AN ECONOMIC ANALYSIS OF COLLECTION AND MARKETING OF NON-TIMBER FOREST PRODUCTS IN KANKER DISTRICT OF CHHATTISGARH

M.Sc. (Ag.) THESIS

by

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CERTIFICATE - I

This is to certify that the thesis entitled **"AN ECONOMIC ANALYSIS OF COLLECTION AND MARKETING OF NON-TIMBER FOREST PRODUCTS IN KANKER DISTRICT OF CHHATTISGARH"** submitted in partial fulfillment of the requirements for the degree of "MASTER OF SCIENCE IN AGRICULTURE" of the Indira Gandhi Krishi Vishwavidyalaya, Raipur, is a record of the bonafide research work carried out by **GAJENDRA KUMAR SINHA** under my guidance and supervision. The subject of the thesis has been approved by Student's Advisory Committee and the Director of Instructions.

No part of the thesis has been submitted for any other degree or diploma (certificate awarded etc.) or has been published/published part has been fully acknowledged. All the assistance and help received during the course of the investigation have been duly acknowledged by him.

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This is to certify that the thesis entitled **"AN ECONOMIC ANALYSIS OF COLLECTION AND MARKETING OF NON-TIMBER FOREST PRODUCTS IN KANKER DISTRICT OF CHHATTISGARH"** submitted by **GAJENDRA KUMAR SINHA** to the Indira Gandhi Krishi Vishwavidyalaya, Raipur in partial fulfillment of the requirements for the degree of M.Sc**. (Ag.)** in the **DEPARTMENT OF AGRICULTURAL ECONOMICS** has been approved by the External Examiner and Student's Advisory Committee after oral examination.

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Dated ***Gajendra Kumar Sinha***

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CHAPTER-I

INTRODUCTION

1.1 Justification:

Forests are a key component of the huge reservoir of bio-resources. They are the source of economically significant products and services in addition to social and ethical values. The forests provide timber and non-timber forest products besides invaluable environmental services. Non-Timber Forest Products (NTFPs) are defined as goods of biological origin other than wood, derived from forests, other wooded lands and trees out side the forests (FAO, 1995). Non-timber forest products include flowers, fruits, tubers, barks, leaves, medicinal plants, mushrooms, seeds, bamboos, fire woods, fodders, fibers, oils, tannins, dyes, gums, resins, honey, lacs, skins, fishes, insects and horns etc.

The 6.2 billion people on the planet, 25 per cent depends to varying degrees on the non-timber forest resources for their livelihood. World wide, it was estimated that several thousands of species are collected from the wild for a variety of purposes (Myers, 1988). In the high diversity forests of Amazonia, more than 2/3 of all the species are used by indigenous communities. At the local community level, non-timber forest products can account for 35 per cent (for e.g. Zimbabwe, Cavendish, 1997) to as much as 60 per cent (for e.g. India, Hegde *et al.*

1996) of household incomes. Non-timber forest products play an important role in both national and local economies. In India more than 500 million people are employed in the non-timber forest product sector. The market of non-timber forest products at primary and secondary level is very enormously and understands. India posses a rich bounty of non-timber forest products in its 64 million hectares of state managed forests. Among 15000 plant species, approximately 3000 species (20%) yield of non-timber forest products. However, only 126 species (0.8%) have been commercially exploited (Maithani, 1994). In India, nearly 500 million people living in and around forest depend on non-timber forest products as a critical component for their sustenance (World Resource Institute, 1990). After implementation of forest conservation act in 1980, the felling of green trees is almost banned and the revenue from timber is drastically declined in the country. Subsequently, the share of non wood forest products (NWFPs) for total forest revenue increased from 20-50 per cent. Campbell *et al.* (2003) found that in India during 1986 non wood forest products accounted for almost 40 per cent of forest department revenues, 75 per cent of net export earnings from forest sector revenues, and 75 per cent of net export earning from forest produces. The opportunity for self-employment which non wood forest products based enterprises provide to the forest dwellers was estimated to be around 3.3 million person years in India.

The newly formed state of Chhattisgarh comprising of 16 districts, well known as the rice bowl of India, is also endowed with vast resources of medicinal and aromatic plants, due to which it is known as the herbal state of India. Chhattisgarh has three distinct agro-climatic zones viz. Chhattisgarh plains, Northern hills and Bastar plateau. This state has a rich biodiversity of medicinal plants. The variable topography and climatic conditions of the state supports its ecological biodiversity. The biodiversity remained intact in those districts where the tribal population is predominant (Patil, 2002-03). Most of the aromatic plants are found naturally in Bastar plateau and northern hills.

In view of the growing demands for the medicinal and aromatic plants and profitability associated with its cultivation, medicinal plants are found to be one of the most important component of farming, that can certainly help in improving the economic status of poor farmers in this region. So, a suitable and economically viable package of practices of medicinal and aromatic plants is required, assuring marketing support, which will increase the income and employment of tribal farmers (Banafar, 2002-03). Hence, there is a need for introduction of medicinal plants and proper utilization of uncultivated land.

Chhattisgarh is a newly borne state of India, endowed with rich forest wealth. More than 44 per cent of the geographical area of the state is covered with luxuriant sal, teak, bamboo, thorn and mixed forests.

These forests harbour a wide variety of non-timber forest products. Almost all kinds of non-timber forest products including edible, non-edible and valuable medicinal products are abundantly found in these forests. About one third of population of the state belongs to indigenous tribes directly depend on non-timber forest products for their livelihood and subsistence. The lifestyles and economy of indigenous communities or forest dwellers such as Abujhamaria, Maria, Muria, Gond, Kanwar, Binjwar, Pradhan, Baiga, Korwa, Kondh, Saora and Kharia etc. are greatly relied on non-timber forest products since time immemorial. However, recent demand for timber, expansion of agricultural activities, shifting cultivation and other anthropogenic activities are causing degradation of natural forests. Under these circumstances, the extraction of non-timber forest products by local communities was widely proposed as a strategy to decrease the rate of deforestation while enhancing livelihoods. As a result, this good extractivism approach, one that preserves natural resources while enhancing income has spawned much research on the role of non-timber forest products on forest conservation and livelihoods.

The collection of non-timber forest products in Chhattisgarh by the tribals and other villagers is done for both domestic and for commercial purposes. Domestic purpose includes the utilization of non-timber forest products for folklore medicines, spiritual and traditional

uses. They collect and consume fruits, nuts, mushrooms, rhizomes, tubers and flowers etc. For health care, they collect various medicinal and aromatic plants for curing various ailments while excess collection is some times sold in local markets. Chhattisgarh government has constructed the Chhattisgarh minor forest federation products (CGMFP) as an apex body with strength of near about one million forest produce gatherers constituting 913 primary forest produce cooperative societies. These societies are mostly involved in collection of nationalized products. The non-timber forest products like tendu leaves, sal seed, harra, dhawra and other gums etc. are collected through cooperatives under the supervision of forest department since all these falls under nationalized forest products.

The income generated from nationalized non-timber forest products is very significant for the total forest revenue in Chhattisgarh. According to an estimate made in Bastar district of Chhattisgarh, the maximum sustained timber yield from one hectare of forest was about $10m^3$ every 20 years yielding a net value of Rs.20,000 while, non wood forest products harvested every year produced a net income of Rs.2,00,000 for the same period (Tewari, 1993b). In the year 2003-04, the total income generated from nationalized non-timber forest products was substantial, where tendu leaves accounted 150.08 crores, sal seed 55.40 crores (collection expenditure) and harra 1.54 crores (Chhattisgarh

State Minor Forest Produce Federation Ltd., 2004). Besides, other non-timber forest products like mahua flower, mahua seed, medicinal plants, aonla and mahul leaves etc. are commercially traded, which may earn more than 5-10 times higher revenue than the nationalized products, that is currently unaccounted. Chhattisgarh is a pioneer state of India; processing the best quality tendu leaves. The tendu leaves are used as beedi wrappers. The potential of production of tendu leaves in Chhattisgarh is approximately 20 lacs standard bags annually, which is nearly 20 percent of the total tendu leaves production of the country.

The marketability of non-timber forest products depends on the amount and resource availability and its demands. Collection and marketing were controlled by private traders in the past. However the state of Chhattisgarh constructed minor forest product federation (CGMPF) to deal with nationalized non-timber forest products. Besides, the tribals sell variety of products to middlemen at a through away price. Some times, they will trade in weekly hat bazaar and trading is also done as barter/exchange system. The middlemen or traders take advantage of the often-desperate need of forest dwellers and offer lowest prices to valuable non wood forest products. The traders/middlemen exploit the innocent poor tribals and deprive the actual benefits of non-timber forest products. The institutional inefficiency and lack of proper marketing facilities are further affecting the collection and trading of non-timber

forest products non-timber forest products in many forest areas of the state. There is no scientific and systematic collection which is practised, the collection is based on the demand and it fluctuates every year. The injudicious and unscientific exploitation will erode the rich diversity of non-timber forest products, which directly influences the lifestyle and economy of forest dwellers. More over the quantitative information on diversity of non-timber forest products and their collection pattern are most important for evolving suitable strategies for their conservation and sustainable utilization and also improving the livelihood and economy of forest dwellers. Information on diversity of non-timber forest products, their collection, utilization and marketing pattern are currently unavailable in many dry tropical forests of Chhattisgarh. Both qualitative and quantitative informations are needed for sustainable management of non-timber forest resources (Table 1.1 and Table 1.2).

Out of more than 500 millions people, approximate 25 per cent depends on the natural resource produce non-timber forest products. Looking to the economic importance of non-timber forest products in Chhattisgarh state, present study was undertaken with following specific objectives.

Table 1.1: Non-timber forest product species of commercial importance in the state.

S. No.	Category of NTFPs	Species/ Produce	Estimation Trade (Rs. Crores)
1.	Nationalized	Tendu leaves, sal seed, harra and babul etc.	225
2.	Non Nationalized - Non-Medicinal	Tamrind (Imli), mahua, lac, mahul leaves and chirounjee etc.	250
3.	Non Nationalized -Medicinal	Baibaring, vanjeera, kalmegh and anola etc	50

Table 1.2: Nationalized Non -Timber Forest Products Collected in Charama Block

(In Quintals)

Produced (Years)	2001-02	2002-03	2003-04	2004-05	2005-06
Harra	4671.375	3985.975	5590.980	1202.695	2993.815
Tendu leaves	3907.650	4085.351	4091.510	2585.900	2939.390

1.2 Objectives:

1. To examine the collection and consumption pattern of non-timber forest products.
2. To find out the marketing channels, marketing cost and price spread of non-timber forest products.

3. To find out the constraints in collection and marketing of non-timber forest products and suggest suitable policy measure to overcome the problems.

1.3 Set up:

Apart from the first introductory chapter, the study is organized into four chapters. Chapter-II presents a brief resume of the important work done by previous researchers on the theme. For the fulfillment of the different objectives of the study selection and description of the study area, the sampled farmers and other methodological details have been presented in Chapter-III. Finally, the results and discussion are presented in Chapter-IV. Chapter-V deals with the summary, conclusions and suggestion for the future research work.

CHAPTER-II

REVIEW OF LITERATURE

This chapter deals with the review of research works done in the past relating to the problem entitled "An Economic Analysis of Collection and Marketing of Non-Timber Forest Products in Kanker District of Chhattisgarh". A brief account of the works reported by the past researchers has been discussed under the following heads.

Kanetkar (1990) reported the collection, marketing and economics of NTFPs by Himachal State Corporation Limited (HPSFC). He reported medicinal herb collection, processing and marketing in the H.P. State and it was observed that the method of extraction, packaging, storage, processing is still in primitive and mostly unscientific in nature. The marketing of medicinal herbs was also not well organized. He suggested that appreciation of marketing principals would definitely fetch attractive prices for the same produce. The communication and transport system of resin needs to be strengthened.

Gulati (1991) conducted a study to find out the reason of collection of NTFPs in the study area and its contribution to the village economy. Study the marketing integration in the non-wood forest produce cycle and help in starting industries based on NTFPs as their

raw material. The author found that on an aggregate basis NTFPs provide employment for 4-5 months per year in which each family earns Rs.100-150 per day from NTFPs collection. These products provided income generating opportunities even during non-agricultural season when other employment was not available. The NTFPs provide higher income (average Rs.30) as compared to that through agriculture labour (Rs.20) or through firewood sale (Rs.20). The income varied from Rs.15-100 per day depending upon the type of NTFPs and season. The main market centers available to the collectors are village itself, Talala town, Veraval and Junagarh.

Kandpal and Chandra (1991) conducted field study jointly with Ramkrishna Mission Loksiksha Parisha to study the prevailing marketing mechanism of mahua seeds with an objective to know about ways of increasing the income level and employment opportunities by suggesting effective collection and marketing of mahua seeds and at the same time making villagers come forward for forest protection. The selected study site was the Purulia district (West Bengal). Study provides and insight into the distribution channels and the people involved at each stage of mahua seed flow reveals the involvement of all the villagers, middlemen to be financially well off. Villagers are

incurring a loss whether they sell directly to middlemen or by barter system however in later the losses are almost double.

Chandran and Ajith (1992) studied the existing system of tendu leaves collection and sale in order to understand the impact of changes made. The micro level study conducted in association with Andhra Pradesh Forest Development Corporation was confined to a particular geographically contiguous area. The study suggested some of the important points to improve tendu leaf collection and ways to improve its efficiency.

Khanna (1992) study on marketing issues in social forestry stated that the present marketing system is based on small and local contractors who specialize in harvesting and obtaining bureaucratic permission for felling and transport of wood. The author suggested that in order to improve the farmer's share out of the consumer's rupee.

Marothia and Gauraha (1992) conducted a study on the marketing of MFPs in the tribal areas Madhya Pradesh (where 80 per cent of the households earns their livelihood through the collection and sale of MFPs) which indicates that in case of nationalized MFPs the collection and trading operations are managed by the M.P. state Minor Forest Produce Trading and Development Federation Limited. The marketing of denationalized MFPs is taking place under the traditional

market net work which is dominated by the middlemen and the unorganized tribal engaged in the collection of MFPs are exploited by the middlemen by paying quite low price for their product usually in kinds i.e. large quantity of DMFPs are purchased by giving in exchange the small quantity of necessities of life.

Mahalingan (1992) examined the institutional support for the marketing of MFPs in India and concluded that the collection, processing and marketing of MFPs generate gainful employment to a sizeable tribal population in India. But the channels of sale of MFPs are not organized in most of the tribal area and large the trade of MFPs has been in the hands of trade on long-term basis. As a matter of policy Govt. of India has taken a number of steps to save the tribals from the clutches of private traders and to ensure fairness in the marketing of MFPs by establishing sound institutional setup in tribal areas during the various plans. But the tribal engaged in the collection of MFPs are still at the mercy of intermediaries and traders.

Patel *et., al*. (1992) concluded that there is decrease in the collection and marketed quantity of minor products like tendu leaves, mahuda flower, but the production of the gum and other products has increased. High variability is found in collection, marketing and price of minor produce.

Singh *et., al.* (1992) conducted an empirical investigation on the production and marketing of MFPs in Himachal Pradesh. The authors worked out the quantum of production and analysed the marketing channels adopted for the sale of MFPs as well as the cost and return for different type of MFPs by size class of holding. They suggested the formation of state level marketing board to regulate and promote the purchase and sale of products within as well as outside the state on remunerative price, which will be beneficial to the producers of MFPs in particular and to the state in general.

Kishore and Diyum (1993) studied with an aim of understanding the present marketing aspects of tamarind and to identify various primary and secondary markets. Various principal area of production was also identified to find out the various uses and markets of tamarind seed. Present trading practices prices offered at different stage of distribution channel and various traditional and non-traditional uses of tamarind (*Tamarindus indica*) were identified. In addition possibility/viability of marketing of value-added forms of tamarind was also looked into. In order to estimate and identify the production areas and quality/quantity produced 21 places were visited spreading in three states. Andhra Pradesh, Tamil Nadu and Karnataka. Study reports that NTGCF involved in the prcurement of tamarind fruit through the

farmers, TDC members collected 32 tones of fruit at a rate of Rs.4.53 per kg. In the study; area because of poverty, mostly middlemen invest money and buy the entire crop from the farmers. In turn farmers are employed by the middlemen for harvesting tamarind at very low wages. Andhra Pradesh state was producing 50,000 tons per year contributing 52 per cent of the total production.

Diyum (1994) concluded that socio-economic upliftment of the tribals who are dependent on forest resource is one of the major aims of West Bengal Tribal Development Co-operative Corporation. The main NTFPs, procured by corporation at present are tendu leaves (*Diospyros melanoxylon*), and sal seed (*Shorea robusta*) only. For these services TDCC changes 1 per cent of total sale value of NTFPs as administrative charges and 4 per cent of loan advanced as an interest per year. The main aim and objectives of West Bengal Tribal Development Co-operative concerned with NTFPs are to under take proper and scientific utilization of forest products and resources and to eliminate middlemen so that maximum benefit can accrue to the tribals or rural poor communities engaged in collection of NTFPs.

Vasudevan (1994) reported that Gujarat State Forest Department Corporation (GSFDC) was involved in big way in the marketing of NTFPs and its involvement starts from organizing collection of village

level to sale of NTFPs. Study observed that agents were paying lesser amount of money to the primary collectors then the fixed rates by GSFDC. As a result tribals showing lack of interst in NTFPs collection due to meager income from it inspite of labour involved and they were trying to divert to other agricultural employment opportunities or selling NTFPs in other towns where it fetched reasonable amount of their produce on the other hand for the local agents selling of NTFPs is an activity of secondary importance in case of private agents, the non-tribal agents are paid commission of 10 per cent on the total amount paid for collection whereas tribal agents were paid 11 per cent. After sale the concerned party paid a safety deposit fixed by GSFDC and has to take NTFPs from their godown within time.

Alind (1995) studied shows that the non-timber forest products (NTFPs) have an immense role to play in shaping the rural economy of India with a changing forest management profile in favour of eco-friendly products and participatory management of forest areas, NTFPs can make a valuable contribution. Neem products have important roles as medicines, pesticides and fertilizers, but suitable marketing efforts are needs to realize their full economic potential.

Makkapatti (1995) studied the present system of collection, seasonality and processing of NTFPs like tamrind, adda leaves, karaya

gum etc. Adda leaves (*Diospyros melanoxylon*) were primarily collected by women on the contrary Tamarind (*Tamarindus indica*) and Karaya gum (*Sterculia urers*) was collected by men and children in the study area. The author also described seasonalitics of selected species i.e. adda leaves – mid April to August; tamarind – February to April; karaya gum – throughout the year, women brought adda leaves in 25-35 bundles per day and each bundle consisted of 80 leaves, while men collected 35 kg. tamarind pods per day and each tree yields 80-100 kg. Pods on the contrary karaya gum yields only 50-70 g. gum per day and approximately 1.20 kg gum was collected by the villagers per day (from atleast 20-30 trees) income from selected NTFPs varies from species to species i.e. adda leaves sale price per week varies from Rs.75 to Rs.100 (for large stack). Tamarind was sold in units of baskets and prices ranged from 100 to 150 (@Rs.4.00 per kg.). It was observed that average income of gum tapper is Rs.220 (for 7 kg.), marketing adda leaves at primary collector level varies from Rs.40-50 per small stack while tamarind was sold to Ginjan cooperative only at a rate of Rs.4.00 per kg. and desected @ Rs. 15-18 per kg.

Khandait (1996) analyzed the importance of non-timber forest products in the three villages of Betul district of Madhya Pradesh. Forest dependency and relationship was one of the factor studies. About 71%

of the population among the total households is depending upon agriculture and rest is employed as wage earners and other secondary occupation. The local community used NTFPs for various purposes among which food, fodder, fuel, structural material as fiber, religious purposes, for household articles, medicinal purposes etc. it was observed that 54 plants were used as fuel wood 34, as food and 120 plants as medicine. The item used for ritual and ornamental purpose was scarcely found in the forest and was collected only on special occasion as festivals.

Marothia and Gauraha (1996) studied and analyzed the role of PMFPCs in managing the collection and marketing of tendu leaves presented in this study. They concluded that the management sources of the societies are largely dominated by the government nominees and the members of the managing committee and other members do not have much control over financial, administrative and technical management. The members are getting proper wages for the collection of tendu leaves but cases of harassment by phad munshis and checkers are evident. The member status is only that of wage labourers and the PMFPCs do not have much stake in the total benefits generated through collection of tendu leaves.

Mishra (1996) has brought out many facts into consideration and raised questions regarding various aspects of the marketing of NTFPs, some are: low procurement price, unorganized market system, lack of awareness regarding processing, lack of financial capacity to begin processing, high rate of interest, no incentives from the government and insignificant involvement of the primary collectors in the marketing process. The study was conducted to find out the value additional potential for two specific NTFPs including on the individual level. The aim of the study is look for processing possibilities at individual, especially primary collector's level.

Mohapatra and Sinha (1997) conducted a study with a focus on the major NTFPs i.e. Mahua (*Madhuea latitotia*), Bhilma (*Semecarpus anacardium*) at Amarwada block, Chindwara district (M.P.). It was observed that the value addition steps identified for mahua have been grading of the flowers and drying the produce properly to increase its shelf life. Amarwada is well known for its chirounjee fruits, it was observed that at village level collecting the fruits in correct time and washing guthly (fruit) to remove impurities would enhance returns from its sale, oil and gudumbe extraction enterprise taken up at the village level would enhance returns to the people from Bhilma. Drying and packaging of the produce in small bags can do value addition of aonla.

Pulverizing and setting aonla powder either individually or mixed with harra and baheda (*Triphala mixture*) can also add value to the produce.

Bhattacharya (1998) concluded that the non-timber forest produce (NTFP) is one of the major source of income generation in the rural and forest areas of M.P.A. large population of tribal is dependent on the collection of these forest resources. Detailed studies have been carried out in 10 identified forest dependent villages to understand different aspects of NTFP such as collection, two villages have been selected for the science and technology management intervention for sustainable extraction and through this to ensure remunerative price to the NTFP gatherers.

