

Livelihood Opportunities in Patha Region

Potential Sub-Sectors, Interventions and Strategies for ABSSS

Under the Guidance of

Shri Bhagwat Prasad

Director

Akhil Bhartiya Samaj Sewa Sansthan

Chitrakoot, U.P.

Aastha Sachdeva

Azeez Narain

TAS Probationers

Oct-Nov, 2009

ACKNOWLEDGEMENTS

We are extremely grateful to Mr. Gaya Prasad Gopal (Pita ji) who was a source of inspiration to us throughout the course of the project. His long struggle for the betterment of the Kol community sets an unprecedented example in the history of leadership, perseverance and selflessness. We, in our strife to become ideal and sensitive leaders, will always keep him at the highest pedestal.

We would also want to express our gratitude towards Mr. Bhagwat Prasad, Director, ABSSS without whose guidance, this project would not have been possible.

Our sincere thanks to all the ABSSS volunteers especially Mr. Desh Raj, Mr. Raj Singh, Mr. Raja Buwa, Dr. R.S. Yadav, Mr. T.P. Singh, Mr. Vijay, Mr. Arvind, Mr. Jaanki, Mr. Ashish, Ms. Shashi Nigam, Ms. Kesar and Ms. Booti for sharing their valuable experiences with us, that helped us develop a perspective about the region and the community. Without their support, completing the tasks in a short span of a month would have been almost impossible.

The officials from UP Forest Corporation, Krishi Vigyan Kendra and Deen Dayal Upadhyaya Research Institute were also a great help.

Last but most importantly, the Kol community, for welcoming us with open arms and introducing us to their culture and traditions. This will hopefully, go a long way in the overall development of the sensitive side of our personalities.

| Title | Page |
|---|-------------|
| <i>PART FOUR: OTHER POTENTIAL LIVELIHOOD OPPORTUNITIES</i> | |
| Bamboo Products & Upliftment of Basorh Community | 70 |
| Asset Rental Service | 76 |
| Honey Packaging & Sericulture | 83 |
| Traditional Arts & Culture | 84 |
| | |
| <i>PART FIVE: RISKS/VULNERABILITIES ASSOCIATED WITH THE PROPOSED INITIATIVES</i> | 85 |
| | |
| <i>PART SIX: SUMMARY & CONCLUSIONS</i> | 88 |
| | |
| <i>REFERENCES</i> | 91 |
| <i>APPENDICES</i> | |
| Appendix A: Resource Map | 92 |
| Appendix B: Wheat and Paddy – Modern vs. Traditional Techniques | 97 |
| Appendix C: Beneficial Pulses for the Region | 101 |
| Appendix D: Beneficial Oil Seeds for the Region | 104 |
| Appendix E: Crop Cycle and Economics of Various Vegetables in the region | 106 |
| Appendix F: Stages and Analysis of Livelihood Opportunities | 118 |

This report aims to highlight potential livelihood opportunities for the rural and tribal communities of Bundelkhand. Most of the research work was carried out in Patha region of Chitrakoot district, where ABSSS, our partner NGO has the most extensive projects.

The biggest opportunities for intervention and improvement of livelihood situations are found in agriculture and through non-timber forest produce. It was observed that while a majority of the population in this region engages in agriculture, it is largely an unprofitable venture for them carried out mainly with the pressures of food security in mind. A detailed analysis of the existing cropping patterns and possible alternatives to the same in Rabi and Kharif has been performed and recommendations such as promotion of vegetable farming and mustard cultivation in Kharif and Rabi seasons respectively have been made. Further, aspects such as the need to provide an impetus to scientific agriculture, promotion of organic farming and enhancement of water management programs have also been delved into. Macro-level systemic or social changes that need to occur for the development of the region and how ABSSS can play its role in the same is also discussed.

Besides agriculture, the other thematic area for livelihood intervention in this area is non-timber forest produce since most tribals in the region depend on the same for their daily livelihood. However, the present market arrangements do not allow for any value addition activities to take place in the area and thereby the majority of the benefit from the end consumers of these products in processed or unprocessed form does not reach the tribals. Interventions by means of a commercial institution – ‘Aadarsh’ to organize self-help groups in the region and link the producers/procurers to the market have been suggested. The existence of such a system would promote skill development and several stages of value addition to take place locally, thereby accruing much larger benefit to the local community.

In addition to the above two, potential livelihood opportunities also exist in bamboo-craft, sericulture and honey packaging. An innovative agricultural asset rental system has been proposed in this report which aims at building an important asset for a group of farming families on which they can command rent, and at the same time fulfill a significant agricultural demand of the area with ease.

An attempt has been made to explicitly elucidate the linkages of all possible interventions and potential sub-sectors with the community, their interaction with the prevailing regulatory and social framework as well synchronize the same with the strategies and resource-base of ABSSS.

Work on this project began with an understanding of the geography of the region and the background on its culture, community, economy, agriculture, political and social climate. This understanding was developed through a series of formal and informal interactions with people from the NGO, support staff, people on the street, shopkeepers, farmers etc. The process was strengthened with preliminary unstructured visits to the fields, villages, local markets, commercial and social hubs.

Parallel to the above process, a review of pertinent literature related to the work done by ABSSS, publications about Bundelkhand in the press, papers and past reports was done. After developing a reasonable understanding of the local community, economy and resources, some broad areas with potential for livelihood were identified.

More detailed work began on these broad sectors through primary research and secondary research. This process helped us identify certain sub-sectors with strong potential for livelihood generation and these were analyzed in detail. The potential analysis was strengthened with expert interviews with agricultural scientists, visits to institutes like Krishi Vigyan Kendra, Deen Dayal Upadhyay Research Institute, first-hand interaction with farmers and tribals as well as with government statutory bodies such as UP State Forest Corporation.

Market and village feedback was repeatedly taken to check the acceptance and feasibility of the livelihood interventions which were beginning to show promise. The organizational and institutional base for the suggested livelihood interventions was structured after studying some successful models of livelihood tried in different parts of the country by other NGOs.

The process was marked by regular feedback and review sessions with senior members of ABSSS which has been working in this area for the past three decades.

BUNDELKHAND: SITUATION ANALYSIS



About Bundelkhand

Geographic Profile

Bundelkhand comprises of seven districts of Southern U.P. and six districts of Northern M.P. These are: Jhansi, Lalitpur, Jalaun, Hamirpur, Mahoba, Banda, Chitrakoot districts in U.P. and Datia, Tikamgarh, Chhatarpur, Panna, Sagar and Damoh districts in MP. The Bundelkhand region

has an area of around 70,000 sq. km. with a population of 15.5 million (Census 2001). It is roughly one and one-third the size of Punjab but with less than two-thirds the population of the state.

Topographically, Bundelkhand is divided into three regions:

- 1) Bundelkhand Plain: This is the northern part along the river Yamuna. Less than 1000 feet above the sea level, this region is devoid of hills or forests.
- 2) Bundelkhand Uplands: This is the plateau region broken by low, flat-topped hills
- 3) Hilly region: The south, south-east and central portions of Bundelkhand comprise of lower Vindhyan hill ranges, with a maximum height of 2000 feet.

The region is known for its mineral wealth. The minerals found in significant quantities here are diamond, granite, sandstone, pyrophyllite, diaspore, limestone, silica sand, rock phosphate, low grade iron-ore, feldspar, clay, agate and dolomite.

Impact of Bundelkhand's Geographic Profile

The topography of the region gives rise to a number of problems as listed below:

- 1) About a sixth of the total land in the region falls under some category of wasteland or the other. In some of its southern districts, a considerable amount of the land is completely barren and uncultivable. In the south and south-east, much of the land is not suitable for agriculture owing to its hilly nature and thick forest cover.
- 2) Owing to the slope from south to north, there is continuous loss of soil due to flow of rivers and rainfall.
- 3) In most parts of the region, an impermeable rocky layer is found at fairly shallow depths. Hence, runoff of both rainwater and soil is high and Bundelkhand is prone to both floods and drought.
- 4) Erratic precipitation and thick forest cover
- 5) Low agricultural productivity due to weather disturbances such as heat storms and hailstorms and difficult soils

Land Use in Bundelkhand

The land use pattern in Bundelkhand is as follows:

Land use in UP Bundelkhand (2004-05) and MP Bundelkhand (2005-06) districts

| District | Total area in hectares | Percentage of total area under different uses | | | | | | |
|----------------|------------------------|---|--------------|-------------|--------------|-----------------------|----------------------|----------|
| | | Notified forest land | Non-agri use | Barren land | Grazing land | Under misc tree crops | Cultivable wasteland | Net sown |
| Jhansi | 5,01,329 | 6.9 | 8.4 | 6.3 | 0.1 | 0.2 | 3.1 | 68 |
| Lalitpur | 5,07,500 | 15 | 7.7 | 3 | 0.6 | 0.2 | 11.9 | 54.8 |
| Jalaun | 4,54,434 | 5.6 | 8 | 2.7 | 0.1 | 0.8 | 0.4 | 0.4 |
| Hamirpur | 3,90,178 | 6.2 | 8 | 2.4 | 0 | 0.2 | 1 | 79.1 |
| Mahoba | 3,27,429 | 4.9 | 11.3 | 2.6 | 0.1 | 0 | 3.5 | 72.8 |
| Banda | 4,38,767 | 1.2 | 6.7 | 2.6 | 0 | 0.3 | 2.5 | 80.1 |
| Chitrakoot | 3,38,897 | 16.4 | 8.3 | 7.1 | 0 | 8.4 | 3.2 | 51.3 |
| UP Bundelkhand | 29,48,534 | 8 | 8.2 | 3.8 | 0.2 | 1.2 | 3.9 | 69 |
| UP | 2,42,01,294 | 7 | 10.9 | 2.1 | 0.3 | 1.4 | 1.9 | 68.9 |
| Datia | 2,95,874 | 8.4 | 7.3 | 4.9 | 1.5 | 0.9 | 5.2 | 66.7 |
| Chhatarpur | 8,63,036 | 24.8 | 5.1 | 0.2 | 7.4 | 0 | 7.5 | 46.8 |
| Tikamgarh | 5,04,002 | 13.7 | 4.7 | 14.2 | 4.6 | 0 | 4.2 | 47.8 |
| Panna | 7,02,924 | 42.6 | 5.9 | 3.2 | 1.2 | NA | 8 | 35.8 |
| Damoh | 7,28,583 | 36.8 | 4.4 | 8.1 | 4.6 | 0 | 1.8 | 42.7 |
| Sagar | 10,22,759 | 29.1 | 5.1 | 1.9 | 8 | 0 | 0.9 | 52.7 |
| MP Bundelkhand | 41,17,178 | 28.5 | 5.2 | 4.6 | 5.2 | | 4.4 | 47.2 |
| MP | 3,07,55,752 | 28.3 | 6.3 | 4.7 | 4.3 | 0 | 3.8 | 48.7 |

Source: District-wise Land Use Statistics, Union Ministry of Agriculture, May 2008. Percentages derived from absolute figures and rounded off. Note: Fallow land categories are not included. NA= Not available.

Chitrakoot district has the largest proportion of land under tree crops in Bundelkhand. At the same time, it has the third largest proportion of barren land, the largest proportion amongst the UP districts of Bundelkhand.

Soil Types

Several kinds and grades of soil are found across Bundelkhand. Broadly, the soil falls into two categories: red soils and black soils.

Wasteland

Over a sixth of the area of Bundelkhand totaling approximately 11,000 sq. km. falls under four broad categories of wasteland.

Wastelands under main categories (2005)

| District | Total wastelands in sq km (% of total land) | Land affected by gullies, in sq km | Wastelands with or without scrub, in sq km | Degraded notified forest land, in sq km | Barren, rocky land, in sq km |
|------------|---|------------------------------------|--|---|------------------------------|
| Jhansi | 851.59 (16.9%) | 117.88 | 537.62 | 148.9 | 36.95 |
| Lalitpur | 478.96 (9.5%) | | 288.09 | 84.38 | 104.3 |
| Jalaun | 278.15 (6%) | 173.48 | 55.97 | 48.10 | |
| Hamirpur | 184.33 (4.5%) | 143.39 | 25.19 | 14.32 | 37.2 |
| Mahoba | 156.14 (5%) | 11.01 | 119.9 | 22.32 | 2.23 |
| Banda | 393.43 (8.4%) | 392.73 | | | |
| Chitrakoot | 127.29 (4.3%) | 19.89 | 20.84 | 30.13 | 54.31 |
| Datia | 606.91 (29.8%) | 173.44 | 249.44 | 126.54 | 18.49 |
| Chhatarpur | 4325.45 (49.8%) | 11.37 | 3611.21 | 661.07 | |
| Tikamgarh | 1109.99 (22%) | | 526.95 | 405.92 | 335.9 |
| Panna | 997.87(14%) | 22.59 | 412.52 | 540.65 | 159.06 |
| Damoh | 1002.92 (13.7%) | 6.54 | 613.52 | 370.54 | |
| Sagar | 1201.29 (11.7%) | | 605.17 | 587.93 | 6.01 |

Source: Wastelands Atlas of India, 2005, Department of Land Resources, Ministry of Rural Development, Government of India. Minor wasteland areas under some categories not listed.

Problem of soil erosion

The Bundelkhand plain suffers from over drainage due to a large number of rivers and streams.

Soil erosion in Banda district

| River/nala | Catchment area in '000 hectares | Area affected by soil erosion in '000 hectares |
|------------|---------------------------------|--|
| Ken | 230 | 147 |
| Baghain | 360 | 265 |
| Pashwani | 275 | 200 |
| Yamuna | 517 | 408 |
| Gunta | 195 | 120 |
| Bardha | 119 | 30 |
| Manda | 35 | 30 |
| Total | 1722 | 1200 |

Source: Banda district gazetteer (1977), p 93

Water Availability/Shortage in the Region

Unfavorable rainfall patterns and geological and topographical conditions make Bundelkhand a region prone to water shortages. A popular saying in the region is 'Gagari na phoote, chahe balam mar jaye' (let the water pot not break, even if the husband should die). Severe water shortage is experienced in years of poor rainfall.

A study of the water situation done in 131 villages of UP Bundelkhand, reported in the WaterAid paper, found that only 7% of villages had enough water to meet domestic needs throughout the year. In more than 60% of the villages, drinking water was available for only one month. Throughout the Bundelkhand region, women had to spend an average 4-5 hours a day to secure around 20 litres of drinking water. Water shortages are bound to increase even in good monsoons years with increasing population, urbanization, quarrying and use of tube wells.

Groundwater Availability

Except for a few regions, ground water is available at fairly accessible depths in most inhabited parts of Bundelkhand.

The Union Government's Minor Irrigation Census (2000-01) indicates the following:

Groundwater level in villages (2000-2001)

| | Percentage of total villages in districts according to groundwater levels | | | |
|----------------|---|-----------|-----------|-------|
| | <10 m | 10 m-30 m | 30 m-70 m | >70 m |
| Jhansi | 58 | 40 | 2 | Neg |
| Lalitpur | 80 | 20 | Neg | Neg |
| Jalaun | 50 | 44 | 5 | 2 |
| Hamirpur | 16 | 60 | 21 | 3 |
| Mahoba | 84 | 16 | Neg | 0 |
| Banda | 33 | 50 | 14 | 3 |
| Chitrakoot | 17 | 63 | 19 | 2 |
| UP Bundelkhand | 48 | 42 | 8 | 1 |
| UP | 70 | 25 | 4 | 2 |
| Datia | 21 | 70 | 9 | Neg |
| Chhatarpur | 62 | 37 | Neg | 0 |
| Tikamgarh | 60 | 40 | 0 | Neg |
| Panna | 84 | 15 | Neg | Neg |
| Damoh | 68 | 23 | 4 | 5 |
| Sagar | 84 | 15 | Neg | Neg |
| MP Bundelkhand | 69 | 29 | 2 | 1 |
| MP | 57 | 40 | 2 | Neg |

Source: State-wise abstract of information from village schedule in Minor Irrigation Census 2000-2001. Percentages derived from absolute figures and rounded off to nearest integer. Neg= <1%

District-wise data of groundwater resources in Uttar Pradesh in April 2000, made available by a joint study of the Central Ground Water Board (CGWB) and the Ground Water Department of the state, showed that while 52% of the groundwater resources of the state had been 'developed' (was being used), in UP Bundelkhand, this level of usage was seen only in Lalitpur district (52%), and to a lesser extent in Jhansi (44%).

In Mahoba district, only 25% of the groundwater resource was developed and in all other districts, the percentage was lower; lowest level of exploitation was in Jalaun (19%).

Irrigation Sources in Bundelkhand

Groundwater, mainly extracted from open wells, is the main source of irrigation in Bundelkhand. Also, canals are a major source of irrigation in UP districts of Bundelkhand.

Percentage of net irrigated area and sources of irrigation in UP Bundelkhand (2003-04) and MP Bundelkhand (2005-06) districts

| | Net irrigated area as % of net sown area | % of net irrigated area by source | | | | |
|-----------------------|--|-----------------------------------|-------|------------|-------------|---------------|
| | | Canals | Tanks | Tube wells | Other wells | Other sources |
| Jhansi | 64 | 45 | 7 | 3 | 43 | 2 |
| Lalitpur | 79 | 33 | 21 | 11 | 33 | 1 |
| Jalaun | 54 | 76 | 2 | 17 | 5 | Neg |
| Hamirpur | 36 | 41 | 2 | 34 | 21 | 2 |
| Mahoba | 48 | 36 | 18 | 2 | 43 | 1 |
| Banda | 34 | 63 | 5 | 26 | 7 | Neg |
| Chitrakoot | 29 | 38 | 17 | 25 | 19 | Neg |
| <i>UP Bundelkhand</i> | 50 | 48 | 10 | 14 | 26 | 1 |
| <i>UP</i> | 79 | 21 | 1 | 71 | 7 | Neg |
| Datia | 68 | 55 | Neg | 1 | 42 | Neg |
| Chhatarpur | 56 | 9 | 2 | Neg | 75 | 12 |
| Tikamgarh | 68 | 8 | 6 | 5 | 76 | 4 |
| Panna | 33 | 12 | 7 | 7 | 22 | 52 |
| Damoh | 36 | 9 | Neg | 26 | 24 | 41 |
| Sagar | 44 | 2 | 1 | 17 | 50 | 31 |
| <i>MP Bundelkhand</i> | 50 | 14 | 3 | 9 | 53 | 21 |
| <i>MP</i> | 38 | 18 | 3 | 26 | 40 | 14 |

Source: District-wise Land Use Statistics, Directorate of Economics & Statistics, Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India, May 2008. Percentages derived from absolute figures and rounded off to nearest integer. Neg=<1%

The quality of irrigation (amount of water available at required intervals, according to crops and stage of crop growth) in Bundelkhand is poor due to rainfall pattern and unfavorable geological and topographical conditions which limit water availability, and poor maintenance of tanks and canals.

Flora and Fauna in Bundelkhand

The flora of Bundelkhand is of the tropical dry deciduous type. The Bundelkhand region is rich in forest resources like babul, palash, tendu patta, mahua etc. A wide range of fish is found in Bundelkhand's rivers.

People

Bundelkhand has a (Census 2001) population of around 15.5 million. The level of urbanization in the region is very low. In most of the districts, over three-fourths the population was living in rural areas, according to Census 2001. The population in the region is pre-dominantly Hindu. Bundeli, also called Bundelkhandi, is the main language of Bundelkhand.



The Bundelkhand region is characterized by some of the lowest levels of per capita income and human development in the country. Literacy levels are poor, especially among women, and infant mortality is relatively high. Temporary and long-term out-migration of males from rural villages in search of alternative sources of livelihood has become increasingly common.

The per capita income in the region is one of the lowest in the country. The region is also characterized by a very low literacy rate, especially among women and high infant mortality. Human pressures on the existing natural resource base are compounded by livestock pressures: the human to cattle (or livestock) ratio is relatively high, almost 1:1, compared with a national ratio of 1:45. Lack of employment opportunities within the region has led to widespread migration, both temporary and long term, of rural youth.

Kol Community

The Kol community inhabits the marginal forest fringed lands in Uttar Pradesh. This community is the most backward and oppressed group in the region. The Kols fall under the Scheduled caste category and have not yet been recognized as a Scheduled tribe by the Government, which deprives them of the

benefits of Government schemes for STs. While the dominant groups, have the possession of all the fertile and irrigated tracts, the tribals have been marginalized to dry lands with shallow soil cover.

The Kols have been culturally and economically dominated for very long. Most of this community was kept as bonded labor and ill treated by rich landlords. This oppression has lasted for so long that the Kols had almost accepted it as their destiny and resigned to their fate. It is only after ABSSS started its work in the region that the Kols have become independent and confident and have acquired a positive outlook towards their future.

Traditionally, the Kol community has been pre-dominantly dependent on forests. Today, the three main occupations of the community are wood cutting, agriculture and collecting Non Timber Forest Produce. Widespread migration to cities like Satna, Delhi etc. is observed in the community owing to the lack of employment opportunities in the region.

Most of the Kols have no skills. The education and health status is very poor. The literacy rate among the adults in a village Mangawan, that has 330 Kol households, is as low as 0.7%. Most of the children in the community still suffer from malnutrition and the dwelling areas are quite unhygienic.

However, having been freed from bonded labor, the community is now hopeful of a bright future and is working hard to achieve the same.

Economy

Bundelkhand ranks amongst the least developed regions of the country. The levels of industrialization and urbanization in the region are extremely low. Agriculture is still the dominant occupation. There are only two large manufacturing units in the entire region. No small or cottage industry in the region enjoys a large market outside. The potential of tourism has also not been realized well.

Percentage-wise breakup of main workers (Census 1991, 2001) (Census 2001 defined a 'main worker' as one who had worked for the major part of six months or more in the year preceding the census household survey. 'Work' was defined as 'participation in any economically productive activity', with or without compensation.)

| District | Cultivation | | Agri labor | | Household industry | | Other work | |
|------------|-------------|------|------------|------|--------------------|------|------------|------|
| | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 | 1991 | 2001 |
| Jhansi | 46.1 | 44.6 | 16 | 10.6 | 5.1 | 5.5 | 32.7 | 39.3 |
| Lalitpur | 70.9 | 68.5 | 10.5 | 7 | 2.3 | 2.8 | 16.4 | 20.7 |
| Jalaun | 54.8 | 50.6 | 23.6 | 18.9 | 2 | 3.4 | 19.5 | 26.4 |
| Hamirpur | 50.6 | 50 | 31.1 | 22.2 | 3 | 3 | 15.3 | 24.5 |
| Mahoba | H | 54.4 | H | 17.7 | H | 3 | H | 23.5 |
| Banda | 59.2 | 54.6 | 26.7 | 20.4 | 2.4 | 3 | 11.8 | 21.4 |
| Chitrakoot | B | 66.2 | B | 18.4 | B | 2.4 | B | 12 |
| Datia | 63 | 63.3 | 12.9 | 11.5 | 2.5 | 1.8 | 21.7 | 23 |
| Chhatarpur | 59.6 | 59.6 | 20.6 | 12.7 | 3.7 | 3.6 | 16.1 | 23.6 |
| Tikamgarh | 73.4 | 68.9 | 11.9 | 9.6 | 2.8 | 3 | 12 | 18.2 |
| Panna | 55.4 | 53.6 | 27 | 21.5 | 3.2 | 2.7 | 14.3 | 20.6 |

| | | | | | | | | |
|---------------|------|------|------|------|------|------|------|------|
| Damoh | 36.1 | 32.8 | 26 | 24.4 | 15.5 | 20.1 | 22.3 | 22.7 |
| Sagar | 32.6 | 30.3 | 22.6 | 20.9 | 20.7 | 21 | 24 | 27.5 |
| UP average | | 47 | | 15.1 | | 5.3 | | 32.6 |
| MP average | | 46.6 | | 20.3 | | 3.8 | | 29.2 |
| India average | | 33.9 | | 20.3 | | 3.9 | | 42.7 |

In 2001, approximately 85% of the population was dependent on agriculture mainly.

