INDIGENOUS KNOWLEDGE ON SELECTION, SUSTAINABLE UTILIZATION OF LOCAL FLORA AND FAUNA FOR FOOD BY TRIBES (PTG) OF ODISHA: A POTENTIAL RESOURCE FOR FOOD AND ENVIRONMENTAL SECURITY

Prepared by
SCSTRTI, Bhubaneswar, Government of Odisha

ACKNOWLEDGEMENT

The Scheduled Caste and Scheduled Tribe Research and Training Institute, Government of Odisha, Bhubaneswar commissioned a study, titled ***"Indigenous Knowledge on Selection & Sustainable Utilization of Local Flora and Fauna for Food by Tribes (PTGs) of Odisha: A Potential Resource for Food and Environmental Security"****,to understand traditional knowledge system on local flora and fauna among the tribal communities of Odisha. This study tries to collect information on the preservation and consumption of different flora and fauna available in their areas during different seasons of the year for different socio-cultural and economic purposes that play important roles in their way of life. During the itinerary of the study, inclusive of other indegenious knowledge system, attempt was also made to understand the calorie intake of different PVTGs of Odisha through anthropometric measurements (height and weight).Including dietary measurement.*

Resource/Research persons fromCTRAN Consulting, A1-A2, 3rd Floor, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar-14, Odisha extended their technical support for data collection, analysis and report drafting with research inputs and guidance from Internal Research Experts of Directorate of SCSTRTI, Bhubaneswar. CTRAN Consulting and its Resource/Research personsdeserve thanks and complements. Also, thanks are due to all the Internal Experts and Researchers of SCSTRTI, especially Mrs. A. Mall, Dy. Director and Nodal Officer, who coordinate the study, and its Administrative and Library staff for their help support for completion of the study.

We are thankful to Ministry of Tribal Affairs, GoI, New Delhi and ST&SC Development Department, GoO, Bhubaneswar for providing financial support for the study. Our special thanks to Mr. Santosh Sarangi, I.A.S, Secretary-cum-Commissioner of STs and SCs Development Department, Govt. of Odisha for his valuable input and continuous support in the study.

Our sincere thanks goes to the concerned district and filed level Officials, who have been kind enough in providing logistic supports and information pertaining to the study.

Last but not least, we are indebted to the tribal people and villagers, who spared their valuable time to provide data and relevant opinion as respondents, without whom this study would not have seen the day of light. SCSTRTI acknowledges their active support and participation in the form of discussing issues with the study teams time and again during field visit.

Prof. (Dr.) A.B. Ota, IAS, Director,
SCSTRTI

Executive Summary:

The study on Indigenous Knowledge systemwas commissioned by the Scheduled Caste and Scheduled Tribe Research and Training Institute, Government of Odisha to understand traditional knowledge system on local flora and fauna among the tribal communities of thestate. The study also looked into collection, preservation and consumption of different flora and fauna available during different seasons of the year for different socio-cultural and economic purposes that play important rolesin their way of life. As a part of the study, attempt has been made to understand the calorie intake of different PVTGs of Odisha through anthropometric measurements (height and weight) which includes also the dietary measurement.

Methodology of the study:
This study has primarily adopted qualitative research methods to understand dependency syndromeof tribals on different flora and fauna available in their area. It tried to document their uses for different purposes. Primary level data were collected from the households of four sample PVTGs (Hill Kharia & Mankirdia PVTGs are taken as one PVTG during study) using structured interview schedule. For gap fillings and better clarity, focus group discussions were conducted at the community level with the PVTG elders.The presumption was that the elders are the retainers of traditional knowledge and the youngers are already influenced by the modernisation.Apart from Government supports for essential goods and services through public distribution system, it was observed that the non-tribal interventions are also there. In addition, the younger generations are more affected by the market forces for consumable items. Apart from this, for the requiredset of information, the development personnel were also interacted.The respectiveITDAs and other district level Government establishments were visited for collection of secondary data.

The household has been the unit of analysis and the universe has been the four PVTGs whose population does not exceed a few thousands. Thus, to have an effective representation the study covered a total of 379 households to understand the uses of different flora and fauna. For preliminary nutritional assessment, the study covered 254 persons of different age groups across four PVTGs covering four districts. Although the study covered fiveofficially declared PVTGs, namely Dangria Kandha, Lanjia Saora, Hill Kharia, Mankirdia and Juang, they have been broadly categorised into four PVTGs wherein Hill Kharia and Mankirdias have been treated as one due to their large similarity in habitat, food habits and features of micro climatic areas for analytical purposes.Further,the reasons of Mankirdia and the Hill Kharias put under one head has been due to lot of similarities in coping mechanisms to their micro ecological conditions and way of life.