Das and Bahl (1998) studied the two MPCAs (Medicinal Plants Conservation Areas) in the state of Karnataka to assess the prevailing biotic influences on the forests by the people living around the subramanya temple and Agumbe MPCAs with particular emphasis to the removal of NTFPs. Local people get sustainable income from the sale of NTFPs. The study is also relevant for participatory management of these forest for sustainable harvest of NTFPs from buffer zone of the MPCAs. The results indicated that both the tribals and non-tribals get maximum income by way of labour (60%) followed by 15 per cent income from sale of NTFPs.

Kumar (1998) reported that tendu leaves (D.melanoxylon) distribution and market in Madhya Pradesh, Maharashtra, Orissa, Andhra Pradesh, Gujarat, Karnataka and Tamil Nadu. It was reported that annual production of leaves in India was approximately 7.5 million standard bags (or 0.30 million tons) and Madhya Pradesh is the largest producer. It was found that the tendu leaf business is highly competitive, lucrative and also very risky. The estimated production of the tendu leaves in the country is approximately 75, 00,000 standard bags. Major producers are Madhya Pradesh, Orissa, Maharashtra and Andhra Pradesh, Rajasthan and Gujarat are also good contributor in major states. The collection of leaf is done through cooperatives while in others contract system is being practiced. Pricing is the second ingredient of the marketing of the leaves after product. Price is highly correlated with the quality of the leaf. Quality of the leaves depends upon the climatic condition during the collection period.

Neloye *et al.* (1998) revealed that the quantity of NTFPs marketed was substantial, amounting to at least US$1.75 million in the first half of 1975. More than 1100 traders, mainly women are engaged in the distribution of NTFPs. Furthermore, the marketing margins obtained by traders vary between 16 per cent (for *Dacryodes edulis*) and 30 per cent (for *Irvingia Spp.*) of the value of sales. Thus the study confirms the

role of NTFPs as a source of employment and income not only for gathers but also for trader, and suggests the need and potential for developing these markets.

Horo (1999) examined the extent of dependency of the villagers in Naugarh block (Varanasi), on the forest resources. The study aims at assessing the availability of the forest resources now and that in the future years. It was also an attempt to study the supply and demand of the forest resources in the region. The main objectives of this were to study 1) forest products available in the region; 2) dependency of the villagers on the forest products; 3) availability of forest resources and also predict its availability in the coming years; 4) to suggest some alternate sources of income to the villagers to improve their socio-economic conditions.

Joseph (1999) discussed the collection, importance and the benefits derived from the different non-timber forest products (NTFPs) in India which include: tendu (*Diospyros melanoxylon*) leaves; sal (*Shorea robusta*) seed; Harra (*Terminalia chebula*) gall nut; and Mahul (*Bauhinia vahlii*) leaves. NTFPs could be grouped into nine categories such as edible plants, medicinal plants and spices, essential oils, gums and resins, tans/dyes, fibers and flosses, bamboos and cranes, and miscellaneous items: Examples of sustainable production, marketing and

management of NTFP operations from Madhya Pradesh, Andhra Pradesh and Maharashtra are also discussed.

Masih and Sharma (1999) revealed that the three categories of Market Intelligence Information (MII) were collected fro non-timber forest products (NTFPs) from the Amarkantak Plateau Region of Madhya Pradesh, India for the years 1996-98, viz. primary information (PI; total quantities of NTFPs (35 items) from 15 villages), weekly market information (WMI; total quantity of NTFPs (50 items) from 20 weekly) and secondary market information (SMI; receipts of NTFPs (60 items) by 22 traders in the region). Through each stage of the present market channel (MC) there was a gradual increase in the number of NTFPs items as well as in their quantities (1:1.42 : 1.7 and 1:1.32 : 2.48, respectively); for state 1, the average quantity per villages of NTFPs was 105.46 t/years, for stage 2 the quantity per market was 196.98 t/years and for stage 3 the average quantity per trader was 374.20 t/years. A total of 63 items of NTFPs are catalogued from the region.

Nag (1999) focused on effective marketing strategies, which play a significant role in fetching better remuneration to the rural poor who are dependent on the collection of this produce. Earlier the tribals used to collect and barter NTFPs in exchange for the goods of their requirement with tribals as well as outsiders. With systematic forest

management the monopoly of the collection and marketing of NTFPs was taken over by the forest department. The forest department leased out the forest ranges to private traders to collect NTFPs other than ivory horn, honey and bee wax, which were collected by the department. Later on NTFPs from various forest ranges were auctioned to private contractors annually. These contractors employed both tribals and non-tribals for the collection. The marketing system of NTFPs is still unstructured and does not have clear rules and regulations, which deprived the procures from getting the genuine price for their products, value addition can help the rural people to earn remunerative prices for their produce collected from the forest. If the value addition of NTFPs is done then its price increases many fold. Value addition option has been suggested for some important NTFPs available in the area. Various channels are linked in the trade of NTFPs in Dhamtari. It was found that NTFPs collectors do not have the proper idea for selling their forest produce. The present study deals with seasonality pattern, distribution, quantification and pricing pattern of tamarind, mahua, aonla and some other NTFPs of the study area. Value addition, marketing channels and linkages were also discussed.

Sinha (2000) reported the timber and non-timber forest products in the area, their use, marketing and their contributions in the economy

and related issues. The study was conducted in the Sidhi district (consisting of 13 villages in Sidhi development block), Madhya Pradesh. This is located in the Baghelkhand region of Madhya Pradesh considerable seasonal variation was observed and in general large number of species is available throughout the year. Large parts of the most of the products like fruits, nuts and seeds etc. are consumed at local level sale and barter is done for only surplus quantity. The market channels are very long and not able to feted good returns to the collectors and there is no alternative available. There is ample scope for value addition at household level, which can be great help to NTFPs collectors.

Tiwari *et al.* (2000) surveyed 22 important traders involved in trading of non-timber forest products (NTFP) on the Amarkantak Plateau of Madhya Pradesh, India. In 1998, showed that 8234.47 t of 47 types of NTFPs with an economic value of Rs.2.70 crore (1 crore = Rs. 10 million) were traded. The trade profile showed that 65 per cent of total trade involved only mahul (*Bauhinia vahli*) leaves. Two thirds of traders had been trading NTFPs for 5-20 years. There was a large gap between quantities of NTFPs entered in primary weekly tribal markets and the quantities traded by NTFP traders.

Masih *et al.* (2001) an investigation of marketing intelligence information (MII) of NTFP was undertaken in 20 primary tribal markets (PTM) of Mandla, Bilaspur and Shahdol districts of Madhya Pradesh. A total of 68 NTFPs items have been catalogued and quantified for their quantities assessed for their values and analyzed price trends within and between the markets.

Masih and Sharma (2001) studied NTFPs and their price trends in primary tribal markets. It has been also noticed that more than 60 per cent of NTFPs trade is carried out in the four months of rainy season, whereas rest of 40 per cent trade was observed in the rest of eight months. The above observation reflects that the local population is not following any storage practice of NTFPs items and they sell their collected products as early as possible in the primary weekly markets least they go rot. A total of 68 NTFPs items have been catalogued and quantified for their quantities assessed for their values and analyzed price trends within and between the markets.

Girisha, *et al.* (2002) study attempts to systematically document market information of few non-timber forest products (NTFPs) such as Katha (*Manufactured hearturod of acacia catechu*), Uppage (*Fruits of Garania Cambogia*), Nutmey (*From seed and arils of myristica malabarica, m. dactyloictes, m. fatua and m. fragrans*), Zumma (*seeds*

of zanthoxylum rhetsa), Kokam (Softdrink prepared from the rind of the fruit of *garcinia indica*), Dharaku (*dry litter*) and Soapnut (fruit of *sapindus trifoliatus*) in Sirsi, Siddapur, Karnataka, India during 2000-01. In general, two marketing channels were identified in the study: Subsistence use and sale to private trader/middlemen.

Krishnamoorthy and Many (2002) study conducted to identify the factors influencing the collection and disposal of non-timber forest products (NTFPs) and to study the marketing practices on NTFPs in Kolli Hills of Salem district, Sathyamangalam Forest Division and the Pollachi Division of Tamil Nadu, India, using pretested questionnaires. The results of the study highlight the factors influencing collection of NTFPs, contribution on NTFPs and in income and employment of tribal communities, marketing channels and problems in collection and disposal. This will help the government in farming appropriate strategies to improve the existing situation and also useful to carried out other further research on NTFPs.

Pandit and Thapa (2003) revealed that the marketing system for non-timber forest products (NTFPs) in a small watershed in Nepal, which is divided into two zones based on elevation profit and marketing margin analysis were done for ten dominant NTFPs traded to find out collector relative share of the income earned through the trade. Finding

revealed that villagers in the upper zone were NTFPs are abundant, are earning considerably higher income from the sale of NTFPs than those in the lower zone. However, intermediary traders take the major portion of the total sales value of most NTFPs traded due to several factors constraining the direct marketing system.

Bhatacharya and Karishma (2004) examined consumption pattern of 38 Non-Wood Forest Products (NWFP). This study indicates that the species considered for study, have high nutritional value and also consumed in sufficient quantities of the total NWFP villagers, 76 per cent consumed by them as food whereas 24 per cent are sold for income generation.

Choudhary *et al.* (2004) reported that Bastar plateau (Chhattisgarh) in rich biodiversity. Bastar forest of the sub region is sub tropical type and main plant species of the region are sal and teak beside these tendu, Mahua, tamarind, kachnar, harra, baheda and arjun. The authors had also worked out the quantity collected and contributed 42.60 per cent which is main source of forest income followed by kosa (21.60%), bamboo (12.20%) and sal seed (4.60%).

Singh and Shah (2004) concluded that the collection of tendu leaves is a massive operation involving around 2-5 million families, who depend on this activity for their livelihood. Key decisions which affect

the livelihood of these poor families are not only based on local political considerations but are managed in an inefficient manner, as a result of which, only 30 per cent of the potential produce is collected. These types of geographically dispersed logistic activities which involve huge resources and affect large number of people who are ideal candidates for an application.

Banafar, *et al.* (2005) reported that marketing is one of the unorganized and under managed sector in Chhattisgarh state. Marketing plays an importance role in Bastar district of Chhattisgarh state. Bastar district has difficult terrain, lacks infrastructural development for marketing of medicinal, herbal and aromatic plants. Producer, village merchant, dealers were generally found engaged in assembling of medicinal, herbal and aromatic plants. The major constraints in production and marketing of medicinal, herbal and aromatic plants are poor socio-economic condition of farmers as the cultivation of medicinal, herbal and aromatic plants are highly capital intensive. As for as constraints are marketing of medicinal, herbal and aromatic plants, in concerns the role of producers-seller was negligible in the fixation of price.

Giri *et al.* (2005) focused on marketing aspects of selected non-timber forest produce (NTFPs) of commercial importance emphasis has

been given to NTFPs items collected by the Villagers/village Forest Management and Protection Committee (VFMPC) members in and around the forest under the Joint Forest Management (JFM) system. The collector of NTFPs gets a small fraction of surplus generation by produce sold in the market. Market middleman (agents, traders and wholesaler) received the maximum benefit from marketing of surplus NTFPs. There is an urgent need for policy intervention to ensure maximum return to local people.

Yadav (2005) studied that the increasing consumer awareness and performance for herbals natural products results in an unexpected surge in the demand for medicinal and aromatic plant (MAPs). This has resulted in over-exploitation of the medicinal plant in the forest ecosystem. The market for most non-timber forest products including MAPs are highly unorganized and secretive and thus, suffer from various market imperfections mainly due to lack of information about demand and supply and product trading to the collectors and cultivation and sustainable resource availability. A conceptual framework for such a Market Information System (MIS) for various stakeholders in this study.

Hazra (2007) reported that Chhattisgarh, the newly carved state in the Union of India, is endowed with vast resources of medicinal and aromatic plants. The state Chhattisgarh known, as “Herbal state” is the

eastern part of India, recognized as the gold mine of biodiversity flora of medicinal plants and traditionally well practiced knowledge of herbal medicine. The state consists of sixteen districts with a total area of 1,35,933 sq. kilometer. Chhattisgarh has three distinct agro-climate zones i.e. Chhattisgarh Plains, Northern Hills and Bastar Plateau. The variable physiographic and climatic conditions of the state support this ecological biodiversity. Most of the aromatic and medicinal plants are found naturally in Bastar Plateau and Northern Hills. Obviously, these two regions have better prospects of collection and documentation of this natural wealth. Suitable soil and climatic conditions also make this region as one of the most potential area for cultivation of MAPs.

Chhattisgarh is bestowed with more than 44 per cent geographical area covered by forest. Identified as one of the richest bio-diversity habitats, the Green State of Chhattisgarh has the dense forest in India, rich wildlife, and above all, over 200 non-timber forest products, with tremendous potential for value addition. The tribal population dwells in side the forest and collects variety of medicinal and drug yielding plants.

CHAPTER III

MATERIALS AND METHODS

The conceptual and analytical framework used in this study is presented in this chapter. Selection of the study area, method of selection of respondents, collection of the data and the analytical framework are briefly discussed here.

This chapter deals with the research methodology adopted for the present study with respect to the selection of study area, selection of respondents, collection of data and analytical techniques. An attempt has been made to present the statistics of different aspects in order to have the knowledge of the study area. Since the study has been undertaken in the Kanker district of Chhattisgarh. Some brief informations about this district and selected villages are described in this chapter. The present chapter consists the geographical location, land use pattern, cropping pattern, live stock and different socio-economic indicators of the study area.

3.1 Selection of the study area:

Out of seven development blocks of Kanker district of Chhattisgarh state, Charama block was selected purposely as it present more or less similar agro - climatic condition of the district. Out of 98

villages from the Charama block, three villages namely Kurutola, Dhehed Kohaka and Gidhali are selected randomly for the study.

3.2 Selection of respondents (Collectors of NTFPs):

From Charama Block of Kanker district, three villages were selected randomly for study, namely Kurutola, Dhehed Kohaka and Gidhali. Out of 1158 farmers family, a sample of 60 respondents were selected by using probability proportionate to size techniques subject to condition that at least three respondents should be included on sample from each of the three categories of farms i.e. small (up to 2 ha.), medium (>2 to 4 ha.) and large farmers (above 4 ha.) in table 3.1 and Fig.3.1.

3.3 Method of enquiring and collection of data:

Primary data was collected from selected non-timber forest product collectors through personal interview method with the help of pre tested questionnaires (Appendix-I). The secondary data was collected from scan through reviews and literature and published sources of village, block and district head quarter level from department of forest government of Chhattisgarh The data collected from this source are distribution of land holdings, agricultural population**,** land utilization pattern, demographic features, cropping pattern, rainfall distribution irrigation sources, fertilizer consumption, soil type, collection and marketing of non timber forest products etc. existing in the study area.

Table 3.1: Number of sample households under different categories

Particular	Number of total households				Number of selected households			
	Kurutola village	Dhehed Kohaka village	Gidhali village	Total	Kurutola village	Dhehed Kohaka village	Gidhali village	Total
Small	193 (50.26)	232 (50.33)	178 (56.86)	603 (52.07)	10 (50.00)	8 (40.00)	12 (60.00)	30 (50.00)
Medium	146 (38.02)	166 (36.00)	114 (36.42)	426 (36.78)	6 (30.00)	9 (45.00)	5 (25.00)	20 (33.33)
Large	45 (11.72)	63 (13.66)	21 (6.70)	129 (11.13)	4 (20.00)	3 (15.00)	3 (15.00)	10 (16.67)
Total	384 (100.00)	461 (100.00)	313 (100.00)	1158 (100.00)	20 (100.00)	20 (100.00)	20 (100.00)	60 (100.00)

Note: Figures in parentheses indicate percentage to total respondent.

3.4 Period of Enquiry:

The details enquiry was done during the year 2006-07.

3.5 Analytical framework:

To find out marketing channels, marketing cost and price spread of non-timber forest products. The following formulae were used.

3.5.1 Marketing cost and Margin

$$C = Cf + Cmi + Cm_2 + Cm_3 + \ldots + Cmn$$

Where,

C = Total marketing cost of producer

Cf = Cost paid by the farmer

Cmi = Cost incurred by i^{th} middleman

3.5.2 Producer price

$$Pf = Pa - Cf$$

Where,

Pf = net price receive by the farmer

Pa = Wholesale price

Cf = Marketing cost incurred by the farmer

3.5.3 Marketing margin of middleman

(a) Absolute margin (Ami)

$$Ami = Pri - (Ppi + Cmi)$$

b) Percentage margin (Pmi)

$$Pmi = \frac{Pn - (Ppi + Cmi)}{Pn} \times 100$$

c) Mark up margin (Mi)

$$Mi = \frac{Pri - (Ppi + Cmi)}{Ppi} \times 100$$

Where,

Pri = Total value of receipts per unit

Ppi = Purchase value of good per unit (purchase price)

Cmi = Cost incurred on marketing per unit

3.6 Farm business analysis:

This includes the detailed analysis of costs and returns of the individual crop enterprises as well as the farm as a whole, the various measures used for the analysis included.

(a) Total input:

a-1 Wages of hired labour paid in case or kind.

a-2 Imputed wages for the farmer and his family used in crop and livestock Production.

a-3 Value of seed, manure and fertilizers and other cash expenses.

a-4 Cost of feed, fodder and concentrates.

a-5 Repairs to dead stock.

a-6 Depreciation on dead stock and livestocks.

a-7 Interest on fixed and working capital.

a-8 Rent of land whether rented or owned.

a-9 Irrigation charges.

(b) Total output:

The quantity of product produced for different crops and livestock enterprises was treated as the total output when the output is multiplied by its price then it is the output value.

(c) Net income:

It is the difference between total receipts and total expenses. It includes the pay of the farm manager and interest on capital invested in the business. It was calculated as:

Net income = Gross income – Total expenses

(d) Family labour income:

It concluded net income or loss plus imputed value of wages for the labour of farmer and his family.

(e) Farm business income:

It is the gross income minus total expenses of production excluding wages of family labour, interest on owned capital and rental value of land. It is a measure of the earnings of a farmer and his family for their capital investment, labour and managerial work. It can be expressed as:

F.B.I. = Family labour income + Interest on working capital + Rental value of land.

(f) Input-output ratio:

It can be expressed as the ratio of output to input. The ratio was calculated as:

Input-output ratio = O / I

Where,

I = Total input

O = Total output

(g) Cost of production per quintal:

It refers to the total input cost divided by output value and then multiplying by the respective prices of main and by-product.

(h) Cost concept:

The cost of production of major pulses has been presented in term of cost A, cost A_1, cost B and Cost C. The cost concepts are given below.

Cost A:

Value of hired human labour (permanent and casual)

Value of owned bullock labour

Value of hired bullock labour

Value of owned machinery

Hired machinery charges

Value of fertilizers

Value of manures (owned and purchased)

Value of seed (farm produced and purchased)

Value of insecticide and pesticide

Irrigation charges

Canal water charges

Land revenue and other taxes

Depreciation on farm implements (bullock drawn and use by human labour)

Depreciation on farm building, farm machinery and irrigation structure

Interest on working capital

Miscellaneous expenses (artisans, ropes and repair to small farm implements)

Cost A_1:

Cost A + Rent paid for leased in land

Cost B:

Cost A_1 + Imputed rental value of owned land (less land revenue paid those upon) + interest on fixed capital (excluding land)

Cost C:

Cost B + imputed value of family labour.

3.6.2 Tabular analysis:

Tabular analysis was used to compare the value of costs, returns and cost of production of crop of different size groups.

3.6.3 Averages:

The average given in the present study relates to weighted average. The following formula was used for calculating the weighted average of different items:

$$\text{Weighted average or weighted mean} = \frac{W_1X_1 + W_2X_2 + \ldots\ldots WnXn}{W_1 + W_2 + \ldots\ldots Wn}$$

$$\text{Weighted average} = \frac{\sum Wx}{\sum W}$$

Where,

X = Weighted value of an item.

W= Weight of X

$\sum$ = N = Total value of weight

3.7 Compound Growth Rate:

Annual compound growth rates in collection of non-timber forest products of major non timber forest produce (tendu leaves, mahua flower, harra, anola, tamarinds, baheda, kusum, char seed, and mahua fruit) were worked out for the state Chhattisgarh as well as district Kanker and block by fitting an exponential function of the following formula was used-

$$Y = AB^t$$

$$\log y = \log a + t \log B$$

Where,

Y= Area / Production /Productivity

a= constant

B= regression coefficient

t= time in year

Compound growth rate (%) = (Antilog B-1) 100

To calculate the collection performance of major non timber forest produce in Charama block of Kanker district and in the state of Chhattisgarh secondary data of collection quantity of non-timber forest products of major NTFP's was collected from different publication of Agricultural Statistics, Government of Madhya Pradesh and Chhattisgarh. Compound growth rate was estimated for the period from 1997-98 to 2007-08 (Appendix-IV).

3.8 Selection of market functionaries / intermediaries:

In the marketing of non-timber forest products, the main market functionaries engaged in the selected Laghu Vanopaj Mandi, village merchant and wholesalers of non–timber forest product, three village merchant and wholesalers of NTFPs were selected randomly for calculating marketing cost and margin.

3.9 General profile of the study area:

A research programme requires knowledge of the region in which the investigation to be carried out. Understanding of the general characteristics of the study area is essential for carried out the study. This study was confined to the three villages of Charama block of Kanker district of Chhattisgarh. The selected villages represent fairly well the agro climatic, socio-economic situation of the Chhattisgarh state.