Employment sources of non-agricultural main workers in UP Bundelkhand (Census 2001)

| | Jhansi | Jalaun | Lalitpur | Hamirpur | Mahoba | Banda | Chitrakoot | Total | % of total |
|--|--------|--------|----------|----------|--------|--------|------------|--------|------------|
| Total main workers | 207396 | 106953 | 70005 | 77433 | 55776 | 106700 | 45100 | 669363 | |
| <i>Employed in:</i> | | | | | | | | | |
| Agriculture related service activities | 5657 | 4569 | 2293 | 5319 | 3411 | 5622 | 2559 | 29430 | 4.4 |
| Forestry | 108 | 267 | 413 | 136 | 102 | 163 | 1551 | 2740 | 0.4 |
| Fishing | 603 | 68 | 117 | 249 | 174 | 525 | 81 | 1817 | 0.3 |
| Mining and quarrying | 1621 | 203 | 4379 | 2103 | 2916 | 2597 | 1830 | 15649 | 2.3 |
| Manufacturing | 45586 | 23726 | 14935 | 17761 | 11709 | 26282 | 9457 | 149456 | 22.3 |
| Construction | 15233 | 8800 | 5745 | 8134 | 8548 | 12756 | 3241 | 62457 | 9.3 |
| Trade and repair | 37087 | 24036 | 5082 | 16349 | 10358 | 22238 | 9365 | 124515 | 18.6 |
| Hotels and restaurants | 1511 | 853 | 824 | 551 | 492 | 950 | 458 | 5639 | 0.8 |
| Financial intermediation | 1511 | 1148 | 654 | 695 | 490 | 1107 | 244 | 5849 | 0.9 |
| Transport, storage and communications | 22767 | 6890 | 6751 | 5153 | 4436 | 6547 | 2928 | 55472 | 8.3 |
| Other business activities | 14970 | 9074 | 3481 | 2850 | 2122 | 5793 | 2440 | 40730 | 6 |
| Public administration and defence | 35654 | 10962 | 8712 | 5688 | 3050 | 8126 | 4123 | 76315 | 11.4 |
| Education | 11128 | 10120 | 4220 | 5969 | 3800 | 7795 | 3434 | 46466 | 6.9 |
| Health and | 3433 | 1593 | 1204 | 2101 | 1362 | 2596 | 720 | 13009 | 1.9 |

| | | | | | | | | |
|---------------|--|--|--|--|--|--|--|-----|
| social work | | | | | | | | |
| Other sectors | | | | | | | | 5.9 |

Employment sources of non-agricultural main workers in MP Bundelkhand (Census 2001)

| | Datia | Tikamgarh | Chhatarpur | Panna | Damoh | Sagar | Total | % of total |
|--|-------|-----------|------------|-------|--------|--------|--------|------------|
| Total main workers | 58634 | 83770 | 124268 | 62525 | 147961 | 310741 | 787899 | |
| <i>Employed in:</i> | | | | | | | | |
| Agriculture related service activities | 5794 | 7077 | 7668 | 3930 | 4946 | 8152 | 37567 | 4.8 |
| Forestry | 280 | 639 | 1092 | 3349 | 1970 | 4059 | 11389 | 1.4 |
| Fishing | 111 | 591 | 141 | 38 | 1970 | 295 | 3146 | 0.4 |
| Mining and quarrying | 541 | 898 | 830 | 5531 | 788 | 2577 | 11165 | 1.4 |
| Manufacturing other than beedi | 9306 | 16743 | 24635 | 11407 | 19638 | 33286 | 115015 | 14.6 |
| Beedi | 1742 | 2224 | 5375 | 1219 | 60888 | 125438 | 196886 | 25 |
| Construction | 7865 | 10557 | 16008 | 5943 | 8003 | 19376 | 67752 | 8.6 |
| Trade and repair | 10849 | 14681 | 22871 | 9040 | 16868 | 35975 | 110284 | 14 |
| Hotels and restaurants | 767 | 1073 | 2073 | 1078 | 2400 | 4832 | 12223 | 1.5 |
| Financial intermediation | 621 | 906 | 1142 | 500 | 1032 | 2193 | 6394 | 0.8 |
| Transport, storage and communications | 3812 | 3192 | 7763 | 3949 | 5842 | 15457 | 40015 | 5 |
| Other business activities | 1507 | 1930 | 3512 | 1618 | 1837 | 4267 | 14671 | 1.9 |
| Public administration and defence | 6153 | 7261 | 11135 | 5204 | 7602 | 23095 | 60450 | 7.7 |
| Education | 4364 | 7497 | 9720 | 5831 | 6753 | 14027 | 48192 | 6.1 |
| Health and social work | 1777 | 3094 | 4040 | 2175 | 3139 | 5506 | 19731 | 2.5 |
| Other sectors | | | | | | | 33019 | 4.2 |

Beedi manufacturing is the single largest source of non-agricultural employment.

The female work participation in the region is significantly high. According to Census 2001, about 30% of the total female population in Bundelkhand is working, much greater than the national average of 25% and the average of 16% for the state of UP. On the one hand, this is an indication of the empowerment of women in the region, on the other, this is a sign of greater economic vulnerability and lower enrollment of girls in schools.

Infrastructure

Amenities in villages and households:

| | Inhabited villages | Villages with | | | | | | | |
|-----------------------|--------------------|----------------|---------------|------------------|-----------------------|---------------------------|------------|-------------|-------------------|
| | | Primary School | Middle School | Secondary School | Primary health centre | Primary health sub-centre | P&T office | Bus service | Pucca road access |
| Jhansi | 750 | 464 | 203 | 40 | 15 | 41 | 381 | 146 | 435 |
| Lalitpur | 697 | 569 | 155 | 14 | 13 | 19 | 247 | 201 | 300 |
| Jalaun | 937 | 822 | 259 | 77 | 22 | 52 | 475 | 139 | 514 |
| Hamirpur | 521 | 464 | 189 | 24 | 17 | 65 | 245 | 120 | 353 |
| Mahoba | 421 | 358 | 99 | 11 | 8 | 24 | 134 | 54 | 197 |
| Banda | 682 | 590 | 246 | 35 | 14 | 33 | 243 | 112 | 374 |
| Chitrakoot | 545 | 430 | 135 | 38 | 17 | 18 | 124 | 57 | 211 |
| <i>UP Bundelkhand</i> | 4553 | 3697 | 1286 | 239 | 106 | 252 | 1849 | 829 | 2384 |
| Datia | 551 | 512 | 128 | 63 | 9 | 92 | 408 | 129 | 197 |
| Chhatarpur | 1080 | 970 | 238 | 98 | 28 | 152 | 252 | 274 | 345 |
| Tikamgarh | 865 | 808 | 229 | 172 | 17 | 149 | 196 | 220 | 276 |
| Panna | 955 | 811 | 200 | 87 | 15 | 109 | 194 | 159 | 241 |
| Damoh | 1175 | 910 | 169 | 61 | 14 | 159 | 288 | 229 | 372 |
| Sagar | 1901 | 1427 | 320 | 102 | 24 | 222 | 420 | 360 | 436 |
| <i>MP Bundelkhand</i> | 6527 | 5438 | 1284 | 583 | 107 | 883 | 1758 | 1371 | 1867 |

Source: District-wise basic data sheets of Census 2001. Figures for UP Bundelkhand and MP Bundelkhand derived by aggregating district figures

It is extremely shocking to see that all the villages do not even have Primary schools. Middle schools are present in only half of the total number of villages and secondary schools are almost a rarity. Again, the ratio of Primary Health centers in the villages is more than 1:50 in most cases which implies that 1 Main Health centre caters to more than 50 villages!!

Most of the villages do not have a proper bus service and some of them do not even have a puce road access.

Another shocking fact is that even today, less than 25% of the households in the UP Bundelkhand districts (except for Jhansi) have an electricity connection! Toilets in houses are another rare occurrence. Less than 35% of the households have toilets even in the more developed districts of Jhansi, Jalaun, etc. In the backward ones like Chitrakoot and Tikamgarh, this ratio is as low as 12.5% and 11% respectively.

Amenities in Households (Census 2001)

| District | Households with electricity (%) | Households with toilets (%) |
|-----------------|--|------------------------------------|
| Jhansi | 43.3 | 35.2 |
| Lalitpur | 20.3 | 17.2 |
| Jalaun | 26.3 | 35.4 |
| Hamirpur | 17.2 | 24.4 |
| Mahoba | 15.8 | 21.8 |
| Banda | 15.2 | 20.2 |
| Chitrakoot | 16.9 | 12.5 |
| Datia | 67.4 | 21.4 |
| Chhatarpur | 46.6 | 15.3 |
| Tikamgarh | 49.3 | 11 |
| Panna | 34.6 | 11.1 |
| Damoh | 64.7 | 13.9 |
| Sagar | 69.2 | 21.3 |

*Source: Census 2001 data quoted in
Ranking and Mapping of Districts
Based on Socio-economic and Demographic Indicators,
International Institute for Population Sciences (IIPS),
Mumbai, 2006*

The rail connectivity of UP Bundelkhand and a few districts in MP Bundelkhand is, however, good. Compared to the total area of these districts, the area covered by rail lines is small, but easy access is offered to cities like Delhi, Mumbai, Bhopal and Jabalpur.

The road connectivity is however poor. Regular bus services are available in only relatively large urban centers. Other small villages with puce road access are serviced by rickshaws and jeeps. These vehicles are generally, poorly maintained and overly crowded. The number of passengers carried usually is two to three times the seating capacity.

Education

According to Census 2001, approximately 20% of the villages in both UP and MP Bundelkhand did not have primary schools. In UP Bundelkhand, there was roughly 1 middle school per 3 villages. However, secondary schools were present in only less than 10% of the villages. Moreover, a shocking fact is that in the entire Bundelkhand region with over 11,000 villages, there were only 35 villages with colleges.

As a result, the levels of literacy and higher education have suffered badly in the region.

Educational attainment of literates (2001)

| District | Total literates | % Matric/ Higher Secondary/ Diploma | % Graduates Postgraduates |
|------------|-----------------|-------------------------------------|---------------------------|
| Jhansi | 958769 | 21.2 | 8.4 |
| Lalitpur | 384491 | 12 | 4.6 |
| Jalaun | 782033 | 9 | 6.6 |
| Hamirpur | 490606 | 16.5 | 5.2 |
| Mahoba | 305662 | 14.6 | 4.9 |
| Banda | 670986 | 15.8 | 5.8 |
| Chitrakoot | 392997 | 13.2 | 3.8 |
| Datia | 373358 | 11.9 | 4 |
| Tikamgarh | 542498 | 14 | 3.5 |
| Chhatarpur | 631370 | 13 | 4.9 |
| Panna | 420622 | 11.5 | 3.3 |
| Damoh | 548331 | 12.5 | 4 |
| Sagar | 1118993 | 14.4 | 5.8 |

Source: District-wise basic data sheets of Census 2001. Percentages derived from absolute figures and rounded off.

Furthermore, the quality of education offered at each level is highly questionable. Absenteeism among staff is a common phenomenon in almost all the villages.

Another problem faced by the rural masses in educating their children is the purchase of uniforms, books, etc. A bigger problem faced by SC/ST parents is that they are forcibly prevented from sending their children to schools by the upper caste influential people in the villages. Moreover, maltreatment of SC/ST children in schools is a common occurrence.

Another important indicator of development of any region is female literacy. Some of the districts in UP Bundelkhand like Lalitpur have female literacy rate as low as 33.3%. However, in Chitrakoot, Jhansi and Jalaun, the female literacy rates were significantly higher than the state average of 42%.

Female Literacy in Bundelkhand (Census 2001)

| District | Female literacy (%) |
|------------|---------------------|
| Jhansi | 51.2 |
| Lalitpur | 33.3 |
| Jalaun | 50.7 |
| Hamirpur | 40.7 |
| Mahoba | 39.6 |
| Banda | 37.1 |
| Chitrakoot | 50.3 |
| Datia | 62.5 |
| Chhatarpur | 39.4 |
| Tikamgarh | 41 |
| Panna | 47.8 |
| Damoh | 47.5 |
| Sagar | 54.5 |

Source: Census 2001 data quoted in Ranking and Mapping of Districts Based on Socio-economic and Demographic Indicators, International Institute for Population Sciences (IIPS), Mumbai, 2006

Health Services

According to Census 2001 data (depicted in the table), there is 1 Primary Health Centre catering to about 50 villages in most districts in Bundelkhand region. This essentially means that 1 PHC serves a rural population of more than 50,000!! By Government of India norms, one primary health centre (PHC) should serve a rural population 30,000 people. Thus, there still seems to be wide gap between the requirement and availability.

Another problem with the health services in the region is the lack of trained staff and adequate supply of medicines and injections. Besides, the health centers face a big problem in terms of staff absenteeism. Moreover, the Health centers are mostly located quite far away from remote villages that are already poorly connected. The Public Health Care System in the region has also miserably failed with respect to prevention and control of contagious and infectious diseases, the most common among these being filariasis, elephantiasis and malaria. Owing to these reasons, the rural families have taken recourse to quacks, ojhas and traditional healers. These quacks have little or no education. They dupe the innocent villagers and loot money from them.

The percentage of births in hospitals ('institutional deliveries') or at home with assistance of skilled professionals is very low. Among poor households in rural areas of UP Bundelkhand, the percentage of hospital deliveries is almost zero. Also, there is little or no care for expectant mothers. All this has led to high mortality rates.

Another related problem is the low presence of Anganwadis in the region. over 60% of rural households in UP either stated that there was no anganwadi in their village, or they did not know of its existence. Only 10% of rural children in the age group 0-6 years went to an anganwadi.



ABSSS: STRUGGLE & ACHIEVEMENTS

Akhil Bhartiya Samaj Sewa Sansthan (ABSSS) is a voluntary organization (registered under Societies Registration Act, 1860) working for the upliftment of the Kol tribal community in Chitrakoot district of Uttar Pradesh Bundelkhand region. The organization started off with three non-formal schools for Kol children in 1978. It is today, taking care of more than 4000 Kol families in 60 gram panchayats of the district.

“ABSSS believes in “Rachna (Creation) and Sangharsh (Non-violent struggle)” to empower the most marginalized and exploited sections. Hence, “Antya Ka Uday” – Rise of the last has been the core developmental value statement of ABSSS. This gets reflected in all developmental interventions and initiatives to build a society where adivasis, dalits and women get equal opportunity (socially, educationally, economically and culturally) to live and work with dignity. In other words, it is undertaking all possible action for the regeneration of self-esteem and confidence along with re-assertion of the tribal and dalits identity, so that they can control their own destiny.”

When ABSSS started its work in the Patha region, under Mr. Gaya Prasad Gopal (affectionately called Pitaji), the situation of the Kol community was extremely bad. Most of the kols had been unfairly deprived of their land. They were working as bonded laborers for big landlords and forest contractors. They were exploited in every possible way by these landlords and the contractors. Moreover, the kols were obliged to work for their ‘masters’ and had no say in where and how they wanted to work. Even Kol women were forced to toil in the fields and homes of rich ‘dadus’.

Over the last 30 years, ABSSS has toiled hard to improve the quality of life of the Kol community.

Major accomplishments of ABSSS over the last 30 years:

- Ensuring that most of the landless kols receive land: This was done in two ways:
 - a) Getting back the land rights of the Kol community from the dadus who had unfairly occupied their land
 - b) Pressurizing the administration to speed up the process of redistribution of Village Community and
- Freedom from bondage and rehabilitation – Though Government records stated that there were no bonded laborers in the region, the reality was that a majority of the kols were still slaves to rich landlords. ABSSS conducted surveys to collect the exact information on slavery and pursued the Government to release and rehabilitate them
- Strengthening Panchayati Raj Institutions
- Development of schools to educate the community
- Formation of Self Help Groups to facilitate the process of borrowing and lending
- Development and maintenance of Soil and Water Management Systems for improving agriculture
- Empowerment of women

Even after so many years, the organization is working with the same zeal to improve the plight of the Kols. The work of ABSSS is bound to slowly but surely steer the region towards progress.

RURAL COMMUNITIES AND LIVELIHOOD INTERVENTIONS

The key livelihood concerns as expressed by local community during our interaction with them were food security, stable house, medical facilities and education for their children.

Dr.Phansalkar in his paper 'Decision Making by Rural Families: The 5 As' highlights that rural households perhaps do not tend to have 'maximizing type' objectives and hence do not necessarily try to maximize their returns on land, labor or investment. In addition, the level of acceptable risk and the amount of leisure they are willing to sacrifice also influence the objectives that a rural household pursues.

It is further elucidated in the paper that the conditions under which they attempt to achieve these objectives are – Assets (physical assets, quality of asset, its work or carrying capacity), Access (to information, state agencies, banks etc.), Assurances, Abilities and Attitudes (which vary from individual to individual).

While attitudes are a matter of a personal 'human' choice, and may not be tackled directly in a defined period of time, livelihood intervention strategies can hope to increase the scope of other conditions of decision making which may contribute to improving the quality of lives of the rural communities. These may be through facilitation in increasing a physical asset base for a farmer (land, implements etc.), providing information on better farming techniques, easier access to credit, developing skills so that tribals can engage in value-addition activities and earn more income.

Interventions may also be along a sub-sector and historically it has been seen that the most significant interventions have actually been around a sub-sector. Sub-sector interventions attempt to enhance the share of the primary producers in a rupee of the ultimate consumer.

A critical aspect to be kept in mind is the sustainability of any intervention and its ability to withstand resource constraints and risks which may occur in the future. It is noted that interventions that do not introduce new and unmanageable risks, address a key bottleneck or mitigate a key stress or risk are more likely to do well ('Synthesis of Case Studies in Livelihood Enhancement in N.E.India' – Mayuri Hazarika and Dr.S.J.Phansalkar).

Bundelkhand is a tough region for agriculture due to mix of geographic, social and economic factors. Yet, a large percentage of population is dependent on it for their livelihood and food security.



This region is characterized as low rainfall and dry with vast marginal lands. Irrigation facilities are sparse. A sizable area (84%) has been allocated to food grains. The yield of most crops in the region is low as the levels of adoption of modern techniques of agriculture here are very low. The region lags far behind in adoption of improved varieties of and application of fertilizers.

In the list of hundred agriculturally most distressed districts in India includes three districts from Uttar Pradesh – Banda, Chitrakoot and Hamirpur. All of them lie in the region of our study in Bundelkhand.

The following pages elucidate the agricultural landscape of the region further.

1. Water Scarcity and Lack of Irrigation System

A little over 60% of the area here is cultivated, but compared to other parts of Uttar Pradesh; the sub-zone has less developed irrigation facilities leading to high soil erosion and low productivity. Less than 25% of the cultivated area is irrigated as against a U.P. State average of nearly 60%.

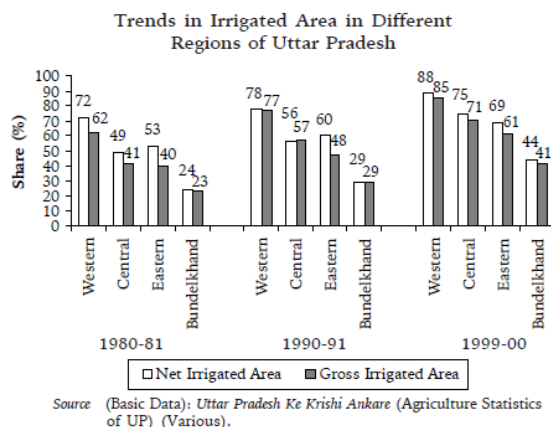
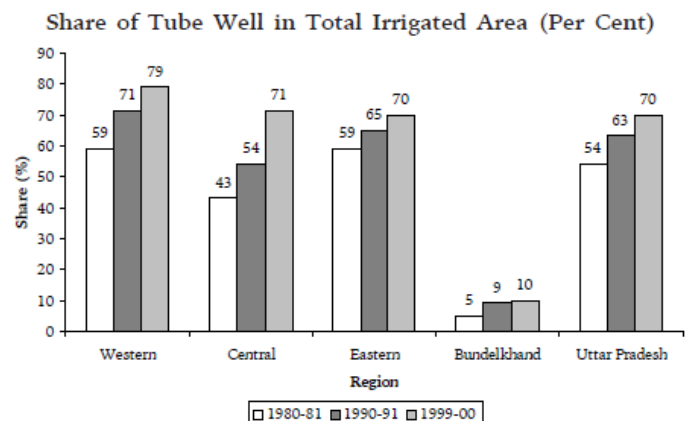


FIGURE 1.8



All the water bodies (rivers, lakes, ponds) in the region dry up by January – February and a drinking water ‘crisis’ begins soon after.

This means the agriculture here is largely rain-dependant and if the **monsoons** are poor (as in the current year, 200mm rainfall as against a normal precipitation of about 1000mm annually), there is little or no availability of water for irrigation of crops. The water table here is also depleting by the year due to repeated poor monsoons and lack of facilities for water harvesting.

Since the **size of the landholdings is very small** for a majority of the farmers (less than 2 ha.), a failure of monsoon adversely affects the farmer’s food security.

2. Low Soil Fertility and Land Productivity

The soil in this region is rocky and not deeper than 4 ft. in most places. This doesn’t allow for easy agriculture. The rocks found here too are loosely sedimented and not strong enough to be utilized for any other purpose.

Low rainfall and years of deforestation along with a lack of facilities for checking water run-off has caused widespread soil erosion depleting its fertility further. As a consequence land productivity is also very low in the region.

The proportion of **wastelands** is very high at about 37% in this sub-zone.

3. Uneven Terrain

A large part of the land in the region is uneven. The elevation of different patches is different and also, the soil consistency differs. Thus, to bring this land under agriculture is quite a difficult task.

4. Low Diversification of Crops and Tendency to Grow only for Food Security

The common tendency amongst tribal farmers here is to grow wheat and paddy largely for their self-consumption and be satisfied with it, without realizing that they may actually be losing out on money in the process.

Area under **cultivation of cash crops** much lower in Bundelkhand in comparison to other parts of Uttar Pradesh as indicated by the data below -

Table 3. Area of major field crops in Madhya Pradesh

| | | (Area in '000 ha) | | | | | |
|-------|----------------------|-------------------|-----------------|------------------------|-------------|--------------------|-----------------|
| Major | | Kymore plateau | Vindhya plateau | Central Narmada valley | Gird region | Bundelkhand region | Satpura plateau |
| 1. | Rice | 476.7 | 218.2 | 23.3 | 43.2 | 41.1 | 51.5 |
| 2. | Wheat | 585.1 | 889.8 | 417.2 | 598.5 | 279.6 | 173.0 |
| 3. | Maize | 49.4 | 30.0 | 4.9 | 47.6 | 3.6 | 69.5 |
| 4. | Jowar | 57.7 | 54.3 | 12.7 | 126.4 | 43.1 | 118.2 |
| 5. | Bajra | 991.0 | 67.0 | 186 | 91.35 | — | — |
| 6. | Gram | 268.1 | 543.6 | 362.6 | 376.2 | 128.5 | 53.5 |
| 7. | Soybean | 154.3 | 557.9 | 469.0 | 178.3 | 92.04 | 206.25 |
| 8. | Rapeseed and mustard | 16.83 | 8.17 | 1.18 | 460.3 | 29.5 | — |
| 9. | Sugarcane | 2.2 | 17.7 | 32.5 | 29.1 | 8.1 | 15.0 |
| 10. | Groundnut | 4.4 | 2.75 | — | 53.4 | 19.5 | 32.0 |
| 11. | Potato | 50.7 | 34.5 | 11.8 | 31.5 | 25.7 | 48.2 |

Crop Preferences according to Importance in Different Regions of Uttar Pradesh, TE 1999/2000

| Region | Crop Preferences | | | |
|-------------|---------------------|---------------------------|---|--|
| | High (> 25% of GCA) | Medium (10-25% of GCA) | Low (5-10% of GCA) | Least (< 5% of GCA) |
| Western | Wheat | Rice, Sugarcane | Pearl Millet, Maize, Rapeseed and Mustard | Barley, Chickpea, Pigeon Pea, Other Pulses, Oilseeds, Fruits and Vegetables |
| Central | Wheat, Rice | - | Maize, Sugarcane | Barley, Sorghum, Pearl Millet, Chickpea, Other pulses, Pigeon Pea, Oilseeds, Fruits and Vegetables |
| Eastern | Rice, Wheat | - | Other Pulses | Barley, Sorghum, Pearl Millet, Maize, Chickpea, Pigeon Pea, Oilseeds, Sugarcane, Fruits and Vegetables |
| Bundelkhand | Wheat | Chickpea and Other Pulses | Sorghum | Barley, Rice, Pearl Millet, Maize, Barley, Pigeon Pea, Oilseeds, Sugarcane, Fruits and Vegetables |

Source (Basic Data): *Uttar Pradesh Ke Krishi Ankare* (Agriculture Statistics of UP) (Various issues) and ICRISAT Database compiled by NCAP.

TABLE 1.15

Diversification of Agriculture in Different Regions of Uttar Pradesh, TE 1997/98

| Region | Commodity Groups | Share in Value of Output (%) | Share in Total Area (%) |
|-------------|---------------------|------------------------------|-------------------------|
| Western | Cereals | 53 | 67 |
| | Pulses | 4 | 5 |
| | Commercial Crops | 35 | 22 |
| | Fruits & Vegetables | 8 | 5 |
| Central | Cereals | 66 | 72 |
| | Pulses | 9 | 11 |
| | Commercial Crops | 21 | 14 |
| Eastern | Fruits & Vegetables | 4 | 4 |
| | Cereals | 77 | 81 |
| | Pulses | 8 | 11 |
| Bundelkhand | Commercial Crops | 8 | 2 |
| | Fruits & Vegetables | 7 | 4 |
| | Cereals | 38 | 42 |
| | Pulses | 54 | 49 |
| | Commercial Crops | 8 | 89 |
| | Fruits & Vegetables | 0.5 | 0.5 |

Source (Basic Data): *Uttar Pradesh Ke Krishi Ankare* (Agriculture Statistics of UP) (Various issues) and ICRISAT Database compiled by NCAP.

TABLE 1.13

Area, Production and Yield of Different Crops in Bundelkhand Region

| Crops | TE 1982/1983 | | | TE 1991/1992 | | | TE 1999/2000 | | |
|----------------------|--------------|--------|----------|--------------|--------|----------|--------------|---------|----------|
| | Area | Prod. | Yield | Area | Prod. | Yield | Area | Prod. | Yield |
| Rice | 92.11 | 63.50 | 689.36 | 85.95 | 71.16 | 827.96 | 74.87 | 79.85 | 1066.45 |
| Wheat | 537.02 | 672.72 | 1252.69 | 558.19 | 844.98 | 1513.78 | 580.04 | 1099.63 | 1895.77 |
| Sorghum | 257.33 | 152.31 | 591.89 | 212.62 | 170.96 | 804.07 | 153.30 | 131.16 | 855.60 |
| Pearl Millet | 33.00 | 13.77 | 417.17 | 27.35 | 20.49 | 749.21 | 23.75 | 24.20 | 1018.95 |
| Maize | 17.13 | 12.47 | 727.82 | 24.76 | 29.13 | 1176.47 | 17.39 | 16.70 | 960.38 |
| Barley | 41.63 | 43.33 | 1040.83 | 27.70 | 39.04 | 1409.10 | 19.01 | 33.24 | 1748.76 |
| Other Coarse Cereals | 41.63 | 43.33 | 1040.83 | 102.65 | 99.99 | 974.02 | 26.05 | 34.00 | 1305.30 |
| Chickpea | 521.05 | 401.95 | 771.41 | 510.52 | 345.88 | 677.52 | 411.92 | 276.18 | 670.45 |
| Pigeon Pea | 88.77 | 122.46 | 1379.52 | 71.38 | 90.99 | 1274.67 | 52.62 | 77.32 | 1469.55 |
| Other Pulses | 123.54 | 51.11 | 413.72 | 283.74 | 289.61 | 1020.71 | 485.72 | 410.72 | 845.59 |
| Groundnut | 2.69 | 2.00 | 742.26 | 17.20 | 13.88 | 807.13 | 34.02 | 31.69 | 931.35 |
| Sesamum | 14.41 | 1.19 | 82.83 | 14.77 | 2.02 | 136.99 | 24.36 | 3.41 | 140.16 |
| Rapeseed & Mustard | 21.38 | 9.20 | 430.46 | 21.93 | 13.41 | 611.34 | 30.64 | 17.42 | 568.53 |
| Linseed | 24.21 | 8.18 | 337.97 | 42.35 | 16.78 | 396.19 | 47.86 | 20.96 | 437.83 |
| Other Oilseeds | 15.89 | 7.73 | 486.47 | 39.33 | 18.26 | 464.28 | 22.17 | 13.79 | 621.99 |
| Sugarcane | 3.30 | 108.48 | 32840.57 | 3.96 | 150.14 | 37946.93 | 5.34 | 221.95 | 41543.94 |
| Cotton | | | | | | | 1.07 | 21.74 | 20260.66 |
| Potato | 1.57 | 26.34 | 16814.89 | 1.25 | 22.68 | 18098.40 | 0.64 | 7.99 | 12510.86 |
| Onion | 0.40 | 3.88 | 9628.10 | 0.60 | 6.88 | 11525.14 | 2.02 | 5.20 | 2575.91 |

Source (Basic Data): Uttar Pradesh Ke Krishi Ankare (Agriculture Statistics of UP) (Various issues) and ICRISAT Database compiled by NCAP.