Economic Status of PVTGs:
From the survey undertaken, it has been ascertained that the number of families below the poverty line, irrespective of PVTG categories, is 93.9 %, i.e., 95.3% in Juang, 84.5 % in Hill KhariaMankirdia, 93.3 % in Dangria Kandha and 97.3 % in Lanjia Saora. Agriculture remains the major source of income (63.50 %) followed by daily wage (19.11 %). The secondary

engagement being the daily wage (60.46 %) is the most important source of income which is supplemented by incomer generated from forest produce collection and selling (32.0 %). Some members in the family also have other sources of income, however, for them, forest produce collection and its selling remains pivotal (88.53 %). Overall, the engagement pattern shows that forest produce collection (33.89 %), daily wage labour (31.53 %) and agriculture (29.13 %) are the major sectors of engagement and income generating sources for the target tribes (PVTGs). Thus, earlier it has already stated as to why foranalysis broadly thesePVTGs have been arranged into four categories.

Of the total average annual income, major part of the income of the family comes from primary sources of engagement (61.0 %). Secondary and otherengagementscontributeabout 30.0 % and 9.0 % of the total annual income of the households respectively. On an average, the annual household income remains to be Rs.18, 442.51. Perhaps, this is the reason for which about 90 % families among the PVTGs are below the poverty line. Average annual income of Dangria Kandha is lowest among four PVTGs followed by Hill Khariaand Mankirdia. Among the four studied PVTGs,a comparative assessment revealed that Lanjia Saora is having the highest annual average income followed by Juang.

Forest Dependency:
About 90.8 % households are highly dependent on forest for deriving essentials of their livelihood. Dependency on forest for various purposes seems declined among the Lanjia Saora (78.8 %) whereas it remains high among theJuangs (93.9 %), the Hill Kharia/Mankirdias (98.3 %) and the Dangria Kandhas (98.3 %).

Dependency on forest by season varies based on the availability of forest produces and requirement of the PVTGs. In winter, dependency on forest remains low for a substantial number of households (52.0 %). More or less similar trend is observed during rainy season when 48.0 % having low dependency on forest. About 92.0 % families heavily depend on forest during summer season.

Among the tribal communities, the children also contribute to the family income directly or indirectly. Direct contribution is seen when they participate in forest collectionand indirect contribution is observed when the elder children take care of the younger ones so that both the parents can go for labour marketto sale their labour or any other engagements. Whenever a scope is available, the children go with friends and kin for forest collection. Therefore, the children are treated as economic assets in tribal economy. Involvement of children in collection of different flora has been observed in all the PVTGs expect Hill-Kharias and Mankirdias. For HillKharias and Mankirdia the forest is no more at aneasy distance from their hamlets and their frequency of moving into forest has reduced for reasons of govt. intervention in rehabilitation and supply of free rice, dal and few other essential goods at their door steps through public distribution system.

However, more number of adult members from Hill Khariaand Mankirdia are involved in collection of different flora from the forest. Involvement of youths in collection of forest produce is relatively less in comparison to adults and the seniors irrespective of sex. The average

quantum of collection by different category of collectors, i.e., children, youth and adult and aged seniors vary.

Certain forest produces like *Kusum* Seeds (*Schleichera oleosa*), *Khandakhai*, *Mahua* flower (*Madhuca indica*), different types of Mushrooms, Resin (*Jhuna*), *Siali* (for rope making) etc.have high value in the market.

Use of Flora and Fauna:

The kinds of selection and the types of use of locally available flora and fauna among the tribal communities are being regulated by their tradition and customs. When to consume and how to conserve are also conditioned by age old traditions. Tribals use different parts of specific plants astheir foods which are collected from the forest in different seasons. Some of the edible parts are consumed raw while some other are processed and cooked for making it suitable for consumption.A few edible plant products are available throughout the year and are consumed by the PVTGs in all seasons.However, while a few of them are collected from nearby areas, some consumable flora are collected from a distant place during specific seasons within their habitat. During different rituals and ceremonies, tribals use / consume different flora such as Bela (*Aegle marmelos*), Mango (*Mangifera indica*), Sal flower (*Shorea robusta*), Neem (*Azardirachta indica*). Apart from flora, different fauna, available in the forest or domesticatedare also consumed during such festive occasions like, *Barha* (*Sus scrofa*), Pigeon (*Columba livia*) etc.They invariably consume domesticated animals such as Buffalo (*Bison bonasus*), Fowl (*Gallus domesticus*), Goat,Pigetc.during annual ritual cycle.

In pre-consumption ritual, first fruit of the season is offered to God. The converted tribals (converted to Christianity) take the first fruit of the season to Church where it is offered to Lord and after that it is consumed (18.9 %). On the eve of *Amba Nuakhai*, *Kangoo Nuakhai*, *Kandul Nuakhai*,a hen is sacrificed and offered at place ofworship (*puja mandap*) or banyan tree (*Ficus religiosa*) and then the food items are consumed. Kusum fruit is taken after sacrificing a pig in *Raja parva*. Some also consume specific fruits after first rice feed day locally known as *Nuakhai*. First fruit of the season is also offered first to Dharani God- the earth god / and ancestral spiritsand then it is consumed.