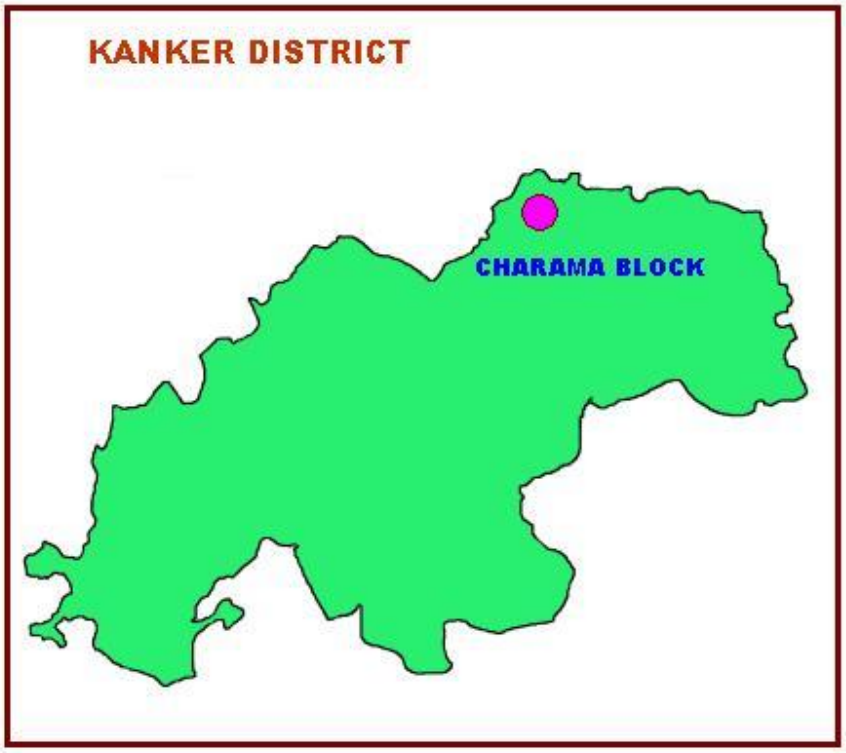
To understand the general characteristics of the study area, a brief description about location, distribution of land holding, soil and topography, climate and rainfall, Human population, land use pattern, water resources, transport and communication, profile of the studied villages, basic infrastructure facilities of Charama block is given in this chapter.

3.10 General profile of the district:

Charama block is more potential for non timber forest produce with comparison to other blocks. Some of villages of Charama block is also connected with border of Orissa sate in which selected villages has more number of non-timber forest produce available under forest area. People have an interest in this business in Charama block as many forest villages present there having sample resources of non timber forest

products. The study was conducted in Kanker district of Chhattisgarh during the year 2006-07.

This district situated in the South eastern corner of the state and lies between $17^0$46' and $20^0$34' North latitudes and $80^0$15' and $82^0$15'. East longitudes with varying elevation ranging from 550 to 760 meters above Mean Sea Level (MSL). The district has an area of 4312 sq. Km. The district has 6 tehsil and seven development blocks. The district bounded on the north by Madhya Pradesh state and on the east Orissa state and on the south Andra Pradesh state and on the west by the Maharashtra state. The general topography of district consists of understanding terrains full of numerous hillocks, covered with dense forest. The climate of Kanker district is considered as sub- humid which is mild in summer and moderate in winter. The mean annual rainfall of the region is 1421.3 mm. The south -west monsoon starts by third week of June and withdraws during first week of October. The Mean Day Temperature various from 18 ^{0}C (January) to 29 ^{0}C (May) and high temperature various from 18.8 ^{0}C to 23 ^{0}C. This study was confined to three villages namely Kurutola, Dhehed Kohaka and Gidhali. These villages (Kurutola, Dhehed Kohaka and Gidhali) are forest village (Map-I and Map-II).



Map-I: Map of Kanker District

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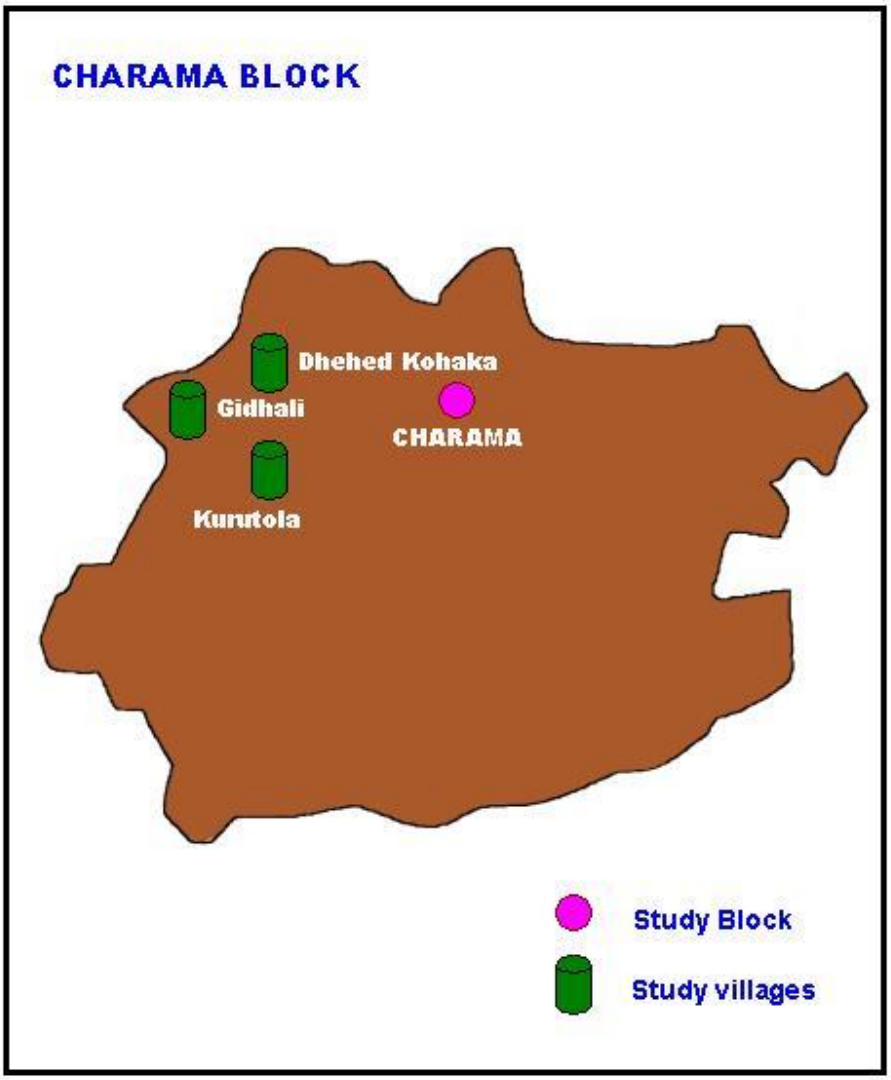

Map-II: Map of study area (Village & Block)

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3.11 Distribution of land holdings

The distribution of land holdings in Charama block of three villages is given in Table 3.2. The distribution of land holding according to size and the total cultivated area falling in each category are given in Table 3.2. The largest number of holding falls under categories below 1.00 hectare.

Table 3.2: Distribution of land holding in Charama block of selected villages.

S.N.	Size of holdings (ha)	Kurutola		Dhehed Kohaka		Gidhali		Total
		No. of holding	Area (ha)	No. of holding	Area (ha)	No. of holding	Area (ha)	
1.	Small (< 2 ha)	10 (50.00)	1.60	8 (40.00)	1.50	12 (60.00)	1.60	30 (50.00)
2.	Medium (2-4 ha)	6 (30.00)	2.02	9 (45.00)	2.50	5 (25.00)	2.42	20 (33.33)
3.	Large (> 4 ha)	4 (20.00)	4.04	3 (15.00)	4.50	3 (15.00)	4.25	10 (16.67)
	Total	20 (100.0)		20 (100.0)		20 (100.0)		60 (100.00)

Note : Figures in parentheses indicate percentage to total.

Source: Village Patwari of respective villages.

3.12 Soil and topography:

The terrain of the district is undulating. Three type of soil are found viz. reddish clay soil, black soil and sandy soil. Soils in the district are very poor in humus and organic matter. The soil in the plain are generally acidic due to undulating topography, network of gutter and nala. The soil erosion is very severe in the district. The district is situated in the Bastar plateau.

3.13 Climate and rainfall:

The climate of the district varies from humid to dry sub humid type. The district has three distinct seasons viz. winter, summer and rainy. There are many local variations in the rainfall and temperature pattern as recorded in various parts of the districts. Average annual rainfall is 1421.3 mm (Table 3.3), winter set in at the beginning of November and Lasts almost to the beginning of March. During December-January few showers are received; otherwise the season generally remains clear.

Table 3.3: Rainfall distribution in Kanker District (C.G.), 2006

S.No.	Months	Rainfall (mm)
1	January	19.5
2	February	17.3
3	March	11.4
4	April	7.74
5	May	38.7
6	June	220.8
7	July	242.8
8	August	284.8
9	September	314.2
10	October	262.4
11	November	1.7
12	December	0.5
	Total	**1421.3**

Source: Weather office department of Kanker District.

Summer season begging from March and last unto June. The Season remains dry and hot but the oppressive heat lasts from the beginning of May to middle of June. The rainy season generally starts by the third week of June and lasts till October. Rains are fairly heavy and long breaks are unusual part receiving comparatively more rains.

3.14 Population distribution:

The total population of the district is 6.51 lacs (2001 census) of which 95.18 per cent is rural and only a small population of 4.82 per cent is urban. The density of population is 100 per sq. Km. The density of population in urban area is very higher as compared to rural area. The growth rate of population is 18.84 per cent at the rate of annually increasing of Kanker district. The population of Scheduled Caste and Scheduled Tribe constitute 4.25 and 56.08 per cent respectively of the total population (Table 3.4 and Table 3.5).

3.15 Land use pattern:

The district has total geographical area of 6,43,374 hectare, about 21.3 per cent area was covered by the forest. Kanker district cover by the 137033 hectare forest area. The district has 4.64 per cent land not available for cultivation and 4.60 per cent fallow land of the total geographical area of the district. The net and gross cropped area is about 33.28 per cent and 33.30 per cent respectively of the total geographical area of the district. The cropping intensity is 105.84 per cent only. The average size of holding in the district is 2.15 ha. In the district about 83.77 per cent of the total area of land holding area in the categories of medium and large farms. The classification of land reveals that in almost in the district about 41.63 per cent of the total number of land holding are in categories of marginal and small farms (Table 3.6 and Table 3.7).

Table 3.4: Demographic features of Kanker district.

S.No.	Particular	Kanker
1.	Total population	65,0934 (100.00)
a.	Male	324636 (49.87)
b.	Female	326298 (50.12)
	Total	650934
c.	Rural	619549 (85.18)
d.	Urban	313885 (4.82)
2.	Percentage of rural population to total population	95.18
3.	Percentage of urban population to total population	4.82
4.	No. of females per 000 males to total population	1005
5.	Population density per sq. km.	100
6.	Decennial growth percentage (199-2001)	16.88
7.	Percentage of district population to state population (1999-2001)	3.12
8.	No. of literates 2001 (000 nos.)	
a.	Male	1.04
b.	Female	1.03

Source: District Statistical booklet (2006), District planning and statistical Office of Kanker (C.G.)

Table3.5: Agricultural population in selected village of Charama block.

(Demography Details)

S.No.	Particular	Number of total households		
		Kurutola	**Dhehed Kohaka**	**Gidhali**
1.	Total population	1091 (100.00)	1140 (100.00)	645 (100.00)
	(a) Male	404 (37.03)	464 (40.70)	182 (28.21)
	(b) Female	251 (23.00)	396 (34.74)	202 (31.32)
	(c)Girls	228 (20.89)	137 (12.09)	134 (20.78)
	(d) Boys	208 (19.06)	143 (12.54)	129 (20.00)
2.	Schedule Caste (SC)	219 (20.07)	22 (1.93)	74 (11.47)
3.	Schedule Tribe (ST)	488 (44.73)	657 (57.63)	258 (40.00)
4.	Cultivars	384 (35.20)	461 (40.44)	313 (48.53)
5.	Agricultural labour	660	880	380
6.	Total workers	712	875	435

Source: Villages Gram Panchayat 2007.

Table 3.6: Land utilization pattern of Kanker district

(In hectare)

S. No.	Particular	Kanker	Percentage To Total Geographical Area
1.	Total geographical area	643374	100.00
2.	Area under forest	137033	21.3
3.	Land under non-agriculture use	29855	4.64
4.	Barren and uncultivable land	19406	3.02
5.	Permanent pasture and other grazing land	46221	7.18
6.	Cultivable waste land	24148	3.75
7.	Fallow land	27588	4.60
8.	Net area sown	214122	33.28
9.	Gross cropped area	226634	33.3
10.	Double cropped area	12512	35.22
11.	Cropping intensity (%)		105.84
12.	Irrigated area	15216	7.11

Source: District Statistical booklet (2006), District planning and statistical office Kanker (C.G.)

Table 3.7: Land utilization pattern in Charama block of Kanker district.

S. No.	Particular	Charama (in ha.)	Percentage to total Geographical area
1.	Geographical area	48273.00	100.00
2.	Forest	9801.00	20.30
3.	Area not available for cultivation (a) Land put to non –argil. uses (b) barren and un available land	 27658.00 5952.00	 57.29 12.39
4.	Other uncultivated land exclusively fallow land (a) Current fallow land (b) Old fallow land	 1710.00 1771.00	 3.54 3.67
5.	Permanent pasture and other grazing land	5000.00	10.36
6.	Cultivable waste land	1757.00	3.64
7.	Land under miscellaneous, trees, crops and groves	22.00	0.045
8.	Net cropped area	27658.00	32.77
9.	Gross sown area	19908.00	41.24
10.	Total cropped area	31745.00	65.74
11.	Net Irrigated area	5081.00	18.37
13.	Cropping intensity (%)		114.70

Source: Agriculture block office.

3.16 Water resource:

The net irrigated area covers only 18.37 per cent of the total net cropped area, there by indicating acute water scarcity in the district for agriculture purpose. Most of the open wells also go drying during summer months. The major sources of irrigation are tanks and well (Table 3.8).

Table 3.8 : Irrigation sources of Charama Block of Kanker District

S. No.	Sources	Charama block	
		Number	Area (ha)
1.	Canal	2	582 (9.50)
2.	Ponds	47	519 (8.47)
3.	Wells	1243	545 (8.89)
4.	Tube wells	187	2275 (37.14)
5.	Irrigated area from other sources	-	1160 (18.94)
6.	Net irrigated area from all sources	-	5081 (82.96)
7.	Irrigated area more than once	-	1043 (17.03)
8.	Gross irrigated area	-	6124 (100.00)

Source: Agriculture block office Charama, Kanker

3.17 Basic infrastructure facilities:

Detail of the basic infrastructure facilities available in the study villages is given in Table 3.9 in the entire three villages the infrastructure facilities are extremely poor/Despite the fact that the available of non timber forest products is in adequate, the marketing support is extremely poor. The adequate supportive services are also major constrains to sell out non-timber forest products at remunerative prices.

Paddy is the major crop occupying the largest area to the cropped area Table 3.10. Maize, Jawar, Milletes, Urad, Mung, Arhar, Hoursegram, Sesamum, and Vegetables is another crop. Broadly the cereal crops dominated over all the crops. The average yield of principles crops grown in the district is quit low. The per hectare consumption of fertilizer in Charama block was 41.40 kg.

Table 3.9: Basic infrastructure facilities in the studied villages

S. No.	Name of infrastructure	Kurutola		Dhehed Kohaka		Gidhali	
		Availa-bility (Y/N)	No.	Availa-bility (Y/N)	No.	Availa-bility (Y/N)	No.
1.	Primary school		1	Y	1	Y	1
2.	Secondary school	Y	1	N	0	N	0
3.	Public school	Y	1	N	0	N	0
4.	Post office	Y	1	N	0	N	0
5.	Road and Transport facilities	Y	1	Y	1	Y	1
6.	College	N	0	N	0	N	0
7.	Co- operatives	N	0	N	0	N	0
8.	Commercial bank	N	0	N	0	N	0
9.	Farm produce storage facilities	N	0	N	0	N	0
10.	Fair price shop	Y	1	Y	0	Y	0
11.	Primary health care center	N	0	N	0	N	0
12.	Veterinary dispensary	N	0	N	0	N	0
13.	Artificially insemination center	N	0	N	0	N	0
14.	Railway station	N	0	N	0	N	0
15.	Bank branch	N	0	N	0	N	0
16	Agriculture extension service, Agro clinic	N	0	N	0	N	0
17	Revenue inspectors/Officers	N	0	N	0	N	0
18	Impliment service center	N	0	N	0	N	0
19	General store	Y	1	Y	1	Y	1
20	Agriculture produce market	Y	1	Y	1	N	0
21	Forest produce market	Y	1	Y	1	Y	1
22	Fruit and vegetable nursery	Y	1	N	0	N	0
23	Other office (Specify)						
	a. Aganbadi	Y	1	Y	1	Y	1
	b. Forest office	N	0	N	0	N	0
	c. Forest village	Y	1	Y	1	Y	1

Table 3.10: Cropping pattern of selected villages of Charama block

(Area in ha)

Season / crops	Kurutola	Dhehed kohaka	Gidhali
A. Kharif			
a. Paddy	173.38	309.14	166.15
b. Maize	5.40	2.30	6.3
c. Jawar	0.26		0.35
d. Millets	13.70	3.60	9.10
e. Urd	3.80	3.10	4.00
f. Mung	-	2.00	-
g. Red gram (Arhar)	-	-	2.90
h. hoursegrame	6.35	8.20	6.35
i. Til (Sesamum)	0.20		0.30
j.Vegetable	13.09	1.73	3.55
Total	**215.18**	**330.07**	**199**
Irrigated	10.30	26.65	1.15
Un-irrigated	204.88	303.42	200.15
B. Rabi			
a. Paddy	1.10	16.70	0.80
b. wheat	0.30	0.80	0.20
c. Lathyrus	0.10	4.90	-
d. Pea (Batra)	-	2.30	-
e. Linseed	-	7.55	-
f. Vegetables	2.00	2.90	1.30
Total	**3.50**	**35.15**	**3.30**

Source: Record from village Patwari of the respective village.

Table 3.11: Fertilizer consumption of selected village of Charama block

(in tones)

S.No.	Particulars	Kurutola	Ddehed kohaka	Gidhali
1.	Urea	52.0	91.2	32.4
2.	DAP	20.0	32.4	10.8
3.	SSP	70.0	18.0	6.0
4.	MOP	12.0	15.6	5.2
5.	IFFCO	9.2	10.8	3.6
6.	Gromore	3.0	9.0	1.7

Source: Records from village Patwari

3.18 Limitation of the study:

During the course of investigation several difficulties were faced in the collection of data from collectors of non–timber forest produce respondents as some of the collection of non-timber forest products by collector's members did not maintain any record and supply data on the basis of their memory, which may not be very correct. Low level of education of the respondents also added to this problem. Some of the respondents did not co-operate in giving data because of some misunderstanding regarding loan and subsidy related issues. Some of the collector's members were biased in giving data toward higher side of expenditure and lower towards income, however, sufficient case was taken to collect data by cross checking with literate neighboring collectors.

CHAPTER-IV

RESULTS AND DISCUSSION

This chapter will discuss from various aspects, the results of the studies, i.e. the extent and pattern of collection, consumption and marketing of sampled households in the three villages namely Kurutola, Dhehed Kohaka and Gidhali under Charama Block of Kanker district of Chhattisgarh state. It also discussed the income and employment pattern of non-timber forest produce collectors.

Chhattisgarh, the newly established state in the center part of the country, endowed with rich bio-diversity. The issue of the conservation and sustainable utilization of natural resources is possible by evolving a feasible mechanism for *in-situ/ex-situ* conservation, domestication, propagation and non-destructive collection with the active help and support from local people. The state Government has resolved to develop Chhattisgarh as herbal state due to its rich and unique bio-cultural diversity.

In Chhattisgarh; forest covers about 44 percent of total geographical area and more than 200 economically important distinct species of non-timber forest produce are available. Kanker district of Chhattisgarh is rich in non-timber forest produce but it lacks infrastructural network for marketing of non-timber forest products.

Village merchant and dealers are generally engaged in treading of non-timber forest products. The major constraint for collection and marketing is poor socio-economic condition.

This study was conducted in Kurutola, Dhehed Kohaka and Gidhali in Charama Block of Kanker district. In the studied villages non-timber forest products were largely collected by the local poor people. Wholesalers and retailers are collecting the raw material from local people and selling it in the primary and secondary market with sizable profitable margin. Therefore, there is a need to put the government policy interventions in action to regularize the collection, marketing and consumption pattern by implementing a systematic and organized strategies / planning to help the local poor people. In this chapter major findings covering various aspects of non-timber forest products are discussed.

This chapter includes collection, consumption and marketing performance of major non-timber forest products (NTFPs) in Charama block of Kanker district of Chhattisgarh state, marketing pattern of major NTFPs and constraint in collection of non-timber forest products by collectors and marketing of major NTFPs in the study area. The outcomes of this study yielded many useful findings regarding collection and marketing performance and constraints in major NTFPs of sample

households of study area. For the sake of convenience, the present chapter has been broadly discussed under the following sub heads:

4.1 General Characteristics of sample households

4.2 Compound growth rate of collection of major NTFPs by collectors

4.3 Economics of collection, consumption and marketing of NTFPs in selected households

4.4 Economics of paddy crops

4.5 Marketing channel, marketing cost and price spread of NTFPs.

4.6 Constraints in collection and marketing of NTFPs

4.1 General characteristics of sample households:

The general characteristics of the sample households are presented in table 4.1. It can be seen from the table 4.1 that the average family size was 4.85. It varied from 3.23 in small farms to 9.20 among large farms. The literacy per cent (82.13) was good because most of the family members were primary educated.

Average size of holding was 2.14 hectares amongst the respondents. It varied from 1.41 hectare on small farms to 4.44 hectares on large farms. Average size of holding increases with the increase in farm size. The average cropping intensity of selected households was reported as 128.87 per cent.