Note: Area = '000 ha; Production = '000 tonnes; Yield = Kg/ha

TABLE 1.14

Annual Compound Growth Rates of Area, Production and Yield of Important Crops in Bundelkhand Region

| Crops | 1980-1989 | | | 1990-1999 | | |
|--------------------|-----------|-------|-------|-----------|--------|-------|
| | Prod. | Area | Yield | Prod. | Area | Yield |
| Rice | 0.86 | -1.73 | 2.64 | 1.31 | -1.58 | 2.94 |
| Wheat | 2.32 | 0.78 | 1.53 | 2.58 | -0.76 | 3.37 |
| Maize | 10.16 | 4.70 | 5.22 | -11.01 | -11.06 | 0.05 |
| Barley | -1.20 | -3.29 | 2.16 | -3.36 | -4.97 | 1.70 |
| Chickpea | -1.17 | 0.97 | -2.12 | -2.18 | -2.38 | 0.20 |
| Pigeon Pea | -2.30 | -2.73 | 0.43 | -0.81 | -3.51 | 2.80 |
| Total Cereals | 1.85 | 0.72 | 1.12 | 1.21 | -1.92 | 3.19 |
| Total Pulses | 2.00 | 1.89 | 0.11 | 0.09 | 0.98 | -0.89 |
| Total Foodgrain | 1.99 | 0.52 | 1.46 | 0.93 | -0.47 | 1.41 |
| Groundnut | 30.14 | 24.97 | 4.14 | 11.99 | 9.71 | 2.08 |
| Rapeseed & Mustard | -1.66 | -2.75 | 1.12 | 1.78 | 2.98 | -1.16 |
| Total Oilseeds | 9.15 | 4.73 | 4.22 | 7.66 | 5.75 | 1.80 |
| Sugarcane | 2.75 | 1.32 | 1.41 | 4.95 | 5.09 | -0.14 |
| Potato | -1.66 | -3.03 | 1.41 | 0.33 | -2.32 | 2.71 |
| Onion | 5.05 | 3.12 | 1.87 | 2.13 | 0.99 | 1.13 |

Source (Basic Data): Uttar Pradesh Ke Krishi Ankare (Agriculture Statistics of UP) (Various issues) and ICRISAT Database compiled by NCAP.

APPENDIX A-1.6

Cropping Pattern of Bundelkhand Region

| Crops | Share in GCA (%) | | |
|----------------------|------------------|--------------|--------------|
| | TE 1982/1983 | TE 1991/1992 | TE 1999/2000 |
| Rice | 4.46 | 4.07 | 3.42 |
| Wheat | 25.99 | 26.40 | 26.53 |
| Sorghum | 12.46 | 10.06 | 7.01 |
| Pearl Millet | 1.60 | 1.29 | 1.09 |
| Maize | 0.83 | 1.17 | 0.80 |
| Other Coarse Cereals | 2.02 | 4.86 | 1.19 |
| Chickpea | 25.22 | 24.15 | 18.84 |
| Pigeon Pea | 4.30 | 3.38 | 2.41 |
| Other Pulses | 5.98 | 13.42 | 22.22 |
| Groundnut | 0.13 | 0.81 | 1.56 |
| Sesamum | 0.70 | 0.70 | 1.11 |
| Rapeseed & Mustard | 1.03 | 1.04 | 1.40 |
| Linseed | 1.17 | 2.00 | 2.19 |
| Sunflower | 0.00 | 0.00 | 0.00 |
| Other Oilseeds | 0.77 | 1.86 | 1.01 |
| Sugarcane | 0.16 | 0.19 | 0.24 |
| Potato | 0.08 | 0.06 | 0.03 |
| Onion | 0.02 | 0.03 | 0.09 |
| Vegetables | 0.29 | 0.34 | 0.12 |
| Misc. Crops | 12.80 | 4.18 | 8.72 |

Source (Basic Data): Uttar Pradesh Ke Krishi Ankare (Agriculture Statistics of UP) (Various).

Our study will highlight certain alternative crops which have strong potential in the area which would provide food security as well as strong net profit for the farmers by simple changes in agricultural practices.

5. Annapratha – Open Grazing

One of the greatest threats to the crops here is open grazing by cattle, goats etc. Cattle from the lower part of Chitrakoot district and also, other districts like Satna and Banda are let loose in the fields instead of being provided proper fodder. This leads to the destruction and spoilage of crops.

To minimize their losses farmers often tend to sow too many seeds in small patch of land here which effectively results in an unhealthy yield. Most farmers have not yet been educated about the methods to protect their farms from this through boundary walls etc.

6. Deforestation and Depletion of Flora & Fauna

One of the prime sources of livelihood for the native tribal communities in this region is cutting and selling firewood. Besides, the forests here are a rich source of herbs, medicinal plants and products like Tendu Patta and Mahua which have high marketability.

Unfortunately, for decades these natural resources have been exploited indiscriminately by a nexus of corrupt politicians, administration and the exploitative rich of the region. This has led to widespread illegal deforestation and depletion of flora and fauna of the region.

7. Lack of Awareness about Scientific Agriculture

Due to poverty, illiteracy and innate backwardness of the region, there is little awareness amongst many farmers about using superior techniques of agriculture to further their produce.

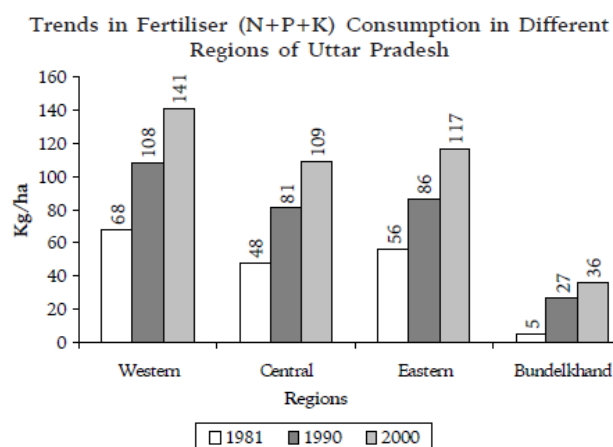
Degree of adoption of improved seeds, application of fertilizers and use modern agricultural equipment is extremely low here.

Existing infrastructure in the region with respect to seed production, storage, transportation and marketing is inadequate in terms of quality and quantity.

Table 14. Farm Power Sources under agro ecological region VIII (Madhya Pradesh)

| Items | Kymore plateau | Vindhyaal plateau | Central Narmada valley | Grid region | Bundelkhand region | Satpura plateau |
|-----------------------------|----------------|-------------------|------------------------|-------------|--------------------|-----------------|
| Agril. labourer (No./100ha) | 39.4 | 28.7 | 36.5 | 12.2 | 18.0 | 28.0 |
| Human energy (kW/ha) | 0.020 | 0.014 | 0.018 | 0.006 | 0.009 | 0.014 |
| Draft animal (No./100ha) | 77.0 | 39.7 | 30.3 | 32.0 | 51.2 | 59.4 |
| Animal energy (kW/ha) | 0.185 | 0.095 | 0.073 | 0.077 | 0.123 | 0.143 |
| Tractor (No./100ha) | 0.7 | 1.8 | 1.7 | 1.9 | 1.2 | 0.4 |
| Power tiller (No./100ha) | 0.01 | 0.01 | 0.01 | Negligible | Negligible | Negligible |
| Electric motor (No./100ha) | 5.7 | 6.5 | 2.5 | 3.9 | 5.6 | 12.3 |
| Diesel engine (No./100ha) | 0.8 | 2.1 | 1.0 | 1.7 | 2.0 | 0.5 |
| Mechanical energy (KW/ha) | 0.438 | 0.830 | 0.575 | 0.728 | 0.628 | 0.580 |
| Total energy (KW/ha) | 0.643 | 0.939 | 0.666 | 0.811 | 0.760 | 0.737 |

FIGURE 1.9



8. Undeveloped Agro-Processing Sector

While the potential for agro-processed goods is large in the region, the development of the same has been constrained by the following factors –

- Non-availability of suitable varieties for processing
- Lack of suitable backward and forward linkages leading to some units become unviable in the area
- Lack of cooling chambers and cold chains
- Inadequate funds and investments in the agro-processing sector
- Rudimentary knowledge of post-harvest techniques amongst farmers and traders
- Weak research in the area

9. Lack of Proper Market for Agricultural Produce

Infrastructure in Bundelkhand is woefully lacking in terms of transport, storage and marketing facilities. There isn't even one cold storage in the entire Chitrakoot Mandal comprising of four districts.

Purchasing power of a majority of people here is low due to low-level of economic development. This has negatively affected agriculturists as well who are not able to reap sufficient benefits for their hard work.

In nutshell, this is a very difficult region to practice agriculture efficiently. Organizations like ABSSS have made strong efforts to improve the state of agriculture in the region through their various projects which are aimed at slowly but surely making agriculture a viable means of earning a livelihood for the local community.

AGRICULTURE: ANALYSIS & RECOMMENDATIONS

1. RABI SEASON: PROMOTION OF MORE PROFITABLE, ALTERNATIVE CROPS TO WHEAT – MUSTARD, GRAM, BARLEY AND LINSEED

Losses in Wheat

The most important crop of this season grown in this region is wheat cultivated by nearly all the farmers on large tracts of land.

The following is an **analysis of the costs** involved in growing **wheat** on one hectare land –

| Activity | Cost/ha (Rs.) |
|--|---------------|
| Preparation of Land <i>5 ploughings</i> | 3000 |
| Seed Cost | 3500 |
| Sowing Labour | 600 |
| Irrigation <i>5 times</i> | 9000 |
| Fertilizer <i>3 bags Urea, 2 bags DAP, 60-70 k and Potash</i> | 4000 |
| Harvesting | 1200 |
| Threshing | 7000 |
| Total cost | 28,300 |

Optimistic Scenario –

| | |
|---|-----------------|
| Yield | 35 qt. |
| Revenue Generated <i>@Rs.1000/qt.</i> | Rs.35000 |
| Maximum Potential Savings | Rs.6700 |

Commonly Observed/Realistic Scenario –

| | |
|---|------------------|
| Yield | 13 qt. |
| Revenue Generated <i>@Rs.1000/qt.</i> | Rs.13000 |
| Loss | -Rs.15300 |

35 qt./ha is an optimistic figure for wheat yield in the region. **Commonly observed yield** in the region was found to be around **4-5 qt./ac. (10-13 qt./ha)** which is far less than the potential yield of 10-16 qt./ac. (25-40 qt./ha) in which case he **ends up making a loss.**

Even in the ‘optimistic’ scenario his savings are less than Rs.7000 which too would go into negative after discounting for his family’s consumption. It is clearly evident this way, why **most farmers involved in the cultivation of wheat are heavily under debt.**

Profitable Alternatives to Wheat

1. Mustard/Sarson

| Parameter | Mustard | Wheat |
|-------------------------------|-----------------|-----------------|
| Potential Yield in Region | 20-25 qt./ha | 35 qt./ha |
| Market Price | Rs.3000/qt. | Rs.1000/qt. |
| Potential Revenue | Rs.75000 | Rs.35000 |
| Seed Cost | Rs.40/kg | Rs.60/kg |
| Irrigation Requirement | Rain-fed | 4-5 times |
| Oil Content | 48-50% | |

The **advantages of cultivating mustard in lieu of wheat** are as follows –

- i) Much higher revenue generation: Rs. 75000/ha compared to Rs.35000/ha for wheat (optimistic case). Commonly achieved revenue is Rs.10000-13000/ha.
- ii) Lower seed cost: Rs. 40/kg compared to Rs.60/kg for wheat
- iii) Less irrigation
- iv) Less fertilizer requirement
- v) Less labor required
- vi) Can be processed into mustard oil and sold as a branded product

2. Gram/Chana

The economics of gram cultivation are similar to mustard and can fetch much higher revenue in place of wheat.

- i) Gram is a **leguminous crop** and thus, requires very less fertilizer

- ii) **Less Irrigation** requirement – only once while wheat requires 4 irrigations
- iii) **Higher market price:** Rs.2500 – 3000/qt.

3. Jau/Barley

Even though it is grown in small quantities, barley can also be a useful cash crop in the region. Its salient features are as follows –

- i) **Short-cycle crop:** Takes 100-105 days to be ready for harvesting and can be harvested by February.
- ii) Jau is an **input to the distilleries** and hence has **high marketability**
- iii) Market price is around Rs.900/qt.; only Rs.100/qt. less than wheat
- iv) Requires **single irrigation** and less labor
- v) Easily achievable output is 10-12 qt./ha here, while the potential yield can be as high as 40-60 qt./ha

4. Alsi/Linseed

Alsi can be grown in areas where nothing else grows on the farmland. It can grow in clayey soils. It can also give yields to the tune of **8 qt./ha** and can serve as **an input cash crop to paints and oils industry.**

Despite higher cost, longer crop cycle and much larger effort, farmers continue to grow wheat here in large numbers for the purpose of food consumption. There is a misconception amongst the locals that they won't have any wheat to eat unless they grow it themselves. They are hence **averse to purchasing wheat from the market for domestic consumption and are satisfied with even a loss made on wheat farming, as long as they don't need to buy it from the market.**

This mentality needs to change and they need to be educated in this regard. **Crops like Mustard, Gram, Jau and Alsi present profitable alternatives in the Rabi season and their cultivation needs to be promoted.**

2. KHARIF SEASON: RICE INTENSIFICATION, VEGETABLE FARMING AND SESAME CULTIVATION

The Kharif season holds **potential for transforming lives in the farming community** here. At present, cultivation in Kharif is not done strongly enough to realize the true potential of the same for the region.

The main advantage of Kharif crops is they are **short duration crops of 90-100 days**. The soil at that time retains enough moisture during the July-Oct period to promote a good crop.

There are **three-major steps** which can be taken in Kharif to enable enhanced livelihood support for the farming community –

- a. Cultivation of paddy through System of Rice Intensification (SRI)
- b. Promotion of Til/Sesame crop
- c. Promotion of vegetable farming

a. Paddy Cultivation through SRI

Consider the basic economics of traditional paddy cultivation in the region –

| Activity | Cost/ha (Rs.) |
|---|---------------------|
| Preparation of Land <i>3 ploughings x Rs.600</i> | 1800 |
| Seed Cost <i>Rs.25/kg x 80 kg/ha</i> | 4000 |
| Sowing Cost <i>Traditional Broadcasting method – 3 Man Days (MD)</i> | 300 |
| Ploughing <i>Another Round</i> | 600 |
| Inter-culturing <i>20 MDs x Rs.100/MD</i> | 2000 |
| Harvesting <i>20 MDs x Rs.100/MD</i> | 2000 |
| Total Cost | Rs. 10,700 |
| Yield | 10-12 qt./ha |
| Selling Price | Rs.700/ha |

| | |
|----------------------|-----------------|
| Total Revenue | Rs.9400 |
| Net Loss | -Rs.1300 |

It is evident that despite proper hard work and effort growing paddy is not profitable. As in the case with wheat, the farmers continue to grow paddy to avoid buying it from the market for domestic consumption.

However, if paddy is cultivated in a scientific manner (SRI) which may include two simple steps –

1. Transplanting instead of broadcasting
2. Maintaining sufficient gap between plants

This may **boost the output from 10-12 qt./ha to 30-40 qt./ha. In rainfed areas.**

A pilot project conducted by ABSSS done with only maintaining specified gaps in cultivation is likely to yield paddy in excess of 40 qt./ha. Hence, the farmers should be urged to grow paddy only with SRI in order to make it economically viable to them.

b. Promotion of Til/Sesame Farming

The table below illustrates the process of sesame farming and indicates why it is an attractive proposition –

| Activity | Cost/ha (Rs.) |
|--|----------------------|
| Preparation of Land & Sowing <i>4 ploughings x Rs.600</i> | 2400 |
| Seed Cost <i>Rs.100/kg x 4 kg/ha</i> | 400 |
| Fertilizer Cost | 1000 |
| Inter-culturing <i>Nikai-Budai - 15 MDs x 2 x Rs.100/MD</i> | 3000 |
| Harvesting <i>15 MDs x Rs.100/MD</i> | 1500 |
| Threshing <i>15 MDs x Rs.100/MD</i> | 1500 |
| Total Cost | Rs. 9,800 |
| Yield | 8 qt./ha |
| Selling Price (varies between Rs. 3000/qt and Rs.11000/qt according to the season) | Rs. 6000/qt |
| Total Revenue | Rs.48,000 |
| Net Profit | Rs.38,200 |

Sesame is a strongly marketable cash crop and hence farmers need to be urged to reduce the area under rice cultivation and grow sesame. Popularity for sesame has remained dormant in the region because of the domestic food insecurity of the locals, an area in which they need to be educated.

c. PROMOTION OF VEGETABLE FARMING

Traditionally, the focus of the agricultural activity in the area has been on achieving food security through the cultivation of cereals. Farmers are satisfied with cultivating as much cereal as is required for their consumption needs even if it is a drain on their financial and physical resources.

The **main reason for vegetable farming not being popular traditionally** is the **inertia of traditional cropping patterns & conflict with lifestyle**. Cultivation of vegetables does not fit into the traditional lifestyles of the tribal communities in the region.

Vegetable farming requires constant maintenance for a period of 2-3 months even during the night time (to protect against wild boar attacks etc.). The men-folk in the tribal families do not generally want to work extra at night and thus, shy away from growing vegetables. While the women are very hard working in the region, they are unable to spare time during the evening to attend to farming needs and hence initiative towards vegetable farming remains low.

However, what many people in the community do not appreciate is that with some effort for a period of few months, they can earn enough for the entire year. We found during the course of our study, the **vegetable cultivation can be a very profitable proposition. Vegetables of Kharif season in particular, are extremely lucrative.**

This point is further illustrated through simple calculations as follows. Let us consider a farmer agrees to cultivate vegetables like **Tomato and Green Chilly (Mirch)** in the Kharif Season on 1 Beegha land.

| | |
|---|---------------------|
| Area under vegetable cultivation | 1600 m ² |
| Space required by one tomato/mirch plant including inter-plant spacing (60 cm x 60 cm) | 0.36 m ² |
| No. of plants in area (1600/0.36) | 4400 |
| Approximate usable plants including spoilage | 4000 |
| Minimum no. of fruit from each plant – - Tomato - Mirch | 3 kg 2 kg |
| Total Output in Season from all plants – - Tomato | 12000 kg |

| | |
|---------------------------------|-------------|
| - Mirch | 8000 kg |
| Selling Price for both (approx) | Rs.15/kg |
| Potential Revenue | |
| - Tomato | Rs.1,80,000 |
| - Mirch | Rs.1,20,000 |
| Cost of Cultivation (approx.) | Rs.8,000 |
| Profit Potential | |
| - Tomato | Rs.1,72,000 |
| - Mirch | Rs.1,12,000 |

Similarly, consider the economics of **Raddish (Mooli)** cultivation in a small patch of land –

| | |
|---|---------------------|
| Area under cultivation | 100 m ² |
| Space required by one tomato/mirch plant including inter-plant spacing (20 cm x 20 cm) | 0.04 m ² |
| No. of plants in area (100/0.04) | 2500 |
| Total plants in a year (6 cycles of 2 months each) | 15000 |
| Selling Price per plant | Rs.1 |
| Potential Revenue | Rs.15,000 |
| Cost of Cultivation | Rs.8,840 |
| Profit Potential | Rs.6160 |
| Profit Potential from 1 Beegha land | Rs.1,00,000 |
| Likely Return to farmer from 100m ² land | 70% |

Similar calculations for several other vegetables clearly indicate that **vegetable farming can be a strong source of livelihood for the local community.**

SUMMARY OF POTENTIAL REVENUE AND FRUITING MONTHS FOR DIFFERENT VEGETABLES

| Vegetable | Cost/ac. (Rs.) | Yield (Qt./ac.) | Revenue/ac. (Rs.) | Profit Potential per Acre (Rs.) | Fruiting Months |
|--------------------|-----------------------|------------------------|--------------------------|--|---|
| Onion | 35,656 | 156 | 1,56,000 | 1,20,344 | Jun |
| Potato | 1,71,616 | 130 | 1,95,000 | 23,384 | Mar |
| Brinjal | 81,976 | 65-78 | 1,19,600 | 37,624 | Winter Fruit: Oct-Dec, Jan-Mar Summer Fruit: May-Jun |
| Tomato | 10,816 | 312 | 4,68,000 | 4,57,184 | Oct-Dec, Jan-Mar |
| Pumpkin | 10,696 | 130 | 1,04,000 | 93,304 | Apr, Oct |
| Raddish | 18,376 | 100 | 41,600 | 23,224 | Year-round |
| Cauliflower | 42,996 | 52 | 1,04,000 | 61,004 | Nov-Dec |
| Lauki | 78,036 | 130-150 | 1,88,500 | 1,10,464 | May-Jun, Sep-Oct |
| Palak | | 250 | 2,00,000 | | Oct-Jan |

As it is evident there are several vegetables which **can yield returns in excess of Rs.1 Lakh annually** by simple changes in agricultural practices.

Some other **advantages for vegetable cultivation in the region are –**

- i) Irrigation requirements during Kharif is much lower as there is some rainfall which can be retained in a farm pond, which is sufficient for vegetable irrigation and yield good returns as well.
- ii) Farmer does not need to allocate the entire land of his farm to vegetables. It is advisable that the farmer sets aside a small patch of his farm, 100 sq. mt. or even one beegha for growing vegetables and utilizes the remaining land for the cultivation of food grains.
- iii) Another advantage of growing vegetables in a small area is that it does not require much external labor. A household comprising of 4-5 working members

can easily manage the entire operation without hiring any external labor, thus, saving on the cost.

Some **new varieties** which have met with some success in the adjoining Satna district are Broccoli, Purple Cabbage, Red Cabbage and Mushroom.

3. PROMOTION OF SCIENTIFIC PRACTICES IN AGRICULTURE

Peculiar soil and water conditions in the area requires a greater promotion of scientific techniques of agriculture be it through better quality seeds, innovative irrigation techniques or cropping patterns. These are likely to ensure higher productivity with minimum expenditure of scarce natural resources.

Organizations like Krishi Vigyan Kendra (KVK) have developed new seeds, irrigation techniques, cropping patterns etc. specific to this area, which have shown good results and such knowledge needs to be imparted to benefit the entire community of the region.

A word of caution here is that the use of scientific techniques does not refer purely to the use of HYV seeds, chemical fertilizers or insecticides but ways to benefit agriculture in a sustainable manner which includes a mix of traditional wisdom and modern knowledge.

The following table illustrates the observed impact on productivity of various crops and vegetables in the region through promotion of modern techniques.

IMPACT ON PRODUCTIVITY OF COMMON CROPS IN THE REGION WITH USE OF SCIENTIFIC TECHNIQUES

| Crop | Overall Productivity in Region (qt./ha) | Current Productivity under Traditional Techniques (qt./ha) | Proven Potential Productivity with Modern Techniques (qt./ha) |
|-------------|--|---|--|
| Paddy | 10.05 | 9.74 | 18.42 |
| Arhar | 4.90 | 1.71 | 13.27 |
| Soyabean | 6.27 | | 12.86 |

| | | | |
|------------|-------|-------|--------|
| Wheat | 13.63 | 10.17 | 25.27 |
| Gram | 6.93 | 6.98 | 19.32 |
| Sesame | 2.75 | 11.19 | 8.25 |
| Vegetables | 48.10 | | 62.86 |
| Fruits | 82.56 | | 103.78 |
| Spices | 34.80 | | 42.87 |
| Jwar | | 2.76 | |
| Urad | | 0.69 | |
| Moong | | 0.72 | |
| Til | | 0.31 | |

Source: Traditional Productivity refers to actual yield data in villages like Paatin and Mangawan. Potential productivity with modern techniques is based on results of KVK initiatives across the region.

- a. Efficient Crop Rotation & Diversification:** Traditionally, crop cycles in the region have revolved around providing food security and maximizing the benefit of rainfall. However, agricultural scientists have developed suitable crop rotation plans for this region which go beyond just this and can also result in increased income for the household.

Some such patterns developed and recommended by KVK in the region are -

| Kharif (Jul-Oct) | Rabi (Oct-Mar) | Jayad (Apr-Jun) | Possible Net Profit per Acre |
|-----------------------------|---------------------------|----------------------------|---|
| Tomato | Matar | Lobhia | Rs.26,600 |
| Lobhia | Bandgobhi | Bhindi | Rs.23,600 |
| Lobhi | Lahsun | Mooli | Rs.30,400 |
| Adrak/Halidi | | Lobhia | Rs.35,200 |

Advantages of diversification of crops –

- a. Increase in farm income
- b. Generate employment opportunities

- c. Stabilize farm income in all seasons
 - d. Conserve and enhance natural resources
- b. **Modern Techniques** such as -
- i) **Raised-bed system of sowing** for wheat which helps conserve water as well as increase yield of wheat by 20-25%
 - ii) **System of Rice Intensification (SRI)/Madagascar** which reduce the labor, irrigation and seed costs significantly. A simple way in which SRI has been implemented successfully in some parts of the region is just by maintaining sufficient gap between seedlings (25cm), which too has boosted the output several times.
- c. **Agriculture-based Self-Sufficiency**
There needs to be an encouragement of models such as **1.5/2.5 ac. model** which ensure that the entire food needs for a family including crops, pulses, condiments, cereals and dairy products can be extracted from the same tract of land without causing any loss to the farmer and also leaving some produce to sell in the market.
- d. **Effective Use of Unutilized Land**
Large parts of the farm land lie unutilized because they are under shades of trees or along embankments and it is believed that anything grown here would be unproductive. However, crops like Bhindi, Adrak and Haldi have been found to grow well even in shade. Bhindi plant can yield upto 20 qt./1000 sq. ft. in 6 months or about 200 qt./ac.
- Experiments with growing fruit trees in such patches have also been successful and deserve encouragement (**Agri-horticultural System** for household living).
- e. Promotion of **orchard-based agriculture**
- f. Promotion of **short-cycle varieties of crops**
- g. Use of **locally available seeds**

Kindly refer to detailed economics, useful seed varieties and scientific techniques for various grains and vegetables given in the appendix.

