 HHs, most of whom are ST HHs and SC HHs, are involved in tendu leaf collection. Whole families are involved in the collection in the summer. Palas gum is extracted and sold by only around 300 HHs, mostly ST/ SC HHs.

Households getting income from herbs and medicinal plants

Other than charota (cassia tora) seed collection, few HHs are involved in collection and sale of parts of herbs and medicinal plants. However, charota is collected across many Project villages.

Charota is a wild herb found in most parts of India as a weed, including the Project area, where it is found along roadsides and in forests. While the roots, leaves and seeds have medicinal value in Ayurveda, it is mainly the seeds that is collected. The seeds are used to make a gelling agent, which has industrial and food applications. Seeds are collected every six months and sold. Around 900 HHs, mostly ST and SC HHs, are involved in collection and sale of seed.

A handful of ST HHs are involved in collection and sale of parts of medicinal plants like gondla (nagarmotha), chittar (chirchira, *Achyranthes asperais*, prickly chaff) and imalgawa (this is the local name of a herb with pumpkin-like leaves, seen in monsoons; we could not obtain its Hindi, English or botanical name equivalents).

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Income generation per item of produce

As already mentioned, a very elementary value chain is followed for getting income from trees and herbs. The produce is collected and sold, locally, usually through middlemen. No nutrients are provided to trees/herbs and no efforts are made to control pest and diseases. No processing of produce is done. Moreover, except for some mango and ber saplings, no tree saplings have been planted, to increase income from trees. Overall, one can say that while a large number of trees and herbs in Project area have income-generation potential, Project area HHs largely see these as supplemental sources of income, with main sources of income being agriculture, labour or migration. This is also evident from the average income gained by HHs from different trees and herbs, as discussed below.

Income from mango and ber

Mango and ber trees that are richly laden with fruits are “sold” to middlemen, who collect the entire produce at their own cost. The price obtained for selling collection-rights in one season per fruit-laden ber tree varies from Rs 300 to 500. This is based on the fact that a mature and healthy ber tree that is over 15-years-old yields around 75 to 200 kg of fruit, and the price given to farmers by middlemen for ber fruit is Rs 3-4/kg. In a good year, a farmer with four healthy ber trees can thus earn around Rs 1500 to Rs 2000 from “sale” of trees. Farmers with less yielding or lesser number of trees sell the produce to middlemen or in the local market for Rs 3-4 per kg. The ber is sold after it is collected and sun-dried for a few days. Average income of HHs selling ber is around Rs 1200 per season.

Collection rights for mature mango trees are sold at the rate of Rs 5000-6000 per tree. The pricing is based on fact that a mature tree yield around 500 kg, and per kg price paid by middleman is around Rs 10. While a few farmers earn over Rs 10,000 from mango produce in this way, the majority sell it in small lots to middlemen or in local markets. Average income per HH selling mango is around Rs 3600 per season.

Income from mahua

While mahua flowers as well as fruit (seed) have sale value, in the Project area only mahua flowers are collected and sold in large volumes. Relatively few HHs collect mahua fruit and depulp it to obtain seed. Even this activity is done mainly to obtain oil for home consumption.

Whole families are involved in mahua-flower collection. Depending on the age and health of a tree, it yields 10-300 kg of flowers. Most trees in Project area are said to be over 60 years old, with yield of over 200 kg of flowers. However, there are huge fluctuations in annual yield. A low-rainfall year, it is said, is followed by low mahua flowering. Further, flash rains with lightning in summer completely stops flowering (this happened in Project area in 2012 summer). Flowers lose 50-75% weight after drying.

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The collected flowers are sun-dried and stored in gunny bags or baskets. However, storage is not generally done for more than two months as HHs require cash, and the flowers are prone to deteriorate at onset of rains. Semi-dried or fully dried flowers are sold at around Rs 10 per kg to middlemen called *Kucchias* who come to the village, or to traders in the two large villages near the Project area. HHs doing mahua sale earn Rs 1500-2500 per season.

Income from neem

Neem fruits are mostly collected by children of poor families. One mature tree yields around 200 kg of fruit, which is purchased by local middlemen at the rate of Rs 3 per kg. HHs doing sale of neem fruit earn around an average of Rs 1200 season.