Table 4.1: General characteristics of sampled households

S.No.	Particulars	Farm size			
		Small	Medium	Large	Overall
1	Total number of sample households	30	20	10	60
2	Average holding size	1.41	2.09	4.42	2.14
3	Average family size	3.23	5.10	9.20	4.85
4	Literacy				
	(a) Illiterate	19 (19.59)	13 (12.75)	20 (21.74)	52 (17.87)
	(b) Primary	28 (28.87)	22 (21.57)	29 (31.52)	79 (27.15)
	(c) Middle	23 (23.71)	31 (30.39)	17 (18.48)	72 (24.74)
	(d) Higher Secondary	22 (22.68)	30 (29.41)	22 (23.91)	74 (25.43)
	(e) Graduate and above	5 (5.15)	5 (4.90)	4 (4.35)	14 (4.81)
	Total	97 (100.00)	102 (100.00)	92 (100.00)	291 (100.00)
5	Age group (years)				
	(a) up to 18	26 (26.80)	26 (25.49)	27 (29.35)	79 (27.15)
	(b) >18 - 40	33 (34.02)	40 (39.22)	32 (34.78)	105 (36.08)
	(c) > 40 - 60	28 (28.87)	31 (30.39)	29 (31.52)	88 (30.24)
	(d) 60 to above	10 (10.31)	5 (4.90)	4 (4.35)	19 (6.53)
	Total	97 (100.00)	102 (100.00)	92 (100.00)	291 (100.00)
6	Cropping intensity	121.35	128.66	136.24	128.87

Note: Figures in parentheses indicate percentage to total

4.2 Compound growth rate of collection of non-timber forest products:

Tendu leaves (*Diospyros melanoxylon*):

The compound growth rate of collection of tendu leaves from Charama block (during period: 1997-1998 to 2007-2008), Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix -IV).

Table 4.2, Fig.4.1, Fig.4.2 and Fig.4.3 shows that the growth rate of tendu leaves registering a non - significant growth rate of 1.96 per cent per annum in Charama block and in Kanker district registering a negatively significant growth rate of 3.98 per cent per annum and in Chhattisgarh state registering a negative significant growth rate of 0.75 per cent per annum.

Sal seed (*Shorea robusta*):

The compound growth rate of collection of sal seed from Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of sal seed registering a significant growth rate of 0.58 per cent per annum in Kanker district and in Chhattisgarh state registering a significant growth rate of 2.46 per cent per annum.

Table 4.2: Compound Growth Rate of Collection of NTFPs in Charama Block, Kanker Union and Chhattisgarh State

Name of NTFPs	Collection of NTFPs in Charama block (Period 1997-98 to 2007-08)	Collection of NTFPs in Kanker district (Period 1998-99 to 2007-08)	Collection of NTFPs in Chhattisgarh state (Period 1998-99 to 2007-08)
Tendu leaves	1.96	-3.98*	-0.75
Sal seed	NA	0.58*	2.46**
Harra	2.86**	-3.92**	-2.55**
Anola	-13.60*	-3.01*	-0.39
Baheda	3.42*	-0.35	1.58
Tamarind	2.00***	-0.63	15.40*
Mahua leaves	-21.46*	NA	-0.10
Kusum seed	-3.55*	1.24	0.06
Chirounjee	NA	2.02***	2.22**

Note: * - Significant at 1 % level of Probability.

** - Significant at 5 % level of Probability.

*** - Significant at 10% level of probability.

Harra (*Terminalia chebula*) :

The compound growth rate of collection of harra from Charama block (during period: 1997-1998 to 2007-2008), Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state(during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of harra registering a significant growth rate of 2.86 per cent per annum in Charama block and in Kanker district registering a negatively significant growth rate of 3.92 per cent per annum and in Chhattisgarh state registering a negatively significant growth rate of 2.55 per cent per annum.

Anola (*Emblica officinalis*):

The compound growth rate of collection of anola from Charama block (during period: 1997-1998 to 2007-2008), Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of anola registering a negatively significant growth rate of 13.60 per cent per annum in Charama block and in Kanker district registering a negatively significant growth rate of 3.01 per cent per annum and in Chhattisgarh state registering a negative non-significant growth rate of 0.39 per cent per annum.

Baheda (*Terminalia bellerica*):

The compound growth rate of collection of baheda from Charama block (during period: 1997-1998 to 2007-2008), Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of baheda registering a significant growth rate of 3.42 per cent per annum in Charama block and in Kanker district registering a negatively non-significant growth rate of 0.35 per cent per annum and in Chhattisgarh state registering a non-significant growth rate of 1.58 per cent per annum.

Tamarind (*Tamarindus indica*):

The compound growth rate of collection of Tamarind from Charama block (during period: 1997-1998 to 2007-2008), Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of tamarind registering a significant growth rate of 2.00 per cent per annum in Charama block and in Kanker district registering a negatively non-significant growth rate of

0.63 per cent per annum and in Chhattisgarh state registering a highly significant growth rate of 15.40 per cent per annum.

Mahua leaves (*Bauhinia vahlii*) :

The compound growth rate of collection of Mahua leaves from Charama block (during period: 1997-1998 to 2007-2008), and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of Mahua leaves registering a negatively significant growth rate of 21.46 per cent per annum in Charama block and in Chhattisgarh state registering a negatively non-significant growth rate of 1.10 per cent per annum.

Kusum seed (*Pongamia oleosa*):

The compound growth rate of collection of kusum seed from Charama block (during period: 1997-1998 to 2007-2008), Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of kusum seed registering a negatively significant growth rate of 3.55 per cent per annum in Charama block and in Kanker district registering a non-significant

growth rate of 1.24 per cent per annum and in Chhattisgarh state registering a non-significant growth rate of 0.06 per cent per annum.

Chirounjee (*Buchannia lanzan*):

The compound growth rate of collection of Chirounjee from Kanker district (during period: 1998-1999 to 2007-2008) and Chhattisgarh state (during period: 1998-1999 to 2007-2008) was calculated through collected secondary data (Appendix-IV).

Table 4.2 shows that the growth rate of chirounjee registering a significant growth rate of 2.02 per cent per annum in Kanker district and in Chhattisgarh state registering a non-significant growth rate of 2.22 per cent per annum.

4.3: Economics of Collection, Consumption and Marketing of NTFPs in selected households:

Collection of non-timber forest products shows decreasing trend with increase in farm size. On an average 305.72 Kg. NTFPs was collected by the sampled house holds. The quantity consumes shows increasing trend as the size increase. On an average 10.96 percent NTFPs were consumed by the selected households from the total quantity collected, and rest of the quantity were sold in the market.

4.3.1 Collection of Non-Timber forest Products:

It can be seen from table 4.3(a) that on an average in all the three categories of farm size viz. small, medium and large collected largest quantity 30.85 per cent tendu leaves as compared other NTFPs. Followed by Mahua flower 10.08 per cent whereas collection of Nagar motha was lowest 1.05 per cent respectively to the total quantity of NTFPs collected.

4.3.2 Consumption of Non-Timber forest Products:

It can be seen from table 4.3(a) that on an average consumption of honey was found higher as compared to other NTFPs being 46.92 per cent followed by turmeric 39.88 per cent whereas, consumption of other NTFPs were observed low.

4.3.3 Selling of Non-Timber forest Products:

Further table 4.3(a) also indicates that on an average in all the three categories of farm size viz. small, medium and large selling all the quantities of Harra, Baheda, Char seed, Anola, Kusum, Lac, Neem and Bhelwa in the market.

Table 4.3(a) Average collection, consumption and selling of non-timber forest products of selected households

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
1	Tendu leaves	Leaves	94.30 (30.85)	1.09 (1.16)	93.20 (98.83)	12.50	1165.00 (34.33)	7
2	Mahua flowers	Flower	30.81 (10.08)	3.33 (10.81)	27.48 (89.19)	7.75	203.49 (6.00)	3
3	Harra	Fruit	14.70 (4.81)	0.00	14.70 (100.00)	2.50	36.78 (1.08	2
4	Baheda	Fruit	10.31 (3.37)	0.00	10.31 (100.00)	2.75	28.22) (0.83	2
5	Char seed	Chirounjee	2.27 (0.74)	0.00	2.27 (100.00)	15.00	34.05) (1.00)	2
6	Tamarind	Fruit	21.59 (7.06)	2.16 (10.00)	19.43 (90.00)	16.00	31.09 (0.92)	2
7	Anola	Fruit	6.70 (2.19)	0.00	6.70 (100.00)	16.00	107.20 (3.16)	1
8	Mahua fruit	Fruit	17.73 (5.80)	3.20 (18.05)	14.53 (81.95)	7.50	108.98 (3.21)	2
9	Kusum	seed	17.66 (5.78)	0.00	17.66 (100.00)	4.00	70.66 (2.08)	1
10	Lac	Lac	7.00 (2.29)	0.00	7.00 (100.00)	100.00	700.00 (20.63)	1
11	Neem	Fruit	11.40 (3.73)	0.00	11.40 (100.00)	15.00	171.00 (5.04)	1

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
12	Shahad	Shahad	3.90 (1.28)	1.83 (46.92)	2.07 (53.08)	100.00	207.00 (6.10)	1
13	Bhelwa	Fruit	12.33 (4.03)	0.00	12.33 (100.00)	2.50	30.83 (0.91)	1
14	Jamun fruit	Fruit	5.06 (1.66)	2.00 (39.53)	3.06 (60.47)	7.00	21.42 (0.63)	1
15	Colocasia	Tuber	8.06 (2.64)	3.17 (39.33)	4.89 (60.67)	10.00	49.00 (1.44)	1
16	Discoria	Tuber	5.70 (1.86)	2.37 (41.58)	3.33 (58.42)	13.00	43.29 (1.28)	1
17	Turmric	Rizome	8.60 (2.81)	3.43 (39.88)	5.17 (60.12)	35.00	180.95 (5.33)	1
18	Tendu fruit	Fruit	11.97 (3.92)	4.70 (39.26)	7.27 (60.74)	5.00	36.35 (1.07)	1
19	Ber fruit	Fruit	7.33 (2.40)	2.76 (37.65)	4.57 (62.35)	5.00	22.85 (0.67)	1
20	Nangar motha	Tuber	3.20 (1.05)	1.46 (45.63)	1.74 (54.38)	15.00	52.20 (1.54)	1
21	Mushroom	Flush	5.10 (1.67)	2.00 (39.22)	3.10 (60.78)	30.00	93.00 (2.74)	1
	Total		**305.72** (100.00)	**33.50** (10.96)	**272.21** (89.04)	**421.50**	**3393.36** (100.00)	**34**

Note: Figures in parentheses indicate percentage to total quantity of collection.

4.3.4 Income generated through selling of NTFPs:

Further table 4.3(a) also indicates that on an average in all the three categories of farm size viz. small, medium and large generate income through selling of non-timber forest products, higher income were generated through tendu leaves i.e. Rs.1165 (34.33 per cent) followed by Lac Rs.700 (20.63 per cent) where as minimum income was observed through Jamun fruits Rs. 21.42 (0.63 per cent)

4.3.5 Employment generated through Collection of NTFPs:

On an average more number of employment days being 7 days (per person) were generated through collection of tendu leaves as compared to other non-timber forest products in table 4.3(a).

4.3.6 Category wise collection of NTFPs:

The highest quantity of NTFPs were collected by medium category farm (325.15 kg.) followed by small (321.99 kg.) and large farm (270.90 kg.).

Table 4.3(b), 4.3(c) and 4.3(d) portrays that medium category of farm size collected higher quantity of tendu leaves which is being 105.50 Kg. followed by small 89.40 Kg and lastly large category of farm being 88 Kg. of tendu leaves.

4.3.7 Category wise consumption of NTFPs:

As for as consumption of total NTFPs are concern as the farm size increases the percentage consumption of NTFPs also increases.

Table 4.3(b), 4.3(c) and 4.3(d) portrays that small category of farm size consumed higher quantity of tendu fruit which is being 5.60 Kg. followed by medium 5.50 Kg and lastly large category of farm being 3.00 Kg. of tendu fruit.

4.3.8 Category wise selling of NTFPs:

More than 87 per cent of NTFPs collected were sold in the market by the selected households.

Table 4.3(b), 4.3(c) and 4.3(d) clearly shows that medium category of farm size selling higher quantity of tendu leaves which is being 104.22 Kg. followed by small 93.20 Kg and lastly large category of farm being 87.20 Kg. of tendu leaves.

4.3.9 Category wise income generated through selling of NTFPs:

Per household income generated through selling of NTFPs was higher on medium farm (Rs.3972.31) followed by small farms (Rs.3853.31).

Table 4.3(b), 4.3(c) and 4.3(d) clearly shows that medium category of farm generated higher income from tendu leaves which is being Rs.1302.75 followed by small Rs.1102.50 and lastly large category of farm being Rs.1090.00 from tendu leaves.

Table 4.3 (b) Collection, consumption and selling of non-timber forest products of small farm size of selected households

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
1	Tendu leaves	Leaves	89.40 (27.76)	1.20 (1.34)	88.20 (98.66)	12.50	1102.50 (28.61)	6
2	Mahua flowers	Flower	31.00 (9.63)	4.00 (12.90)	27.00 (87.10)	7.75	195.75 (5.08)	3
3	Harra	Fruit	22.30 (6.93)	0.00	22.30 (100.00)	2.50	55.85 (1.45)	2
4	Baheda	Fruit	14.48 (4.50)	0.00	14.48 (100.00)	2.75	39.42 (1.02)	2
5	Char seed	Chirounjee	2.06 (0.64)	0.00	2.06 (100.00)	15.00	30.90 (0.80)	2
6	Tamarind	Fruit	20.43 (6.34)	2.00 (9.79)	18.43 (90.21)	16.00	294.88 (7.65)	2
7	Anola	Fruit	10.16 (3.16)	0.00	10.16 (100.00)	16.00	162.56 (4.22)	1
8	Mahua fruit	Fruit	18.66 (5.80)	3.00 (16.08)	15.66 (83.92)	7.50	117.45 (3.05)	2
9	Kusum	seed	20.00 (6.21)	0.00	20.00 (100.00)	4.00	80.00 (2.08)	2
10	Lac	Lac	8.00 (2.48)	0.00	8.00 (100.00)	100.00	800.00 (20.76)	1
11	Neem	Fruit	12.20 (3.79)	0.00	12.20 (100.00)	15.00	183.00 (4.75)	1

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
12	Shahad	Shahad	3.70	1.50	2.20	100.00	220.00	1
			(1.15)	(40.54)	(59.46)		(5.71)	
13	Bhelwa	Fruit	12.00	0.00	12.00	2.50	30.00	1
			(3.73)		(100.00)		(0.78)	
14	Jamun fruit	Fruit	5.00	1.00	4.00	7.00	28.00	1
			(1.55)	(20.00)	(80.00)		(0.73)	
15	Colocasia	Tuber	8.50	3.50	5.00	10.00	50.00	1
			(2.64)	(41.18)	(58.82)		(1.30)	
16	Discoria	Tuber	5.60	1.60	4.00	13.00	52.00	1
			(1.74)	(28.57)	(71.43)		(1.35)	
17	Turmric	Rizome	8.60	2.60	6.00	35.00	210.00	1
			(2.67)	(30.23)	(69.77)		(5.45)	
18	Tendu fruit	Fruit	15.60	5.60	10.00	5.00	50.00	1
			(4.84)	(35.90)	(64.10)		(1.30)	
19	Ber fruit	Fruit	7.50	2.50	5.00	5.00	25.00	1
			(2.33)	(33.33)	(66.67)		(0.65)	
20	Nangar motha	Tuber	1.20	0.00	1.20	15.00	18.00	1
			(0.37)		(100.00)		(0.47)	
21	Mushroom	Flush	5.60	2.00	3.60	30.00	108.00	1
			(1.74)	(35.71)	(64.29)		(2.80)	
	Total		**321.99**	**30.50**	**291.49**	**421.50**	**3853.31**	**34**
			(100.00)	(9.47)	(90.53)		(100.00)	

Note: Figures in parentheses indicate percentage to total quantity of collection.

Table 4.3 (c) Collection, consumption and selling of non-timber forest products of medium farm size in of selected households

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
1	Tendu leaves	Leaves	105.50 (32.45)	1.28 (1.21)	104.22 (98.79)	12.50	1302.75 (32.80)	8
2	Mahua flowers	Flower	28.45 (8.75)	3.00 (10.54)	25.45 (89.46)	7.75	197.24 (4.97)	3
3	Harra	Fruit	16.60 (5.11)	0.00	16.60 (100.00)	2.50	41.50 (1.04)	2
4	Baheda	Fruit	10.45 (3.21)	0.00	10.45 (100.00)	2.75	28.74 (0.72)	2
5	Char seed	Chirounjee	2.55 (0.78)	0.00	2.55 (100.00)	15.00	38.25 (0.96)	1
6	Tamarind	Fruit	22.85 (7.03)	2.50 (10.94)	20.35 (89.06)	16.00	325.60 (8.20)	2
7	Anola	Fruit	6.30 (1.94)	0.00	6.30 (100.00)	16.00	100.80 (2.54)	1
8	Mahua fruit	Fruit	14.85 (4.57)	3.50 (23.57)	11.35 (76.43)	7.50	85.13 (2.14)	2
9	Kusum	seed	18.00 (5.54)	0.00	18.00 (100.00)	4.00	72.00 (1.81)	2
10	Lac	Lac	8.00 (2.46)	0.00	8.00 (100.00)	100.00	800.00 (20.14)	1
11	Neem	Fruit	12.00 (3.69)	0.00	12.00 (100.00)	15.00	180.00 (4.53)	1

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
12	Shahad	Shahad	4.00 (1.23)	2.00 (50.00)	2.00 (50.00)	100.00	200.00 (5.03)	1
13	Bhelwa	Fruit	13.00 (4.00)	0.00	13.00 (100.00)	2.50	32.50 (0.82)	1
14	Jamun fruit	Fruit	5.20 (1.60)	2.00 (38.46)	3.20 (61.54)	7.00	22.40 (0.56)	1
15	Colocasia	Tuber	8.50 (2.61)	3.50 (41.18)	5.00 (58.82)	10.00	50.00 (1.26)	1
16	Discoria	Tuber	6.30 (1.94)	2.50 (39.68)	3.80 (60.32)	13.00	49.40 (1.24)	1
17	Turmric	Rizome	9.70 (2.98)	3.20 (32.99)	6.50 (67.01)	35.00	227.50 (5.73)	1
18	Tendu fruit	Fruit	15.30 (4.71)	5.50 (35.95)	9.80 (64.05)	5.00	49.00 (1.23)	1
19	Ber fruit	Fruit	8.20 (2.52)	2.50 (30.49)	5.70 (69.51)	5.00	28.50 (0.72)	1
20	Nangar motha	Tuber	3.20 (0.98)	1.20 (37.50)	2.00 (62.50)	15.00	30.00 (0.76)	1
21	Mushroom	Flush	6.20 (1.91)	2.50 (40.32)	3.70 (59.68)	30.00	111.00 (2.79)	1
	Total		**325.15** (100.00)	**35.18** (10.82)	**289.97** (89.18)	**421.50**	**3972.31** (100.00)	**35**

Note: Figures in parentheses indicate percentage to total quantity of collection.

Table 4.3 (d) Collection, consumption and selling of non-timber forest products of large farm size of selected households

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
1	Tendu leaves	Leaves	88.00 (32.48)	0.80 (0.91)	87.20 (99.09)	12.50	1090.00 (34.85)	6
2	Mahua flowers	Flower	33.00 (12.18)	3.00 (9.09)	30.00 (90.91)	7.75	217.50 (6.95)	3
3	Harra	Fruit	5.20 (1.92)	0.00	5.20 (100.00)	2.50	13.00 (0.42)	2
4	Baheda	Fruit	6.00 (2.21)	0.00	6.00 (100.00)	2.75	16.50 (0.53)	2
5	Char seed	Chirounjee	2.20 (0.81)	0.00	2.20 (100.00)	15.00	33.00 (1.06)	2
6	Tamarind	Fruit	21.50 (7.94)	2.00 (9.30)	19.50 (90.70)	16.00	312.00 (9.98)	2
7	Anola	Fruit	4.40 (1.62)	0.00	4.40 (100.00)	16.00	70.40 (2.25)	2
8	Mahua fruit	Fruit	19.70 (7.27)	3.00 (15.23)	16.70 (84.77)	7.50	125.25 (4.01)	2
9	Kusum	seed	15.00 (5.54)	0.00	15.00 (100.00)	4.00	60.00 (1.92)	1
10	Lac	Lac	5.00 (1.85)	0.00	5.00 (100.00)	100.00	500.00 (15.99)	1
11	Neem	Fruit	10.00 (3.69)	0.00	10.00 (100.00)	15.00	150.00 (4.80)	1

S.No.	Name of NTFPs	Uses parts	Quantity of collection (in kg.)	Quantity of consumption (in kg.)	Quantity of selling (in kg.)	Selling price of NTFPs (in Rs./kg.)	Income generate through selling (in Rs.)	Employment generate through collection of NTFPs (in days)
12	Shahad	Shahad	4.00 (1.48)	2.00 (50.00)	2.00 (50.00)	100.00	200.00 (6.40)	1
13	Bhelwa	Fruit	12.00 (4.43)	0.00	12.00 (100.00)	2.50	30.00 (0.96)	1
14	Jamun fruit	Fruit	5.00 (1.85)	3.00 (60.00)	2.00 (40.00)	7.00	14.00 (0.45)	1
15	Colocasia	Tuber	7.20 (2.66)	2.50 (34.72)	4.70 (65.28)	10.00	47.00 (1.50)	1
16	Discoria	Tuber	5.20 (1.92)	3.00 (57.69)	2.20 (42.31)	13.00	28.60 (0.91)	1
17	Turmric	Rizome	7.50 (2.77)	4.50 (60.00)	3.00 (40.00)	35.00	105.00 (3.36)	1
18	Tendu fruit	Fruit	5.00 (1.85)	3.00 (60.00)	2.00 (40.00)	5.00	10.00 (0.32)	1
19	Ber fruit	Fruit	6.30 (2.33)	3.30 (52.38)	3.00 (47.62)	5.00	15.00 (0.48)	1
20	Nangar motha	Tuber	5.20 (1.92)	3.20 (61.54)	2.00 (38.46)	15.00	30.00 (0.96)	1
21	Mushroom	Flush	3.50 (1.29)	1.50 (42.86)	2.00 (57.14)	30.00	60.00 (1.92)	1
	Total		**270.90** (100.00)	**34.80** (12.85)	**236.10** (87.15)	**421.50**	**3127.25** (100.00)	**34**

Note: Figures in parentheses indicate percentage to total quantity of collection.