4. INTENSIFICATION OF WATER MANAGEMENT PROGRAMS

Lack of irrigation facilities is perhaps the single-most important factor constraining the development of strong agriculture here. Programs such as water-shed management and use of alternative irrigation techniques can go a long way in helping this cause.

Programs such as water-shed management being run by ABSSS have shown strong results in bringing drinking and irrigation water for the farming community. These projects need to be further developed to include more and more villages of the region.

Development of Land & In-situ Rain Water Harvesting

- i) Land Leveling
- ii) Land Bunding
- iii) 5% Farm Pond model
- iv) '30 x 40' model
- v) Renovation of bunds
- vi) Construction of Earthen Gully Plugs, etc.

Ex-situ Rainwater Harvesting

- i) Construction of Earthen dams
- ii) Ponds
- iii) Masonary dams
- iv) Renovation of ponds
- v) Renovation of earthen dams/bunds

Water Resource Development

- i) Construction/Renovation of wells, open wells
- ii) Lift irrigation

Advantages of water-shed management programs –

- i) Conservation of natural resources like soil and water
- ii) Collection and dissemination of traditional village wisdom related to agriculture to larger community
- iii) Promotion of agro-based cottage industries
- iv) Creation of rural livelihood opportunities
- v) Training and education of farmers
- vi) Ensuring community development and involvement in water resource management

Alternative Irrigation Techniques

Alternative irrigation techniques such as micro-irrigation, drip irrigation and pitcher technique can save significant costs for the farmers as well as enhance productivity. For e.g. Drip irrigation saves upto 70% water and increases productivity by 50-120%.

Some of the other **advantages of these irrigation methods** are -

- a. Conservation of electricity
- b. Less labor requirement
- c. Minimum impact of insects and diseases
- d. Consistent land fertility

5. PROMOTION OF ORGANIC FARMING

As mentioned earlier, promotion of scientific agriculture does not imply simply the adoption of HYV and GM seeds, pesticides, fertilizers etc. Excessive use of the same can lead to risks and introduction of new pests which are resistant to pesticides. The solution lies in moderating the use of inputs and eventually to move towards organic farming. Organic farming does not use chemical inputs and does not rely on high risk technologies.

The inputs can be managed in the following ways –

- a. **Seed Strategy:** To ensure that seeds are produced locally for the crops which are widely grown and are not technologically sensitive. Instead of going through a cycle of foundation seeds, proceeding them off-site, going through a process of testing and certification to sell the seeds back in the same area, strategies should be evolved to supply foundation seeds and ensure that local markets to develop seeds.
- b. **Fertilizer Strategy:** It should be ensured that fertilizers are used in correct proportion based on each farmer's soil type. Soil testing facilities can ensure proper inspection of soil and accurate recommendations to the farmers to ensure precious resources are not wasted by excessive use of fertilizers.
- c. **Pesticide Strategy:** To ensure a gradual reduction and eventual elimination of synthetic pesticides as a step towards sustainable agriculture.

Main benefits of organic farming are –

vii) Cost reduction and increase of net income. For poor farmers, a reduced cost of agriculture can be a boon. Organic farming is not capital-intensive.

- viii) Higher self-sufficiency and less dependence on off-farm inputs
- ix) Crop diversification leading to risk mitigation
- x) Soil improvement
- xi) Improvement of quality and market value of products – premium price for certified organic products
- xii) Balance eco-system
- xiii) Spin-offs such as opening market for vermicompost and processing

Studies have revealed that over a medium period (1-7 years) cost/yield in organic farming was best in organic farming for crops like cotton, rice, sugarcane and banana.

6. INTRODUCTION OF COLD STORAGE FACILITIES

Vegetables like potatoes, onion etc. can fetch much higher prices to the farmer if they are stored in proper conditions and sold in the market when the prices are attractive. At present, there isn't even one storage facility in the entire Chitrakoot Mandal which spans four districts.

It would be a worthwhile exercise to help farmers with group storage facilities where they can store their crops and reap more benefits for their effort. This effort will also need to be accompanied by selection of seeds which make the fruit stronger during storage period.

For this purpose, ABSSS should pursue the Government and private investors to set up a cold storage facility in the area. Also, benefit can be derived from the **Capital Investment Subsidy Scheme for Cold Storages** offered by NABARD.

The approximate cost for a 6000MT cold storage is Rs.1.8 crores, and NABARD provides a subsidy of 25% of the amount. A consortium of public institutions and local private investors should be pursued to make this investment in the region which will benefit the farming community at large.

POTENTIAL REVENUE GAINS IN VEGETABLE FARMING WITH INTRODUCTION OF STORAGE FACILITIES

| Vegetable | Yield/Ac. (kg) | SP/kg (Rs.) in Season | SP/kg (Rs.) Off-season | Total Sales/Ac. (Rs.) without Storage | Revenue Potential/Ac. with Storage (Rs.) | % Revenue Gain /Ac. |
|-----------|----------------|-----------------------|------------------------|---------------------------------------|--|---------------------|
| Onion | 15600 | 10 | 20 | 156000 | 234000 | 50.00% |
| Potato | 13000 | 15 | 28 | 195000 | 279500 | 43.33% |
| Tomato | 26000 | 8 | 15 | 208000 | 299000 | 43.75% |
| Pumpkin | 13000 | 8 | 12 | 104000 | 130000 | 25.00% |

- Assuming half the produce is directly taken from the field to the market and half is stored for sale later

7. IMPROVEMENT OF PEDIGREE OF FARM ANIMALS

Several locals here maintain cattle, buffaloes and goats in large numbers without realizing the financial burden they entail. The pedigree and health of many of these animals is so poor that very often as many as ten cows together also don't yield a litre of milk. In addition, they destroy a lot of farm crop. Yet, they are maintained assiduously by the locals.

There is hence a need to have better quality cattle here so that villagers who chose to maintain them at least have a source of income from them.

ABSSS is the foremost body working in the region for the benefit of the farming community at large. Their efforts in water-shed management in recent times have made irrigation possible to large tracts of land in Bundelkhand and farmers are reaping benefits of the same.

ABSSS has been taking initiative in some of the above suggested directions and actively working for the benefit of the farming community. Their efforts in this direction need to be intensified as it channelizes its energies in the following additional directions –

- 1. Mainstreaming Alternate Crops:** As suggested above there are several vegetables and cash crops which are likely to provide a stronger source of livelihood for the farmers in comparison to their traditional practices. The economic and social benefits of cultivating these crops needs to be explained to the farmers, a task which ABSSS volunteers who have been working closely with the community for decades can further facilitate.

A technique to achieve the above mentioned end would be to organize the farmers taking to alternate crops and vegetables into **cultivation-specific growers' associations**. This idea is developed further in the following sections.

- 2. Soil Testing & Suitable Conditioning:** ABSSS can play an important role through its team of agro-scientists in testing the soil for the farmers and advising conditioning steps as per requirement. The farmers need to be educated about deficiencies in humus, gypsum etc. in their soil so that corrective measures to restore soil fertility maybe taken.

- 3. Crop Selection & Seeds:** There is a need to provide the farmers with the knowledge of the appropriate crops for their field and then provide correct seeds according to their soil and irrigation conditions. This process needs to be backed further by providing continued technical and knowledge support to the farmers in the best ways to cultivate the selected crop.

To carry out this activity in an institutionalized manner, ABSSS can play a pivotal role in the initiation of a **seed resource centre** in the region which provides knowledge, skills and quality seeds, specifically for the benefit of the soil and climate types in this region.

- 4. Promoting Techniques like Green Manuring, Lift Irrigation as a Movement:** Organic ways of improving the soil condition such as green manuring, organic fertilizers like compost pit, cow pit pack (CPP), organic pest control (vermicompost) etc. need to be promoted as a movement in the region. All the farmers need to be made aware of these simple yet

effective techniques of improving their soil quality and ABSSS can play an important role in leading the knowledge campaign. ABSSS can also facilitate the demonstration of improved farming.

A similar effort needs to go into development of advanced and efficient techniques of irrigation like lift irrigation as a commonly followed practice here so that farmers can reap maximum benefit of the limited available water.

5. Land Use Diversification – ABSSS can promote the practices of Horticulture, Afforestation and Grassland and Forest Development among the farmers.

6. Proliferation of Scientific Techniques in the Community: ABSSS with its expanding knowledge base and links with agricultural experts can provide an impetus to the penetration of scientific techniques in agriculture

7. Encouraging Value-addition and Agro-Processing: The next logical step after selection of suitable crops is to engage the community in value addition activities of their agricultural produce. These could be simple activities like extraction of mustard oil, pulses processing etc. which can be packaged, branded and lend themselves to high marketability.

A model for a **SHG enabled commercial organization** of these value added products is proposed in further sections of this report.

8. Facilitating in Provision of Credit, Micro-finance and Crop Insurance: In the medium to long-term, ABSSS can play a key role in enabling setting up of Micro-Finance Institutions (MFIs) in the region to fulfill the credit needs of the farmers. Crop Insurance can also be an effective measure against the uncertainties that cause crop failure. Crop Insurance however is not a very well-developed concept in India although in recent times private companies like ICICI, AICI and Iffko Tokio General Insurance have launched rainfall as well as temperature related insurance in certain states. These can be pursued to roll-out their operations in India.

9. Exposure Visits and Capacity Building: ABSSS can facilitate the organization of Exposure visits for farmers, SHGs and NGO staff. ABSSS can also play a major role in training of farmers.

Bundelkhand New Crop Growers' Association

Having practiced traditional forms of agriculture and conventional crops for centuries, it is natural that the local community will have their share of apprehensions about bringing in these changes. Lack of education, poverty and decades of exploitation as bonded laborers would unfortunately mean that many of the farmers may not feel confident about switching to suggestions such as vegetables cultivation or reducing the area under cultivation of wheat.

It is hence, proposed that a new crop growers' association be formed to support the farmers through this phase of change and give them the belief that these modifications in their practices are for their own good.

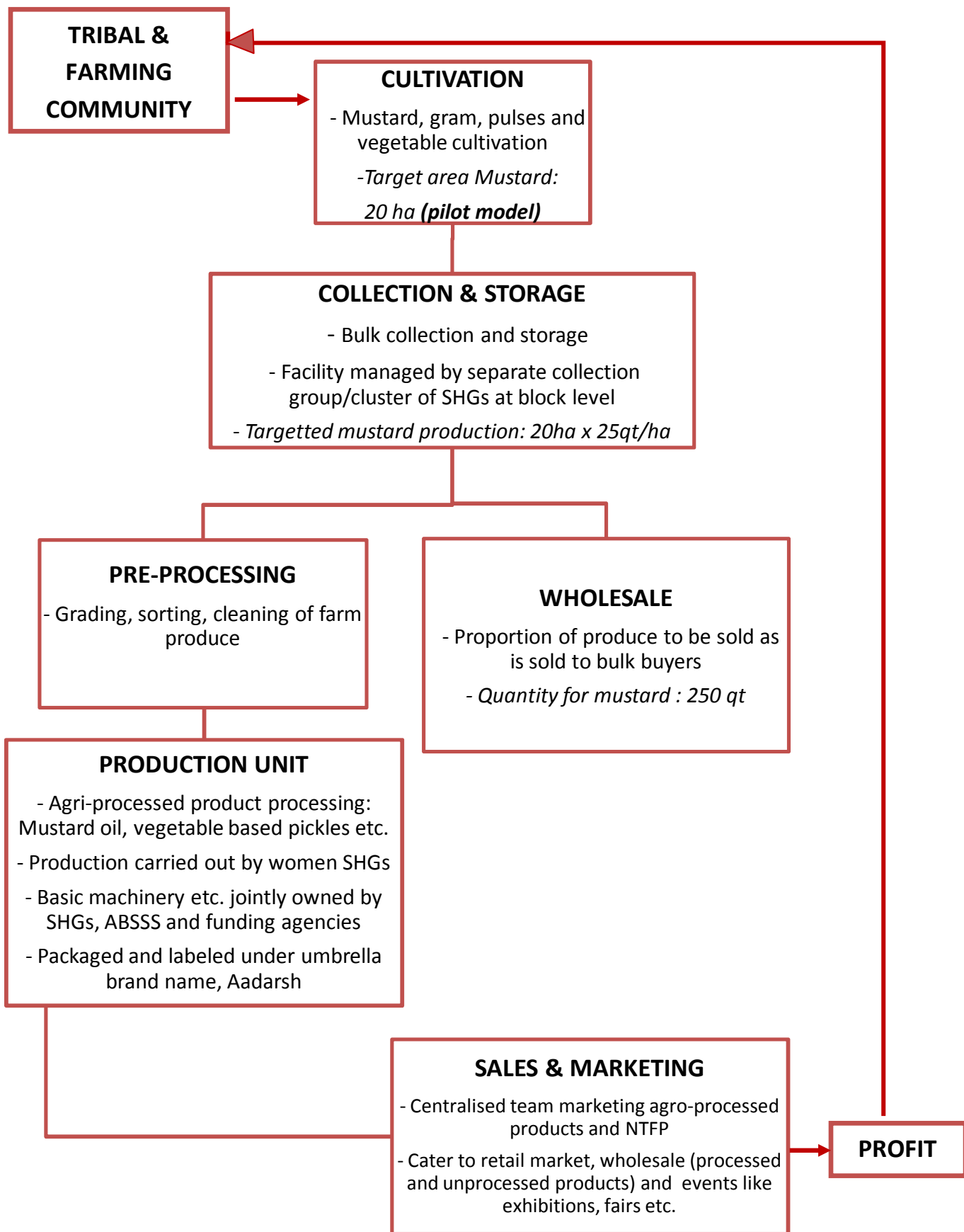
This association will be organized into sub-groups based on who is growing which crop. So, farmers maybe organized into say Gram Growers' Group, Mustard Growers' Group etc. These groups will serve the following purposes –

1. Meet and convene on a periodic basis to interact and share learnings and best practices
2. They will be provided trainings, attend workshops facilitated through ABSSS which will guide them on improve methodologies, address their apprehensions
3. Collectively provide and get resources such as seeds, manure etc. specific to their needs
4. Advocacy and promotion of beneficial crops to other members of their community
5. Organize themselves for value-addition of agricultural produce and earn higher amounts on semi-processed and processed agricultural products like mustard oil and pickles

These groups may be organized at village level, block level and even district level going forward.

While it is understandable, that the members of these groups will be rotating every year depending on their crop selection for the particular year, the idea of being associated under a broad umbrella would go a long way in building their confidence about improved agriculture and how they are making a significant contribution to the same.

A proposed model for carrying out value-addition activities and marketing them in conjunction with other livelihood generating products from the region under a unified brand name is suggested in the later parts of this report.



NON-TIMBER FOREST PRODUCE: SITUATION ANALYSIS

About NTFP

NTFP or Non Timber Forest Produce refers to all the products other than timber that can be obtained from the forests. These were earlier referred to as Minor Forest Products (MFPs) as the major objective of forest management was production of timber. However, it has now been realized that these products play a very significant role in village and tribal economies. Thus, the term NTFP has gained preference over MFP.

NTFP can be obtained from around 3000 species found in the Indian forests but only 126 of these have developed marketability¹. Important NTFP include bamboo, resin, lac, katha, canes, tendu leaves used for making 'bidis', sal leaves for making plates, sal seeds for oil extraction, mahua flowers for distillation of liquor, sabai and other grasses for fodder or rope making, medicinal herbs, tassar silk cocoons, honey, fruits and tubers. The relative importance and



availability of each NTFP varies from one region to another. The total value of these products in the country is estimated to exceed one billion dollars annually².

Millions of people living in and around forests in India depend on NTFP for their livelihood³. It is observed that about 50% of the employment generated in the forestry sector is through NTFP. Tendu leaves, sal seeds and mahua flowers provide the maximum employment in the plains while

resin and medicinal plants play the same role in the Himalayan region. It is estimated that NTFP income accounts for 55% of the total income generated in the forestry sector⁴. The total employment generated for this activity is estimated to be around 2 million person years⁵.

¹ Maithani G.P., 1994

² Poffenberger Mark, 1990

³ World Resources Institute, 1990

⁴ Pachauri Rashmi, undated

⁵ World Bank, 1993

Bundelkhand and Forests

Till the late 19th century, the Bundelkhand region was extremely densely forested. However, there has been extensive deforestation in the region owing to the following reasons:

- a. Rising demand for wood
- b. Agricultural Expansion – especially after Green Revolution
- c. Population Explosion
- d. Poor Land management
- e. Ruthless Government approved commercial logging

Traditionally, these forests have been very rich reserves for natural resources like amla, mahua, chiraunji, tendu patta, bel and about 140 different kinds of medicinal plants. However, due to increased deforestation and climate change, the available quantities of these NTFP have been dwindling over the years.

The tribal communities in this area are extremely forest dependent. The NTFP play a very important role in the lives of the tribals. This community is dependent on these products for its daily subsistence as well as religious and cultural needs.



Many of the tribals are landless or possess insignificant pieces of land. Even in the families that possess significant portions of land and practice agriculture, the women folk collect firewood and NTFP on

a daily basis and sell them in the nearby markets of Majhgawan and Satna. This is so because the farmers are unable to sustain themselves on agriculture only. The main reason for this is low productivity of the soil due to erosion of top soil owing to poor land and water management in the past. Also, most of the agriculture in the region is rain fed and the rainfall in the region has been considerably low in the last 3-4 years.

Hence, an important occupation of the tribal community is collecting timber and non-timber forest produce from the forests. Collecting NTFP from the forest and selling it to the Forest Corporation or the contractors in the open market is a part of their daily routine.

Role of the Forest Corporation

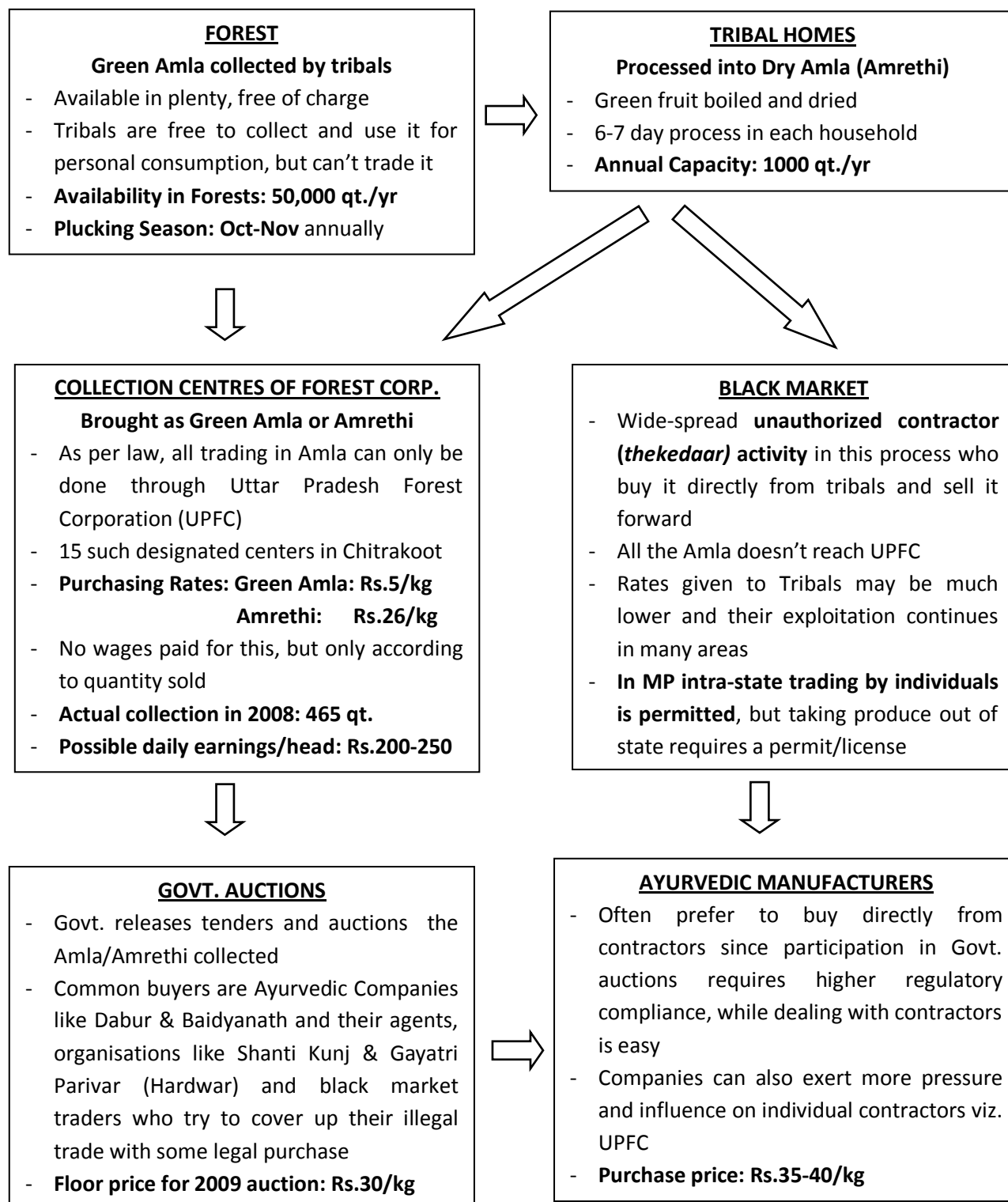
In Uttar Pradesh, the Forest Department used to give NTFP collection on lease to private contractors. These leases were given on the basis of highest bid in the auctions held by the Uttar Pradesh Forest Department. However, due to this practice, the forest dependent

communities suffered incessantly. The contractors bought NTFP from them by paying them meager labor charges. Thus, to stop this exploitation and ensure a suitable price to the tribals, the collection and trade of all major forest products like amla, tendu patta, bamboo, medicinal plants etc. has been nationalized. (Amla, however, is free for collection and trade by the tribals in M.P.). A few like mahua and chiraunji are free for collection and trade by the tribals.