Income from tendu

Tendu leaves are collected from forest trees over a period of around 15 days, usually from the last week of April to the first week of May. Leaves are stacked in bundles of 100 leaves. Tendu is the only NTFP item in Project area, whose collection and sale is controlled entirely by government. Rates are also fixed unilaterally by the government. In 2012, tendu-leaf collectors got Rs 75 per bundle. On an average, one HH collects and sells 30-45 bundles in a season, earning Rs 2200-3300.

The tendu-leaf collectors are organised under primary cooperative societies called Prathmik Van Upaj Samitis. There are 12 such societies in the Project area. (see Appendix for more details of the tendu-collection structure)

Income from palas

While many parts of the palas tree are useful and have commercial value, only the gum is extracted from its bark and sold in the Project area. Incisions are made in the bark and the juice that exudes is collected eight days later. The juice hardens into brittle beads of gum. From one tree, around 300 gm of gum can be so obtained, and is brought by middlemen at the rate of Rs 50 per kg. HHs doing collection and sale of gum earn around an average of Rs 1100 per year.

Income from charota

Charota seed is sold by collectors individually to local middlemen, who pay around Rs 5 per kg. Depending on number of persons available in the family for doing seed collection, HHs earn Rs 300 to Rs 3000 a year from sale of seed, with average income from this source being Rs 1400 per HH.

Income from other medicinal plants

Tubers of nagarmotha are collected and sold for around Rs 10 per kg. Root of chittar is sold for the same price. Roots of imalgawa, available only in the rainy season, are sold

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for Rs 20 to Rs 25 per kg. Only 4-5 SC HHs are involved in collection of these roots, from forest areas, and the income they earn from this source is Rs 250-800. In all three cases, the buyer is a local middleman.

Location of end markets

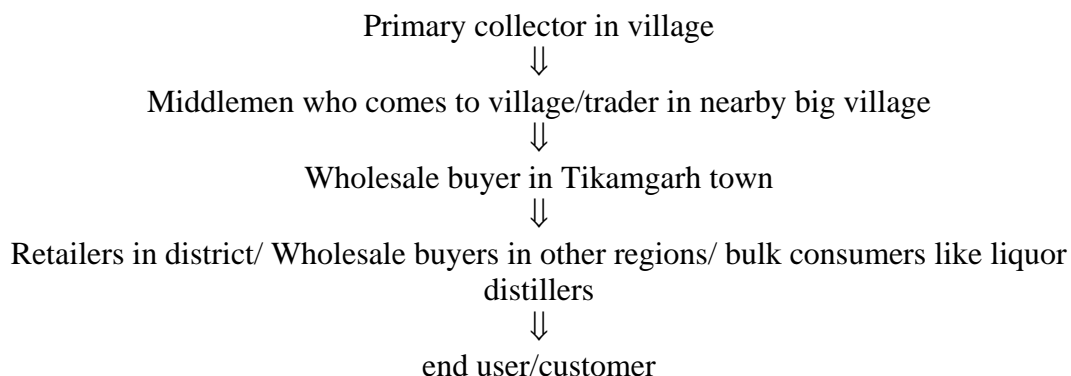
Through a value chain described in the next sub-section, produce from trees and herbs ends up in end markets at diverse locations as shown in table 2.2. For edible fruits, the end markets include villages in and around Project area, Tikamgarh town, and other large settlements in the district.

Table 2.2: Location of end markets for produce

Produce	Location of end market
Ber fruit	Tikamgarh, Kanpur, Lucknow
Mango fruit	Tikamgarh, Kanpur, Sagar
Mahua flower/seed	Tikamgarh, Kanpur, Sagar
Neem seed	Tikamgarh, Sagar, Newadi (Tikamgarh dt)
Palas gum	Rajasthan (Jaipur?)
Charota seed	Sagar, Khurai (Sagar dt)
Other medicinal plants	Kanpur, Sagar

Value chain

Generally, the movement of all tree and herb produce is as shown in the diagram below.