4.3.10 Category wise employment generate through collection of NTFPs:

It can be seen from the table 4.3(b) that on an average 34 days employment were generated through collection of NTFPs by the selected households.

Further table 4.3(b), 4.3(c) and 4.3(d) also indicates that medium categories of farm size employment generated through collection of non timber forest products was higher which is being 35 days followed by small and large category 34 days of employment generated.

4.3.11 Price Structure Non- Timber Forest Products.

Price variability of non -timber forest products (NTFPs) across major market of Chhattisgarh (Charama, Dhamtari and Raipur) and at national level is given in Table 4.4. It can be seen from table that no definite trend of price can be trace out across the major market of Chhattisgarh and it is also difficult to relate Chhattisgarh market price with the national wholesale average.

However, in case of some NTFPs the wholesaler price of particular NTFPs products / raw material largely depended on the local

Table 4.4: Price Structure of Non Timber Forest Products in major market of Chhattisgarh.

(Average price/quintal)

S.No.	Name of NTFPs	Uses parts	Studied village	Dhamtari	Raipur	At National level average price
1.	Mahua Flower	Flower	700-725	800-900	1300-1350	1500-1600
2.	Mahua Fruit (Stone)	Fruit	800-900	950-1000	1300-1350	1500-1600
3.	Anola	Fruit	1625-1700	2000-2500	2000-2100	3400-3500
4.	Baheda	Fruit	275-300	300-350	350-450	450-550
5.	Chirayata	Leaf	250-350	600-650	600-750	1300-1400
6.	Arjunchall	Bark	500-600	500	400-450	1100-1200
7.	Tamarind	Fruit	1600-1650	1750-1800	1900-2000	2100-2200
8.	Safed musali	Root	--	40,000	--	--
9.	Tikhur	Root	--	5000-6000	4500-5000	7000-7500
10.	Satavar	Root	1500-1600	--	2500-3000	--
11.	Kusum	Seed	400-450	550-600	600-700	1000-1100
12.	Harra	Fruit	250-300	350-400	400-500	600-700
13	Char seed	Chirounjee	1500-1550	1600-1680	1700-1850	2500-2700

Source: Department of forest Government of Chhattisgarh, 2006-07.

demand i.e. the price of some NTFPs are higher in Dhamtari market in comparison to the Raipur market. Further the price also governed through the traditionally established marketing channels. In state of Chhattisgarh the trading of NTFPs is still governed through hidden marketing channel.

4.4 Economics of paddy crop:

Table 4.5 clearly shows that the per hectare cost of cultivation of paddy was higher on large farms as compare to small farms. It was due to the fact that the large farmers could incurred more expenditure on modern farm inputs like quality seed, fertilizer, plant protection material and hired labour etc. as a result of borrowing from different credit institutions and better economic status. The higher expenditure returns into higher yield and returns on these farms as compare to others.

The per hectare average cost of cultivation of paddy came to Rs.7270.02. The per hectare cost of cultivation showed a rising trend with the rise in the size of farms.

4.4.1: Yield value of output and cost of production per quintal

The per hectare yield, value of output and cost of production per quintal of paddy on the sample farms have been worked out in table 4.6.

Table 4.5: Economics of paddy crop on different size groups of farms

(Rs./ha)

S. No.	Particulars	Farm size			Average
		Small	Medium	Large	
1.	Family human labour	1884.16 (28.27)	1530.24 (21.69)	836.06 (10.38)	1407.55 (19.36)
2.	Hired human labour	1019.83 (15.30)	1657.16 (23.49)	2675.84 (33.22)	1798.41 (24.74)
3.	Total human labour	2903.99 (43.57)	3187.40 (45.18)	3511.90 (43.60)	3205.95 (44.10)
4.	Bullock labour	1055.98 (15.84)	700.50 (9.93)	675.76 (7.15)	808.90 (11.13)
5.	Tractor power	325.84 (4.88)	450.64 (6.38)	840.89 (10.44)	544.01 (7.48)
6.	Seed cost	605.80 (9.09)	612.24 (8.67)	652.38 (8.09)	623.95 (8.58)
7.	Irrigation charges	65.00 (0.97)	75.25 (1.06)	95.30 (1.18)	78.78 (1.08)
8.	Plant protection material	315.52 (4.73)	486.31 (6.89)	589.04 (7.31)	465.52 (6.40)
9.	Manure and fertilizer	928.36 (13.93)	1055.81 (14.92)	1135.50 (14.09)	1041.34 (14.32)
10.	Land revenue	30 (0.45)	30 (0.43)	30 (0.37)	30 (0.41)
11.	Interest on working capital	433.13 (6.50)	458.49 (6.50)	523.53 (6.50)	472.55 (6.50)
	Total input cost	6663.62 (100.00)	7053.64 (100.00)	8054.30 (100.00)	7270.02 (100.00)

Note: Figures in parentheses indicate percent of total input cost

Table 4.6: Per hectare yield, value of output and cost of production per quintal of paddy

(Rs./ha)

S. No.	Particulars	Farm size			
		Small	Medium	Large	Average
1.	Input cost (Rs.)	6663.62	7053.64	8054.30	7270.02
2.	Production (qtl)				
	a. Main product	15.70	17.29	20.36	17.82
	b. By product	26.30	28.84	30.90	28.71
3.	Value of production (Rs.)				
	a. Main product	11775.00	12967.50	15270.00	13368.34
	b. By product	657.50	713.50	772.50	715.40
	Total value of production (Rs.)	12432.50	13681.00	16042.50	14083.74
4.	Cost of production (Rs./qtl)				
	a. Main product	401.98	386.68	376.54	388.22
	b. By product	13.39	12.88	12.55	12.93

Table 4.6 indicates that the per hectare average yield of paddy come to 17.82 quintals of main product and 28.71 quintal of by-product on the sample farms. The average cost of production per quintal, was worked out to Rs.388.22 for main product and Rs.12.93 for by-product. It decreased with the increased in the size of farms due to higher yields in return to the cost of cultivation on the large farms. The average value of output per hectare came to Rs.14083.74. The higher value of output on large farms was associated with the higher expenditure incurred on modern farm inputs. Paddy is the major crop of selected households which is also major source of income, other than paddy non-timber forest products was other major source of income.

4.4.2: Measures of farm profit

The per hectare values of net income, family labour income and farm business income on the sample farms of different size groups have been worked out in the table 4.7 and Fig.4.4. Table clearly indicates that, the average value of net income, family labour income and farm business income per hectare came to Rs.6813.72, Rs.5406.17 and Rs.5878.72, respectively, on the sample farms of different sizes. The average input-output ratio in paddy came to 1:1.94 on the sample farms. As the farm size increases the input-output ratio also increases.

Table 4.7: Cost and return of paddy on the sample farms for different group of farms

(Rs./ha)

S. No.	Particular	Farm size			Average
		Small	Medium	Large	
1.	Input cost	6663.62	7053.64	8054.30	7270.02
2.	Output value	12432.50	13681.00	16042.50	14083.74
3.	Net income	5768.88	6627.36	7988.20	6813.72
4.	Family labour income	3884.72	5097.12	7152.14	5406.17
5.	Farm business income	4317.85	5555.61	7675.67	5878.72
6.	Input-Output ratio	1:1.86	1:1.93	1:1.99	1:1.94

4.4.3: Cost and returns on the basis of cost concept

The Cost and returns on the basis of cost concept in the production of paddy have been presented in the table 4.8. Table portrays that, on an average cost-A, cost-B and cost-C were worked out to Rs.5862.48, Rs.7662.48 and Rs.9070.02 per hectare, respectively on the sample farms. It is noted that rupees 1800 were considered as imputed rental value of owned land for each crop season. The incomes over different costs were also worked out. The average income over cost-A, cost-B and cost-C were calculated as Rs.8221.27, Rs.6421.27 and Rs.5301.69 per hectare, respectively.

4.5 Marketing channel, marketing cost and price spread of NTFPs.

4.5.1 Disposable Pattern:

The disposable pattern of NTFPs was presented in Table 4.9 and Fig. 4.5. It an be seen from table that more than 72.00 per cent of the total NTFPs were traded through village merchant/tribal agent and remaining quantity was traded through villagers. In case of tendu leaves total quantity was sold to Primary Minor Forest Produce Cooperative Society (MFPS). Lac, Neem, Anola, Mahua flower, Harra, Baheda were mostly traded through village merchant/tribal agents. However, Char seed, Jamun fruit, Colocasia, Ber fruit, Mushroom and Nagar motha were sold to villagers.

Table 4.8: Break-up of total cost, cost concept wise income over different cost in paddy

(Rs./ha)

S. No.	Particulars	Farm size			Average
		Small	Medium	Large	
A.	**Break-up of cost**				
	a. Cost A	4779.46	5523.40	7218.24	5862.48
	b. Cost A1	4779.46	5523.40	7218.24	5862.48
	c. Cost B	6579.46	7323.40	9018.24	7662.48
	d. Cost C	8463.62	8853.64	9854.30	9070.02
B.	**Income over different cost**				
	a. Income over cost A	7653.04	8157.60	8824.26	8221.27
	b. Income over cost A1	7653.04	8157.60	8824.26	8221.27
	c. Income over cost B	5853.04	6357.60	7024.26	6421.27
	d. Income over cost C	3968.88	4827.36	7024.26	5301.69

Table 4.9: Overall disposal pattern of non-timber forest products of sampled households

(Kg. per households)

S.No.	Categories of NTFPs	Quantity of NTFPs traded	Disposal pattern of NTFPs (%)	
			Villagers	Village merchant/ Tribal agent
1	Mahua flowers	27.48 (100.00)	2.78 (10.12)	24.70 (89.88)
2	Harra	14.70 (100.00)	1.75 (11.90)	12.95 (88.10)
3	Baheda	10.31 (100.00)	1.55 (15.00)	8.76 (85.00)
4	Char seed	2.27 (100.00)	2.04 (90.00)	0.23 (10.00)
5	Tamarind	19.43 (100.00)	6.50 (33.45)	12.93 (66.55)
6	Anola	6.70 (100.00)	0.65 (9.70)	6.05 (90.30)
7	Mahua fruit	14.53 (100.00)	2.45 (16.86)	12.08 (83.14)
8	Kusum	17.66 (100.00)	3.77 (21.35)	13.89 (78.65)
9	Lac	7.00 (100.00)	0.00	7.00 (100.00)
10	Neem	11.40 (100.00)	0.34 (3.00)	11.06 (97.00)
11	Shahad (Honey)	2.07 (100.00)	0.62 (30.00)	1.45 (70.00)
12	Bhelwa	12.33 (100.00)	3.23 (26.20)	9.10 (73.80)
13	Jamun fruit	3.06 (100.00)	2.91 (95.00)	0.15 (5.00)
14	Colocasia	4.89 (100.00)	3.90 (79.75)	0.99 (20.25)
15	Discoria	3.33 (100.00)	2.16 (65.00)	1.17 (35.00)
16	Turmric	5.17 (100.00)	1.29 (25.00)	3.88 (75.00)
17	Tendu fruit	7.27 (100.00)	5.45 (75.00)	1.82 (25.00)
18	Ber fruit	4.57 (100.00)	3.80 (83.15)	0.77 (16.85)
19	Nangar motha	1.74 (100.00)	1.39 (80.00)	0.35 (20.00)
20	Mushroom	3.10 (100.00)	3.10 (100.00)	0.00
	Total	**179.01 (100.00)**	**49.69 (27.76)**	**129.32 (72.24)**

Note: Figures in parentheses indicate percentage to total.

4.5.2 Marketing channels of NTFPs:

In the study there were two marketing channels were found out for the marketing of NTFPs i.e. Channel-I: Collector – Consumer and Channel-II: Collector – Village merchant/tribal agent – Wholesaler. In case of Channel-II, the wholesaler who sale the NTFPs in the different part of the state as well as other state. The price received by the wholesaler from the different merchant is assumed as ultimate consumer for calculating the price spread.

4.5.3 Marketing cost of NTFPs:

Table 4.10 clearly indicates that the marketing charges paid by the collectors in the marketing of tamarind came to Rs.40.00 per quintal in channel-I and marketing charges paid by the collectors, villager merchant and wholesaler was observed Rs.32.00, Rs.100.00 and Rs.144.00 per quintal in channel-II respectively.

Table 4.11 clearly indicates that the marketing charges paid by the collectors in the marketing of mahua came to Rs.26.00 per quintal in channel-I, and marketing charges paid by the collectors, villager merchant and wholesaler was observed Rs.14.50, Rs.55.00 and Rs.108.00 per quintal in channel-II respectively.

Table 4.10: Price spread of Tamarind

(Rs./quintal)

S.No.	Particulars	Charges	Channel-I	Channel-II
A.	**Collectors**			
	Price received by collector		2000.00	1600.00
	Processing cost 2 %		40.00	32.00
	Net price received by		1960.00	1568.00
	collectors		(98.00)	(71.27)
B.	**Village merchant**			
	Transportation charges	4.00 / qt.		4.00
	Loss	3% of the total value		54.00
	Weighing and packing	3.00 / qt.		3.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	2 % of the total value		36.00
	Sub total			**100.00**
	Price paid by village merchant			1600.00
	Price received by village merchant			1800.00
	Net margin of village			100.00
	merchant			(4.54)
C.	**Wholesaler**			
	Transportation charges	5.00 / qt.		5.00
	Loss	3% of the total value		66.00
	Weighing and packing	4.00 / qt.		4.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	3 % of the total value		66.00
	Sub total			**144.00**
	Price paid by wholesaler			1800.00
	Price received by wholesaler			2200.00
	Net margin of wholesaler			256.00
				(11.63)
	Ultimate consumer price		2000.00	2200.00*
			(100.00)	(100.00)

Note: Figures in parentheses indicate percentage to total.

* The price received by the wholesaler from the different merchant/trader is assumed as ultimate consumer for calculating the price spread.

Table 4.11: Price spread of Mahua

(Rs./quintal)

S.No.	Particulars	Charges	Channel-I	Channel-II
A.	**Collectors**			
	Price received by collector		1300.00	725.00
	Processing cost 2 %		26.00	14.50
	Net price received by		1274.00	710.50
	collectors		(98.00)	(44.40)
B.	**Village merchant**			
	Transportation charges	4.00 / qt.		4.00
	Loss	3% of the total value		27.00
	Weighing and packing	3.00 / qt.		3.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	2 % of the total value		18.00
	Sub total			**55.00**
	Price paid by village merchant			725.00
	Price received by village merchant			900.00
	Net margin of village			120.00
	merchant			(7.50)
C.	**Wholesaler**			
	Transportation charges	5.00 / qt.		5.00
	Loss	3% of the total value		48.00
	Weighing and packing	4.00 / qt.		4.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	3 % of the total value		48.00
	Sub total			**108.00**
	Price paid by wholesaler			900.00
	Price received by wholesaler			1600.00
	Net margin of wholesaler			592.00
				(37.00)
	Ultimate consumer price		1300.00	1600.00*
			(100.00)	(100.00)

Note: Figures in parentheses indicate percentage to total.

* The price received by the wholesaler from the different merchant/trader is assumed as ultimate consumer for calculating the price spread.

Table 4.12 clearly indicates that the marketing charges paid by the collectors in the marketing of harra came to Rs.10.00 per quintal in channel-I and marketing charges paid by the collectors, villager merchant and wholesaler was observed Rs.5.00, Rs.30.00 and Rs.54.00 per quintal in channel-II respectively.

Table 4.13 clearly indicates that the marketing charges paid by the collectors in the marketing of baheda came to Rs.9.00 per quintal in channel-I and marketing charges paid by the collectors, villager merchant and wholesaler was observed Rs.5.50, Rs.31.00 and Rs.45.00 per quintal in channel-II respectively.

Table 4.14 clearly indicates that the marketing charges paid by the collectors in the marketing of kusum seed came to Rs.14.00 per quintal in channel-I and marketing charges paid by the collectors, villager merchant and wholesaler was observed Rs.8.00, Rs.37.50 and Rs.72.00 per quintal in channel-II respectively.

4.5.4 Price Spread of NTFPs:

The price spread analysis of Tamarind was presented in table 4.10. It can be seen from the tables that net price received by the collectors was highest being 98.00 per cent in Channel-I and only 71.27 per cent in case of Channel-II. In Channel-II the net margin of the

Table 4.12: Price spread of Harra

(Rs./quintal)

S.No.	Particulars	Charges	Channel-I	Channel-II
A.	**Collectors**			
	Price received by collector		500.00	250.00
	Processing cost 2 %		10.00	5.00
	Net price received by		490.00	245.00
	collectors		(98.00)	(35.00)
B.	**Village merchant**			
	Transportation charges	4.00 / qt.		4.00
	Loss	3% of the total value		12.00
	Weighing and packing	3.00 / qt.		3.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	2 % of the total value		8.00
	Sub total			**30.00**
	Price paid by village merchant			250.00
	Price received by village merchant			400.00
	Net margin of village			120.00
	merchant			(17.14)
C.	**Wholesaler**			
	Transportation charges	5.00 / qt.		5.00
	Loss	3% of the total value		21.00
	Weighing and packing	4.00 / qt.		4.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	3 % of the total value		21.00
	Sub total			**54.00**
	Price paid by wholesaler			400.00
	Price received by wholesaler			700.00
	Net margin of wholesaler			246.00
				(35.14)
	Ultimate consumer price		500.00	700.00*
			(100.00)	(100.00)

Table 4.13: Price spread of Baheda

(Rs./quintal)

S.No.	Particulars	Charges	Channel-I	Channel-II
A.	**Collectors**			
	Price received by collector		450.00	275.00
	Processing cost 2 %		9.00	5.50
	Net price received by		441.00	269.50
	collectors		(98.00)	(49.00)
B.	**Village merchant**			
	Transportation charges	4.00 / qt.		4.00
	Loss	3% of the total value		10.50
	Weighing and packing	3.00 / qt.		3.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	2 % of the total value		10.50
	Sub total			**31.00**
	Price paid by village merchant			275.00
	Price received by village merchant			350.00
	Net margin of village			44.00
	merchant			(8.00)
C.	**Wholesaler**			
	Transportation charges	5.00 / qt.		5.00
	Loss	3% of the total value		16.50
	Weighing and packing	4.00 / qt.		4.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	3 % of the total value		16.50
	Sub total			**45.00**
	Price paid by wholesaler			350.00
	Price received by wholesaler			550.00
	Net margin of wholesaler			155.00
				(28.18)
	Ultimate consumer price		450.00	550.00*
			(100.00)	(100.00)

Note: Figures in parentheses indicate percentage to total.

* The price received by the wholesaler from the different merchant/trader is assumed as ultimate consumer for calculating the price spread.

Table 4.14: Price spread of Kusum Seed

(Rs./quintal)

S.No.	Particulars	Charges	Channel-I	Channel-II
A.	**Collectors**			
	Price received by collector		700.00	400.00
	Processing cost 2 %		14.00	8.00
	Net price received by		686.00	392.00
	collectors		(98.00)	(48.55)
B.	**Village merchant**			
	Transportation charges	4.00 / qt.		4.00
	Loss	3% of the total value		16.50
	Weighing and packing	3.00 / qt.		3.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	2 % of the total value		11.00
	Sub total			**37.50**
	Price paid by village merchant			400.00
	Price received by village merchant			550.00
	Net margin of village			112.50
	merchant			(11.25)
C.	**Wholesaler**			
	Transportation charges	5.00 / qt.		5.00
	Loss	3% of the total value		30.00
	Weighing and packing	4.00 / qt.		4.00
	Loading and unloading charges	3.00 / qt.		3.00
	Other charges	3 % of the total value		30.00
	Sub total			**72.00**
	Price paid by wholesaler			550.00
	Price received by wholesaler			1000.00
	Net margin of wholesaler			378.00
				(37.80)
	Ultimate consumer price		700.00	1000.00*
			(100.00)	(100.00)

Note: Figures in parentheses indicate percentage to total.

* The price received by the wholesaler from the different merchant/trader is assumed as ultimate consumer for calculating the price spread.

wholesaler and village merchant was 11.63 per cent and 4.54 per cent, respectively.

The price spread analysis of Mahua was presented in table 4.11. It can be seen from the tables that net price received by the collectors was highest being 98.00 per cent in Channel-I and only 44.40 per cent in case of Channel-II. In Channel-II the net margin of the wholesaler and village merchant was 37.00 per cent and 7.50 per cent, respectively.

The price spread analysis of Harra was presented in table 4.12. It can be seen from the tables that net price received by the collectors was highest being 98.00 per cent in Channel-I and only 35.00 per cent in case of Channel-II. In Channel-II the net margin of the wholesaler and village merchant was 35.14 per cent and 17.14 per cent, respectively.

The price spread analysis of Baheda was presented in table 4.13. It can be seen from the tables that net price received by the collectors was highest being 98.00 per cent in Channel-I and only 49.00 per cent in case of Channel-II. In Channel-II the net margin of the wholesaler and village merchant was 28.18 per cent and 8.00 per cent, respectively.

The price spread analysis of Kusum seed was presented in table 4.14. It can be seen from the tables that net price received by the collectors was highest being 98.00 per cent in Channel-I and only 48.55 per cent in case of Channel-II. In Channel-II the net margin of the wholesaler and village merchant was 37.80 per cent and 11.25 per cent, respectively.