Prevailing Trade Channels for Major NTFP

AMLA

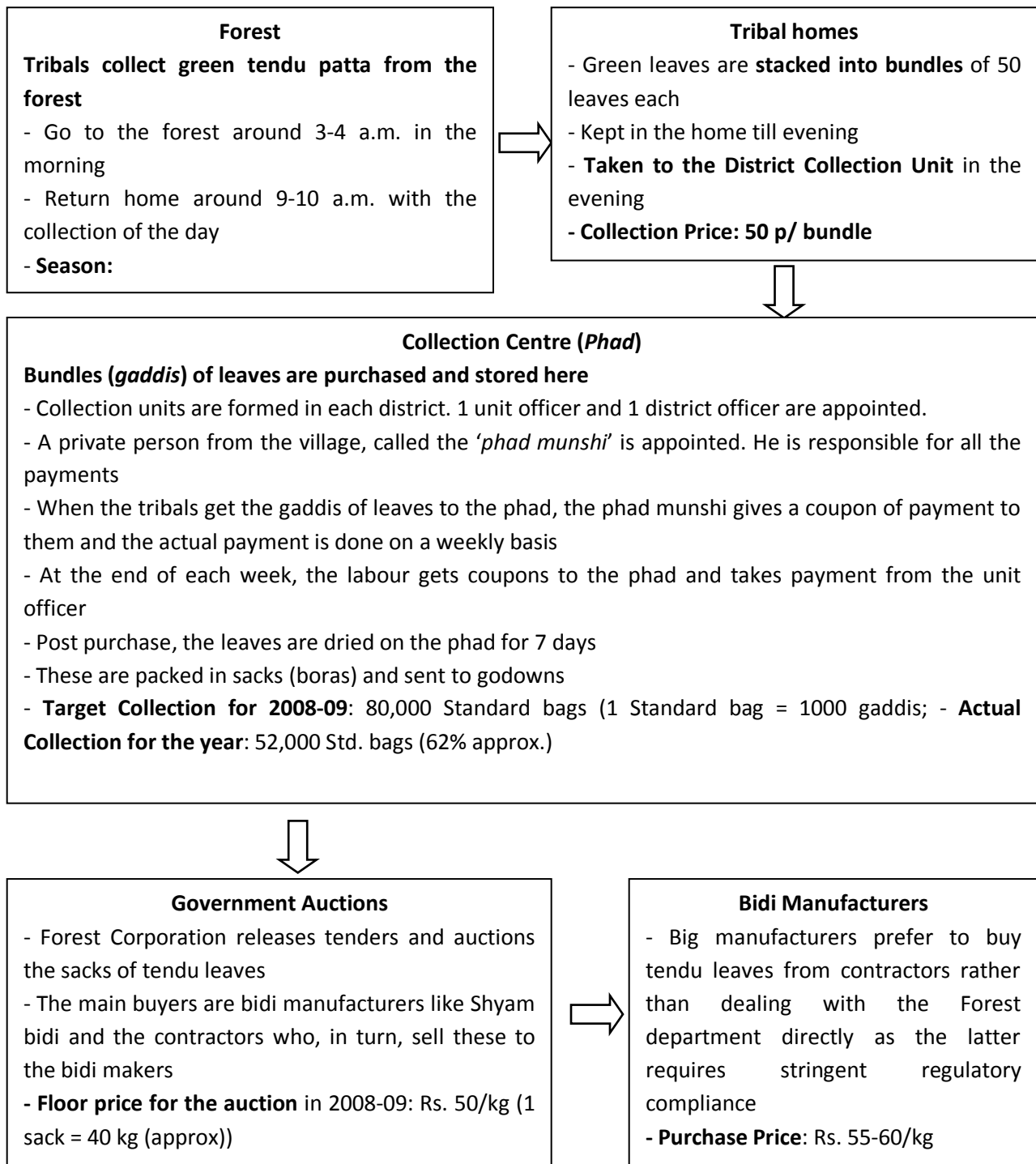
| | |
|--------------------|--|
| Item | AMLA |
| Description | Finds wide-spread use in preparation of Ayurvedic chyawanprash, oil, powder, achar, murabba, trifala, medicines etc. |



TENDU PATTA

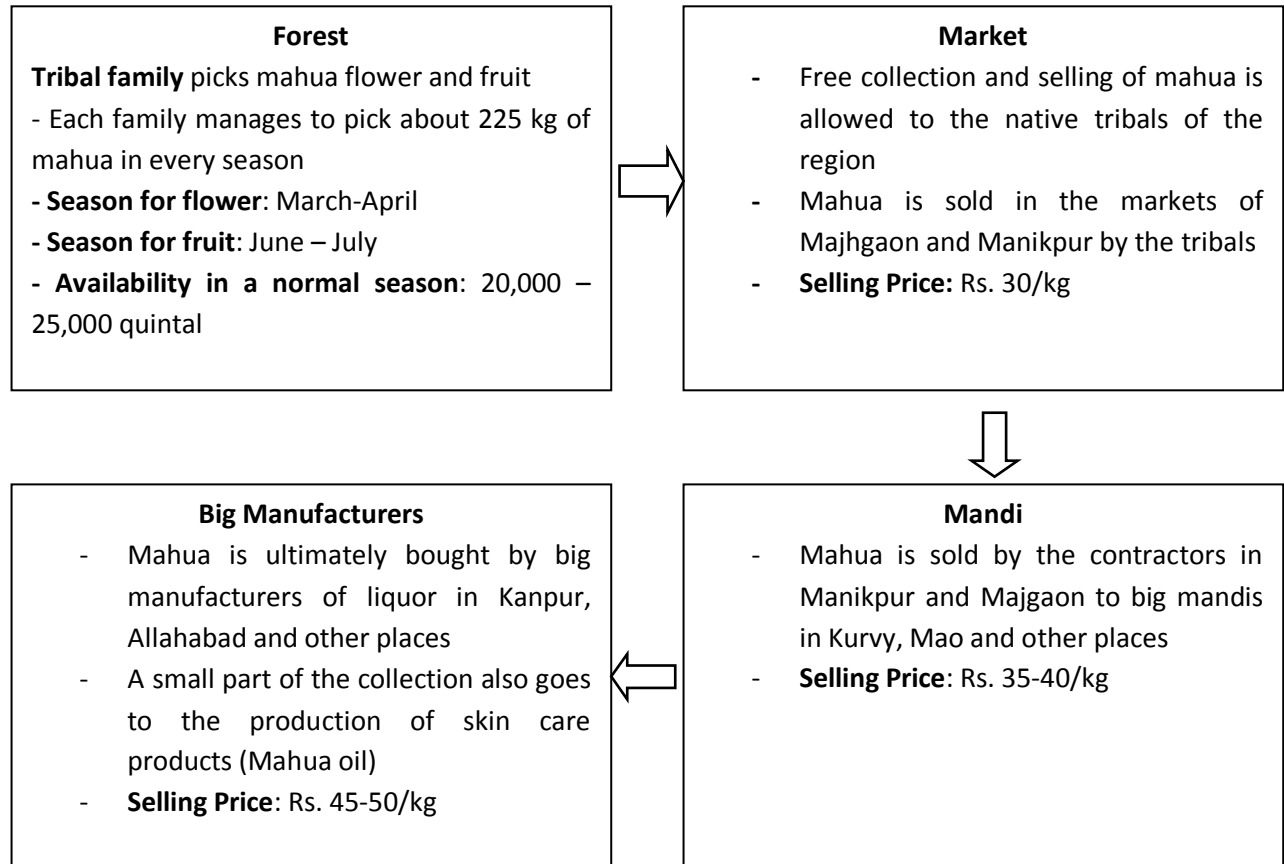
| | |
|--------------------|---|
| Item | Tendu Patta |
| Description | A major ingredient in the production of bidis |

Historical Background: Tendu patta leaves were on contract till 1981. Patches of land used to be auctioned by the government. These contractors used to ill-treat the tribal laborers, some were even kept as bonded laborers. In 1981, the Forest Department stepped in and nationalized the collection of tendu leaves, thus, ensuring a fair reward for the tribal laborers.



MAHUA

| | |
|--------------------|---|
| Item | Mahua |
| Description | A major raw material for the production of liquor, soaps, medicines |



Palash Leaves that have traditionally been used for making dona pattal, are also collected and traded in a similar manner as mahua.

BAMBOO

Forest

- Cutting of bamboo trees is carried out once every 3 years
- Availability: 5 lakh bamboos
- Most of the bamboo trees are now, located in the area of Ranipur sanctuary where deforestation is banned. So, now collection is less



Tribal homes

- Bamboo can be collected in areas outside the sanctuary area
- The dried/diseased/very old trees are identified by the Forest Department and marked for felling
- **Taken to the District Collection Unit**
- **Collection Price: 75 p/ nug (bamboo)**



Collection Centre (*Phad*)

Bamboo is purchased and stored here

- Collection units are formed in each district. 1 unit officer and 1 district officer are appointed.
- A private person from the village, called the '*phad munshi*' is appointed. He is responsible for all the payments
- When the tribals get the bamboo to the phad, the phad munshi gives a coupon of payment to them and the actual payment is done on a weekly basis
- At the end of each week, the labour gets coupons to the phad and takes payment from the unit officer



Government Auctions

- Forest Corporation releases tenders and auctions the bamboo
- Contractor collects and takes the bamboo to the godowns
- Auction Price: Rs. 1.5/nug (bamboo)



Manufacturers

- Big manufacturers prefer to buy bamboo from contractors rather than dealing with the Forest department directly as the latter requires stringent regulatory compliance
- **Purchase Price: Rs. 2/nug**

HERBS AND MEDICINAL PLANTS/AUSHADHIS

There are a number of medicinal plants found widely in the forests of the region.

| S. No. | Aushadhi Name (Common name) | Scientific name | Collection Price in 2008-09 (Rs./kg.) |
|--------|-----------------------------|--------------------------|---------------------------------------|
| 1 | Gudmar patti | Gymnema Sylvestres | 22.00 |
| 2 | Bel Gooda | Awgle Marmelos | 6.50 |
| 3 | Punarnava Mool | Boerhavia diffusa | 9.00 |
| 4 | Mal kangni | Celestrus paniculata | 20.70 |
| 5 | Chitrak Jad | Plumbago Zeylanica | 17.90 |
| 6 | Aavla Kali | Emblica officinalis | 26.00 |
| 7 | Neem Beej | Azadirachta indica | 2.75 |
| 8 | Baheda Phal | Terminalia balerica | 1.75 |
| 9 | Baheda Chhilka | Terminalia balerica | 3.45 |
| 10 | Van Tulsi Panchang | Ocimum gratissimum | 3.45 |
| 11 | Naibuti | | 5.50 |
| 12 | Bhoomi Aanvla | Phyllanthus amarus | 8.25 |
| 13 | Bhringraj | Eclipta abla | 8.25 |
| 14 | Satavar Safed | Asparagus racemosus | 33.10 |
| 15 | Puvaar Beej | | 1.40 |
| 16 | Naagarmotha Sookha | Cyperus scaariosus root | 6.20 |
| 17 | Vayuwiding Beej | Embelia ribes | 41.40 |
| 18 | Giloy | Tinospora cordifolia | 4.15 |
| 19 | Shankpushpi | Convolvulus dorycnium | 15.20 |
| 20 | Indrajau | Wrightia tinctoria | 16.55 |
| 21 | Kaaknaasha | Martynia annua | 4.15 |
| 22 | Palash Phool | Butea monosperma | 4.15 |
| 23 | Shivlingi beej | Bryonopsis lyconibsa | 41.40 |
| 24 | Sahtara | Fiumaria officinalis | 5.50 |
| 25 | Nishodhkalajad | Ipomoea turpethum | 16.55 |
| 26 | Marodphali | Helicteres Isora | 3.45 |
| 27 | Kaali Dudhi | Cryptolopis buchanani | 3.45 |
| 28 | Belpatta | Awgle Marmelos | 7.00 |
| 29 | Neem patta | Azadirachta indica | 7.00 |
| 30 | Imlauva | Ampelecocissus latifolia | 4.15 |
| 31 | Nagarmotha geela | Cyperus rotundus | 4.00 |
| 32 | Neem phool | Azadirachta indica | 10.00 |
| 33 | Barahi Kand | Dioscorca bulbiferia | 5.00 |
| 34 | Sarethi Panchang | Cocculus hirsutus | 5.00 |

These are collected in a similar manner as aonla.

Thousands of people are involved in collecting amla, mahua, tendu patta, etc. For many families, especially women, NTFP collection is the primary occupation. Also, NTFP based activities require simple technologies and little or no skill. Hence, these are quite suitable for the poor tribals in the region.

Despite being so much dependent on forests, the tribals are unable to derive optimum benefit from the trade of MFP owing to the following reasons:

- 1) **Exploitation by rich and influential contractors** – For a long time, the forest produce has been monopolized by influential contractors. They kept the tribals as bonded laborers to collect the forest produce for them. Even till recently, some contractors used the tribal labor for collection of forest produce and only paid them wages for the job. To curb this malpractice, the Forest Corporation has taken the collection of forest produce in its own hands. The idea is to ensure that the tribals get a minimum price for the forest produce. However, the exploitation of the tribals at the hands of contractors still exists.
- 2) **Inability to sell directly to manufacturers** – The poor tribals depend on NTFP for their daily cash needs. Hence, they collect these products and sell them to the nearest contractor at dirt cheap price almost on a daily basis. Many times, these tribals end up giving the NTFP to the contractor for free in order to repay their earlier debts. The contractor, then, accumulates a significant volume of the NTFP and sells it to a bigger contractor or manufacturer at a much higher price. The margin at each stage is at least Rs. 4-5. In this way, the contractor ends up accruing profits from the hard work of the poor tribals while the tribals continue struggling for their daily needs.

Lack of a storage place is another reason that prevents the tribals from accumulating the NTFP and selling these to the manufacturers directly.
- 3) **Lack of an organized effort for NTFP trade** – There is complete absence of an organized body that can help in collection and marketing of the NTFP directly to big manufacturers, thus, eliminating middle men and helping the tribals get a better return for their hard work.
- 4) **Lack of skill sets to process and market the forest produce** – The tribals lack the necessary skill sets to process the forest produce into value added products. Moreover, the community has been oppressed for very long and has very less exposure to the

outside world. This makes it difficult for them to market their collection/value added products to big contractors/manufacturers/retail sellers

Role for ABSSS

The above sections clearly demonstrate **indicate that the largest proportion of money changes hands between the middle men whose margins are Rs.4-5/kg at each stage of transfer.** This benefits needs to accrue to tribals.

Thus, a need is felt to organize the tribals under the supervision of ABSSS and form a dedicated organization for the collection, processing and marketing of forest produce. While several forest products can be directly sold in wholesale to large buyers, Ayurvedic manufacturers etc., others like Amla can be processed into value-added products such as murabba and supari at the village level so that tribals can claim stake over more and more stages of value addition and earn higher revenues.

This process will not only provide them a stronger source of income, it will also develop their vocational and organizational skills which will help make this means of livelihood sustainable and more beneficial in the long run.

The details of a proposed model for the same are discussed in the following sections.

AADARSH: ORGANISATION FOR MARKET INTERVENTION

From the very beginning, the tribal community has been very largely dependent on the forests to satisfy their needs. Even today, the main source of livelihood for the poor, landless tribals is collecting and selling timber and non-timber forest produce. Minor Forest Produce like amla, mahua, tendu patta etc. are collected in large quantities by the tribals every year and sold to the Forest Corporation and contractors. These contractors further, sell these to large manufacturers or their agents thus, extracting a much higher price for the MFP. The tribals are unable to derive optimum benefit from their collection of forest produce owing to several reasons like exploitation by influential contractors, inability to gain access to big manufacturers, their hand-to-mouth style of living and lack of storage space. Also, it is observed that if the forest products are processed and added value to, these can fetch a much higher price and greater benefit to the tribal community.

Similarly, in case of agriculture, there are a number of modifications which when brought about in the traditional system of agriculture, can yield much higher returns for the farming community. We propose promotion of alternative crops to wheat and paddy to act as cash crops which can also fetch good returns to the farmers in unprocessed, semi-processed and processed product form.

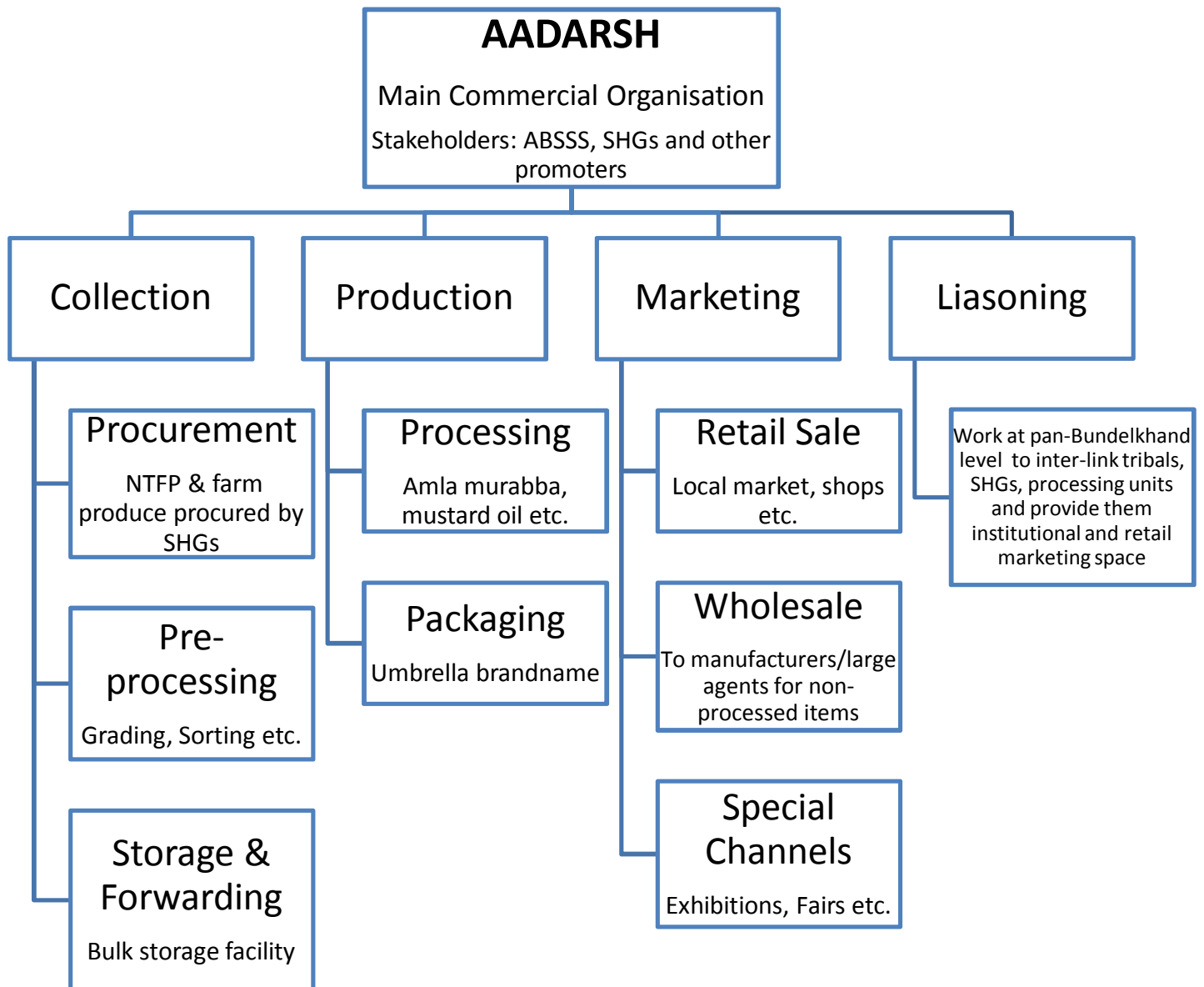
Organizations like ABSSS have been trying to educate the tribal community about the aforementioned facts. However, a more systematic approach is needed to bring about a significant impact. The skills of the local community need to be developed in an institutionalized way to provide greater marketability to MFPs and agricultural produce.

Thus, it is felt that there is a need to form an organization (with assistance from ABSSS) that will help the tribals to organize themselves and also impart the necessary skill sets to process and market their agricultural and forest produce.

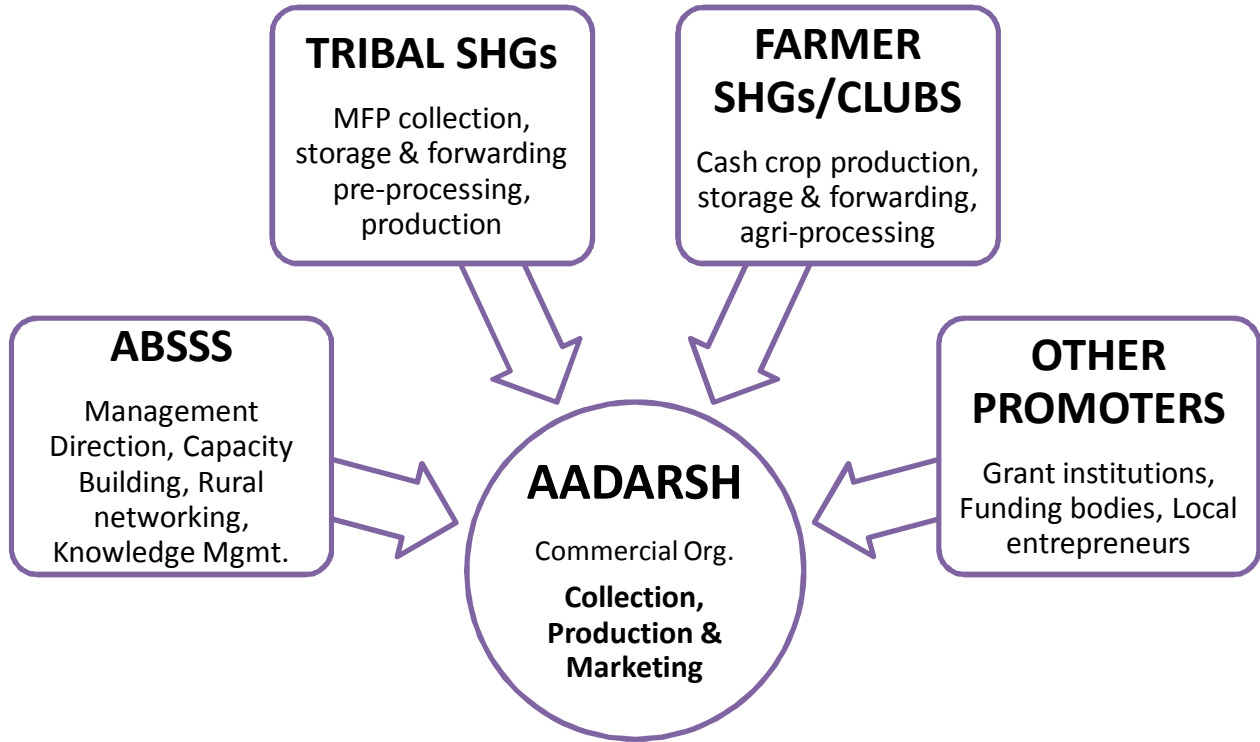
Hence, the **objectives behind forming Aadarsh** are:

- To bring the tribal families together in a collective effort for value addition, greater returns and employment generation
- To ensure greater benefit to the tribals by eliminating middle men in the trade of agricultural and forest produce
- To impart necessary skills for value addition and marketing of agricultural and forest produce and facilitate exchange of learnings
- To empower the tribal community and work for their overall betterment