Margins realised at each stage are difficult to ascertain as wholesale buyers and retailers are secretive about the same. Further, it is quite apparent that the margins fluctuate according to demand-supply position. Nevertheless, from information available from various sources, it is clear that there is a margin of at least 8-12% at each level. The highest margin is obtained by the middleman/trader who transports produce from area of collection to wholesaler. Excluding the transportation cost he has to incur, the margin can go up to even 50% when demand exceeds supply, or when the produce is sold off-season. In 2011, it was learnt, mahua flowers obtained from farmers by middlemen at the rate of

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Rs 10/kg were sold by the latter to wholesalers at Rs 15/kg. Neem seeds obtained from farmers at Rs 3/kg were sold after sorting and cleaning at Rs 7/kg to wholesalers. Palas gum obtained by middlemen from collectors at Rs 50/kg was sold to wholesalers at Rs 80- 90/kg. The offseason rate was reportedly Rs 100-125 per kg.

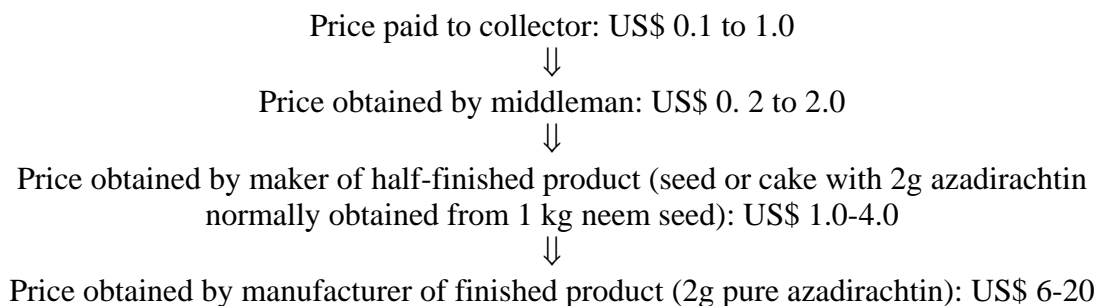
(For list of major wholesale buyers of NTFP in and around Tikamgarh, see Appendix)

Value realised down the line

Whereas ber fruit is sold by farmers for Rs 3-5 per kg, the retail selling price in Tikamgarh is Rs 7. Likewise, while farmers get around Rs 10 per kg of mango, the retail selling price (according to variety) is Rs 12-15 per kg.

When value is added to produce, through technological and marketing inputs, the value realised at final point of sale is many times the value realised at first point on sale. This is so especially in case of produce that is used to make formulations with industrial/commercial or medicinal use.

For instance, data given by the Neem Foundation of India shows that value of of 1 kg of neem seed increases as follows¹:



It can be thus seen that the value of neem fruit increases by 60 to 200 times from the first to the last point in the value chain.

Likewise, the export price of Butea (palas) gum², used in medicines, is Rs 200/kg, or four times the price given to collectors. Oil of nagarmotha extracted by steam distillation of roots of plant is used in the manufacturing of perfumery compounds, soaps, cosmetics and incense sticks (agarbatti). The oil, known as Cypriol Oil, has international market price of around US\$ 175 per kg.

Extract of chittar or prickly chaff, used in many ayurvedic formulations, sells for around US\$ 12 per kg.

¹ <http://www.neemfoundation.org/neem-articles/neem-updates/vol-v-no-4/economics-of-neem-in-crop-protection.html>

² <http://jagdishrajiv.com/index1.php?c=52&p=85>

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However, these figures only give an indication of the inherent value of the collected produce. They do not imply that the inherent value can be realised by collectors, as processing required to realise that value is generally beyond their technological and financial capacity.

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3. Value Enhancement Possibilities from Produce of Trees and Herbs

In general, possibilities for enhancing value from any product are as follows:

KEY VALUE ENHANCING OPTIONS	Reduce Costs/ Use Better Quality Inputs ↓	Reduce Costs/ Increase Yield/ ↓	Choose High- Value Options ↓	Realise Higher Price ↓
VALUE CHAIN STAGES	Input Procurement ⇒	Production ⇒	Value Addition ⇒	Marketing

When we apply the above framework to tree and herb produce from Project area, we see that the first stage is irrelevant, as no inputs are used. Value enhancement possibilities exist only in the other three stages.