Different flora and specific parts of the flora is used as medicines like leaf of *Gangasiuli* (*Nyctanthes arborescences*) is used for fever / malaria, oil extract of *Kusuma* (*Schleichera oleosa*) is used for skin allergies, *Gedu Saga* (Leafy vegetable) is used for improving blood, stem bark of *Kumbhi* (*Careya arborea*) is used for abortion, *Bela* (*Aegle marmelos*) is used for stomach pain as well as *Mania Kanta* and *Sabala Gacha* for the same purpose. Apart from Flora, Fauna are also used for medicines like flesh, oil extract from beer fats and blood is used for Chicken Pox, Rheumatism, Muscle pain, *Bata*. *Kai Pimpudi*(black ants) are taken during cold, flesh of *Bajrakapta* is consumed for cold, Fur and bone of *Ghusuri* (Pig) is used for preventing witchcraft etc.

In order to appease God and spirits the PVTGs sacrifice different animals / birds such as domesticated Fowl (*Gallus domesticus*), Forest Fowls (*Gallus spps*) etc. Different flora is also used to complete the mourning rituals / mortuary rites such as leaves and fruits of bitter gourd,

leaves of Sal, gum of Mahua tree, seeds of mustard etc. Different fauna is also used during the purification process like flesh of Porcupine, Bara (wild Pig), the Crabs etc.

The PVTGs use different flora during pregnancy for easy delivery, preventing skin related disease during pregnancy, for better health of the pregnant women etc. Major plant products consumed are like *Pita Saga*, *Kusum* fruits, Roots of *Patal Garuda* etc. Flesh, egg and fish is also provided to the pregnant women with some wild birds / animals like flesh of *Gunduri bird*, flesh of *Kutura* etc. In the post-natal period, different green leafy vegetables and animal proteins are given to the mother such as tubers of *Ambada* (*Spondias pinnata*) andTamarind (*Tarmaridus indicus*).

Tribals also use different plants to get intoxicated like cell sap of *Salapa* tree (*Caryota urens*), Fruits and flowers of *Mahua* (*Madhuca longifolia*) plant, roots of *Patal Garuda* (*Rauvolfia serpentina*) etc. For birth control / family planning, tribals use different flora such as roots of *Gandhuri Ghasa* (herb), roots and flower of *Chakunda*, roots of *Pitabali*, root and leaves of *Mandar* shrub including flower etc.

Sustainable use of floraand fauna:
Tribals have already suffered a lot in the past few decades due to extraneous pressure emanating mainly from the entry of outsiders into their peaceful zone. For reasons like launching big projects, dams, power plants and factories for manufacturing large scale industrial goods, they often face scarcity of their usual resources. They also realise it now that their contacts with the outside world did greater harm than benefit accrued in their favour. Their culture has been impoverished and their previous harmony with nature has been disturbed. Many fauna and flora are completely lost. Today they are alienated in their own habitat. Therefore, the interest of the tribals in the forest and environment based on skill should not miss the attention for formulation of comprehensive forest development policy.

Sustainable use of fauna and flora resources refers to a kind of use of these resources such that it regenerates and get conserved more than what could be consumed. There are many factors that contribute to affect the sustainability of the resources such as improvement in soil fertility, conservation of water resources, management of the growth of vegetation, conservation of biological diversity so as to help the food chain function and finally contribute to the conservation of environment. Ever since the dawn of humanculture, food, fodder and fuel needs have met by the constant use of land and forest. In recent years the significant increase of mining operation, expansion of road ways and use of water, denudation of forest for industrial and other purposes, increasing pressure of population and the livestock there is a change in quality and quantity of natural resources base. The population and its ratio to survival resources must remain within the carrying capacity of the area.

All the studied four PVTGs have their own strategies and management style to have sustainable supply of fauna and flora for consumptionin their own locality. The indigenous techniques the tribals followare age-old practices. These reflect in terms of time gap management between the periods of procurement/collection.The PVTGs for generations have established interdependent

relationships with the biosphere of their habitat. They exchange elements withtheir physical habitat. The waste andunused parts of whateverplant or animal products the tribals consume are disposed not at random. These get decomposed and ultimately thesewaste by-products turnedinto foodmaterials of the plants and animals. Broadly speaking it is the complex chained and balanced cycle of life. Among the Odisha PVTGs, there has been a lot of similarity in their strategy for sustainable use of fauna and flora.The tools and techniques adopted by the specific group are season specific due to scarcity of water and plant products available on the ground in addition to the games in forest that supply food for the tribals. However, the techniques adopted for such a process of interdependence, the community and the environment have little variation and symbiotic relation between man and non-man hasbeen found to be community specific.The totemic groups (clan groups) pay homage to the ancestral spirit (s)symbolised by one or a few wooden poles of specific plants erected in village arena. The reverence shown to the plants and animals for reasons of belief remains typical to the tribal clans or descent group as in case of *birinda* among the Saora and their locality.