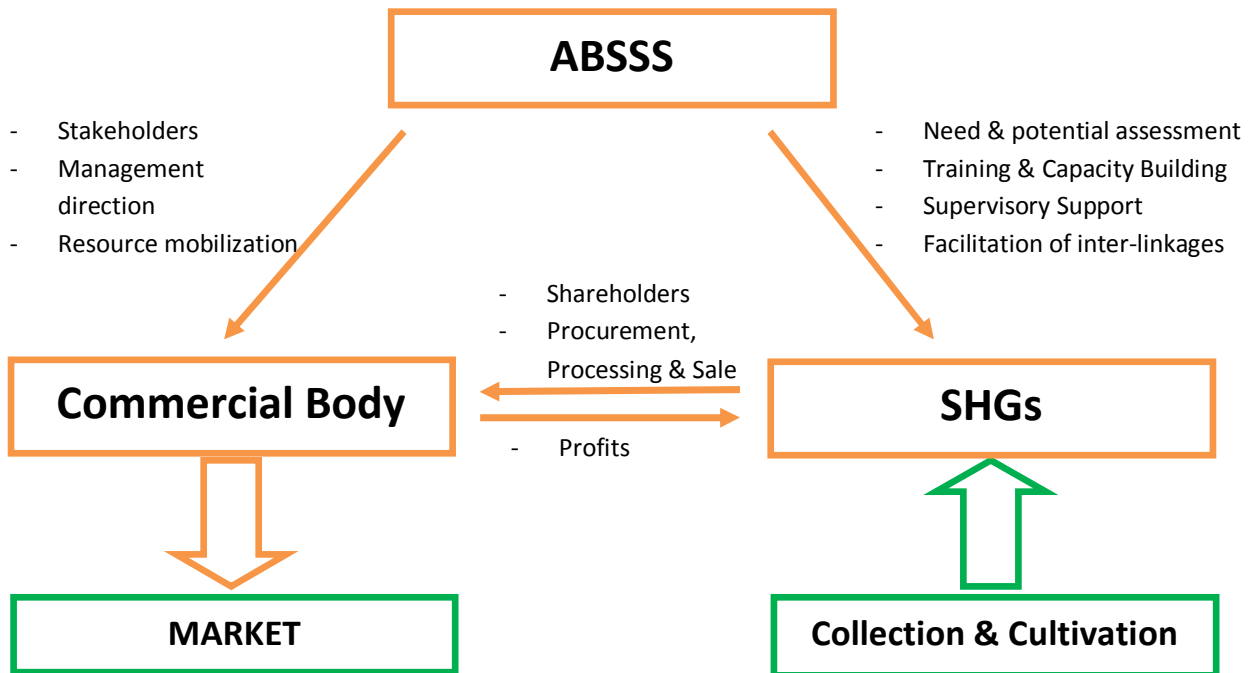
PROPOSED ORGANISATION STRUCTURE



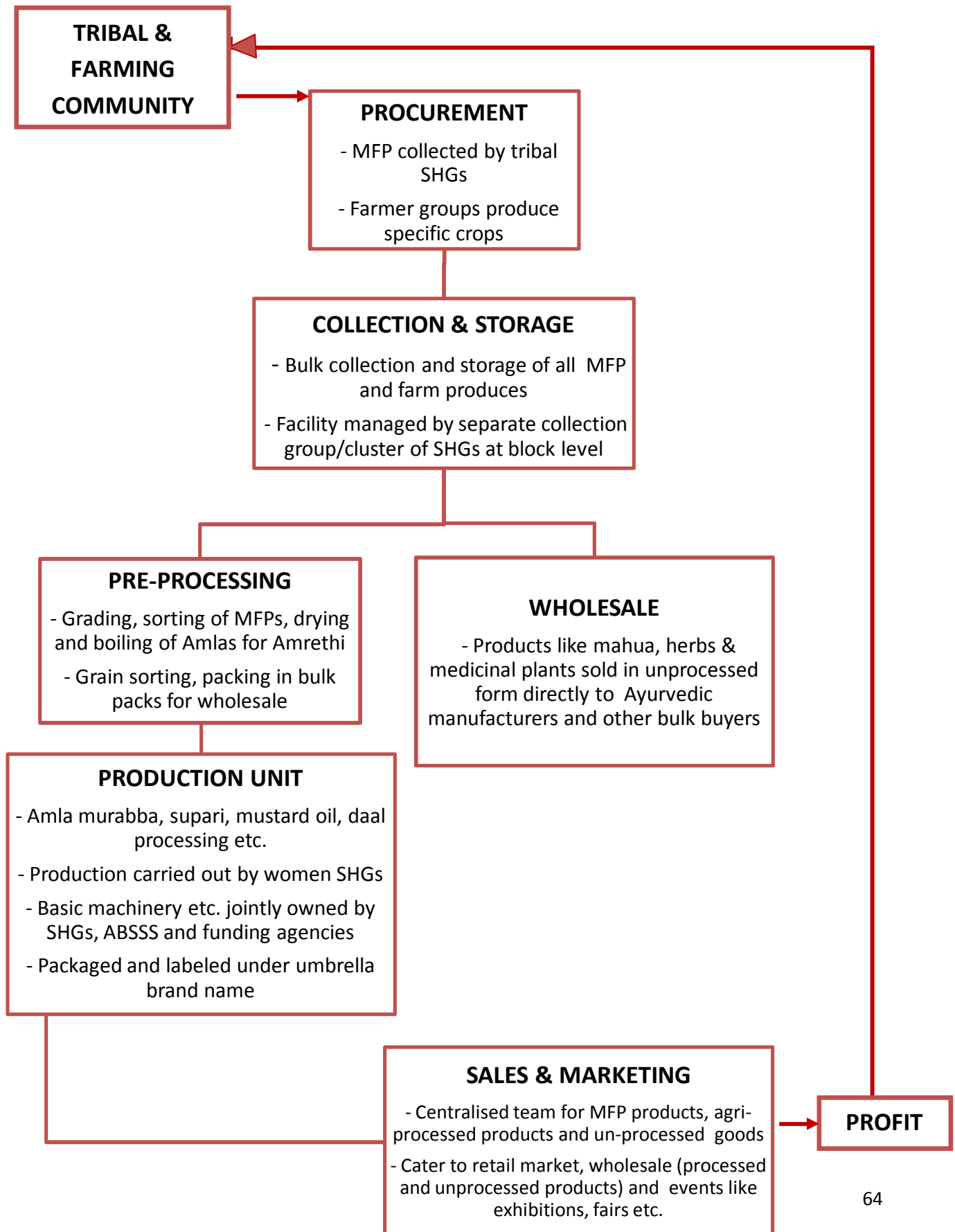
STAKEHOLDERS IN AADARSH



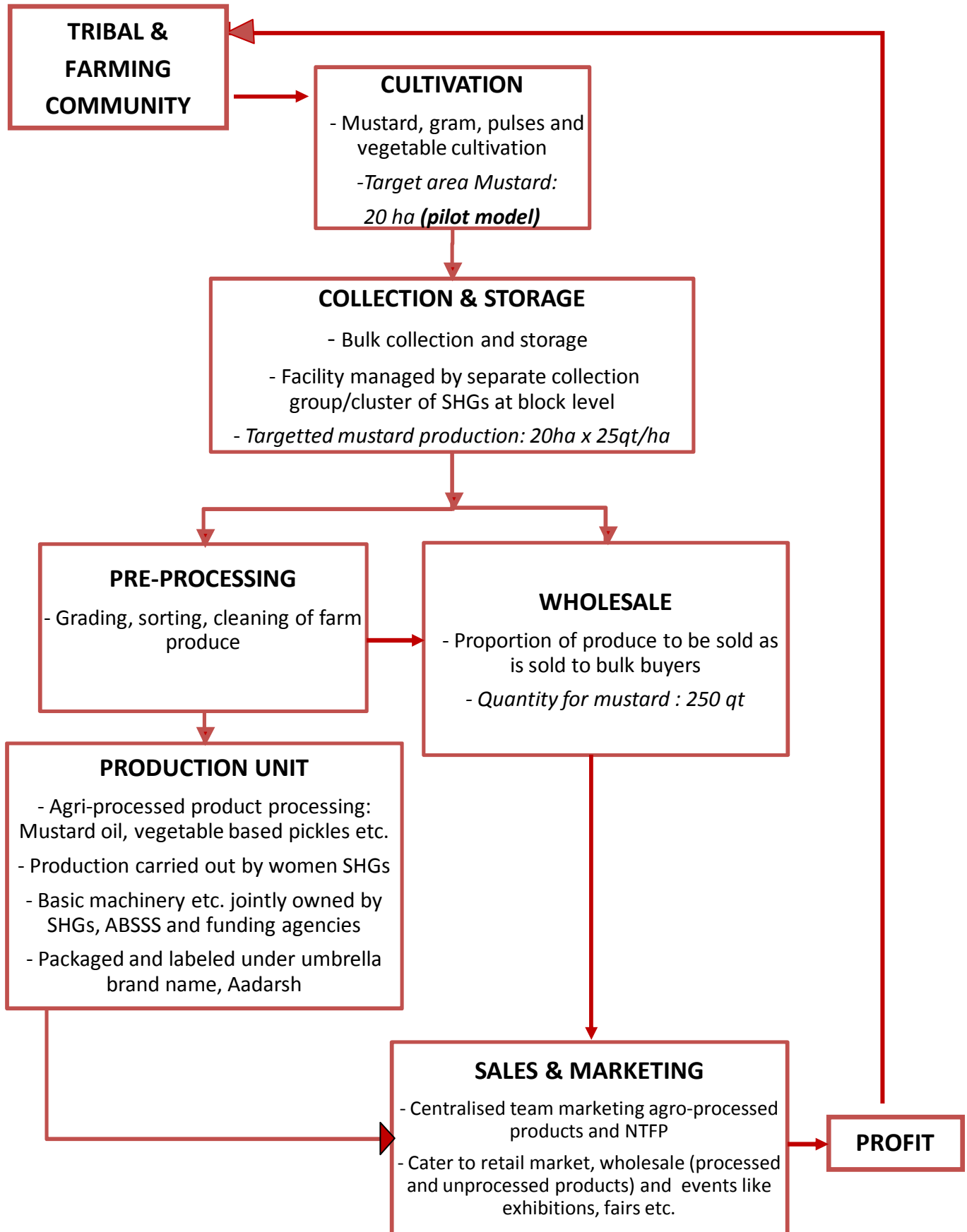
INTER-LINKAGES



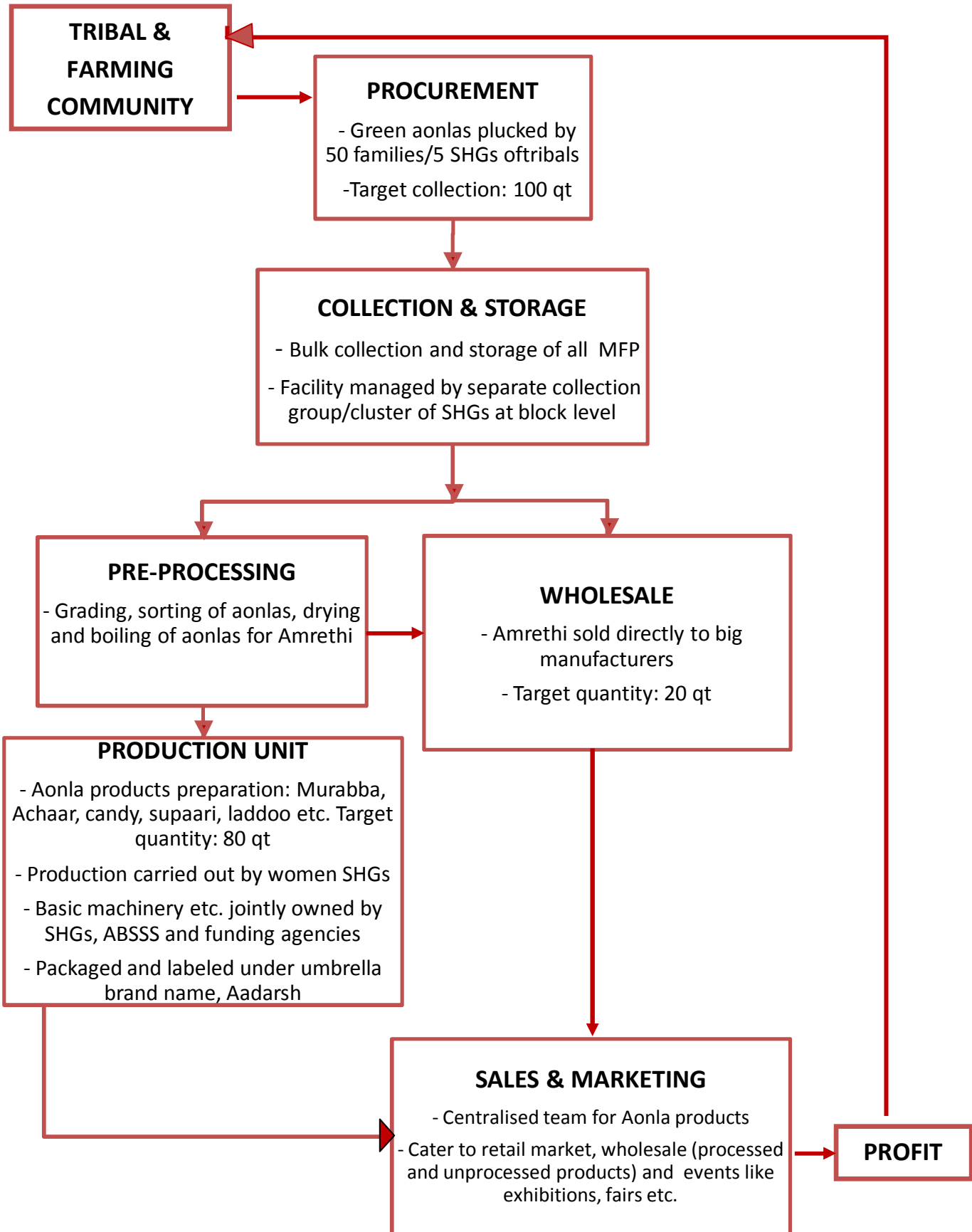
OPERATING MODEL



MODEL FOR AGRI-INTERVENTION



VALUE-ADDITION THROUGH AMLA-PROCESSING



Steps involved in the Value addition and Marketing process of the Amla unit:

- 1) **Procurement** – 10 SHGs of 10 members each/ 50 families are to be identified. These SHGs are to be made responsible for plucking green amlas from the forest in the required quantity.

Target quantity to be collected = 100 qt

- 2) **Collection and Storage** – The amlas collected are to be brought to the Collection Centres by the SHGs. The payment for the amlas (at the market rate) is to be done on the spot. This is necessary to ensure that there is no liquidity crisis for the tribal families.

The entire amla collection is to be stored in a warehouse.

- 3) **Pre-processed** – The amlas collected are to be graded and sorted. Amrethi production also takes place at this stage only.

- 4) **Wholesaling** – Aadarsh is to develop tie-ups with large manufacturers. The amrethi produced in the previous step is to be sold to these large players directly so that the tribals can get a better price.

- 5) **Production Unit** – Here, amla products like murabba, achar, candy, supaari, laddoo etc. are to be prepared. 3-4 SHGs of women are to be dedicated for this job.

All the finished products are to be packaged under the 'Aadarsh' brand name by the Packaging team.

- 6) **Sales and Marketing** – Finally, the Sales and Marketing team is to be made responsible for sales in local markets and on special occasions like fairs, exhibitions, etc.

Human Resource Requirement for the Unit

| Step No. | Name | Human Resource Requirement |
|----------|--|--|
| 1 | Procurement | 5 SHGs of about 10 members each |
| 2 | Collection, Storage and Pre Processing | 5 |
| 3 | Wholesale | 2 |
| 4 | Production Unit | 40 women for production + 10 persons for packaging |
| 5 | Sales and Marketing | 10 |

Detailed Cost Analysis:

| S.No. | Item | Unit cost | Quantity | Expected Cost (Rs.) |
|--------------|---------------------|-----------|----------|---------------------|
| 1 | Raw Material Cost | 6/kg | 10000 | 60000 |
| 2 | Storage Space | | | 15000 |
| 3 | Training cost | | | 40,000 |
| 4 | Production Cost | 28/kg | 8000 | 2,04,000 |
| 5 | Packaging Cost | 12/kg | 8000 | 96,000 |
| 6 | Marketing cost | | | 20,000 |
| 7 | Transportation Cost | | | 15,000 |
| 8 | Administrative cost | | | 60,000 |
| Total | | | | 5,10,000 |

Expected Revenue Generation:

| Item | Quantity (kg) | Unit Price (Rs./kg) | Revenue |
|--------------|---------------|---------------------|-----------------|
| Amrethi | 2000 | 40 | 80,000 |
| Murabba | 4500 | 70 | 3,15,000 |
| Achaar | 750 | 70 | 52,500 |
| Candy | 750 | 140 | 1,05,000 |
| Supaari | 750 | 100 | 75,000 |
| Laddoo | 750 | 100 | 75,000 |
| Total | | | 7,02,500 |

$$\begin{aligned}\text{Expected Profit} &= 7,02,500 - 5,10,000 \\ &= 1,92,500\end{aligned}$$

The profit generated by the unit is again to be redistributed among the SHGs involved.

Going forward, many such units can be established under the parent company Aadarsh.

INTERVENTION FOR OTHER NTFPs

The idea is to collect mahua and medicinal herbs in large quantities and sell them to the big manufacturers directly. The various steps involved in the process are as follows:

Step I: Identification of 10 villages for MFP collection

Step II: Training imparted to the villagers to identify the herbs

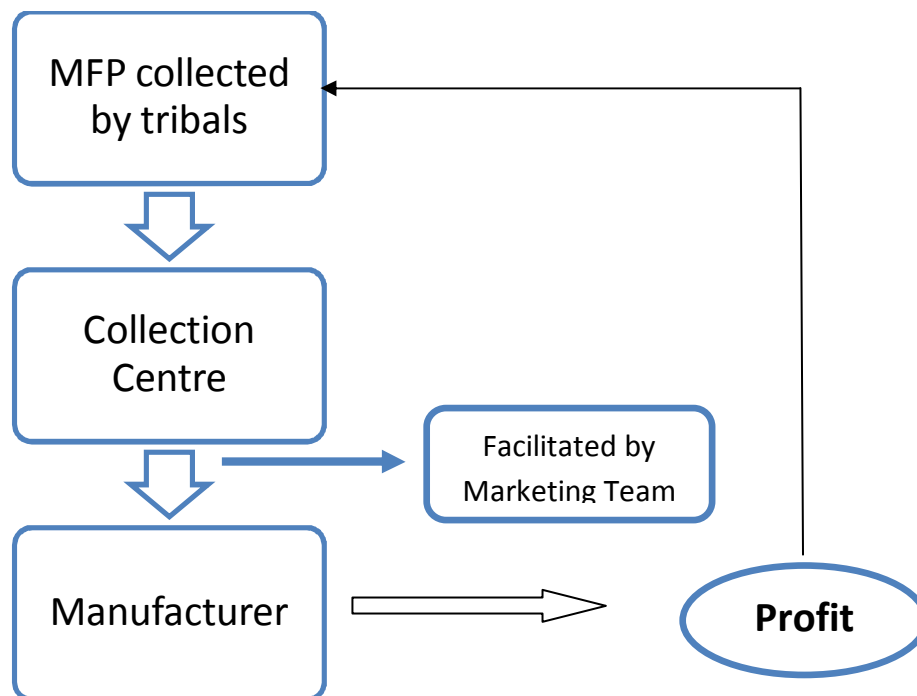
Step III: A Collection Centre is formed for the MFP, managed by tribal SHGs and supervisors from ABSSS

Step IV: A Marketing team is constituted to establish tie-ups with big manufacturers. The team will have representatives from the tribal SHGs as well as volunteers from ABSSS

Step V: MFP collected and sold to the manufacturer directly, getting a higher price for the tribals

Step VI: Profit distributed to the tribal families involved

The above process can be depicted in the following manner:



BAMBOO PRODUCTS AND UPLIFTMENT OF THE BASORH COMMUNITY

Members of the Basorh community have traditionally been treated as untouchables in the region. This community has been treated in the most inhumane manner, by being forced to work as human scavengers.

Even amongst the Scheduled Castes (SCs) their condition is amongst the worst in the region as the benefits of various Government schemes have been claimed by other castes, in particular Chamars.

Low levels of literacy have prevented their amelioration over time and they have been victims of the 'culture of silence', where any voice raised by individuals in the community has been brutally crushed by the more powerful strata of society.

It is estimated that there 3% population of Bundelkhand belongs to Basorh caste and they comprise a significant 10-15% of the SC population of the region. Hence, there is need for a concerted effort to work for this community and improve its lot. It is desirable that an independent NGO takes up the cause of this community. ABSSS has mentored the formation of 14 NGOs working in different parts of Bundelkhand and it is suggested that it plays a similar role here and help the organization stand on its feet for 3-5 years.

The key tasks of this body would be –

1. Conduct an independent survey of the Basorh community in the region and obtain data on their actual economic, social, literacy, health standards.
2. Restore the dignity of the caste by bringing them out of the task of human scavenging
3. Develop their skills and capacity to engage them with more respectable means of livelihood.

A proposed means of livelihood for the Basorh community is bamboo-work. At present, a small cluster of 150 families of Basorh is engaged in this trade in an unorganized manner.

The fallacies with the present state of affairs is –

1. Their skills are not developed in bamboo work and they are able to make limited products, mainly *tokris* (baskets).
2. Middlemen who supply their produce to large traders in Satna etc. manage to absorb as much as 2-3 times their earnings as this community doesn't have collective bargaining power.
3. Their trade is highly localized and does not include the Basorh community at large

BAMBOO-PRODUCTS COOPERATIVE

A Bamboo-Products cooperative can help address these fallacies and ensure better livelihood for the Basorh community.

Location

Tokri-makers Basti, Majhgawan (for pilot project)

Present Scenario

Source of Bamboo: Jaitvara, Khutaya, Patna

No. of households engaged in profession: 150

Avg. Members/household: 4

Total people engaged in profession: $150 \times 4 = 600$

Tokris/day/person: 2

Total tokris produced/day: 1200

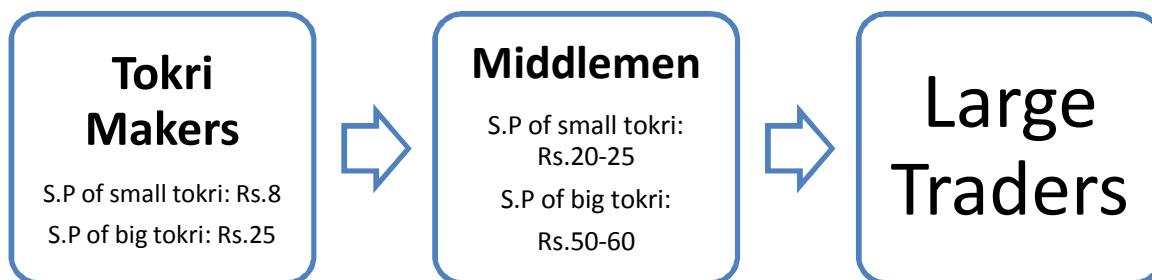
Of which small: 600, big: 600 (assumed)

Revenue/day by selling to middlemen/shopkeepers:

$600 \times \text{Rs.}8 + 600 \times \text{Rs.}25 : \text{Rs.}4800 + 15000 = \text{Rs.}19800$

S.P. by shopkeepers to traders: S – Rs.20-25, B: Rs.50-60

Tokri makers lose out on this huge revenue because of their inability to sell directly to traders or end consumers. They are able to produce only basic products due to limited skills.



Images of a Tokri-making Basorh Family in Majhgawan



Proposal

Create a cooperative of tokri-makers in Majhgawan and organize their trade.

1. They will collectively manufacture the products and sell them directly to traders and end-consumers.
2. They will all sell their products in a centrally coordinated manner and under a unified brand name.
3. They will be imparted training in producing other higher value add bamboo products such as lamp shades, mobile covers, small furniture so that their produces become more marketable.

Pilot Model

Human Resources

Cooperative size: 100(25 families) divided into following groups –

Raw material handlers: 35

Basket Makers: 55

Sales & supply team: 10

Tasks can be rotated between various teams on monthly or weekly basis so that everyone is equipped to handle all tasks independently

Administrative and supervisory staff: 2 people

Products

55 makers everyday can make around 110-120 products

These can be a mix of small and big baskets, brooms, sieves etc.

Expected Revenue & Costs

For illustrative purpose, suppose only small and big baskets are manufactured, though going forward many high value add products can be made.

Since products are being directly sold to traders, they can be offered a lower price than through middlemen -

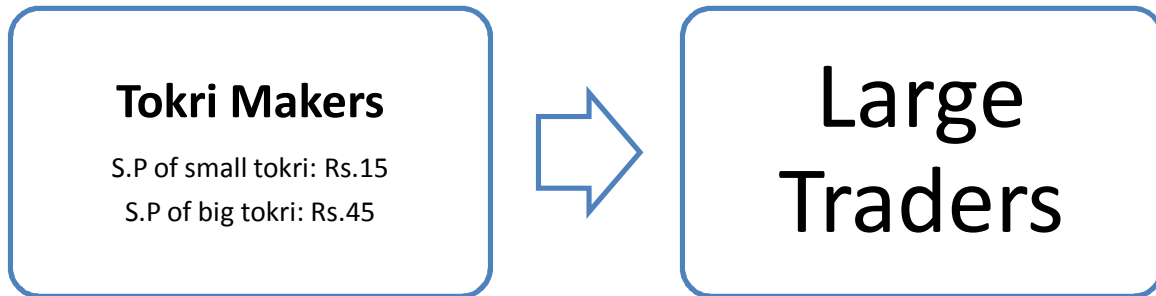
Big baskets: $60 \times \text{Rs.}45 = \text{Rs.}2700$

Small basket: $60 \times \text{Rs.}15 = \text{Rs.} 900$

Total revenue per day = $\text{Rs.}3600$

Earlier revenue for 120 pieces/day = $10\% \text{ of } 19800 = \text{Rs.}1980$

Administrative costs: $\text{Rs.}10000$ per month



Advantages

1. Economies of scale in raw material gathering
2. Collective bargaining power in market
3. Direct sale to traders and end-consumers, elimination of middlemen
4. Establishment of a 'brand' leading to credibility in market
5. Enhanced skills to produce higher value add items
6. Prevention of injuries in procuring and cutting of bamboo with improved training and development.

Future Scope

1. Setting up a cooperative shop in a prominent market to sell to consumers and trader
2. Scale up cooperative to include Basorh community members across Bundelkhand and alleviate them out of their current plight by providing them a dignified source of livelihood.

Images of a value-added Bamboo products developed by tribals at DRI, Chitrakoot



TRACTOR AND PUMP RENTAL SERVICE

A major gap found in this region was the **non-availability of power implements** such as tractors and pump sets for the farmers for the purpose of irrigation, ploughing, sowing and threshing.

On an average, in a Gram Panchayat in this region which comprises of 4-5 villages, there are not more than 2-3 pumps or tractors, which are **owned by the well-off farmers**. At the time of land preparation in Kharif and Rabi, these farmers first use the pumps and tractors on their own land and for the balance period rent it out to the farmers on an hourly basis.

Since the resources are scarce, there is **waiting by upto 40-50 farmers for each pump set**. Often 'correct' irrigation, bowing etc. **timings are missed by the farmers due to non-availability of the implement on time which directly reduces the quality and quantity of his farm output**. Many are not able to use the facility at all due to access and affordability issues.

Proposal

SHGs purchase diesel pump sets and tractors and rent them out to the community. These assets used during off-season for transport, logistics, milling and oil expelling purposes to provide secondary income.

Pilot Model

Area: ABSSS water-shed projects area – Itvan-Paatin to Amchur Neruwa

ABSSS facilitates 50 SHGs to get finance to purchase 20 tractors and 30 diesel pumpsets in water-shed region

Each SHG employs one operator/driver per implement and invests in basic infrastructure for flour mill, oil expeller and tractor trollies for secondary income

Pumpsets and tractors rented out to farmers on hourly basis in Patha region during season for their irrigation, ploughing, sowing and threshing needs

Tractors to earn revenue during off-season through transport and logistics services
Pumpsets to be used as energy sources for oil expeller, flour mill etc. which are setup by owner SHGs

Economics of the Model

| | | |
|---------------------------------------|---------|---------|
| Total cultivated area in Patha (ha) | 3000 | |
| Hours reqd./ha | 15 | 1 |
| Hrs reqd. for entire area | 45000 | 3000 |
| No. of rounds of usage/field | 4 | 6 |
| Total Requirement (hrs) | 180,000 | 18,000 |
| | | |
| REVENUE | | |
| AGRICULTURAL INCOME | | |
| Usage days in season | 60 | 60 |
| Feasible usage/day (hrs) | 15 | 10 |
| Total usage/unit (hrs) | 900 | 600 |
| Rental revenue/hr (Rs.) | 60 | 300 |
| Total agricultural revenue/unit (Rs.) | 54,000 | 180,000 |

| | | |
|---|-----------------|-----------------|
| No. of units reqd. in region | 200 | 30 |
| | | |
| SECONDARY INCOME | | |
| Transport & Logistics Revenue/day (Rs.) | 0 | 1500 |
| Flour mills & Oil Expeller Rev./day (Rs.) | 300 | - |
| Non-agricultural usage days | 30 | 30 |
| Total non-agricultural income /unit (Rs.) | 9,000 | 45,000 |
| No. of assets with secondary rev. potential | 30 | 20 |
| | | |
| TOTAL ANNUAL REVENUE/ASSET (Rs.) | 63,000 | 225,000 |
| Secondary usage hours/unit | 450 | 300 |
| TOTAL ANNUAL USAGE HOURS | 1350 | 900 |
| | | |
| COST ANALYSIS | | |
| Cost/unit (Rs.) | 135,000 | 600,000 |
| | | |
| Operator Salary (4 months) | 16000 | 16000 |
| Engine Oil Fillings (1 filling/200 hrs) | 7 | 5 |
| Cost/filling (Rs.) | 450 | 450 |
| Total Oil Expense (Rs.) | 3,038 | 2,025 |
| Misc. Expenses | 5000 | 10000 |
| TOTAL OUTFLOW IN (Year I, Rs.) | 159,038 | 628,025 |
| OPERATING EXPENSE (Year II onwards, Rs.) | 24,038 | 28,025 |
| CASH RECOVERY & PROFIT | 3rd year | 3rd year |
| NPV | 116,680 | 664,872 |
| IRR | 38% | 47% |

CASH FLOW - PUMPSET

| Year | Net Flow | Inflow | Outflow | Cum. Cash |
|------|----------|--------|---------|-----------|
| 1 | (96,038) | 63,000 | 159,038 | (96,038) |
| 2 | 38,963 | 63,000 | 24,038 | (57,075) |
| 3 | 38,963 | 63,000 | 24,038 | (18,113) |
| 4 | 38,963 | 63,000 | 24,038 | 20,850 |
| 5 | 38,963 | 63,000 | 24,038 | 59,813 |
| 6 | 38,963 | 63,000 | 24,038 | 98,775 |
| 7 | 38,963 | 63,000 | 24,038 | 137,738 |
| 8 | 38,963 | 63,000 | 24,038 | 176,700 |
| 9 | 38,963 | 63,000 | 24,038 | 215,663 |
| 10 | 38,963 | 63,000 | 24,038 | 254,625 |

NPV (10 yrs., Rs.) 116,680

IRR 38%

CASH FLOW - TRACTOR

| Year | Net Flow | Inflow | Outflow | Cum. Cash |
|------|-----------|---------|---------|-----------|
| 1 | (403,025) | 225,000 | 628,025 | (403,025) |
| 2 | 196,975 | 225,000 | 28,025 | (206,050) |
| 3 | 196,975 | 225,000 | 28,025 | (9,075) |
| 4 | 196,975 | 225,000 | 28,025 | 187,900 |
| 5 | 196,975 | 225,000 | 28,025 | 384,875 |
| 6 | 196,975 | 225,000 | 28,025 | 581,850 |
| 7 | 196,975 | 225,000 | 28,025 | 778,825 |
| 8 | 196,975 | 225,000 | 28,025 | 975,800 |
| 9 | 196,975 | 225,000 | 28,025 | 1,172,775 |
| 10 | 196,975 | 225,000 | 28,025 | 1,369,750 |

NPV (10 yrs., Rs.) 664,872

IRR 47%

Advantages

1. Plugs the gap in availability of power implements in region
2. In-sync with growing efforts of water management in the region
3. Organizes for the have-nots, a 'business' which is run on the whims and fancies of the haves
4. Large non-agricultural income from tractors through transport and logistics
5. Builds an asset for the SHG which is a strong source of income from agriculture and secondary activities.
6. Entire costs recovered in less than 3 yrs. with a high return
7. Scope for scalability across Bundelkhand and other regions with similar scenario

Possible pitfalls of Asset Rental Model

- 1) **Increase in the cost of cultivation** - Introduction of power implements may lead to an increase in the cost of cultivation. This will increase the burden on the farmers. However, the production is also bound to increase which will inevitably lead to an increase in income for the farmers in the region. For wheat, proper ploughing, sowing of seeds and irrigation will lead to doubling of productivity. Similarly, in case of paddy, the productivity may increase to twice the amount obtained with little or no irrigation and traditional methods of sowing and ploughing.