While considering any value-enhancing option for the benefit of poor communities, we have to see that the option meets the following general requirements:

- It would be of use for the maximum number of all HHs, or maximum number of most marginalised HHs.
- It should have the potential to significantly increase HHs' income in a sustainable manner, without causing severe or irreversible environmental damage, accentuating existing gender and social-group imbalances, or violating laws and legal regulations.
- It should be viable in local conditions, including physical and social environment, available public infrastructure and markets.
- It has the potential to enjoy community participation; it should not be remote from community's experience or knowledge
- It should have proven results: there should be results from comparable regions, or results should be provable in Project area through a pilot.
- Significant impact should be realisable in short or medium-term.
- Risk-factor should be low.
- Capital requirement should be low: finance needs have be such that they can be met through SHG savings, moderate grants or soft bank-loans.
- Estimated learning-curve should match community's learning capacity

Keeping in mind the above, value-enhancing possibilities at the stages of production, value addition or marketing are discussed below;

Value enhancement through higher production/yield

While there is definite scope for increasing production and yield of produce from trees and herbs, this will not necessarily translate into higher income. In fact, higher production/yield may reduce the income being currently earned. For example, increased

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ber production from Project area will depress prices obtained by collectors, which are already quite low.

Though Tikamgarh is not known as one of MP's "mango belts", there is scope for increasing mango production and yields by establishing nurseries and promoting nutrient and pest management. However, discussions with community stakeholders revealed that the community is concerned that even current mango yields are reducing, apparently due to air pollution caused by brick kilns around the Project area. Due to this problem, farmers are reluctant to invest in large-scale plantation, and without plantation on a large scale, protection of trees at fruiting stage from theft becomes unviable.

Increasing production/yield of other edible fruits like custard apple can be recommended only at the level of targeted and pilot initiatives, as the number of HHs collecting and selling these other fruits is currently low.

We then come to neem and mahua trees, which are found in large numbers. There is scope for gaining additional value from produce of these trees, as discussed later. But there is a problem at the production stage that needs to be addressed. It is seen that a large number of both mahua and neem trees are affected by a variety of diseases and pest/insect problems.

Particularly in mahua trees the following problems are seen:

- leaf spot and leaf blight
- leaf rust
- damage caused by bark-eating caterpillar
- decay of wood due to fungus

These problems will affect long-term income-earning potential from trees. Hence, it is necessary to impart knowledge about the scientific methods of controlling these problems—typically by application of some chemical formulations. Further, considering the age of the trees in the Project area, and the long gestation period of the tree (10-15 years), it is imperative to establish new mahua plantations, through seeds and/or grafting of saplings.

Long-term income-earning potential from ber trees is also affected due to a variety of problems like:

- attacks by fruit fly, bark eating caterpillar, hairy caterpillar and leaf chafer, and
- diseases like powdery mildew, black spot on leaves, alternaria leaf spot and fruit rot.

These can be controlled by adopting proper spray schedules recommended by local horticulture experts. It is important to avoid high doses of application of chemicals.

Higher value through better collection practices

Collection of mahua flowers and neem fruits is marked by high contamination by mud and pebbles. This can be avoided by promotion of the following simple practices:

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- cleaning of area under tree, and if possible, spreading a thin layer of wet cowdung in collection area
- use of clean sheet of cloth or plastic sheets for collection

The produce so obtained will be of better quality, with higher value potential.

Collection of gum from palas is currently done in an unscientific and unsustainable manner, by simply making incisions on the tree. It is necessary to promote a better collection practice, involving injection of gum-inducing chemicals into holes drilled at the base of trees. In any case, gum should be removed only from trees that are at least 8-10 years old.

Exploring income generation from other produce of trees

It is seen that all marketable produce from trees is not being collected and sold in large quantities. Particularly in case of mahua, it is seen that sale of seeds is not happening on a large scale. It appears that the labour involved is a disincentive, as HHs already spend up to 20 days in a season to collect flowers. There is also little local marketing avenue for the seed. Hence, market for the seed in nearby large towns like Tikamgarh and Sagar can be explored, and after working out the economics of transportation, ST HHs may be encouraged to collect fruit and sell the seed. The HHs would have to be given training in proper method of depulping and storing seed. A key requirement is complete removal of moisture from seeds.

Only gum is obtained and sold from palas trees. Leaves are collected only for use in nursery beds and by some HHs of nhavi caste, for making cups, which are used in marriages. The local market demand for the leaf cups is not so high as to encourage other HHs to take up this activity.