Food Security and Nutrition:

Annual household expenditure pattern reflects that about 55.5% spent more than 40 % of their income in food consumption apart from collected forest produce. Subsidized supply of rice through PDS fare price shops has been a great support to these tribal to manage their required food expenses with low income.

Kitchen garden has been one of the sources of nutritional food for the tribals. The PVTGs grow about 46 different crops in their kitchen garden which includes mostly vegetables along with some pulses and minor millets / coarse grains. The average annual production from the kitchen garden, irrespective of crop types, normally varies between 28 kg to 35 kg. Major part of the production is consumed at the household level; however, a small part of the production is sold out locally or in the nearby market at a price range of Rs.13/- to Rs.15/- per Kg to meet the other essential articles.

Food habits of PVTGs have undergone a major change (98.7 %) due to number of factors. Non-availability of desired flora and fauna (25.3 %), less collection of consumable flora and fauna due to decreasing forest cover (8.2 %), increased availability of rice through PDS (96.6 %), increasing agricultural activities and production of other crops (24.0 %), change in lifestyle (61.5 %), change in taste (44.9 %) and gradual change in consumption pattern at household level (50.9 %) are a few important reasons of change in food habits.

The PVTGs consume different food items under different food categories, i.e., cereals, pulses, vegetables, milk and milk products, meat / fish, fat / oil and fruits. Some of these food items are uncultivated foods, collected from forest whereas remaining are either cultivated or collected through PDS and markets. Increased penetration of PDS has influenced the food habit of tribal and consumption of rice has emerged as most staple food for the PVTGs. It is consumed round the day both in breakfast, lunch and dinner along with some green vegetables / leafy vegetables. Consumption of pulses, which are rich in protein, has reduced to a greater extent. Consumption

of coarse / minor millets is still a food habit of the tribal and Ragi is prominent among them which are consumed along with rice of independently during different times of a day.

With regard to consumption, the average mean quantum of consumption per day in adult category (>17 years) observed to be high in Hill Kharia and Mankirdia followed by Lanjia Saora. In terms of Calorific value of consumed items, it is observed that calorie intake of male is less than that of female in overall situation, irrespective of PVTG category. Further, in children categories, there is a marginal gain in calorie consumption in the age group of 4-9 years whereas there is less calorie intake in 10-15 years' age group.

The overall findings of the study are presented in this report in five chapters. **Chapter I** gives the overview of the study objectives, itsapproach and methods adopted to realise the empiric situation of the study. The **Chapter II** gives an overview of the sample PVTGs, characteristics of the study area, occupational engagement and landholding pattern. A document the livelihood of the PVTGs has been the intention. Their forest dependency isalso discussed in this chapter. Collection and use of different flora and fauna by the PVTGs is presented in **Chapter III** along with its conservation measures. **Chapter IV** discusses about the food security and nutritional aspects of the PVTGs based on the food and nutritional assessment. Conclusion and Recommendations, based on the study findings are presented in **Chapter V**.

Table of Contents

List of Tables

Abbreviations:

AAY	Antodaya Anna Yojana
ASHA	Accredited Social Health Activist
AWW	Anganwadi Worker
BMI	Body Mass Index
BPL	Below Poverty Line
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
FRA	Forest Rights Act
GDP	Gross Domestic Product
ICDS	Integrated Child Development Scheme
ICMR	Indian Council of Medical Research
ISFR	India State of Forest Report
ITK	Indigenous Tribal Knowledge
ITDA	Integrated Tribals Development Agency
JFM	Joint Forest Management
LWE	Left Wing extremism
MDM	Mid-Day Meal
MFP	Minor Forest Produces
NGO	Non-Government Organisation
NIN	National Institution of Nutrition
NTFP	Non-Timber Forest Products / Produces
PDS	Public Distribution System
PRA	Participatory Rural Appraisal
PVTG	Particularly Vulnerable Tribals Group
SC	Scheduled Caste
SCSTRTI	Scheduled Caste & Scheduled Tribe Research & Training Institution
SD	Standard Deviation
ST	Scheduled Tribe
WHO	World Health Organisation

Chapter One: Study Overview:

1.1 Introduction

In India as well as in Odisha, the life and economy of the tribal groups are intimately connected with the forest. Odishan tribes are generally classified into two sections, the "primitive" group and the "advanced" group. The primitive tribes are at pre-agricultural and low level of technological development, practising hunting, food gathering and shifting cultivation. The advanced group includes the settled agriculturists and industrial workers.Majority of the indigenous population of Odisha actually lives inside the forests and make a living out of the forest produce collected by them. Thus, forest plays a vital role in the socio-economic and cultural life of the tribal people. Majority of the tribal population live in the forested regions in harmony with nature for many centuries and developed a symbiotic relationship with the forest. Though most of the tribes have small or marginal land holdings and are dedicated farmers but they cultivate it for certain period of a year due to poor irrigation, inadequate agricultural infrastructure and support system etc. Rest of the months they completely depend on forest collections.The tribals derive direct benefits from the forest, like using forest habitat, shelter, raw materials for household equipments; other objects of material culture like resins, gums and dyes., firewood, herbal medicines; fodder for cattle and grazing areas, shoots, tubers, roots, seeds, leaves, flowers, stems, and wild mushrooms, etc for food. According to an estimate, 80% of tribal of Odisha, Bihar, Madhya Pradesh, West Bengal, Himachal Pradesh depends on forest for 25% to 50% of their annual food requirements.

The inexhaustible knowledge on locally available flora and fauna, ethno ecological perceptions on the nature,separates the ethnic communities from other communities. The term Indigenous Knowledge (IK) was used by Robert Chambers in 1979 in a book co-edited by Brokensha, Warren and Werner in 1980. Klaus Seeland, Senior Lecture at the Chair of Forest Policy and Forest Economics at the Swiss Federal Institute of Technology (ETH) defined, "Indigenous Knowledge means that something is originating locally and performed by a community or society in specific place. It emerges as people's perception and experience in an environment at a given time and is a continuous process of observation and interpretation in relation to the locally acknowledged every day rationalities and transcendental powers" (*Seeland, 2000*). Indegenous technical knowledge has become important for a sustainable management and conservation of forest.

Change of knowledge alters the views which have prevailed respecting the relations of savages to barbarians, and barbarians to civilized men (*Lewis Henry Morgan, Ancient Society, 1877*). All that differentiated various stages of socio-political evolution of mankind was the parallel evolution of human knowledge. People developed this knowledge with prolonged interaction with nature and society. Hence this knowledge is termed as "Indigenous Knowledge" of the aborigines across the globe. This indigenous knowledge helped the tribes to maintain their culture and live a disciplined life. Indigenous knowledge worked as driving force to culture and hence helped in manifestation and evolution of the society.

The traditional knowledge, the tribe following, is backed by scientific functions. Indigenous knowledge is the traditional knowledge of the local community existing within and developed around the specific conditions of women and men indigenous to a particular geographical area (*Grenier, 1998*). Indigenous knowledge is found in people's memory and activity and is expressed in the form of stories, songs, folklores, proverbs, dance, myths, cultural values, beliefs, rituals, community laws, local language and

taxonomy, agricultural practices, equipment, materials, plant species, and animal breeds (*Basu, 2009*). In due course of social evolution indigenous knowledge or the native knowledge have undergone many changes due to cultural innovation, diffusion and assimilation of outside culture into certain societies, urbanization or even unilineal evolution of certain culture. With present day scientific knowledge, it is established that the physics behind the native knowledge can't be ignored. The knowledge which comes down from the ancestors, generation after generation in a community, has the main source of utilization and management of resources. This knowledge is not a self-induced knowledge, but knowledge gained out of a lot of minds, experience, experiments, observation, and natural phenomenon. Activities such as health, education, religion, cultivation, and traditions depend on this indigenous knowledge of the particular community. So the indigenous knowledge is very essential for the survival and existence of the community. Had there been no indigenous knowledge, these tribes would have been disappeared. However,Srivastava (2009) while reviewing and analysing the tribal scene of India- past and present commentsthat thereexists a persistent problem in meeting the basic minimum services viz; food, nutrition, safe drinking water, primary health care, education, safe environment and productive assets at least at the level of survival and subsistence of PVTGs.

India, being the welfare state takes every initiative to bring alltribes tothe main stream of development and to become the shareholder of the benefits like any other bonafied citizen of the country. For its effective implementation,a lot of developmental interventions have been made by both the Cenral and State Governments of different states. Depending upon the political awareness of the community and quality of human resource development, a few tribeshave been developed more than that of theothers. But, it was also observed that within the same ethnic group (tribe), a section hasbecome very poor and severely marginalised. Constitutional provisions carefully safeguard the interest of the poorest of the poor and marginalised of the marginalised.