4.6 Constraints in collection and marketing of NTFPs:

Table 4.15 indicated that the ‘deforestation’ was the major constraint expressed by majority of respondents (38.33%) followed by ‘less quantity available’ (21.67%) and the availability of non-timber forest products ‘far away from residence’ was expressed by 8.33 per cent of respondents.

Table 4.15: Constraints faced by respondents in collection and marketing of non-timber forest products.

(N = 60)

S. No	Constraints	Frequency	Percent
1.	Deforestation	23	38.33
2.	Less quantity available	13	21.67
3.	Time consuming	11	18.33
4.	Competition among collectors	8	13.33
5.	The availability of non-timber forest products far away from residence	5	8.33

CHAPTER – V

SUMMARY, CONCLUSION AND SUGGESTIONS FOR THE FUTURE RESEARCH WORK

5.1 Summary and Conclusions:

In Chhattisgarh, non- timber forest produce are emerging, which will help in changing the rural scenario by uplifting the standard of living. Kanker district accounts for more than 21.3 percent (137033 ha.) Forest area and Charama block account for more than 20.30 per cent (9801.00 ha.) forest area collectively under non- timber forest products. NTFPs attention to this area that after having enormous natural resources, why this district is suffering from backwardness in collection aspects of non-timber forest produce keeping in view of the importance of NTFPs Charama block of Kanker district in Chhattisgarh collection, consumption and marketing has been proposed to be undertaken in studied villages. The finding of present inquiry would be of greater significant to the policy makers. Further, economist may develop such policy on non timber forest produce so that its profitability may be enhanced sustainably the present study was undertaken in selected villages of Charama block where farmers are not cultivating the non timber forest produce but are getting benefit out of it by collecting it from nearby forest and selling it directly or indirectly to consumers. It also

examines the collection and consumption pattern of non timber forest in Charama block of Kanker district in Chhattisgarh with following objectives.

- To examine the collection and consumption pattern of non-timber forest products.
- To workout marketing channels, marketing cost and price spread of non-timber forest products.
- To Find out the constraints in collection and marketing of non-timber forest products and suggest suitable policy measure to over come the problems.

The present study was conducted in Charama block of Kanker district of Chhattisgarh 60 farmers (collectors) were selected randomly from 3 villages namely Kurutola, Dhehed Kohaka and Gidhali. The primary data were collected for the year 2006-07. Primary data related to the collection of non timber forest produce from collectors were collected from the respondence using well design questionnaires and schedules. The secondary data regarding the collection of major non timber forest produce in Charama block of Kanker district of Chhattisgarh. State, were collected from forest department of Charama, Kanker and Raipur respectively. To work out the status of major non timber forest produce in Chhattisgarh trend analysis was done to work out the cost of cultivation, the standard method of cost of

cultivation was adopted. To calculate the marketing cost, price spread etc. standard method was used.

The study yielded following major findings

1. The average cropping intensity observed in the study area was 114.70 per cent.
2. The growth rate of collection of non-timber forest produce in Charama Block (during period: 1997-98 to 2007-08) i.e., Tamarind (2.00 per cent), Harra (2.86 per cent) and Baheda (3.42 per cent) registering a significant growth rate of per annum and negatively significant growth rate was found in case of Mahua leaves (21.46 per cent), Anola (13.60 per cent) and Kusum seed (3.55 per cent).
3. The growth rate of collection of non-timber forest produce in Kanker District (during period: 1998-99 to 2007-08) i.e., Chirounjee (2.02 per cent) and sal (0.58 per cent) registering a significant growth rate of per annum and negatively significant growth rate was found in case of Tendu leaves (3.98 per cent), Harra (3.92 per cent) and anola seed (3.01 per cent).
4. The growth rate of collection of non-timber forest produced in Chhattisgarh state (during period: 1998-99 to 2007-08) i.e., Tamarind (15.40 per cent) and Sal seed (2.46 per cent) registering a significant growth rate of per annum respectively and negatively significant

growth rate was found in case of Tendu leaves (0.75 per cent) and Harra (2.55 per cent).

5. The growth rate of Tendu leaves was found non-significant in Charama block. In Kanker district Baheda, Tamarind, Mahua leaves and Kusum seed was found non-significant growth rate. Non-significant growth rate was observed in Chhattisgarh state particularly in case of Anola, Baheda, Mahua leaves, Kusum seed and Chirounjee.

6. On an average 305.72 Kg. NTFPs was collected by the sampled households. The quantity consumes shows increasing trend as the farm size increases.

7. On an average 10.96 percent NTFPs were consumed by the selected households from the total quantity collected, and rest of the quantity were sold in the market.

8. On an average in all the three categories of farm size viz. small, medium and large collected largest quantity 30.85 per cent tendu leaves as compared other NTFPs. Followed by Mahua flower 10.08 per cent whereas, collection of Nagar motha was lowest 1.05 per cent respectively to the total quantity of NTFPs collected.

9. On an average consumption of honey was found higher as compared to other NTFPs being 46.92 per cent followed by turmeric 39.88 per cent.

10. On an average all the quantities of Harra, Baheda, Char seed, Anola, Kusum, Lac, Neem and Bhelwa were sold in the market.

11. On an average in higher income were generated through selling of tendu leaves Rs.1165 (34.33 per cent) followed by Lac Rs.700 (20.63 per cent) where as minimum income was observed through Jamun fruits Rs. 21.42 (0.63 per cent).

12. On an average more number of employment days being 7 days (per person) were generated through collection of tendu leaves as compared to other non-timber forest products.

13. Medium category of farm size collected higher quantity of tendu leaves which is being 105.50 Kg. followed by small 89.40 Kg and lastly large category of farm being 88 Kg. of tendu leaves.

14. Small category of farm size consumed higher quantity of tendu fruit which is being 5.60 Kg. followed by medium 5.50 Kg and lastly large category of farm being 3.00 Kg. of tendu fruit.

15. On an average the cost of cultivation per hectare of paddy was calculated at Rs. 7270.02. The cost of cultivation per hectares showed rising trend with the rise in farm size.

16. On an average income over cost per hectare cost-A, cost-B and cost-C were calculated as Rs.8221.27, Rs.6421.27 and Rs.5301.69 per hectare, respectively.

17. Paddy is the major crop of selected households which is also major source of income, other than paddy non-tibmer forest products was other major source of income.

18. On the average input- output ratio of paddy came to ratio 1:1.94 of sampled farmers.

19. In case of paddy per hectare cost of cultivation and input- output ration showed increasing trend as the farm size increases.

20. More than 72.00 per cent of the total NTFPs were traded through village merchant/tribal agent and remaining quantity was traded through villagers.

21. There were two marketing channel found for the marketing of major non- timber forest products which are as follows.

Channel – I: Collectors – Village merchant

Channel – II: Collectors – Village merchant – Wholesalers

22. Marketing charges paid by the collectors in the marketing of tamarind, Mahua, Harra, Baheda and Kusum seed were came to Rs.40.00, Rs.26.00, Rs.10.00, Rs.9.00 and Rs.14.00 per quintal in channel-I.

23. The price spread analysis of Tamarind, Mahua, Harra, Baheda and Kusum seed was observed that net price received by the collectors was highest being 98.00 per cent in Channel-I. In Channel-II the net margin of the wholesaler and village merchant was 11.63 per cent and

4.54 per cent of Tamarind, 37.00 per cent and 7.50 per cent of Mahua, 35.14 per cent and 17.14 per cent of Harra, 28.18 per cent and 8.00 per cent of Baheda and Kusum seed was observed 37.80 per cent and 11.25 per cent, respectively.

24. Deforestation, time consuming and the availability of non-timber forest products is far away from residence were major constraints faced by the collectors.

5.2 Suggestions for the future research work:

1. Alternate sources of income to the villagers to improve their socio-economic conditions.
2. Appreciation of marketing principals would definitely fetch attractive prices for the same produce. The communication and transport system of resin needs to be strengthened.
3. Increasing the income level and employment opportunities by suggesting effective collection and marketing of non-timber forest products and at the same time making villagers come forward for forest protection.
4. Number of steps should be taken by Government of India to save the tribals from the clutches of private traders and to ensure fairness in the marketing of non-timber forest products by establishing sound institutional setup in tribal areas during the various plans.

5. The members of the managing committee and other members should have much control over financial, administrative and technical management.
6. There should be high procurement price for all the non-timber forest products.
7. Market system should be well organized.
8. Awareness regarding processing at local level.
9. Significant involvement of the primary collectors in the marketing process.
10. With systematic forest management the oligopoly of the collection and marketing of NTFPs should be taken over by the forest department.
11. The marketing system of NTFPs should be structured and have clear rules and regulations, which deprived the procures from getting the genuine price for their products, value addition can help the rural people to earn remunerative prices for their produce collected from the forest.
12. Formation of state level marketing board should regulate and promote the purchase and sale of products within as well as outside the state on remunerative price, which will be beneficial to the collectors of non-timber forest products in particular and to the state in general.

13. The market for most non-timber forest products including Medicinal and Aromatic Plants (MAPs) should be highly organized and open.
14. Afforestation should be promoted through distribution of plants to the farmers to avoid deforestation.
15. Promotion of biogas as an alternative of fuel wood.
16. Government of India should formulate suitable policies to the collectors regarding collection, processing and marketing of NTFPs etc.

AN ECONOMIC ANALYSIS OF COLLECTION AND MARKETING OF NON-TIMBER FOREST PRODUCTS IN KANKER DISTRICT OF CHHATTISGARH

By

GAJENDRA KUMAR SINHA

ABSTRACT

Non-Timber Forest Products play an important role in both national and local economy. In India more than 500 millions people are employed in the non-timber forest products (NTFPs) sector. The market of non-timber forest products at primary and secondary level is very enormously and understands. India posses a rich bounty of non-timber forest products in its 64 million hectares of state managed forests. Among 15000 plant species approximately 3000 species (20 per cent) yield of non-timber forest products. only 126 species (0.8 per cent) have been commercially exploited**.**

This study was undertaken to fulfill the following objectives:

- To examine the collection and consumption pattern of non-timber forest products.
- To workout marketing channels, marketing cost and price spread of non-timber forest products.
- To Find out the constraints in collection and marketing of non-timber forest products and suggest suitable policy measure to over come the problems.

The present study was conducted in three villages namely Kurutola, Dhehed Kohaka and Gidhali of Charama Block of Kanker District in Chhattisgarh. Sixty respondents were selected randomly. Primary data was collected from selected non-timber forest products collectors through personal interview method with the help of pre-tested schedule. The secondary data was collected from department of forest, Government of Chhattisgarh. The primary data were collected for the year 2006-07.

The major findings of this study revealed that the average cropping intensity was 114.70. per cent. The growth rate of Tamarind, Harra and Baheda was observed significant in Charama block, however, in case of Kanker district only Chirounjee and sal registering significant growth rate. In case of Chhattisgarh state Tamarind and Sal seed registering significant growth rate. On an average 305.72 Kg. NTFPs was collected by the sampled house holds. The quantity consumes shows increasing trend

as the farm size increases, on an average 10.96 percent NTFPs were consumed by the selected households from the total quantity collected and rest of the quantity were sold in the market. The higher income generated through tendu leaves Rs.1165 (34.33 per cent) followed by Lac Rs.700 (20.63 per cent) where as minimum income was found through Jamun fruits Rs. 21.42 (0.63 per cent). On an average more number of employment days being 7 days were generated through collection of tendu leaves as compared to other non-timber forest products. Paddy is the major crop of selected households which is also major source of income, other than paddy, non-tibmer forest products was other major source of income.

More than 72.00 per cent of the total NTFPs were traded through village merchant/tribal agent and remaining quantity was traded to villagers, there is two marketing channel found for the marketing of major non-timber forest products which are as follows: Channel – I: Collectors – Villagers, Channel – II: Collectors – Village merchant – Wholesalers. The price spread analysis of Tamarind, Mahua, Harra, Baheda and Kusum seed was observed that net price received by the collectors was highest being 98.00 per cent in Channel-I. In Channel-II the net margin received by the collector was found 71.27 per cent, 44.40 per cent, 35.00 per cent, 49.00 per cent, 49.55 per cent in Tamarind, Mahua, Harra, Baheda and Kusum seed respectively. Deforestation, time consuming and the availability of non-timber forest products is far away from residence were the major constraints faced by the collectors. Study suggested that Increasing the income level and employment opportunities by suggesting effective collection and marketing of non-timber forest products and at the same time making villagers come forward for forest protection to maintain the plant population for higher availability of non-timber forest products.

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APPENDIX-I

DEPARTMENT OF AGRICULTURAL ECONOMICS
INDIRA GANDHI KRISHI VISHWA VIDYALAYA, RAIPUR, (C.G.)

"AN ECONOMIC ANALYSIS OF COLLECTION AND MARKETING OF NON-TIMBER FOREST PRODUCTS IN KANKER DISTRICT OF CHHATTISGARH"

Gajendra Kumar Sinha

HOUSEHOLDS SCHEDULE

A. General information

1. Name of Farmer……2. Age……..…

3. Education*……4. Caste (Gen/ST/SC/OBC)……

5. Village……..… 6. Distance from market ……

7. Distance from pacca road (km)…….…….....

8. Date of Interview…….……

B. Details of the family

S. N.	Name of family member	Relati-on to head	Sex M/F	Age	Educ.a-tion*	Labour active (PA)				Employment (Days)			Income (Rs.)		
						Full time		Part time							
						Y	N	Y	N	Farm	Off farm	Non farm	Farm	Off farm	Non farm
	Total														

* 1 = Illiterate, 2 = Primary, 3 = High School, 4 = College, 5 = University/ P.G.

C. Details of land holding

Land use

S. No.	Particular	Area (ha)	Agriculture		Source of irrigation	Soil type	Land quality #
			Irrigated (area)	Un-irrigated			
1. 2. 3.	Owned land i. Cultivated ii. Homestead Leased in Leased out						
	Total land						

1 = Poor, 2 = Average, 3 = Good, 4 = Very Good.

D. Source of irrigation

S.No.	**Particular**	**Area (ha) irrigated**	**Irrigation charges (Rs.)**	**Remarks**
1. 2. 3. 4. 5. 6.	Tank Canal Tube well Well Stop dam Other			
	Total			

E. Collection and selling of Non-Timber Forest Products

SN	Name of NTFPs	Season	Quantity collected (kg.)	Distance from Forest (km.)	Disposal pattern						Marketing cost (Rs.)	Distance from Market (km.)
					Q	P	Q	P	Q	P		
1	Tendu leaves											
2	Mahua Fruit											
3	Mahua leaves											
4	Harra											
5	Sal Seed											
6	Babul Seed											
7	Behara											
8	Bhelwa											
9	Char Seed											
10	Kusum Seed											
11	Tamrind											
12	Anola											
13	Others											
	Total											

Q= Quantity, and P= Price

F. Collection, Consumption and Selling of NTFPs

S.No.	Name of NNTPs	Season	Collection of NTFPs (quantity in Kg)	Consumption of NTFPs (quantity in Kg)	Consumption Pattern of NTFPs (quantity in Kg)	Profit of Consu-mption Pattern	Selling quantity	Selling Price	Selling Mediato
1	Tendu leaves								
2	Mahua Fruit								
3	Mahua leaves								
4	Harra								
5	Sal Seed								
6	Tamarind								
7	Baheda								
8	Anola								
9	Char Seed								
10	Kusum Seed								
11	Other								
	Total								

J. Consumption Purpose Use of Non- Timber Forest Products.

S. No.	Name of NTFPs	Season	Quantity of Consumption (in Kg)	Consumption Pattern
1	Tendu leaves			
2	Mahua Fruit			
3	Mahua leaves			
4	Harra			
5	Sal Seed			
6	Babul Seed			
7	Behara			
8	Bhelwa			
9	Char Seed			
10	Kusum Seed			
11	Tamrind			
12	Anola			
13	Others			

K. Selling of Non- Timber Forest Products.

S. No.	Name of NTFPs	Season	Quantity of Selling (in Kg)	Price of Products
1	Tendu leaves			
2	Mahua Fruit			
3	Mahua leaves			
4	Harra			
5	Sal Seed			
6	Babul Seed			
7	Behara			
8	Bhelwa			
9	Char Seed			
10	Kusum Seed			
11	Tamrind			
12	Anola			
13	Others			
	Total			

L. Collection, Consumption and Selling of NTFPs

S.No.	Name of NNTPs	Season	Collection of NTFPs (quantity in Kg)	Consumption of NTFPs (quantity in Kg)	Consumption Pattern of NTFPs (quantity in Kg)	Profit of Consu-mption Pattern	Selling quantity	Selling Price	Selling Mediato
1	Tendu leaves								
2	Mahua Fruit								
3	Mahua leaves								
4	Harra								
5	Sal Seed								
6	Tamarind								
7	Behara								
8	Anola								
9	Char Seed								
10	Kusum Seed								
11	Other								
	Total								

M. Administrative Problem: Limitation Permission to Collect

Constraint Collection and Marketing of NTFPs

Collection of NTFPs

- Faraway from residence
- Time consuming
- Competition among collectors
- Deforestation
- Less quantity available

N. Wholesaler survey:

1. Date of interview ----------

2. Name of whole seller ----------

3. Name of market ----------

4. Total quantity of collected non-timber forest products ----------

Months	**Total quantity of purchase(Quintal)**	**Price paid (Rs./Quintal)**	**Price received (Rs./Quintal)**
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.			
Total			

5. Either purchase through commission agent or direct from producer ----------
   If purchase from commission agent then commission charges paid by him (Rs. /
   Qts) --- ----------
6. Number of worker employed / day ----------
7. Cost incurred on labour (Monthly /daily) ----------
1. Mandi fees Rs. ----------
2. Weighting charges ----------
3. Packing charges Rs. ----------
4. Loading charges Rs.----------
5. Transportation charges Rs. ----------
6. Storage charges Rs.----------
7. Any other charges Rs.----------
8. Other cost
   a. License fee (Rs. /year) ----------
   b. Maintenance expanses (Rs/year) ----------
   c. Expenditure on stationeries (Rs/year) ----------
   d. Rent on shop (Rs. /month) ----------
   e. Capital investment ----------
   f. Interest on capital ----------

9. Whether incurred any losses Yes/No ----------
   If losses incurred then how much (quintal) ----------
10. To whom the produce in sold ----------
   Price received by the whole seller for the produce (Rs. /Qts) ----------

APPENDIX-II

DEPARTMENT OF AGRICULTURAL ECONOMICS
INDIRA GANDHI KRISHI VISHWA VIDYALAYA, RAIPUR, C.G.

"AN ECONOMIC ANALYSIS OF COLLECTION AND MARKETING OF NON-TIMBER FOREST PRODUCTS IN KANKER DISTRICT OF CHHATTISGARH"

Gajendra Kumar Sinha

VILLAGE PROFILE

1. **Name of village**

a. Block ---------- b. District---------- c. State----------

2. Location

a) Distance from block head quarter ----------
b) Distance from district head quarter ----------
c) Distance from nearly city ----------
d) Distance from state capital ----------
e) Distance from nearly railway station ----------

3. Basic Infrastructure Facilities in the Village

S.N	Name of Infrastructure	Distance From Village (KM)	Availability (Yes/ No)	Number	Remarks
1	Post office				
2	Railway Station				
3	Road and Transportation Facility				
4	Primary School				
5	Middle School				
6	High School				
7	College				
8	Primary Ag. Cooperative Society				
9	Commercial Bank/RRB				
10	Health Center				
11	Veterinary Dispensary				
12	Ag. Extension Service/ Agro Clinic				
13	Revenue inspector office				
14	Other importance center a) b)				

4. Demography Details

1. Population

S.N	Population	Population					
		SC	ST	OBC	GEN	Total	Remark
1	Adult Male Female						
2	Children (below 15 yrs.) Girls Boys						

5. Land Use Pattern

i.	Geographical area	
ii.	Forest area	
iii.	Net Cropped area	
iv.	Land put to non-agriculture use	
v.	Barren and uncultivable land	
vi.	Fallow land a. Current Fallow b. Old Fallow	
vii.	Area shown more than once	
viii.	Culturable waste land	
ix.	Cropping intensity	

6. Climate, Topography, Type of Soil and Vegetation Pattern

i. Type of Climate (Humid, Arid, Temperate etc.)

ii. Rainfall (mm), Kharif ----------
Rabi ----------
Summer ----------

iii. Topography----------

iv. Soil type : (Alluvial, heavy soil Sandy loam, Yellow forest soil)----------

v. Type of Vegetation
   a. Timber
   b. Non Timber

7. Source of Irrigation

S. No.	Source of Irrigation	Area Irrigated (ha.)	Remarks
1	Canal		
2	Tank		
3	Tube well		
4	Stopdam		
5	Dug well		
6	River		
7	Others		
	Total		

8. Cropping Pattern

S. No.	Season	Crops	Variety	Area (ha.)	
				Unirrigated Area	Irrigated Area (ha.)
1	Kharif				
2	Rabi				
3	Summer				

9. Forest

S. No.	Name of Forest Products	Availability in the Past (Yes / No)	Present Status	Reason	Remarks
1	Fuel Wood				
2	Timber				
3	Leaf materials				
4	Tendu leaves				
5	Sal Seed				
6	Mahua Flower				
7	Mahua Fruit				
8	Harra				
9	Tubers				
10	Others NTFPs				

10. Rainfall Distribution in Charama Block of Kanker District

S. No.	Months	Rainfall (in mm)
1	January	
2	February	
3	March	
4	April	
5	May	
6	June	
7	July	
8	August	
9	September	
10	October	
11	November	
12	December	
	Total	

Sources: ----------

APPENDIX – III

NAME OF SAMPLE FARMERS

S.No.	Name of farmer		Name of farmer		Name of farmer
	Small	26.	Jagdish Netam		***Large***
1.	Maya Ram	27.	Bharat Singh	1.	Sanjay
2.	Chait Ram	28.	Piluram	2.	Ved Ram
3.	Budhram	29.	Dinesh Ram	3.	Ramsingh
4.	Shyam Lal	30.	Prakash Sinha	4.	Jailal Vatti
5.	Bhagwati		***Medium***	5.	Janak Ram
6.	Sughuram	1.	Smt. Gayan bai	6.	Hemraj
7.	Smt. Bhanubai	2.	Smt. Sona Bai	7.	Ramesh
8.	Ramsagar Vatti	3.	Dehar Ram	8.	Ramsingh
9.	Ram Charan	4.	Rameshwar Sinha	9.	Shyam lal
10.	Kartik Ram	5.	Fulsingh	10.	Awadh Ram
11.	Vishnu Ram	6.	Shyam Lal		
12.	Charan Das	7.	Shobha Ram		
13.	Ravindra Kashyap	8.	Sukhram		
14.	Anandi Ram	9.	Rupram		
15.	Bharat Ram	10.	Rajendra		
16.	Jagdish Ram	11.	Komal Marar		
17.	Balwant Ram	12.	Alakh Ram		
18.	Sanat Ram	13.	Chaitu ram		
19.	Awadh Ram	14.	Atma Ram		
20.	Keshav Ram	15.	Bali Ram Sinha		
21.	Rakesh	16.	Jayesh Naik		
22.	Bhoj Ram	17.	Animesh		
23.	Dulam	18.	Bhupendra Kumar		
24.	Rakesh Kumar	19.	Vishahu Sinha		
25.	Suresh Markam	20.	Balram		

Table: Uses of non timber forest products in the studied village.