Thus, on doing a cost benefit analysis for mechanization of agriculture in the backdrop of the current situation in the region, we find that the benefit of using modern machines will be more. However, the modernization of agriculture may lead to its commercialization. This will, in turn lead to a sort of a social conflict between the castes and the classes to acquire the implements as much and as quickly as possible.

- 2) **Pollution of the environment** – The pump sets and the tractors use diesel as the source of power. This may lead to pollution of the village environment.

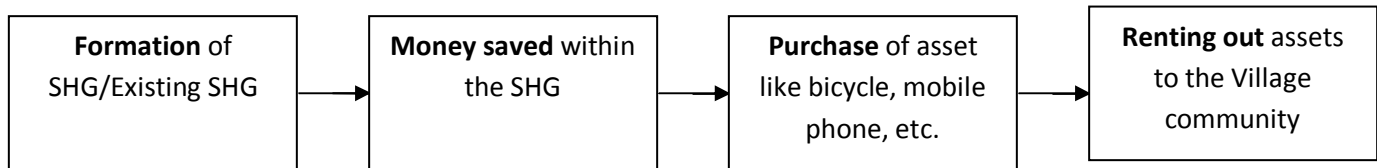
Alternative suggestions

- 1) **Drip Irrigation/Sprinkler system** – The use of these methods will lead to conservation of water as well as a decrease in the cost of cultivation. However, these systems require relatively sophisticated infrastructure and high initial spending on developing the same. The maintenance requirement as well as the cost will also be high. However, the agricultural practices in the region are extremely primitive. Thus, it is observed that the farmers in the region need quite some time before they can adopt techniques like these. Though, in the long run, these techniques may suitably be adopted in the region.
- 2) **Looking for environment friendly alternatives to diesel** – In the interest of checking environmental pollution due to the use of diesel, alternatives like jetropha plant should be tried in the long run. Jetropha is a source for biodiesel which is not petroleum based and hence a clean source of energy. Moreover, jetropha grows successfully in scarce water conditions and has been grown successfully in the Patha region.
- 3) **Use of low cost sustainable agricultural technologies** – In order to serve the purpose of increasing agricultural production and farm incomes for small farmers while minimizing the impact on the environment, simple technologies like man-powered **treadle pumps** can be adopted. To the small farmers who may not be able to afford expensive diesel pump sets, treadle pumps offer a cheap and clean solution for irrigation purposes. Though a treadle pump requires a full day to lift enough water for irrigation of just a beegha of land as compared to a diesel pump that will need just about 2-3 hours for the job, yet, the affordability aspect will ensure that even very small farmers can become self sufficient.



Farmer using leg pump to draw water for his field





There are currently, about 5-6 Self Help Groups in every village comprising of about 10 members each. Each of these groups has managed to save Rs. 4000-5000 over a period of time. A good use of this money can be in terms of purchasing assets that satisfy the basic needs of the village community. Once bought by the SHG, these assets can be rented out to the villagers on a daily/weekly basis at a nominal rate. The SHG will not only be able to recover the cost of the asset but will also become profitable within a few months as illustrated below.

1) A possible asset that should find huge demand in the village is a **bicycle**. This satisfies the most basic need of the villagers for commuting outside the village. Currently, the only mode of transport available to the villagers is a jeep. The jeeps are extremely congested and overloaded and ply only at specific times, 3-4 times a day. Thus, it was felt that it will be extremely beneficial to the farmers if a **day rental scheme** for **bicycles** can be started. A simple calculation shows that the SHG will start making profits in less than 8 months.

| | |
|--|-----------------------|
| Cost of buying a second hand bicycle = | Rs. 600 |
| Proposed rent/day = | Rs.5 |
| Expected Utilization in a week = | 4 days/week |
| Monthly Revenue = | Rs. 5 x 4 x 4 = Rs.80 |
| Break Even Point = | 600/80 = 7.5 months |

2) Another service that has good potential is a **Mobile PCO**. The SHG can purchase a mobile phone and start a 24 hour phone service in the village. Again, a simple calculation demonstrates that the venture will become profitable in less than 2 months.

| | |
|------------------------|--|
| Handset cost = | Rs. 1000 |
| Call charge = | Actual Call cost + Re.1 per 10 minutes |
| Expected daily usage = | 15 people x 2 minutes = Rs.20 |
| Breakeven point = | 1000/20 = 50 days |

An SHG possessing Rs. 2000 or above can easily provide both the above services.

Honey Packaging

Another opportunity that has a good potential for livelihood creation is collecting and packaging honey. The forest in the Patha region produces about 10 tons of natural honey every year. This honey can be easily packaged under our brand name and marketed in the local market as well as in fairs and exhibitions. Packaged honey sells at a price of around Rs. 100/kg. The value chain for the same can be similar to one already illustrated for NTFP-based products.

Sericulture

Sericulture also provides a good opportunity to the farmers. If silk worms are reared in a farm of about 1 acre for 2 months, the production of silk in the process will be enough to generate an income of Rs. 8000-15000 for the farmer. If the farm is watered, the farmer can easily repeat the process about 5-6 times in a year. There have been attempts to develop the same on a small scale in Patha in the past which have met with some success. These models can be scaled up further to engage more people from the community.

TRADITIONAL ARTS AND CULTURE

There are certain traditional music and dance forms of the Kol community. Some extremely talented singers and dancers among the Kols have been identified by ABSSS. These people have been given a platform for enhancing their skills and showcasing it to the world. The performers have been organized into a Cultural Group. This group has performed and been appreciated at various events within Bundelkhand and in the cities of Delhi, Mumbai, etc. Cultural events like 'Lok Laya' are organized frequently by ABSSS to give an exposure to the tribal performers. Through their music and dance forms, efforts have also been made by ABSSS to attract the attention of the outside world to the plight of the tribal community.

These art forms have the potential to become a good alternative source of livelihood for the talented tribals. Also, these art forms can help bring Bundelkhand into limelight in the country. However, much effort still needs to be made to motivate these people to enhance their skills and make their performances more appropriate for stage presentation.

RISKS/VULNERABILITIES ASSOCIATED WITH THE PROPOSED INITIATIVES

- 1) **Difficulty in convincing the tribals** - The tribal community has been following certain **traditional practices** in agriculture. They have got so deeply ingrained in their minds that it will be difficult to convince them to adopt new crops and techniques.

Also, there is a belief that if they do not grow traditional food grains, they will lose their food security. The idea of buying from the market, somehow, does not appeal to the tribals. Thus, it will be difficult to convince the farmers to grow more profitable crops.

Moreover, a change in agricultural practices may involve a **change in lifestyle**, for example, cultivation of vegetables requires one person to keep tab in the field during night time. The tribal men may be reluctant to accept these changes in their lifestyle.

Furthermore, the tribals in this region have a tendency to earn only as much is sufficient for their needs. They work for a few days and then, stop working till they exhaust the money earned. Getting full time commitment for our initiatives from this community may prove to be a daunting task.

- 2) **Variation in agricultural lands of different farmers** – The agricultural conditions (soil type, availability of water, etc.) may be different for different farmers and hence, a uniform strategy cannot be adopted for the entire community. A proper soil testing will need to be done and based on the findings, suitable recommendations in terms of cropping patterns and techniques will have to be made to the farmers.
- 3) **Lack of credit availability** – Owing to the lack of finances, the farmers and SHGs may not be able to use the best possible inputs/techniques/cropping pattern for the concerned piece of land. Also, they may be reluctant to experiment due to cash crunch.
- 4) **Water and Soil Management systems** – All agricultural interventions need good irrigation. The amount of rainfall in the region has been abysmally low over the past few years. Also, the region is prone to widespread soil erosion. Thus, to ensure the success of the interventions, rapid development of water and soil management systems is necessary. The current pace of this development is quite slow and needs to gain momentum.
- 5) **Hand to mouth nature of the community** – Most of the tribal community has a hand-to-mouth subsistence. Thus, the new proposals, particularly in agriculture, may not find acceptance if they have a very large gestation period for returns.
- 6) **Dynamic nature of the SHGs** – A member of say, a Mustard Growers' Self Help Group may want to grow some other crop the next year. He will be replaced by some other farmer who wants to grow mustard that year. Thus, the Self Help Groups will be very loose and dynamic groups of farmers brought together by the desire to grow a particular crop. Holding such dynamic groups of people together may present a challenge.

- 7) **Inconducive business environment** – The environment in the region is not very conducive for doing business due to various problems like dacoits, political instability, etc. Any major development in the region both in terms of agriculture and forest produce will require large investment and hence, will require private funding in some form or the other. The private business houses may not be willing to enter this region owing to the above factors.
- 8) **Anna Pratha** – The practice of open grazing in the region is a major cause for crop spoilage. This may hamper the process of Agricultural Intervention also.
- 9) **Critical need for a storage facility** – The region is in dire need for a cold storage facility for vegetables. Till the time, such a facility is developed, the farmers will continue to grow quantities that will be sufficient to cater to the local market only. Thus, in order to develop this region as a major vegetable producer, a cold storage facility is absolutely essential.
- 10) **Illiteracy and lack of awareness among tribals** – Due to the widespread illiteracy and lack of awareness in the region, it may prove to be difficult to explain the new techniques/cropping patterns of agriculture. It will also be difficult to impart new skills required for processing and marketing agricultural and forest produce.
- 11) **Low power availability in the region** – Power is critical for certain steps in agriculture and agri-processing. Thus, absence of power in the village for most part of the day might be a deterrent in implementing the new techniques and processing the agricultural produce.
- 12) **Low availability of pump sets, tractors, etc.** – The number of pump sets and tractors in the village are abysmally low.
- 13) **Difficulty in entering the NTFP market** – Despite the nationalization of collection of all major NTFP, there exists a nexus of influential contractors who continue to buy NTFP from the tribals and supply big manufacturers directly, making huge profits in the process. This nexus is so strong that it may be difficult for Aadarsh to break through it and establish links with the big manufacturers.
- 14) **Dwindling numbers of certain species of trees** – Owing to widespread deforestation and climate change, certain species of trees found in the region have depleted considerably. If the phenomenon continues, a number of NTFP found from these trees will no longer be available.

Afforestation and private growing of important trees is a possible remedy. However, each tree will require at least 7-8 years to grow.

- 15) **Difference in rules for UP and MP** – Half of the Chitrakoot district lies in U.P. while the other half lies in M.P. The difference in rules, regulations and legislations between the two states might pose some challenges for the interventions.

- 16) Possible change in regulation** – Any change in regulation related to agricultural and forest produce might affect the proposed business model adversely
- 17) Institutionalization of processes** – Setting up well defined processes for each of the activities is essential for scaling up operations.
- 18) Moral hazard** – It has been observed that once the tribals save some money, they start spending it on vices like alcohol, tobacco, gambling, etc. This will not only degenerate the social fabric but also hamper the process of intervention.
- 19) Lack of initiative on the part of tribal men folk** – The tribal women are extremely persevering and hard working. On the other hand, the men of the community are a little laid back and have a tendency to pass on all the work to their women. However, their support is essential for any organized effort even if it only involves women. It may be difficult to gain commitment and support from them for a new initiative.



SUMMARY

| | Short Term Measures | Medium Term Measures | Long Term Measures |
|-----------------------------------|--|---|--|
| Agriculture | | | |
| Rabi Season | Promotion of more profitable, alternative crops to wheat – Mustard, Gram, Barley and Linseed through formation of Self Help Groups | | |
| Kharif Season | Rice Intensification | | |
| | Sesame cultivation | Increase area under Sesame | |
| | Vegetable Farming, Promotion through formation of Bundelkhand New Crop Growers' Association | Increase production of vegetables, Preparation of Achaar by wives of Vegetable growers and Marketing under the Aadarsh brand name | Development of a cold storage facility, Establish the region as a major vegetable producing centre |
| Promotion of scientific practices | Efficient Crop Rotation & Diversification | | |
| | Modern techniques such as Raised Bed system of sowing | | |
| | Encouragement to models like 1.5 ac – 2.5 ac models | | |
| | Effective Use of Unutilized Land in growing crops like bhindi, adrak and haldi | | |
| | Promotion of orchard-based agriculture | | |
| | Promotion of short-cycle varieties of crops | | |
| | Use of locally available seeds | | |
| Other Recommendations | Intensification of Water Management Programs | | |
| | Promotion of Alternative Irrigation Techniques | | |
| | Improvement of Pedigree of Farm Animals | | |
| | Soil Testing & Suitable Conditioning | | |
| | Provision of appropriate quality of seeds | Development of a Seed Resource Centre | |
| | Promoting techniques like green manuring, organic | | |

| | | | |
|--|--|---|---|
| | farming, lift irrigation etc. | | |
| | Promotion of Land Use Diversification through Horticulture, Afforestation and Grassland & Fodder Development | | |
| | Exposure visits and Capacity Building for farmers, SHGs etc. | | |
| | Encouraging Value addition and Agro Processing | Formation of a commercial organization for value added products, Storage and Logistics Infrastructure | |
| | | | Facilitating in Provision of Credit, Micro Finance and Crop Insurance |
| | | | |
| NTFP | | | |
| | Formation of SHGs for collection, processing and marketing of Amla Formation of a commercial organization for value added products | Capacity building and Skill enhancement | Strengthening the brand |
| | Formation of SHGs for collection and wholesaling of major NTFP like mahua, medicinal herbs etc. Formation of a commercial organization for value added products | Capacity building and Skill enhancement | Strengthening the brand |
| | | | |
| Other Livelihood Opportunities | | | |
| Bamboo Processing and Upliftment of the Basorh Community | Formation of an independent NGO to take up the cause of the Basorh community | Development of the skills of the community in bamboo work | Formation of a co-operative of tokri makers |
| Honey Packaging | Organized collection, packaging and marketing | | |
| Sericulture | Promotion of the practice | | |
| Community Development Needs | | Preparing the Community for Entrepreneurship | |
| | | | Evolution from dignity to self reliance |

After centuries of struggle and bonded labor, the Kol community of the Patha region has tasted freedom for the first time in the past ten years. It has taken relentless efforts on the parts of NGOs like ABSSS to introduce the concept of self dignity to this distressed group.

The aim of the study was to improve the quality of life for this community through identification of livelihood opportunities and formulation of methodology for livelihood creation. It is hoped that the recommendations presented above will somewhat help in serving the purpose. However, livelihood generation is one of the many tools for improving the standard of living of any community. Other equally important aspects are proper housing, education, health care, hygienic living conditions, better connectivity, clean drinking water, law and order etc. Moreover, the traditional mindsets of the community need to be tackled sensitively. There is also a need to orient them towards the concept of entrepreneurship and self reliance.

While some of the tasks mentioned above can be handled by individual organizations, the bigger causes of education, health care etc. need to be addressed by joint efforts from the Government, the NGOs and the Community. While work in this direction is already on, a lot still needs to be done.

1. Long-term Strategies and Programmes for Mechanization of Agriculture in Agro Climatic Zone–VIII : Central Plateau and Hills region
Dr M.M. Pandey, *Central Institute of Agricultural Engineering, Bhopal*
2. Agri-Horticultural System for Household Livelihood - A Case Study
R.P. Dwivedi, R.K. Tewari, K. Kareemulla, O.P. Chaturvedi and P. Rai
3. Development Report: Uttar Pradesh Vol.2, Planning Commission, Govt. of India
4. Action Plan to Address Agrarian Distress in India – Report to NABARD, January 2008
5. Handouts by Deendayal Research Institute, Chitrakoot
6. Farmer handouts by Krishi Vigyan Kendra, Majhgawan
7. Draft report of a Study on watershed development in Sunari watershed (semi-ravine area) of Datia district
by Madhya Pradesh SPWD, New Delhi and SAMBHAV, Gwalior, May 2004
8. UP Planning Atlas 2007
9. Livelihoods Promotion Training Program Phase I Reading Material
10. www.bundelkhandinfo.org
11. International Journal of Rural Studies Vol 16 No. 2 October 2009
12. “Fighting Terror, Protecting Dignity”, Report by Bharat Dogra
13. Indian Development edited by Jean Dreze & Amartya Sen
14. Natural Resources Based Planning For Poverty Alleviation with Special Emphasis on the Role of Women by Bharat Dogra

APPENDIX A Resource Map

A. Natural Resources –

1) Land –

- a. **Soil type** – The region has red, yellow, black and gravelly soils. About **40%** of the cultivated area has **yellow soil** while **60%** of it has **gravelly soil**
- b. The **slope** of the land is about **0-3%** approximately
- c. The **depth** in case of **yellow soil** is **5-10 feet** while that in case of **gravelly soil** is **1-3 feet**
- d. About **15%** of the total land area is **under forests**
- e. About **7%** of the land is **barren or non cultivable**
- f. About **62%** of the land is **cultivable but is not cultivated** currently
- g. Actual area used for cultivation of **Kharif** is **less than 2%**
- h. Actual area used for cultivation in **Rabi** is **around 16%**
Only about **10%** of this land is **irrigated**.
- i. There is **little or no agriculture** during the **Summer months**
- j. It is observed that for paady and wheat, the household consumption is more than the production.

2) Water

Average rainfall in mm (over the last 5 years) = **850 mm**.

There has been significant incidence of crop failures over the past five years owing to poor rainfall.

Sources of water:

Hand pumps for drinking water – 8 in Summers, 11 each in Monsoon and Winter

Public wells – 6 throughout the year

Public tanks – 2 in Monsoon and Winter

Streams – 4 in Monsoon and Winter

Several hand pumps, tanks and streams go dry in summers and a **water crisis** is created. The **quality of water** provided by these sources is not very good for drinking, nonetheless it is used for the purpose.

Women and small girls travel for half an hour on an average to fetch drinking water from the source.

The **level of water** in dug wells is **approximately 5-6 m** in summers, about **7 m in winter** and **9 m in monsoon**.

Major sources of irrigation are tanks, open wells and Nalas.

3) Climate

November to January – Dry Winters

February to March – Spring season

April to June – Dry summers

July to August – Rainy season

September to October – Moderate Climate (Neither very hot nor very cold)

The climate in the region is more or less dry with some humidity during the rainy season.

4) Forests

About 15% of the total land area in the region is under forests.

Major tree species and their usage:

Firewood trees – cutting firewood for commercial purposes

Amla tree – Trade of amla and amrethi

Tendu – Bidi making

Chiraunji

Neem – Medicinal use

Mahua seed/flowers – Liquor, medicinal use

Timber

Palash tree – Leaves used for making dona pattal

Babool

Several medicinal plants

5) Livestock

Most of the rich villagers own **cows, buffaloes, sheep and goats**. Poor villagers, however own more of hens and cocks. However, the point to be noted is that approximately 40% of the total cows and 33% of the total buffaloes are dry and thus, not of much use.

6) Energy Sources

Major sources of energy in the region are:

a) Firewood and

b) Limited electric supply (for about 10 hours in a day for 10 days in a month)

7) Environmental threats to the natural resources:

a) **Land** – Due to the slopy terrain of the region, the quality of the soil is deteriorating due to **erosion of precious top soil**

- b) **Water** – The annual rainfall in the past few years has been very less. Owing to this, the water table in the area is falling
- c) **Forests** – Due to extensive deforestation, the forest cover is getting depleted and many species of trees are getting adversely affected.
- d) **Energy Sources** – Firewood which is a major source of energy in the region is depleting because of extensive deforestation.

II. Physical Resources

- 1) **Irrigation Infrastructure** – Mostly, pump sets powered by diesel are used for irrigation purposes
- 2) **Haats** – There is a Wednesday ‘bazaar’ in Majhgawan
- 3) **Market yards** – The nearest markets are Manikpur and Majhgawan.
- 4) **Warehouses** – Forest produce collection centres of the U.P. Forest Corporation.
- 5) **Electricity** – There is limited electric supply for about 10 hours in the day, during night time for about 10 days in the month. In this cluster, electricity is available only in Tikariya and Mangawan. The other villages in the region do not have an electric supply.
- 6) **Roads** – Less than 40% of the villages in the area have a pucca road access
- 7) **Railway lines** – The nearest railway stations are in Tikariya, Manikpur and Majhgawan. Manikpur is pretty well connected to major cities like Delhi, Mumbai, Allahabad, Lucknow, etc.
- 8) **Transport facilities** – The villages are connected with each other and with the main markets/block headquarters only by jeeps. The big villages like Tikariya have bus services as well. The jeeps are very often poorly maintained and overcrowded. Also, these ply only 3-4 times in a day. Thus, connectivity of these villages is a matter of concern.
- 9) **Post Office** – The nearest post office is in the village of Markundi besides the big post offices in Manikpur and Majhgawan.
- 10) **Health facilities** – The nearest hospital is in Manikpur which is 30 kms away
- 11) **Living Conditions** – Only about 2% of the houses are pucca houses while the rest are all semi-pucca, mud houses. Again only, 2% of the houses have toilets, the others don’t. Only about 6% have a legal electricity connection. There are no gas stoves in the region. All the households use chulas only. The hygiene levels in the villages are extremely poor.

III. Human Resources

Mangawan Gram Panchayat has a **population** of about 2000.

Number of households = 330 with an **average family size** of 6 persons.

Out of these, about 300 i.e. 91% of the total households belong to SCs and OBCs. About 56% of the total households are Below Poverty Line. About 47% are marginal farmers (< 1 ha land), about 29% are small farmers (own 1-2 ha of land), only 5% are semi medium farmers (own 2-5 hac of land) while 19 % are still landless.

Male-Female ratio = 903:1031

Average number of earning members in each household = 2 – Men are generally involved in agriculture or are wage earners on other's lands, Women are involved in collecting and selling timber and Non timber forest produce.

Major Economic activities households engage in

The main economic activities that the tribal households here are involved in are:

- Wood cutting
- Agriculture
- Trade of Non Timber Forest Produce
- Daily waging for NREGA or land holding farmers
- Very few are involved in shop keeping as well

Labor Availability and Skill Levels – Labor is very easily and cheaply available. However, there is little or no skilled labor suitable for jobs in manufacturing and services sectors.

Though the tribal community has some traditional song and dance forms which if promoted properly can gain widespread popularity. ABSSS is trying to promote this talent of the Kol community by formation of a Cultural Group of the Kols. This group comprises of some very talented singers and dancers from the community and has been appreciated at various forums in New Delhi, Mumbai and other places.

The Basorh community is known in the region for its traditional occupation of tokri making. Their skill needs to be enhanced properly to generate more value for their products.

Entrepreneurial abilities are restricted to people of higher castes. Rich farmers and influential forest contractors have amazing business acumen. However, the poor and oppressed kol community does not possess the knowledge and the skills to undertake entrepreneurial ventures.

Educational profile of the population – Most of the Kol community is illiterate. A few of them are just literate. Even fewer have studied till the primary level. Most of the people who have obtained higher education belong to higher castes. The literacy levels in case of women are even lower. However, after ABSSS started its work in this region, the education standards in women have gone up.

The literacy rate in males is only 21.3% while it is even lower for women: 16.6% approximately.

Health Profile of the Population

The health condition of the people in the region is not very good. People suffer from frequent illness. Diseases like malaria and typhoid are widespread. Several people die every year owing to these diseases.

The hygiene level in the region is also very poor, which is again one of the reasons behind diseases like malaria and typhoid.

Many women and children seen in the region were malnourished. Infant and child mortality in the region is quite high. Infant mortality in 2008 was about 18%. The percentage of women dying during child birth was about 9%.

IV. Social Resources

The Kol community is quite homogenous. There is a feeling of mutual trust and understanding within the community as everybody is almost at the same level. However, Kols have very long been ill-treated by the upper castes. Thus, naturally the upper castes are not trusted by this community.

The gender relations are quite congenial. Women, in fact, have a lot of say in the household matters. However, the men folk are big work-shirkers and have a habit of passing on all the work to their women.

Initially the land holdings of the Kols had unfairly been grabbed by rich landlords. However, after the redistribution of land, most of the Kol families in the region own land.

V. Financial Resources

There are no formal sources of credit in the region yet. The Kols borrow within their community only and from the local baniya in the village.

Most of the credit requirements in the region are for minimum subsistence and marriages only. However, there is some requirement for agriculture as well.

Several Self Help Groups of women have been formed by ABSSS to facilitate the process of saving, borrowing and lending money among its members.

VI. Institutional Resources

Primary School – 1 in a nearby village Tikariya

Middle school – 1 in Tikariya

No Intermediate school or college

Primary Health Centre – 1 under construction

PDS – only 1 in Tikariya

Medicine shops – Nearest only in Majhgawan and Manikpur

Hospital – Nearest only in Manikpur (about 30 kms away)

Nearest police station is in Markundi, about 12 kms away.

Nearest Post office is in Markundi, about 12 kms away.

Nearest Bank is also in Markundi, about 10 kms away.