During 5th Five-YearPlan, a new strategy was developed for overall development of tribals whereby the vulnerable tribals and indigenous communities were treated as a separate group and termed as Primitive Tribals Group (subsequently they have been re-designated as Particularly Vulnerable Tribals Groups (PVTGs). There are 75 Primitive Tribals Groups in India and of them Odisha houses 13 Primitive Tribals Groups namely (1) The Birhor, (2) The BondoPoraja, (3) The Didayi, (4) The DangriaKandha, (5) The Juang, (6) The Kharia, (7) The KutiaKandha, (8) The LanjiaSaora, (9) The Lodha, (10) The Mankirdia, (11) The Paudi Bhuyan, (12) The Saora and (13) The ChuktiaBhunjia.

Majority of the tribal population of Odisha lives in forest ecosystem and has its own socio-cultural pattern, traditionand typical food practices. All the 13 Primitive TribalCommunities of Odisha are numerically small and most of these tribals have small or marginal land holdings. They grow food grains for about 8 months; and for rest of the months, they depend on the forestcollection for their survival.Mostly, their food comprises of variety of unconventional foods, like edible forms of flowers, fruits, berries and nuts,roots, tubers, stems, leaves, seeds and wild mushrooms etc.

1.2 Symbiotic Relationship of Tribals with Forest

Forest is an integral part of socio-cultural life of tribals and their livelihoods. Tribals living in rural areas dependent to a great extent upon forest resources for their livelihood. It is well known that access to forest land and forest produce plays a critical role in the livelihood of the tribal people.A larger segment of tribals people not only derive economic sustenance from the forest, but also forest remain socially and culturally a way of their life. Basic needs like fuelwood, fodder and small timber that are important for

them are derived from forest. This may be one of the reasons to observe a high concentration of tribal people in dense forest areas.

The symbiotic relationship which exists between the tribal people and the forest does not confine to the economic sphere alone. It covers other spheres like medicine, recreational activities, social, religious and cultural aspects of their life. The relationship ensures the fulfilment of their daily needs and the protection of the environment. Since the tribal communities are almost landless or marginal farmers, they depend upon forests more for survival than on other sources of livelihood. The variety of trees and plants yielding valuable EFP and with food value is too many to identify. They are knowledgeable about such plants and the use to which they use in their daily life. They know which kind of timber is most suitable for building their houses, for agricultural implements, for furniture and for crafts and artefacts. Thatching grass, rope-making fibres, cup and plate-making leaves, trap-making reeds and bamboos, poisonous ingredients used in arrowheads and numberless such other products are collected from the forests. Their isolated existence in inaccessible areas in forests has compelled them to bank upon herbal medicine in times of illness. It is observed that mostly economically poor collect and sell NTFPs in large quantities. They retain large part of the produce for their own use and sell remaining part in the market. With depleting forest, the NTFPs are not easily available and collectable quantity of NTFPs is decreasing day by day as compared to past years.

1.3 Forest Policies and Tribal Livelihoods

The land area of India totals to 328.7 million ha of which 142.5 million ha. (43.3%) is under agriculture, forests cover 76.5 million ha. (23.27%). According to the State of Forest Report (FSI 1997), the actual forest cover is 63.34 million ha (19.27%) of which 26.13 million ha. are degraded. (NFAP 1999). According to Forest Survey of India Report, 2013, there is a growth of 0.18% (7,831 Km^2) in forest area.

However, forest area is being rapidly depleted in many parts of the State and country due to the heavy pressure of population on land. Having about 2.5% of world's geographic area, India at present is supporting 16% of planet's human population and 18% of cattle population. The forest cover has been reducing both in quality and extent. The degradation is not only indicated by crown density decline but also soil erosion, lack of natural regeneration. Between 1950 and 1980 India lost about 4.3 million ha of forest land for non-forest use like development of agriculture, heavy industries and other developmental process. Complete with this there are serious problems of encroachment, grazing, forest fire, shifting cultivation and illegal felling. Most of the flora and fauna species are endangered with a serious economic implication. A recent World Bank report estimated that due to degradation and deforestation the loss has been up to one million ha per year during 1970s to 1980s. The depletion of the forest resources has aroused the passion of the rural poor in particular and the general public. As such, there have been spontaneous popular movements. Conservation and protection of forestland has become one of the top priorities for the country's development.

Forest plays a vital role in the rural economy. Forest sector is the second largest land use after agriculture. India's biodiversity is rich & unique. It is one of the 12 mega diversity countries in the world having vast variety of flora & fauna, which collectively account for 60-70% of world's biodiversity. Its ten bio-geographic regions represent a broad range of ecosystems. India has world's 6% flowering plant species and 14% of world's avian fauna (World Bank 1996). There are nearly 45,000 species of plants in the country and similarly, in fauna there are 81,250 recorded species (NFAP, 1999). Forest sector contributes about 1.7% of GDP of the country. However, this figure does not take into account its numerous non-market and external benefits and the vast amount of fuelwood and fodder and other forest products

collected legally or illegally. One estimate shows that total annual removals from the forest is worth about US$ 7.1 billion or Rs.30,000 crores which includes about 270 million tons of fuelwood, 280 million tons of fodder and over 12 million cubic meter of timber and countless non-timber forest products (NTFP)[1]. This does not include value of environmental services provided by the forest.