S.N.	Trade name	Type of plant	Season	Used part	Uses
1.	Anola	Tree	Dec-Jan	Fruits /seed	Digestive purpose, ingredient of "Chyanprash" and Triphala churan.
2.	Mahua	Tree	Feb-June	Seed/ flower	Alcohol preparation, Cosmetic and soap preparation, Veterinary medicine use in abscess
3.	Tamarind	Tree	App-July	Seed/fruits	Pickles, fodder purpose
4.	Bahera	Tree	Dec-Jan	Fruits/barks	Ingredient of Triphala churan
5.	Harra	Tree	Jan- Mar	Fruits /bark	Ingredient of Triphala churan, seed powder used in cough and cold control.
6.	Chirongi	Tree	May- June	Fruits / bark and oil	Edible oil, cleaning of wounds, ringworms.
7.	Kusum/Kosam	Tree	May July	Seed /oil	Used in pimples, skin disease, muscular pain and antiparasitic properties.
8.	Tendu leaves	Tree	Mar- App	Leaves	Bidi wapper.

Source: Field survey of studies villages carried out on Appril 2007.

Table : Collection of Non timber forest products calendar in studied village.

S.No.	Months	Non timber forest products
1.	January	Anola, harra, bhelwa
2.	February	Anola, harra, bhelwa mahua, Tamarind, Tendu leaves
3.	March	Chirongi,mahua,Tendu leaf, Tamarind
4.	April	Tamarind, Tendu leaves, harra, behara
5.	May	Chirongi, Tendu leaf, kusum
6.	June	Patal kumada, Kusum and Tora
7.	July	Kusum, Tora

Source: Field survey of studied villagers carried on April 2007.

Table : Medicinal Plants available in Chhattisgarh and their Uses

Botanical Name	Common/Local Name	Plant part	Medicinal Use
Abelmoschus mushotus *Syn. Hibiscus abelmoschus*	Maskdana, Kasturibhendi	Seed	Antibiotic in snake bite, Perfume, Cosmetic, Flavoring of tobacco, tea and medicines
Abroma angusta *Acacia concini* *Acorus calamus*	Ulatkambal Sikakai Bach, Vacha	Fruit juice Rhizome Leaf, Root	Congestion Hair cleaning Diarrhoea, Paralysis, Skin diseases, Sedative, Fever, Headache, Diarrhoea, Cold, Bronchitis
Adatoda zeylanica	Adusa, Vasak	Fruit, Leaf, Root	Cough, Asthma, Snake bite
Adhatoda vasica	Adusa	Seed, Root, Flower	For piles, Bronchitis, Fever

Botanical Name	**Common/Local Name**	**Plant part**	**Medicinal Use**
Aegle manelos	Bel	Fruit, Flower, Leaves, Root	Abdominal troubles, chronic dysentery, Inflammation of eyes, Fistula
Aloe vera	Gwarpatha, Ghritkumari	Pulp	Burn Vitality, Wrakness, colic, Liver disorder, toothache, pile, liver swelling
Andrographis paniculata	Kalmegh, Bhunimb	Root, Bark, Whole plant	Snake bite, Fever, worm, Dysentry, Gastritis
Asperagus racemosus	Satawer	Root	Tonic, lncrease milk of feeding mothers, Diarrhoea, Skin wrinkling
Bauhunia variegata	Kachnar	Root	Snake bite
Bixa orellana	Sinduri	Seed	Edible colour
Cassia fistula	Amaltas	Bud, Bark, Fruit	Antipyretic, Laxative, Cough, Bronchitis, Sanake bite, Malerial fever
Catherenthus roseus	Sadabahar	Leaf, Flower	Diabetes, Cancer Leukemia
Celastrus peniculatus	Maalkanguni, Malkangani	Bark, Seed, Seed oil	Abortion, Arthritis, Laxative, Leprosy, Paralysis, Spondelitis, Body Pain, Fever, Dysenty, Diarrhoea
Chenopodium album	Bathua	Leaves	Tonic, Skin diseases
Chlorophytum borivillianum	Safed Musali	Tubers/ root	Tonic, Physical weakness

Botanical Name	**Common/Local Name**	**Plant part**	**Medicinal Use**
Cissus quadrangularis	Hadjord	Plant	Bone fracture, healing of wounds
Commiphora mukul	Guggul	Leaf	Laxative, Demulcent, Leprosy
Convalvulus microphyllus	Sankhpushpi	Leaf	Diabetes, High B. P., Cancer, Memory
Curcuma longa	Jangli haldi	Rhizome	Blood purifiler, wounds, Cough, cold
Curculina orchidelus	Kali musali	Tuber	Leucoderma, Vigour, Fever, Cough
Curcuma angustifolia	Teekhur	Rhizome	Aromatic stimulant, Tonic, warms, anemia, measles, asthma
Curcuma aromatica	Amahaldi	Rhizome	Wounds healing
Cymbopogon flexiosus	Lemon grass	Leaf, Leaf oil	Vitamin A synthesis, cosmetics, Antihelmintic, Sprain, Fever
Cymbopogon martini	Pamarosa	Leaves	Aromatic Oil
Cymbopogon winteianus	Citronella	Leaf	Mosquito repellant, antiseptic
Cyperus scariosus	Nagarmotha	Rhizome	Stamach ach, diarrhoea
Datura metel	Datura	Root, Leaf	Swollen part of body, pain, swelling
Dioscora aculata	Zaminkand	Tuber	Piles
Embelia ribesburm	Bibidang	Fruit	Antibiotic, tuberculosis
Embelica myrobalans	Aonla	Fruit	Digestive, diabetes
Enacyclus pyrethrum	Akarkara	Flower	Digestion, Rheumatism
Glorisia superba	Kaliyari	Leaf, tuber	Snake bite, Leprosy, Skin diseases
Glycosnis mauritiana	Gonji	Leaf paste	Poisonous bite
Gymnema sylvestre	Gudmar	Root, leaf	Snake bite. Diabetes

Botanical Name	**Common/Local Name**	**Plant part**	**Medicinal Use**
Hedychium acuminatum	Kapur Kachri	Root	Snake bite
Ichono carpus	ananthmool	Root	Blood purification
Mucuna pruriens	Kemanch/konch	seed	Worm, tonic for feeble body
Nyctanthus arbartritis	Harsingar, parijat	Root, seed	Loose motion. Bronchitis
Ocimum tenuiflorum	kalitulsi	Whole plant	Snake bite
Ocimum basilicum	Van tulsi	leaf	Keep away snakes
Piper longum	Pipli, lendipipal	root	Fever, cough, gastritis, chronic diarrhoea
Pluchia lensifolia	Rasna	-	Tonic, rheumatic, pains
Plumbago zeylanica	Chitrak, chitaur	Root	Dyspepsia, fever, rheumatism
Pongamia glabra	Karanj	Oil	Skin diseases
Psoralea coryfolia	Bakuchi, bawchi	Seed	Curing itch & sores, skin diseases, leprosy, leucoderma, blood purifier.
Rauwolfia serpentina	sarpgandha	Root	Blood pressure, stranguary, fever, wounds, colic, urine contraction
Sphaeranthes indicus	Gorakhmundi	Flower, leaves	Tonic, Vitiligo, Hypoglycemic
Swertia chirata	Chirayata	Whole Plant	Fever
Terminalia bellirica	Beheda	Bark, Fruit, Seed	Wound, Snake bite, Digestive, Headache, menstrual trouble, Fistuala, Dysentry
Tinospora crispa	Giloy	Stem	Diphtheria
Vetiveria zizanoides	Khas	Root	Perfumes
Vitex negundo	Nirgundi	Leaf	Eye inflammation
Withania somnifera	Ashwagandha	Leaves, Root	Low blood pressure, Health tonic

Table : Important Medicinal and Aromatic Crops identified for promotion in Chhattisgarh by state Medicinal Plant Borad

Name of Crops	**Botanical Name**
sarpgandha	*Rauwolfia serpentine*
Coleus	*Coleus forskohie*
Patchouli	*Pogustemonon cablin*
Kewanch	*Mucuna pruriens*
Kalihari	*Gloriosa superba*
Giloy	*Tinospora codrifolia*
Stevia	*Stevia rebudiana*
Aonla	*Emblica officinalis*
Gwapatha	*Aloe barbedensis*
Aromatic Grasses Lemon Grass Pamarosa / Jamrosa / Citronella	*Cymbopogon species*

Table : Area and distribution of medicinal and aromatic plants crops in Chhattisgarh

Crops	**Area**	**Distribution**
Aromatic Crops		
Japanese mint	40	Raipur, Durg, Bhatapara, Bastar,
Lemon grass	250	Rajnandgaon
Palmrosa	160	Bastar, Rajnandgaon, Durg
		Bastar
Medicinal Crops		
Kasutir bindi	40	Raipur, Bhatapara, Dhamtari, Bastar,
Ashwagandha	10	Bilaspur
Buch	20	Raipur, Bastar, Bilaspur
Anota / Sinduri	15	Raipur, Raigarh, Bastar
Sarpgandha	5	Bastar

Table : Annual availability of medicinal plant produce in Chhattisgarh

Local Name	Botanical Name	Quantity (qtls.)
Anola Dry	*Emblica officinalis*	10000
Anola Green	*Emblica officinalis*	500
Van tulsi	*Ocimum gratissimum*	30000
Bel Pulp	*Aegle marmelos*	30000
Bel Fruit	*Aegle marmelos*	3000
Vanjira	*Vernonia anthelmintica*	6000
Baibadang	*Embelia ribes*	3000
Dhawai Flower	*Woodfordia fruticosa*	25000
Kalmegh	*Andrographis paniculata*	15000
Bhelwa Fruit	*Semecarpus anacardium*	10000
Baheda	*Terminalia belerica*	38000
Nagarmotha	*Cyperus esculentus*	10000
Malkangani	*Maranta arundinacea*	3000
Tikhur	*Curcuma angustifolia*	1000
Honey	*Soymida febrifuga*	1000
Rohina Fruit	*Chlirophytum tubrosum*	5000
Safed Musali	*Aspargus racemosus*	1000
Satawar	*Caryea arbofea*	3000
Gataran	*Gardenia gummifera*	1000
Bhul Aonla	*Strychnos potatorum*	4000
Patalkumhda	*Terminalia arjuna*	2000
Vai Kumbhi	*Zizyphus zylopyra*	2000
Dikamali	*Ipomoea nil*	1500
Nirmali	*Helictress isora*	2000
Arjun Bark	*Celastrus paniculatus*	1000
Ghotiya Fruit	*Zizyphus zylopyra*	3000
Kaladana	*Ipomoea nil*	2000
Marorphalli	*Helictress isora*	1500
Paibela	*Celastreus paniculatus*	1000
Inder Joo	*Holarrhena antidysenterica*	200
Nisodh	*Operculina turpethium*	300
Giloy	*Tinospora cordifolia*	800
Kasoundhi	*Cassia occidentalis*	300

Table : Potential species of medicinal and aromatic plants for Chhattisgarh

Comman Name	Botenical Name
Sikakai	*Acacia concini*
Lemon grass	*Cymbopogon flexuous*
Henna	*Lawsonia inermis*
Kewanch	*Muccuna prurence*
Ghrit kunwari	*Aloe barbedensis*
Adusa	*Adhatoda vasica*
Satawar	*Asparagus officials*
Tikur	*Curcuma angustifolia*
Senna leaves	*Cassia angustifolia*
Asugandha	*Withania sominifera*
Isabgoal	*Plantago ovata*
Pudina	*Mentha arvensis*
Safed musali	*Chlorophytum borivilianum*
Buch	*Acorus calamus*
Sarpgandha	*Rauvolfia serpentine*
Kalihari	*Glorisa superba*
Sadabahar	*Catharanthus roseus*
Pipali	*Piper longum*
Datura	*Datura stamonium*
Bramhi	*Centella asiatica*
Bidari kand	*Pueraria tuberose*
Kasturi bhindi	*Abelmoschus moschatus*
Tulsi	*Ocimum sactum*
Dioscorea	*Dioscorea delloidea*
Kalmegh	*Andrographis paniculata*

Table : Availability of medicinal plant in Chhattisgarh for preparation of Herbal extracts / isolate

Plant	Plant part	Active principle	Activity / use
Adhathoda vasica	Leaf	Vascine	Bronchodilator
Allium sativum	Bulb	Allin Allicine	Hypochlesterolemic
Andrographis paniculata	Leaf	Andrographolide	Hepatoprotective
Bcopa monneri	Leaf	Bcosides	Brain tonic, Memory improvement
Boswellia serrata	Resin	Boswellic acids	Arthritis
Cassia angustifilia	Leaf Pod	Sennosides	Laxative
Centella asiatica	Leaf	Asiatic acid Asiaticoside	Pschtropic skin ailments
Garcinia asiatica	Fruit	Hydroxy citric acid	For obesity
Gingko biloba	Leaf	Gingkolides	For treatment of cerebral and circulatory diseases
Gymnema sylvestre	Leaf	Gymenemic acid	Antidiabetic
Holarhena antidysentrica	Bark	Conescine	Antidysentric
Hypericum peroratum	Leaf	Flavonoids	Nervous disorders
Tinospora codrifolia	Leaf	Tinosporin	Immunomodulator
Tribulus terrestris	Root	Saponins	For strengthening body resistance and circulation disorders
Valerian wallichenia	Root	Valepotriates	Tranquilliser
Withania somnifera	Root	Withanolides	Adaptogenic

Table : Trading centers of herbal products in different agro-climatic zones of Chhattisgarh

Agro-climatic zone	Major trading centers	Medicinal plants traded
Bastar	Bijapur, Keshkal Bhanu prathapur Kanker, Narayanpur Jagdalpur, Kondagaon	Thikur, Sarpagandha, Imli, eng, Amla, Harra, Behera, Shikakai, Voyabiding, Chirayata, Rataniyot, Arjun, Sattavar, Akarkara, Amahaldi, Dhai, etc.
Chhattisgarh Plains	Bilaspur, Raipur Pandariya, Mungeli Kota, Rudri, Dhamtari Durg, Mahasamund Pendra, Raigarh	Safed musli, Van Tulsi, Thikur, Ratanjyot, Anola, Neem, Bilwa, Chirayata, Chrorata, Arjn, etc.
Northern Hills	Ambhikapur, Korea Jashpur	Sarphgandha, Nagarmotha, Imli, Sattavar, Chirayata, Arjun, Karanj, etc.

APPENDIX-IV

Non Timber forest Produced Collected in Chhattisgarh State (In lakh quintal)

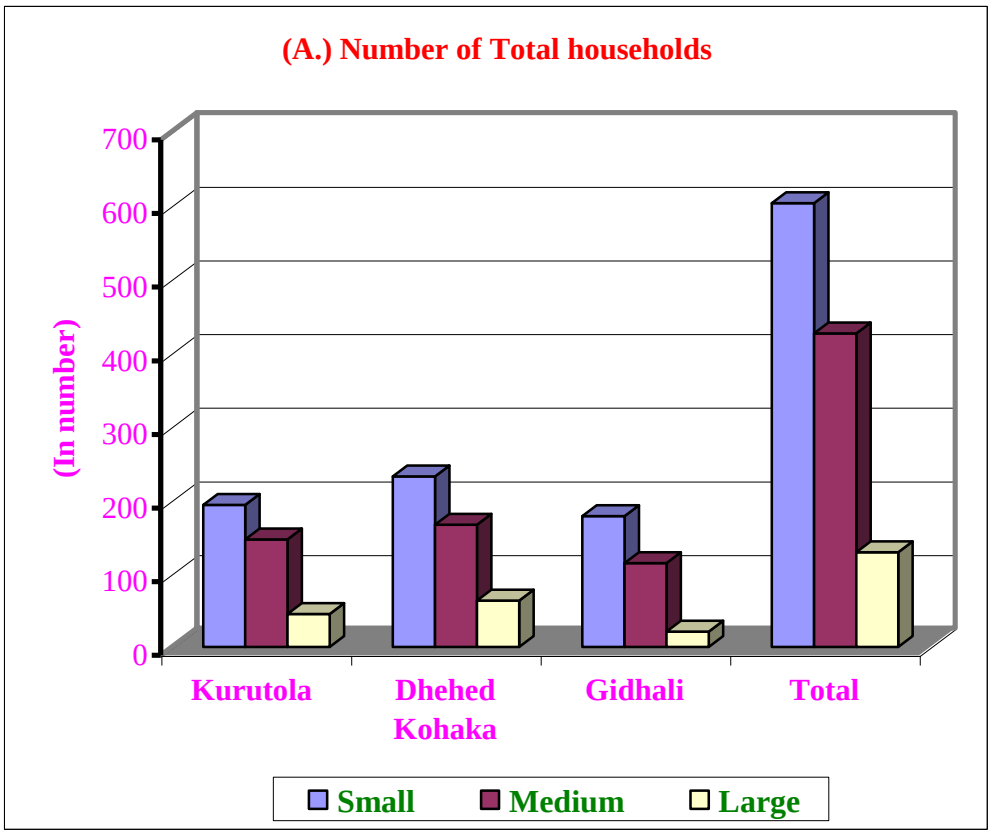
Years	Tendu leaves	Sal seed	Harra	Anola	Baheda	Tamrind	Mahul leaves	Kusum seed	Chirounjee
1998-99	16.87	2.36	5.68	28.43	27.56	48.40	48.43	26.27	40.46
1999-2000	18.51	3.40	7.34	29.24	22.54	50.24	49.23	27.20	41.52
2000-01	16.67	4.77	6.64	26.24	27.44	4.83	47.86	25.44	51.46
2001-02	19.58	1.35	8.53	27.86	29.24	52.04	42.24	20.69	49.43
2002-03	18.12	8.55	6.31	29.53	25.45	44.32	44.34	23.47	47.26
2003-04	18.86	1.25	6.1	30.56	26.27	2.98	46.76	26.46	47.83
2004-05	14.92	9.24	4.41	31.23	28.44	33.84	50.26	24.27	49.37
2005-06	14.72	0.49	6.1	27.20	29.21	43.82	49.56	22.90	50.37
2006-07	17.18	6.30	5.1	24.43	29.70	50.30	38.90	26.48	51.64
2007-08	18.21	5.28	6.22	28.56	28.83	51.05	52.46	26.26	51.70

Non Timber forest Produced Collected in Charama Block (In lakh quintal)

	Tendu leaves	Sal seed	Harra	Anola	Baheda	Tamrind	Mahua leaves	Kusum seed
1997-98	0.59	0	1.56	1.54	1.68	0.52	18.53	0.65
1998-99	0.03	0	3.04	1.43	2.45	0.63	224.6	0.78
1999-2000	0.42	0	3.24	1.64	1.48	0.46	12.24	0.86
2000-01	0.37	0	2.02	2.03	2.3	0.4	21.61	1.01
2001-02	0.04	0	4.67	1.96	3.2	0.68	9.53	1.62
2002-03	0.04	0	3.99	1.35	1.8	0.44	22.24	2.02
2003-04	0.04	0	5.59	0.35	2.04	0.62	7.1	0.2
2004-05	0.03	0	1.20	0.67	1.21	0.54	15.3	1.15
2005-06	0.03	0	2.99	9.18	0.25	0.67	9.26	0.98
2006-07	0.44	0	3.44	0.58	1.15	0.69	8.25	1.08
2007-08	0.62	0	3.28	0.15	6.03	0.54	5.2	0.31

Non Timber forest Produced Collected in Kanker Union (In lakh quintal)

Years	Tendu leaves	Sal seed	Harra	Anola	Baheda	Tamrind	Chirounjee	Kusum seed
1998-99	5.22	1.96	1.74	8.60	2.51	11.33	12.25	3.23
1999-2000	5.44	2.93	1.96	10.38	2.37	14.87	13.60	2.56
2000-01	5.94	2.95	1.86	13.25	2.33	10.36	11.23	3.44
2001-02	6.05	1.74	1.96	15.20	2.48	8.93	14.60	2.63
2002-03	6.22	2.76	2.10	14.45	2.56	13.62	15.25	3.34
2003-04	5.85	3.27	2.67	8.32	2.21	9.65	11.30	3.95
2004-05	5.41	1.34	2.88	7.40	2.36	10.16	8.20	4.23
2005-06	4.15	5.46	2.27	9.20	2.12	12.45	12.53	2.93
2006-07	3.66	0.68	0.92	8.12	2.32	14.32	8.73	2.83
2007-08	4.42	5.18	1.19	10.00	2.60	9.33	14.12	3.44