The scope for lac cultivation on palas trees is entirely unexplored. Average yield of lac per palas tree infested with lac insect would range from 0.5 to 10 kg, depending on the size of the tree. Some of the lac that is left on the trees after collection in April-May becomes fit to be gathered in October-November, for sale as brood lac (lac seed). At the wholesale market, the price realised would be above Rs 75-100/kg. Assuming that one palas tree would give total lac yield of 8kg in a year (in two seasons), and considering cost to be incurred for transportation to fairly distant markets (eg, in Sagar), promotion of lac cultivation would be viable only if at least 100 palas trees in a compact area are infested with lac insects. Further, the following will have to be kept in mind:

- Income generation from lac cultivation requires patience and a lot of hard work.
- Timing of seeding and harvesting is very important; income generation is critically dependent on doing these activities at the right time, and quickly.
- Lac production falls severely in adverse weather conditions.

Value chain study of income from trees and herbs

Value addition options

While there is tremendous value to be gained by processing fruits and medicinal herb produce, the technology and costs involved in processing, packaging and marketing are beyond the capacity of poor communities.

While some value-added products like chutneys, pickles and syrups can be made at relatively low cost at the village level, there is no substantial market in Tikamgarh town for sale of these products. (Tikamgarh is a small town that enjoys little tourist traffic and is not yet connected by rail or air).

However, there are many simple methods of enhancing value after collection of produce, through better drying and storing processes.

In case of ber, the conventional method drying the fruit in courtyards or rooftops lead to much loss of fruit. A better alternative is:

- grading and washing fully ripe fruits
- dipping fruits in boiling water for 2 to 6 minutes (blanching)
- if possible, exposing blanched fruits to sulphur dioxide fumes, by burning sulphur powder at the rate of 3.5-10 g per kg of fruit
- drying fruits under sun for 7 to 10 days
- if possible, packing and sealing dried fruits in plastic pouches, so that moisture is retained.

Even if the above method is not followed, proper drying of different produce like ber fruit, mahua flowers/fruits, neem fruits can be easily ensured through construction of drying platforms with stone tops in a convenient common area of a village. A platform of 160 sq ft can be constructed for around Rs 40,000. The platform should preferably have a filter channel for separating dirt from the produce left for drying. Simple wooden instruments can be used for spreading the produce for drying. Produce should be thinly spread across the platform so that drying is uniform and possibility of spread of fungal infections is reduced. If required, a dry vegetation fence can be put around the platform. Experience from several other development projects like the Western Orissa Rural Livelihoods Project (WORLP) show that these simple methods greatly enhance quality of produce sold, through better drying. Funding for the one-time investment for drying platforms can be obtained through panchayat or other government sources.

After proper drying, proper storage is essential. Traditional methods of storing in baskets/sacks in corners of house lead to damage of produce through infiltration of dust, harmful bacteria and insects, and moisture. Use of polythene as packing material is a simple solution to these problems. Further, specially demarcated drying rooms/sheds with stone flooring and leak-proof walls and roofs will ensure that damage to stored produce is minimised. Investment on construction of such structures, or using them on rental basis, becomes viable if produce is aggregated for collective sale, as discussed later.

Value chain study of income from trees and herbs

Ber powder

Ber powder, which has medicinal value, is exported from India and sold at a price of over US \$ 40 per kg³. The powder is made simply by washing and sun-drying fully ripe fruits, and grinding dried fruits. The end product has to be stored in low density polythene pouches, and has shelf life of around 12 months. Considering the low technology involved, and the ample availability of ber, the viability of supplying ber powder to bulk buyers in Mumbai/Delhi is worth exploring.

Higher value realisation through collective marketing

Across India, and across different development projects focused on NTFP and fruit collectors, the one proven and viable method on realising higher income is aggregation of produce and collective sale by groups such as SHGs. This is primarily because:

- Highest margins are realised by trader/middlemen who buys from collector and sells to wholesaler—through collective marketing, this margin is realised by the group that does aggregation and sale
- NTFP middlemen/traders routinely under-pay collectors by using non-standard weighing equipment, which leads to under-weighing

It can be reasonably assumed that there will be a 30% addition in value realised if produce is aggregated and sold about three months after peak collection time, when prices are lowest. The economics is so attractive that collective sale becomes viable even if the group invests its own money on a drying platform, storage space and proper weighing scale.