Non-timber forest products (NTFPs) refer to medicinal plants, food, resin, fibre and others kinds of non-timber products collected from the forest (Peters et. al., 1989, Chamberlein et. al., 1998). Gathering NTFPs from local forest for household use and getting cash income by tribals can be traced thousands of years ago (Ticktin 2004, Freed 2001). To collect and use NTFPs is a key issue related not only to living standards improvement and traditional culture of indigenous people but also conservation of biodiversity and sustainable development of concerned regions (Kareiva 1994, Gould et. al., 1998, Baird and Dearden 2003). Traditional market not only provides a major venue to indigenous people for getting cash income from their produce but also is important sites for spreading traditional knowledge on plant use and conservation (Williams et al., 2000, Mertz et. al., 2001). Tribals collect Non Timber Forest Products (NTFP's) like roots, tubers, flowers, fruits, fibres, gum, resin, dye, tannins, honey and wax etc. to fulfil their day to day requirements.

Impact of state interventions on the livelihood of the tribal people remains critical, because of faulty policy of land-reforms in the post-Independence era.Tribal people have lost significant amount of land over which they had customary usufruct rights[2]. Sometimes, it is also argued that because of changed land use and tenure systems and denial of legal rights over shifting lands, restrictive forest policies, loss of operational land holding to non-tribals, ban on the practice of shifting cultivation and allied measures of forest conservation, a major source of tribals people's livelihood got negatively impacted.

The forest related policies of the government too have severely curtailed the tribal people's access to forest and forest produce. Instead of protecting the rights of the local people, declaration of several reserve and protected forests have been done without settlement of rights or providing adequate recognition of rights on land used for shifting cultivation. Further, deforestation associated with various development projects, such as mining, dams, etc., have adversely affected tribals people's livelihood as forest remain the mainstay of their food and economic security. In addition, unfair trade practices of traders, middlemen and forest contractors have resulted in exploitation of tribal people and not getting remunerative prices for sale of non-timber forest produces (NTFPs).

Despite adoption of policies to ensure optimal collection, fair-price fixation of certain commodities (Kendu leaf etc.) and marketing of NTFPs, exploitation of tribal people continue to certain degree. Due to depleting forest resources and linked livelihood, many tribal people became indebted to local non-tribals and moneylenders, apart from alienation from the land and land based resources. The raised crops are also verbally mortgaged. to which the tribal peasants are subjected to alienate. However, instead of nurturing tribal livelihood, developmental interventions in India have mainly resulted in curtailment of tribal people's access to traditional sustainable sources of livelihood. The situation of tribal people in the state of Odisha is no different from those in other states of the country. Recently the state has witnessed increasing tribal resistance and protests against state encroachment on their land rights[3].

With the change of governance system, because of increasing agitation by the tribals and their supporters, different policies were formulated for their welfare and their development. Apart from improving social

[1] Biswas P.K.; Forest, People and Livelihoods; the need for Participatory Management.
[2] Padhi S., Panigrahi N., Tribal Movements and Livelihoods: Recent Development in Odisha, Working Paper No. 51
[3] Padhi S., Panigrahi N., Tribal Movements and Livelihoods: Recent Development in Odisha, Working Paper No. 51

security, Government also focused on minimising tribal exploitation through policy measures. Different financial policies were formulated to provide grants, subsidised credit to tribals for livelihoods as well as bringing different forward and backward linkages with different schemes for strengthening their economic condition. However, dependencies of tribals on forest still remain important, though degree of dependency for livelihoods decreased significantly due to its depletion.

Degradation and depletion of the forest resources has impacted in increasing poverty and sufferings among the tribals. Therefore, it is imperative to rehabilitate degraded forest resources in order to sustain tribal livelihoods. This is possible through restoration of forest resources and maintaining its bio-diversity.

The National Forest Policy, 1988 of the Government of India envisages people's involvement in conservation, protection and management of forest. It emphasized that forest produce must go first to the people living in and around forests. Further, in 1990 a Government resolution supported involvement of non-governmental organizations and the creation of village level institutions in forest management. With the active support of local organizations, people's participation in forest management, was initiated and is generally known as Joint Forest Management (JFM) in India. Now, it is recognized that participatory management of forests is key to sustainable development for people and forests. After introduction of ST & OTFD(Recognition of Forest Right) Act,2006 & FRA Amendment Rules,2012, the responsibilities and authority for sustainable use,conservation of biodiversity and maintenance of ecological balanceand thereby strengthening the conservation regime of the forests while ensuring their livelihood and their food security depends totally on the tribal people. The Act recognised the right to hold and live in the forest land under the individual and common occupation for habitation or for self cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers. They have got the right of ownership, access to collect; use and dispose of minor forest produce which has been collectedwithin or outside village boundaries.