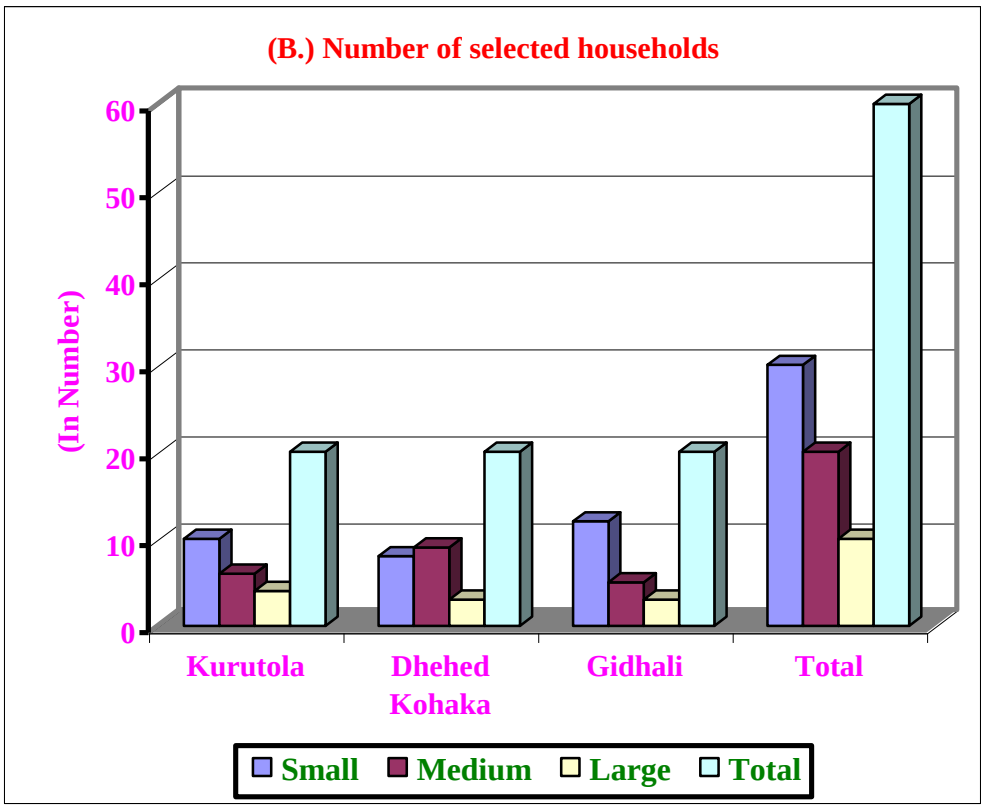


Fig. 3.1: Number of total households and selected households

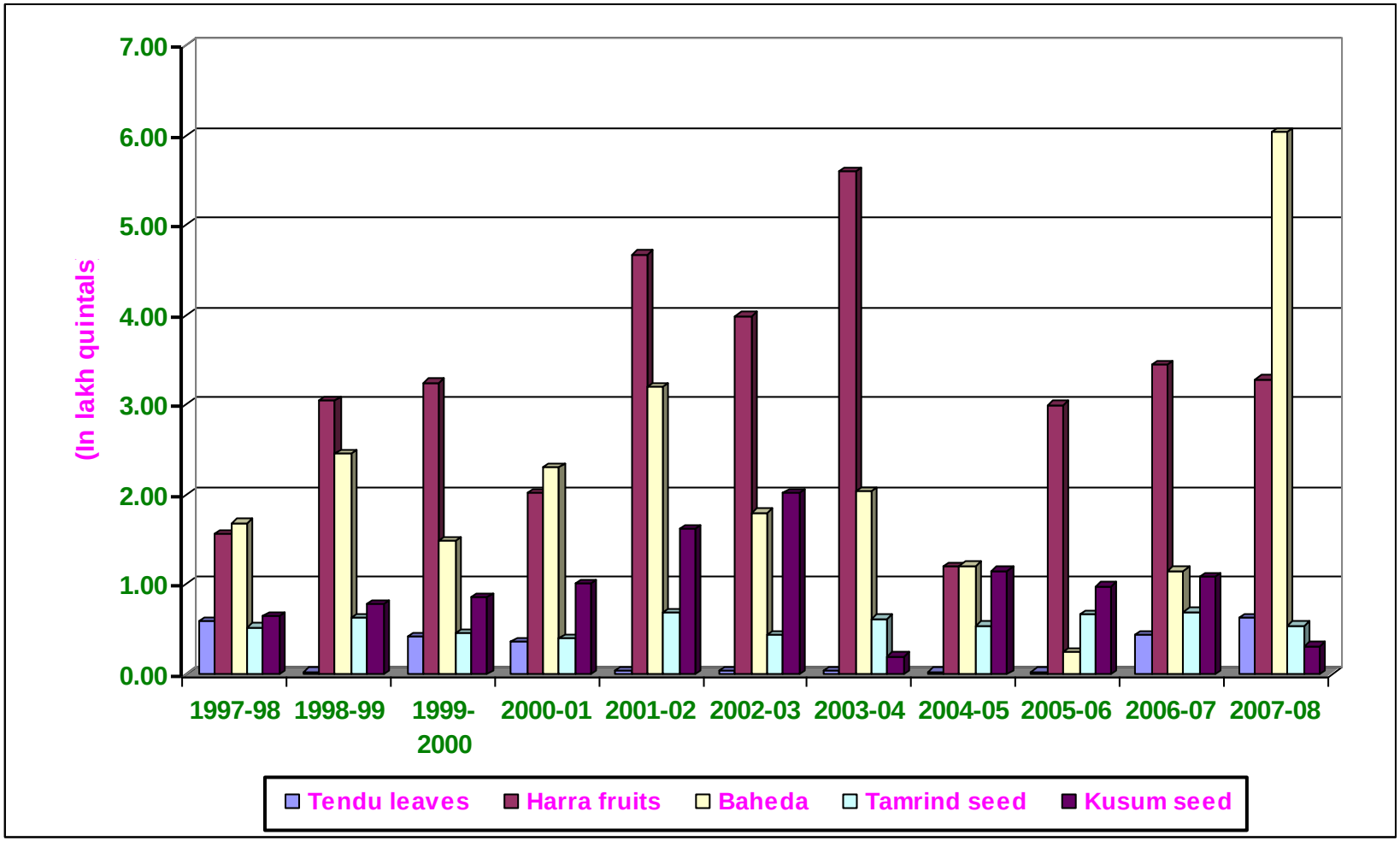


Fig. 4.1: Collection of non-timber forest products in Charama block

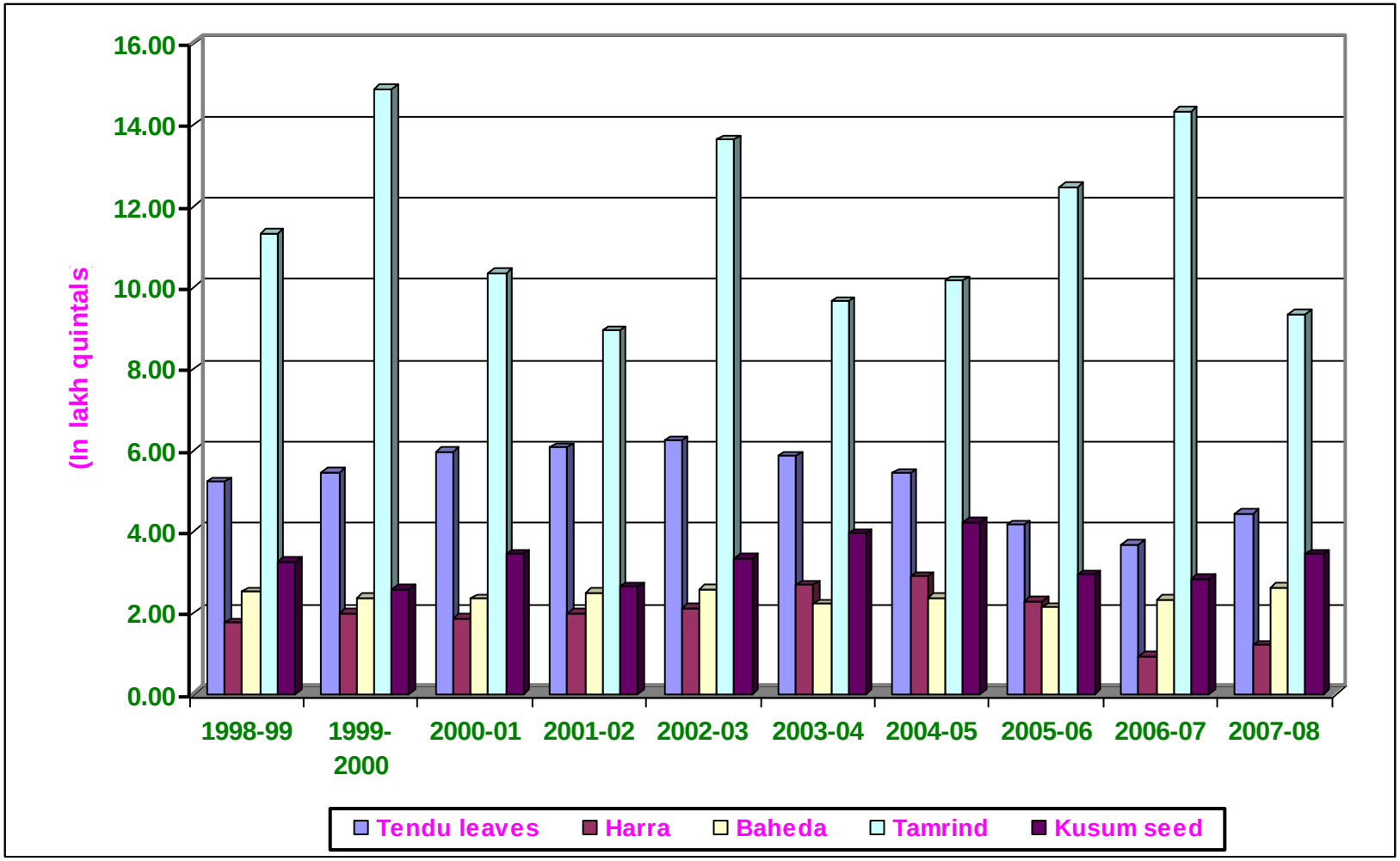


Fig. 4.2: Collection of non-timber forest products in Kanker district

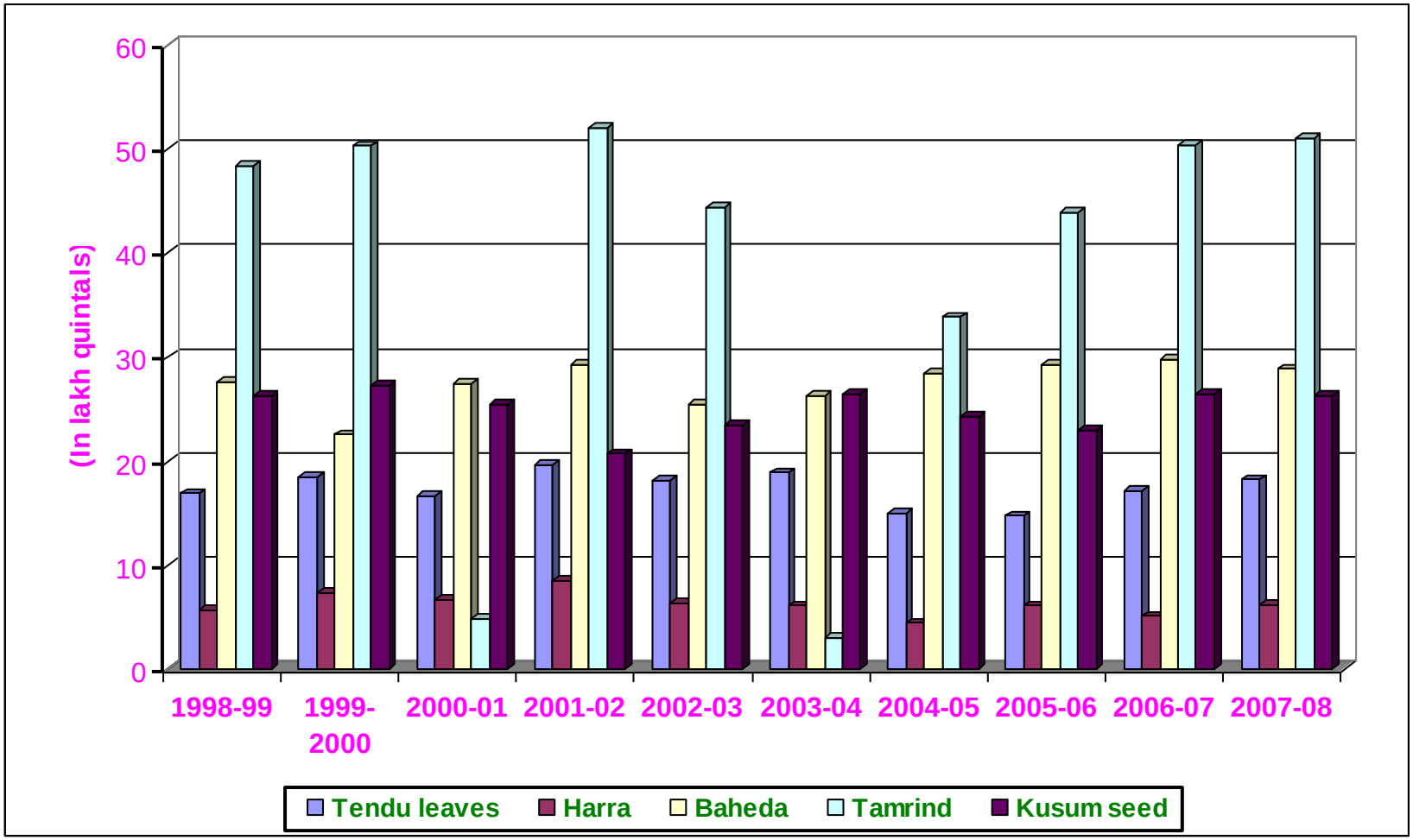


Fig. 4.3: Collection of non-timber forest products in Chhattisgarh state

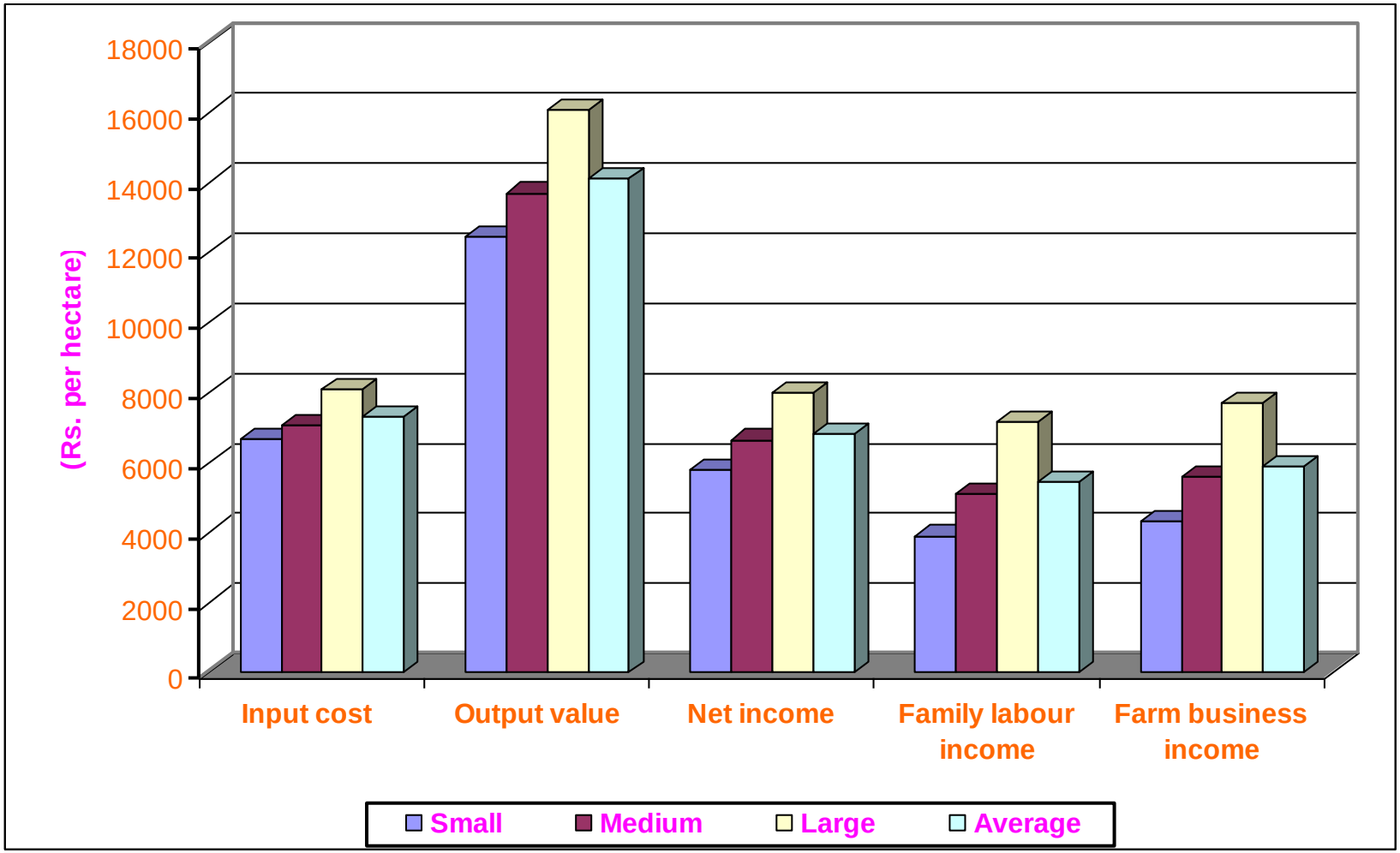


Fig. 4.4: Cost and return of paddy on the sample farms for different group of farms

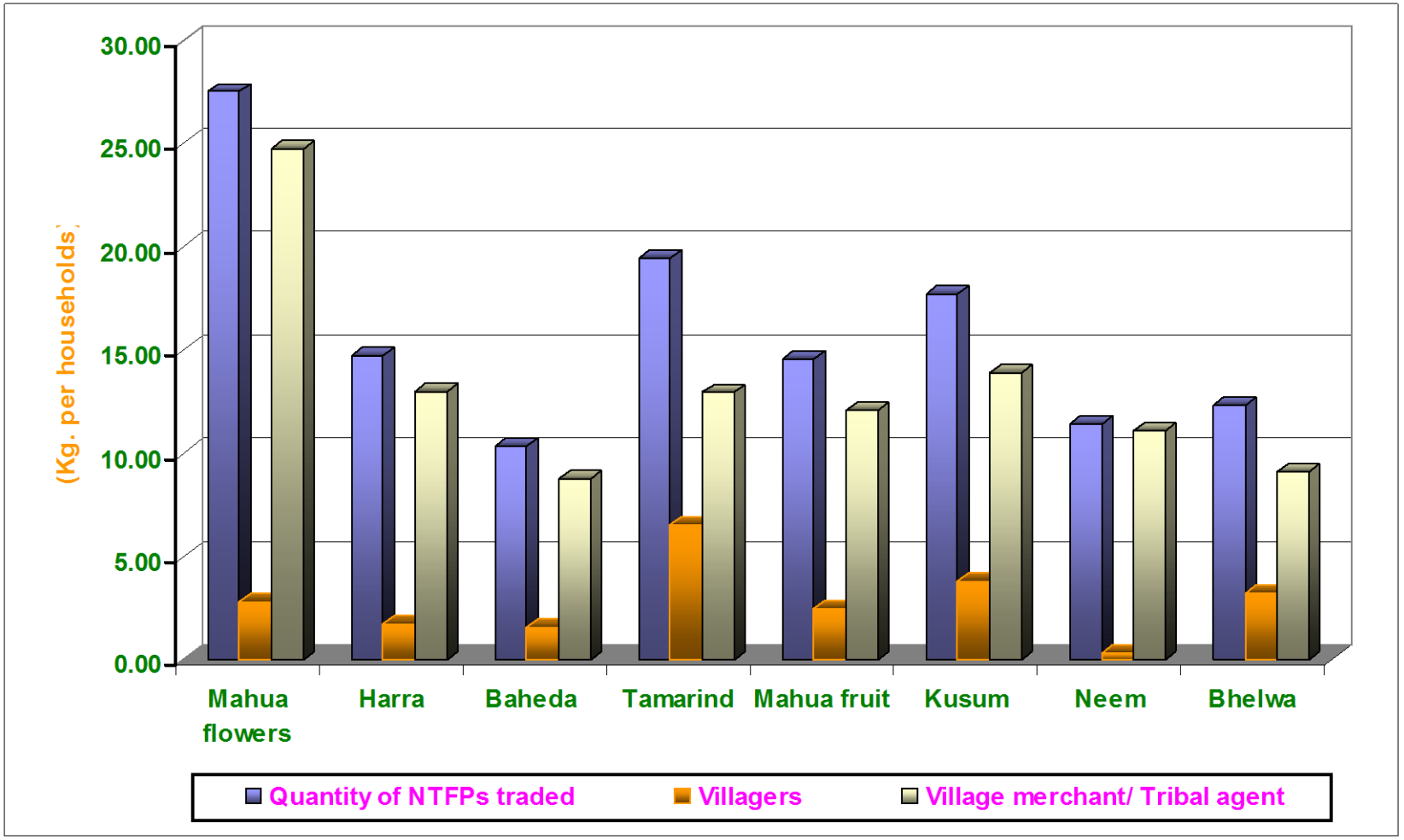


Fig. 4.5: Disposal pattern of non-timber forest products