We can see this from an example, involving mahua flowers collected and sold by 15 HHs. Assuming that each HH has 2 quintals of dried flowers, each HH would earn around Rs 1800 if it sells the flowers to the middlemen who comes to the village, at the 2011 season rate of Rs 10/kg, minus loss due to under-weighing. If the HHs were to do this activity as a group, with proper drying and weighing facilities at their cost, they would have to incur expenditure Rs 40,000 for a drying platform and around Rs 7000 for a manual weighing scale with up to 20kg weights. Further, to store a total 30 quintals of dried produce in one safe and secure place for 3 months, they may have to incur rent of around Rs 2000 and expenditure of Rs 3000 for purchasing suitable polythene material. Cost of transporting the stored produce to Tikamgarh would be around Rs 3000. Hence, total cost would be Rs 55,000. After storage for 3 months, minimum price obtained from wholesaler at Tikamgarh, as per 2011 season's data, would be Rs 20/kg. Hence, gross earning for group would be Rs 60,000 and net earning per HH in the year 1 would be around Rs 300. However, at constant prices, net earning per HH in year 2 would rise sharply to nearly Rs 3700, or double the net earning realisable from sale done individually at the village level.

However, collective marketing, especially by women who have traditionally not been exposed to wholesale markets, involves several preparatory steps as listed in Appendix.

³ <http://chakrapaniayurveda.com/ber.html>

Value chain study of income from trees and herbs

Towards an action plan

From the above discussion, several possible action points for higher value realisation emerge. Selection and prioritisation of action points has to be done through consultation with the community, keeping in mind the following issues:

- Relatively low priority accorded by HHs to income from trees and herbs, compared to income from agriculture crops
- Project limitations, in terms of time-period and funds, for providing support in any form other than training, capacity-building and facilitation of mobilisation

Consultations with the community can be dovetailed with meetings for discussing higher returns from agriculture (explained in related other study). For facilitating discussion on higher income realisation from tree and herbs, the points in Table 3.1 may be used.

Table 3.1: Stage-wise actionable points to increase returns

Production/ Collection stage	Post-collection stage
<ul style="list-style-type: none">• Learning to control pest and disease problems in mahua and ber trees• Individual/group plantation of mahua trees through seeds and/or grafts• Learning/practising better methods of collecting mahua flowers and neem fruits• Learning injection technique of collection of gum from palas• Exploring busines viability of collecting and selling mahua seed in nearby large towns• Undertaking lac cultivation over minimum 100 palas trees	<ul style="list-style-type: none">• Construction of drying platforms with stone tops, with SHG/panchayat/other funds• Use of polythene as packing material• Collective marketing of various NTFP like mahua flowers through SHGs/other groups, with investment in drying platform, weighing machine, storage areas

Value chain study of income from trees and herbs

Appendix

1. NTFP policy and regulation regime

All produce from forests except timber are collectively called non timber forest products (NTFP). NTFP includes fibres, flosses, grasses, reeds, cane, fodder, essential oils, tannins, dyes, medicinal plants, oilseeds, edible products, leaves and animal products like honey.

The trade of NTFP in Madhya Pradesh is governed by Madhya Pradesh Van Upaj (Vyapar Viniyaman) Adhiniyam, 1969 and the rules made under the act. The rules place several restrictions on the growth, transport and retail sale of specified products. Producers/collectors, traders and consumers of the specified products have to take necessary permits and have to get themselves registered if their production, trade and use of specified products exceeds a specified quantity.

The specified products include: gum of kulu, dhawda, babool, khair and cheed; harra; kaccharia and sal seed.

Notably, mahua flowers and seeds, palas gum, chironji and charota seeds are not specified products. (Mahua was a specified product till 1996).

Apart from specified products, the forest department has the right to impose restrictions on collection and trading in any NTFP, if the department deems it to be produce of an endangered species. In this way, collection and trading of some NTFP is restricted either in the whole state or in certain districts, and the list of banned items may change from district to district. Trading in most barks has been banned all over the state. Similarly, trading in sal seed, chironji and aonla was banned in some districts in some seasons.

Trading in some NTFP is also controlled by Madhya Pradesh Minor Forest Produce (Trade & Development) Cooperative Federation (MFPCF), formed in 1984, to trade in selected NTFP. The agency has a monopoly for the purchase and sale of tendu leaves, sal seeds, various gums kacharia, and harra. The MFPCF also procures some other produce like mahua flowers, chironji seeds and kernel, which are also bought by private traders

Trade in tendu leaves is regulated by the Madhya Pradesh Tendu Patta (Vyapar Viniyaman) Adhiniyam, 1964, whereby the government has control over the trade of tendu leaves, with the power to purchase, transport and sell the leaves.