APPENDIX B

Comparison of Modern vs. Traditional Techniques of Wheat & Paddy Cultivation

| | |
|---------------------|--|
| Item | WHEAT |
| Category | Agriculture Produce |
| Sub-Category | Food grain |
| Description | - Rabi crop - Main crop for food security in the region |

| Item | Traditional Practice in Region | Scientific Method |
|------------------------|--|---|
| Seed | | |
| - Variety | Sujata, Kathiya, C-306 | WH-147 |
| - Quantity | 60 kg/ac. | 40 kg/ac. (for unirrigated areas) 50 kg/ac. in case of late sowing |
| - Cost | Rs.3500/ac. | Rs.4500-5000/ac. |
| Irrigation Req. | Twice: Pre-irrigation + 1 | Thrice |
| Fertilizer Qty. | 2 kg/ha, usually DAP Extremely low | Rain-fed wheat: NPK 40-20-20 kg/ha Semi-irrigated: NPK 60-20-20 kg/ha Irrigated: NPK 120-60-40 kg/ha Half of seed qty. (DAP) |
| Weedicide | None | Recommended use |
| Insecticide | Rotten cow-dung | Chlorpyrifos: 3-4 ml/kg |
| Yield | 4.2 qt./ac. (Paatin) | 10-16 qt./ac. |
| Advantages | | - Seed requirement upto 33% less - More responsive to inputs |
| Drawbacks | - High amount of loose smut - Prone to termite attack | - Water requirement is more |

Simple Region-specific Changes in Agricultural Practices to benefit Farming Community –

1. Selection of **varieties requiring less irrigation**

Use of those varieties which yield sufficient output even with 1-2 rounds of irrigation needs further promotion. Some of these varieties are –

| | |
|-----------------|--|
| 1-2 irrigations | Amar (HW-2004), HI-1500, HI-1531, JW-3020, JW-17 |
| 2-3 irrigations | JW-1142, JW-1106, JW-28, Malavshakti, Malavratna, Malavkeertipurna, Swarna |
| Yield | 30-40 qt./ac. |

2. **Early sowing**

Water sources in the region tend to dry up by Dec-Jan every year. Hence, it is recommended to use those varieties of wheat which can be sown in Oct-Nov so that conserved water can be utilized efficiently.

3. **Limited Ploughing**

Since monsoon has a tendency to get delayed often, the Kharif crop is harvested late. If a lot of time is spent in preparation of land for the Rabi crop post Kharif harvest, then sowing of Rabi crop will also get delayed and farmers will not be able to utilize the retained sub-soil moisture. It is hence recommended to quickly make the land ready after 1-2 ploughings for the Rabi season.

4. **Preventing Fallage**

Local varieties of wheat or those grown in unirrigated areas have a tendency to grow tall and hence fall. The distance between rows of these varieties of wheat should be kept at least 30 cm to prevent fallage.

New varieties of paddy like GR-75, Narendra – 97, Shushk Samrat and GR-201 are shorter and hence and thus, the risk of fallage is lower. These should be preferred over the taller varieties that are prone to fallage.

| | |
|---------------------|---------------------|
| Item | PADDY |
| Category | Agriculture Produce |
| Sub-Category | Food grain |
| Description | Kharif Crop |

| Item | Traditional Practice in Region | Scientific Method |
|-------------------------|--|--|
| Seed | | |
| - Variety | Lohundi, Kardhana | GR-75, Narendra – 97, Shushk Samrat, GR - 271 |
| - Quantity | 60 kg/ac. | 40 kg/ac. For transplanted paddy – 16 kg/acre For Madagascar technique – 5 kg/acre |
| - Cost | Rs.4000/ac. | Rs.4750/ac. |
| Duration | 75-80 days | 75-80 days |
| Height of plants | Height is more - threat of falling and loss of productivity | Height is less |
| Irrigation Req. | Standing water in the field | Intermittent irrigation like wheat but a source should be available |
| Fertilizer Qty. | 2 kg/ha, usually DAP Extremely low | 20 kg/acre DAP at the time of sowing/transplantation, 10 kg per acre Urea at the time of sowing/transplantation 50 kg/acre for Madagascar |
| Weedicide | None | Recommended use |
| Insecticide | | |
| Yield | 3-4 qt./ac. | 8-10 qt./ac. |
| Advantages | | - Seed requirement upto 92% less - Increased productivity |
| Drawbacks | - Weed problem - Falling - Insect infestation (Gandhi) | |

New Technique: Madagascar/System of Rice Intensification

| Parameter | Traditional Method | Madagascar/SRI |
|---|---|-------------------------|
| Space required for nursery (for transplantation) | 1/50th of the field | 1/20th of the field |
| Stage of transplantation of seedlings | 21-25 days after sowing | 12-14 days after sowing |
| Number of seeds transplanted in 1 place | 4-5 | Only 1 |
| Distance between crops | Very less gap maintained due to fear of animals, insects etc. | 25 cms. |
| Yield | 2.5-3 qt./ac. | 8-10 qt./ac. |
| Labour | More labor required | Less labor required |

APPENDIX C
Beneficial Pulses for the Region

| | |
|---------------------|---|
| Item | MASOOR |
| Category | Agriculture Produce |
| Sub-Category | Pulses |
| Description | Rabi crop, grows well in this region with less irrigation |

Suitable varieties for this region -

| Variety | Crop Duration | Wt./1000 units | Yield |
|----------------|---------------------------------|-----------------------|--------------|
| Type-36 | 130-140 days (ripens slower) | | 6-8 qt./ac. |
| JL-1 | NA | 25g | 4-5 qt./ac. |
| Mallika | NA | 27g | 3-4 qt./ac. |
| B-77 | 120 days | | 5-6 qt./ac. |
| Lens 4076 | 115-120 days | 35g (large size) | 4-6 qt./ac. |

| Item | Description |
|-------------------------------|--|
| Seed | |
| - Quantity | 15-16 kg/ac. |
| Irrigation Req. | Grows well in rain-dependant areas,1-2 irrigation rounds in case of no rainfall |
| Fertilizer/Manure Qty. | Pre-sowing: 80-100 qt./ac. organic manure, NPK 40-20-20 kg/ac., 45 kg DAP, 70 kg Urea, 32 kg Murate of Potash At the time of sowing: 100 kg DAP, 30kg Murate of Potash or NPK 12:32:16 150kg/ha |

| | |
|---------------------|---------------------|
| Item | CHANA/GRAM |
| Category | Agriculture Produce |
| Sub-Category | Pulses |
| Description | Rabi crop |

| Item | Description |
|-------------------------------|---|
| Seed | |
| - Varieties | Uday, KGD-1168, JG-63, JG-11, JG-315, JG-16, Avrodhi K-508, Phule Pragati-5, Radhe |
| Yield | Traditional: 2.5 qt./ac in areas like Paatin Use of HYV can increase output by 25-30% |
| Fertilizer/Manure Qty. | Fertilizer requirement is much less than that for wheat although farmers commonly use it in the same quantities in the region |

| | |
|-----------------|---------------------|
| Item | SOYABEEN |
| Category | Agriculture Produce |

| Item | Traditional Varieties | Successful Modern Varieties |
|-------------------------|-----------------------------------|--|
| Seed | | |
| - Variety | JS-357 | JS-9305, JS-9752, Satri, Ramban |
| - Quantity | 35-40 kg/ac. | 25-30 kg/ac. |
| Yield | 3 qt./ac | 7-8 qt./ac. |
| Fertilizer | Not used in conventional practice | Potash: 50 kg/ac. Gypsum: 100 kg/ac. |
| Organic Manure | | 25-50 kg/ac. |
| Salient Features | | - Germinates better - Requires deeper ploughing - Larger gap |

| | |
|---------------------|--------------------------------------|
| Item | ARHAR |
| Category | Agriculture Produce |
| Sub-Category | Pulses |
| Description | Primary pulse consumed in the region |

| Item | Description |
|-------------------|---|
| Seed | |
| - Varieties | JKM-189 |
| Yield | Traditional: 70-80 kg/ac. Use of HYV can increase output by 25-30% |
| Crop Cycle | Traditional: 10 months Modern: 6 months |
| Notes | Traditionally, Arhar was only grown in areas where Paddy could not grow properly. However, there is potential for it to be cultivated in a regular manner as an important crop. |

APPENDIX D
Beneficial Oilseeds for the Region

| | |
|---------------------|-----------------------|
| Item | SARSON/MUSTARD |
| Category | Agriculture Produce |
| Sub-Category | Oilseed |
| Description | Rabi crop |

Suitable varieties for this region –

| Seed | Crop Duration (Days) | Yield (qt./ha) | Specialty |
|----------------|-----------------------------|-----------------------|--|
| NDR 8501 | 125-130 | 25-30 | Large-grain size, more branches, oil content 42% |
| Pusa Bold | 110 | 15-18 | |
| Agrani | 120-125 | 10-15 | Suitable for intermittent farming |
| Aravali | 110-115 | 15-18 | Suitable for rain-dependant areas with late sowing |
| Pusa Jaiskisan | 120-125 | 20-22 | Medium –sized grain |
| Varuna | 125-130 | 15-18 | |

| Item | Description |
|-------------------------------|--|
| Seed | |
| - Quantity | 5 kg/ha |
| - Cost | Foundation: Rs. 50 per kg. Certified: Rs. 49 per kg. |
| Yield | 225000-250000 plants/ha 12-15 qt./ha in rain-fed areas , (11-12 qt./ha in Paatin-Mangawan) 20-25 qt./ha in irrigated areas |
| Irrigation | Grown usually in unirrigated areas, but 1-2 rounds of irrigation, especially to ensure moisture during growth period improves the quality of crop considerably |
| Fertilizer/Manure Qty. | Irrigated State: NPK 120-60-40 kg/ha |
| Crop Protection | Isoproturan (weedicide), Diethane M-45, Diethane Z-78, Thiodon |

| | |
|---------------------|---|
| Item | ALSI |
| Category | Agriculture Produce |
| Sub-Category | Oilseed |
| Description | Rabi crop, suitable for rain-dependant areas, often grown in areas where nothing else grows |

Suitable varieties for this region -

| Variety | Crop Duration | Yield |
|----------------|----------------------|--------------|
| Jawahar-17 | 115-120 days | 3-4 qt./ac. |
| Jawahar-7 | 115-125 days | 3-4 qt./ac |
| Jawahar-9 | 115-125 days | 3-4 qt./ac |
| Neelam | 120-125 days | 6-8 qt./ac |

| Item | Description |
|--------------------|-----------------------|
| Insecticide | Phosphemidan, Thiodon |
| Weedicide | Fluchlorine |

APPENDIX E

Crop Cycle and Economics of Vegetable Cultivation in the Region

| | |
|---------------------|---------------------|
| Item | ONION/PYAAZ |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| | | | | | | | | | | | |
|-------------------|----------------------|----------------------|----------------------|----------------------|----------------|----------|----------|----------|----------|----------|----------|
| J | F | M | A | M | J | J | A | S | O | N | D |
| Seeds Sown | Standing Crop | Standing Crop | Standing Crop | Standing Crop | Harvest | | | | | | |

Economics of Cultivation

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|--------------------------|------------------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 1440 | 1440 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| Labour | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Preparation of nursery <i>1 worker, 1 day</i> | 100 | 260 |
| Sowing <i>5 workers for 5-6 days</i> | 3000 | 7800 |
| Watering <i>Every 7 days, 1 worker</i> | 2400 | 6240 |
| Once the plant is ready, it gets dried up. Then, digging up the plant for 7-10 days, 40 worker days for 1 <i>Beegha</i> | 4000 | 10400 |
| 3-4 days for separating the root and the <i>Danthal</i> - 10 worker days for 1 <i>Beegha</i> | 1000 | 2600 |
| Seed cost <i>@Rs.500 (1 kg seed @ Rs.500/kg)</i> | 500 | 1300 |
| Chemical Fertilizer | 600 | 1560 |

| | | |
|---|----------------------------|---------------------------|
| 1 bora (50 kg.) @ Rs. 600 | | |
| Urea dressing 3 times, 20 kg urea @ Rs. 5-6/kg | 300 | 780 |
| Insecticide/ Pesticide Malatheaon 50gm/Beegha in 20 lt. water @Rs.60/packet (50g) | 60 | 156 |
| TOTAL COST | 14600 | 35656 |
| OUTPUT | 6000 kg/Beegha (60 qt.) | 15600 kg/ac. (156 qt.) |
| TOTAL SALES (Rs.) | 60000 | 156000 |

Scientific Cultivation

| Item | Description |
|-------------------------------|---|
| Seed | |
| - Variety | Agrifound Lightrate, Pusa Madhavi, Aarkaniketan, Pusa Red |
| - Quantity | 4 kg/ac. |
| - Cost | Rs.1000-1200/kg |
| Irrigation Req. | Every 15-20 days, more frequently at the time of bud formation |
| Fertilizer/Manure Qty. | Pre-sowing: 80-100 qt./ac. organic manure, NPK 40-20-20 kg/ac., 45 kg DAP, 70 kg Urea, 32 kg Murate of Potash At the time of sowing: 5 kg organic manure, 30g DAP, 25g Urea, 25g Murate of Potash for each <i>kyaari</i> (3m L x 75cm W, 25 <i>kyaaris</i> per ac.) |

| | |
|---------------------------|---|
| Crop Protection | Monochrotofos, Mancozeb |
| Yield | 100-120 qt./ac. |
| Cost of Production | Rs.125-130 /qt. |
| Profit | Rs.27000-32000/qt. if sold @ Rs.400/qt. |

| | |
|---------------------|---------------------|
| Item | POTATO/AALOO |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| | | | | | | | | | | | |
|------------------|------------------|----------------|----------|----------|----------|----------|----------|----------|---------------|------------------|------------------|
| J | F | M | A | M | J | J | A | S | O | N | D |
| | | | | | | | | | Seeds Sown | Standing Crop | Standing Crop |
| Standing Crop | Standing Crop | Harvest | | | | | | | | | |

Economics of Cultivation

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|------------------------------|------------------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 1440 | 1440 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| <i>Labour</i> | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Sowing <i>5 workers for 5-6 days</i> | 3000 | 7800 |
| Watering <i>Every 7 days, 1 worker</i> | 2400 | 6240 |
| Harvesting <i>15 men X 5 days</i> | 56250 | 150000 |
| Seed cost <i>@Rs.500 (1 kg seed @ Rs.500/kg)</i> | 500 | 1300 |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600</i> | 600 | 1560 |

| | | |
|--|----------------------------|---------------------------|
| Insecticide/ Pesticide <i>Malatheon 50gm/Beegha in 20 lt. water</i> <i>@Rs.60/packet (50g)</i> | 60 | 156 |
| TOTAL COST | 65450 | 171616 |
| OUTPUT | 5000 kg/Beegha (50 qt.) | 13000 kg/ac. (130 qt.) |
| TOTAL SALES <i>@Rs.15/kg</i> | 75000 | 195000 |

Scientific Cultivation

| Item | Description |
|-------------------------------|--|
| Seed | |
| - Variety | Early: Kufri Chandramukhi, Kufri Bahar, Kufri Ashoka Middle: Kufri Baadshah, Kufri Lalima, Kufri Pukhraj, Chipsauna – 1, Chipsauna – 2 Late: Kufri Baadshah, Kufri Satluj |
| - Quantity | 10-12 quintal/acre |
| Fertilizer/Manure Qty. | 80-100 quintal compost, 70 kg DAP, 60kg Murate of Potash, 60 kg. Urea |
| Crop Protection | Matribujeen: 150 gm in 200-250 lt. water, Metalixul; 2 gm/lt., Indosulfan: 10-12 kg/acre |

| | |
|---------------------|------------------------|
| Item | BRINJAL/BAINGAN |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |
| Description | Rabi & Jayad crop |

Crop Cycle

| J | F | M | A | M | J | J | A | S | O | N | D |
|--------------|-----------------------------|--------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|---|---|--------------|--------------|--------------|
| | | | | | | Seeds sown (Winter crop) | | | Winter Fruit | Winter Fruit | Winter Fruit |
| Winter Fruit | Winter Fruit | Winter Fruit | Yield possible with irrigation | Yield possible with irrigation | Yield possible with irrigation | | | | | | |
| | Seeds sown (Summer crop) | | | Summer Fruit | Summer Fruit | | | | | | |

Economics of Cultivation

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|----------------------|-----------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 7200 | 7200 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| <i>Labour</i> | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Sowing <i>5 workers for 5-6 days for both summer and winter</i> | 6000 | 15600 |

| | | |
|--|------------------------|------------------------|
| <i>crops</i> | | |
| Watering <i>Every 7 days, 1 worker</i> | 2400 | 6240 |
| Fruit months <i>3 men x 8 months</i> | 18000 | 46800 |
| Seed cost <i>@Rs.250 for each cycle</i> | 500 | 1300 |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600</i> | 600 | 1560 |
| Insecticide/ Pesticide <i>Malatheon 50gm/Beegha in 20 lt. water @Rs.60/packet (50g)</i> | 60 | 156 |
| TOTAL COST | 35960 | 81976 |
| OUTPUT | 3000 kg (25-30 qt.) | 7800 kg (65-78 qt.) |
| TOTAL SALES <i>Assuming one third output from Summer crop@ Rs.10/kg and two third output from winter crop@ Rs. 18/kg</i> | 46000 | 119600 |

Scientific Cultivation

| Item | Description |
|--------------|---|
| Seed | |
| - Variety | Narendra Baingan II, Narendra Baingan VII |
| Yield | 120-140 qt./acre |

| | |
|---------------------|-----------------------|
| Item | TAMATAR/TOMATO |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| | | | | | | | | | | | |
|-------|-------|-------|---|---|---|---------------|---|---|-----------------|-------|-------|
| J | F | M | A | M | J | J | A | S | O | N | D |
| | | | | | | Seeds sown | | | Fruit begins | Fruit | Fruit |
| Fruit | Fruit | Fruit | | | | | | | | | |

Economics of Cultivation

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|------------------------------|------------------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 2160 | 2160 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| <i>Labour</i> | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Preparation of nursery <i>1 worker for 1 day</i> | 100 | 260 |
| Sowing <i>5 workers for 2 days</i> | 1000 | 2600 |
| Watering <i>Every 30 days, 1 worker</i> | 900 | 2340 |
| Plucking the fruit <i>2 workers, 1day</i> | 200 | 520 |
| Seed cost <i>@Rs.100 (100 g seed)</i> | 100 | 260 |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600</i> | 600 | 1560 |
| Insecticide/ Pesticide <i>Malatheon 50gm/beegha in 20 lt. water @ Rs.60/packet (50g)</i> | 60 | 156 |

| | | |
|---------------------------------|------------------------------|------------------------|
| Total Cost | 6320 | 10816 |
| OUTPUT | 10000 kg/Beegha (100 qt.) | 26000/ac. (260 qt.) |
| TOTAL SALES @ Rs.8/kg | 80000 | 208000 |

Scientific Cultivation

| Item | Description |
|--------------------------------|---|
| Seed | |
| - Variety | S-7, S-9, Pusa Ruby, Kashi Vishesh |
| - Quantity | 400-500 g/hectare |
| - Cost | Rs. 1200/ kg. (from KVK) |
| Additional Requirements | <ul style="list-style-type: none"> - Seed treatment - Nursery should be grown - Distance between rows should be at least 1.5 feet though traditionally it has not been kept more than 1 feet |
| Crop Protection | Deficiency of Boron causes fruit cracking |
| Yield | 200-250 quintal/hectare while traditionally it has been only 60-150 quintal/hectare |

| | |
|---------------------|-----------------------|
| Item | KADDOO/PUMPKIN |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| | | | | | | | | | | | |
|----------|---------------|----------|-----------------|----------|----------|---------------|----------|----------|-----------------|----------|----------|
| J | F | M | A | M | J | J | A | S | O | N | D |
| | Seeds sown | | Fruit begins | | | Seeds Sown | | | Fruit begins | | |

Economics of Cultivation

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|----------------------------|---------------------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 1440 | 1440 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| <i>Labour</i> | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Sowing <i>5 workers for 1 day</i> | 500 | 1300 |
| Watering <i>Every 15 days in summer and 30 days in winter, 1 worker</i> | 900 | 2340 |
| Plucking the fruit <i>2 workers, 1day</i> | 200 | 520 |
| Seed cost @Rs.100 | 100 | 260 |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600</i> | 600 | 1560 |
| Insecticide/ Pesticide <i>Malatheon 50gm/beegha in 20 lt. water @ Rs.60/packet (50g)</i> | 60 | 156 |
| TOTAL COST | 5000 | 10696 |
| OUTPUT | 5000 kg/Beegha (50 qt.) | 13000 kg/ac. (130 qt.) |
| TOTAL SALES <i>Assuming half output is sold in season @ Rs.8/kg</i> | 40000 | 104000 |

| | |
|---------------------|----------------------|
| Item | MOOLI/RADDISH |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| J | F | M | A | M | J | J | A | S | O | N | D |
| Cycle 1 | | Cycle 2 | | Cycle 3 | | Cycle 4 | | Cycle 5 | | Cycle 6 | |

Economics of Cultivation

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|------------------------------|---------------------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 2880 | 2880 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| <i>Labour</i> | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Sowing <i>5 workers for 1 day</i> | 500 | 1300 |
| Watering <i>Every 15 days in summer and 30 days in winter, 1 worker</i> | 900 | 2340 |
| Plucking the fruit <i>2 workers, 1day for 6 months</i> | 1200 | 3120 |
| Seed cost <i>@Rs.250 for each cycle</i> | 1500 | 3900 |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600</i> | 600 | 1560 |
| Insecticide/ Pesticide <i>Malatheon 50gm/beegha in 20 lt. water @ Rs.60/packet (50g)</i> | 60 | 156 |
| TOTAL COST | 8840 | 18376 |
| OUTPUT | 10000 kg/Beegha (100 qt.) | 26000 kg/ac. (260 qt.) |
| TOTAL SALES <i>@Rs.4/kg</i> | 40000 | 104000 |

| | |
|---------------------|--------------------------|
| Item | GOBHI/CAULIFLOWER |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------|----------|----------|
| J | F | M | A | M | J | J | A | S | O | N | D |
| | | | | | | | | | Seeds sown | Fruit | Fruit |

| Activity | Cost/Beegha (Rs.) | Cost/Acre (Rs.) |
|---|----------------------------|-------------------------|
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | 720 | 720 |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | 1000 | 2600 |
| <i>Labour</i> | | |
| Preparation of field <i>1 worker for 2 days</i> | 200 | 520 |
| Preparation of nursery <i>1 worker for 1 day</i> | 100 | 260 |
| Sowing <i>5 workers for 3 days</i> | 1500 | 3900 |
| Watering <i>Every 30 days, 1 worker</i> | 300 | 780 |
| Plucking the fruit <i>2 workers, 2 months</i> | 12000 | 31200 |
| Seed cost <i>@Rs.500 (100 g seed)</i> | 500 | 1300 |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600</i> | 600 | 1560 |
| Insecticide/ Pesticide <i>Malatheon 50gm/beegha in 20 lt. water @ Rs.60/packet (50g)</i> | 60 | 156 |
| Total Cost | 16980 | 42996 |
| OUTPUT | 2000 kg/Beegha (20 qt.) | 5200 kg/ac. (52 qt.) |
| TOTAL SALES | 40000 | 104000 |

| | |
|---------------------|---------------------|
| Item | LAUKI |
| Category | Agriculture Produce |
| Sub-Category | Vegetable |

Crop Cycle

| J | F | M | A | M | J | J | A | S | O | N | D |
|--|---|---|---------------|-----------------|-----------------|---|---------------|---|-----------------|---|---|
| | | | Seeds sown | Summer Fruit | Summer Fruit | | Seeds sown | Winter fruit | Winter fruit | | |
| Activity | | | | | | | | Cost/Beegha (Rs.) | | Cost/Acre (Rs.) | |
| Electricity <i>@Rs.120/H.P./month for 2 H.P. motor</i> | | | | | | | | 1440 | | 1440 | |
| Preparation of field <i>2 trolleys of manure, each trolley costs Rs. 400-500</i> | | | | | | | | 1000 | | 2600 | |
| <i>Labour</i> | | | | | | | | | | | |
| Preparation of field <i>1 worker for 2 days</i> | | | | | | | | 200 | | 520 | |
| Preparation of nursery <i>1 worker for 1 day</i> | | | | | | | | 200 | | 520 | |
| Sowing <i>5 workers for 3 days</i> | | | | | | | | 1500 | | 3900 | |
| Watering <i>Every 30 days, 1 worker</i> | | | | | | | | 900 | | 2340 | |
| Plucking the fruit <i>2 workers, 4months</i> | | | | | | | | 24000 | | 62400 | |
| Seed cost <i>@Rs.200 for each cycle</i> | | | | | | | | 400 | | 1040 | |
| Chemical Fertilizer <i>1 bora (50 kg.) @ Rs. 600 for each cycle</i> | | | | | | | | 1200 | | 3120 | |
| Insecticide/ Pesticide <i>Malatheon 50gm/beegha in 20 lt. water @ Rs.60/packet (50g)</i> | | | | | | | | 60 | | 156 | |
| Total Cost | | | | | | | | 30900 | | 78036 | |
| OUTPUT | | | | | | | | 5000 – 6000 kg/Beegha (50-60 qt./ac.) in each season | | 13000 – 15600 kg/ac. (130 - 156 qt./ac.) in each season | |
| TOTAL SALES <i>Assuming half output is of summer crop@ Rs. 12/kg and half output is of winter crop @ Rs.2,5/kg</i> | | | | | | | | 72500 | | 1885000 | |

APPENDIX F

Stages in Analysis of Livelihood Opportunities

Model 3 of 'A Resource Book for Livelihood Promotion' lists a systematic approach to identification of livelihood opportunities in the area. The various stages in the process are –

1. Getting to know the local economy
 - a. Getting to know a village
 - b. Identifying sample villages and rural towns
 - c. Analysis of available resources
 - i. Natural resources: land, water, forests, livestock etc.
 - ii. Physical resources: Irrigation systems, haats, electricity, roads, health facilities etc.
 - iii. Human resources: labor and skill availability, entrepreneurial ability of various communities in the population, education and health profile of population
 - iv. Social resources: gender and caste relations, property rights
 - v. Financial resources: available source of credit and other financial services
 - vi. Institutional resources: Cooperatives, banks, schools etc.
 - d. Identifying existing enterprises
 - i. Farm-based: Food processing, animal husbandry
 - ii. Manufacturing: Such as weaving, bidi rolling, carpentry
 - iii. Services: Such as repair, retail, health etc.
 - e. Market visit
 - f. Preparing a preliminary list of potential livelihood opportunities

2. Detailed analysis of potential opportunities
 - a. Household and market analysis of demand, future projections
 - b. Enterprise surveys
 - c. Selection of livelihood opportunities for promotion in village/block

Those activities should be selected for promotion which have –

- i. High potential for income, employment, asset-building, food security, income-smoothing for poor households
- ii. Good market demand
- iii. Maybe taken up by poor families targeted, including women in households
- iv. For which skills exist or maybe acquired easily by the local community
- v. For which resources are available or easily sourceable without causing environmental degradation or legal infringement