Since 1988, tendu-leaf collection rights have been handed over to primary co-operative societies (PACS) of collectors, under a three-tier structure, with PACS at the bottom, District Forest Produce Co-operative Union (DFPCU) in the middle and State Minor Forest Produce (Trade & Development) Co-operative Federation (SMFPCF) at the top. Collectors are paid at common collection/payment sites called phads. A phad munshi (clerk) is appointed for the purpose of calculating collection and making wage payment.

Value chain study of income from trees and herbs

2. Preparatory steps for collective marketing

Collective marketing, especially by women who have traditionally not been exposed to wholesale markets, involves several preparatory steps:

- Generation of awareness about the benefits of collective marketing
- Identification of groups with high interest and willingness to take the risk (discussed below)
- Generation of awareness about the benefits of collective marketing
- Exposure visits for gaining familiarity with wholesale buyers and wholesale markets (mandis)
- Establishing relationship with reliable wholesale market buyer
- Identification and grooming of group leaders and building their capacity for conducting group meetings, resolving disputes, record-keeping, basic auditing, and communication and negotiation with market players
- Building group's knowledge and skills about proper sorting, drying, storage and quality control practices
- Determination of minimum volumes required to make transportation of bulk produce to wholesale market viable (as per payload capacity of vehicle chosen for transportation, vehicle-hiring cost and other factors)
- Selection and preparation of sites for drying and storing
- Arranging finance for proper drying/storing/weighing facilities and transportation
- Obtaining license for trading, if applicable
- Making arrangements for drying and storing, through construction or rent of premises
- Planning collection/procurement
- Fixation of purchase price in case some produce is to be bought from outside the group, to make up for any shortfall (as per payload capacity of vehicle chosen for transportation)
- Fixation of distress sale price, in case of unforeseen circumstances such as damage to produce due to rain, slump in market prices, etc.

Groups have to be ready to bear the following risks:

- Strong opposition from middlemen, who may instigate dissent within village/group, physically obstruct aggregation and collective marketing, or use measures like boycott of entire villages
- Reduced or even nil availability of produce in some seasons due to weather fluctuations
- Slump in wholesale market prices due to high supply
- Loss of stored produce due to theft, moisture, rain, bacterial/fungal infection.

Value chain study of income from trees and herbs

3. List of 20 villages with demographic details

Village	Total Families	SC Families	ST Families	General category Families	OBC Families
Rajapur	200	90	0	5	105
Magra	202	10	60	0	132
Mayrikhera	209	95	32	0	82
Nagara	400	90	0	0	310
Madnikhera	55	54	0	0	1
Satyanagar	45	45	0	0	0
Sapon	50	0	40	1	9
Gopalpura	135	75	0	0	60
Bhagalpura	40	40	0	0	0
Ratanganj	60	0	30	3	27
Sauryana	64	4	59	0	1
Basiyan Khera	68	0	36	7	25
Dudataura	330	30	40	0	260
Ramnagar	305	60	0	6	239
Harinagar	40	16	0	0	24
Matapur	56	32	4	0	20
Madanpur	42	12	0	0	30
Mujra	98	41	12	1	44
Haidarpur Adivasi Basti	30	0	30	0	0
Suda Dharampura	136	60	15	1	60
Total	2565	754	358	24	1429

4. Major NTFP Traders in and around Tikamgarh

M/s. Jain Jadi Booti Bhandar
Near Mukesh Lodge
Tikamgarh

M/s.R.K. Trading Co
Galla Mandi
Tikamgarh

Shri Lachchhu Shivhare
Galla Market
Chhatarpur

Pt. Mannulal Ramkishor Tiwari
Ramgali Bazar
Chhatarpur

M/s.Tirupati Traders (Retailer)
Shri Ramdas Patariya

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Ramgali,
Chhatarpur

Vaidik Agro Products
5, Civil Lines
Sagar

M/s. Akash Traders
Shri Akash Jain
Motinagar ward
Bahubali Colony
Sagar

Shri Pradeep Sattbhaiya
Nawak mandi
Sagar

Shri Rameshwar Prasad Gupta
Opp. Baldev Mandir
Panna