1.4 Relevance of the Study

The livelihood among Particularly Vulnerable Tribals Groups in Odisha is complex, dynamic and multidimensional phenomenon, the perception of which varies with geographic location, type of community life, age, gender, education, fluctuations in resources, services and infrastructure and social, economic, cultural and ecological determinants. With the loss of forest cover and accelerated deforestation, the socio-economic and ecological impacts on local indigenous communities have become acute. Degradation of the surrounding environment has adversely affected food accessibility, livelihood options and quality of life, of local indigenous communities. In real life, such communities have been seriously affected as a result of both degradation of forestland and their reduced accessibility to forest resources on account of stringent forest laws and the upper hand of the non-tribals including government officials. The sense of feat towards forest official, vigilant department personnel dealing with liquor, tabacco and wild animal and police made many of the PVTGs silent. They also put to taskby poachers and timber / traders who acted as abettors for games/timbers in forest. The extremists are another set of people who often pounce upon their collections.

The tribes of Odisha are very traditional and animistic. They are the retainers of their traditional knowledge, skill and practices. They have their own explanation for everything they believe and practice.Most of their traditional knowledge system is nurtured and perpetuated through ritual practices. This knowledge has been inherited from their ancestors and the present generation passes it on to the next

generation by incorporating their knowledge into their culture. In other words, Indigenous Tribal Knowledge (ITK) is an integral and inseparable part of their culture.This does not mean that their knowledge is stagnant.As and when required, there are internal changes to adopt new elements to their knowledge system caused mostly due to acculturation. The tribal indigenous knowledge may also be known as local tribal knowledge.Such knowledge has its own meaning in the given culture and thus this knowledge is culture specific. It has its own limitations.

It is crucial for the disadvantaged communities who are deprived of economic and social benefits largely depend on such knowledge for their livelihood. But this kind of knowledge, i.e., indigenous knowledge is always confined to a particular group of people living in a particular territory to which their material and non-material culture woven around for centuries. The reason behind this slow change may be attributed to their relative geographic isolation for many years and enormous faith on the age-old customs and traditions.The process of flow of the knowledge encysted within their small kins group. As Odisha is a homeland of diversified ethnic (tribal) communities with their unique enriched culture, the immense variety of flora and fauna become their life line. The ITK they generated and retained is too wide and complex. Thus, an empirical study on the same area of interest is worth researched. Further, since the world of technology changing fast, if we do not record now, we may not record them ever. Under this scenario, the present study strives to map out existing indigenous knowledge of selected Particularly Vulnerable Tribal Groups (PVTGs) of the state of Odisha on their food habits pertaining to forest dependency. This study also aims to find out possibilities of blending of exiting native knowledge with modern scientific interventions for preservation of forest ecology and sustainable livelihood resources.

The relevance of the study is basically bi-folded in nature. The study willgive us a clear idea about the concept of conserving forest, conserving food, and conserving ecology through the methods followed by the tribal people. And in this period of time, when the modern world is facing many problems like global warming, pollution etc., the knowledge gained from the indigenous people might show us a way to handle or even face the situation. Through this study, we can also plan to conjoin the scientific technology for conservation along with their traditional method which might give a boost to the forest as imposition of new methods for conservation and preservation which may not be accepted by the tribes, rather thiswill initiate a protest against government. As a mandatory work (People's Biodiversity Register) of biodiversity acts in India, this is the high time to do a study on local ethno-botanical information about the uses of wild plants and animals as food source diversity by the tribals of Odisha. As we know that wild foods are not only important to food security in extreme cases, they often make up a portion of the tribals diet in other times too. This folk wisdom could benefit humankind in many ways.

The study also emphasizes on the nutritional aspect of tribal people. Nutritional assessment and food assessment of the PVTGs has been made through the study.

1.5 Review of Literature

The study used both primary as well as secondary sources of data for its findings and interpretation. The secondary data have been collected from published and as well as unpublished documents of Government Departments and documents on relevant areas on tribal communities available with the private agencies such as, Census report, Statistical Abstract of Odisha, District Statistical Hand Book, District at a Glance, District Gazetteer, and information collected from different district level Government Offices, including ITDAs. Besides, secondary data were also collected from monographs, research reports, research papers published in journals, books and from web publications. Some of these references are highlighted below.

Forest in India: Environmental and Production Frontiers,by V.P. Agarwal (1990): The book describes the land use pattern, forest area and population history of forest ecology, soil erosion, climate change and concepts of forest management. This piece of literature expresses holistic perspectives of Indian ecology and climate with specific reference to reliance of tribes on forests. This book also describes the age old relationship between the tribes and forest in India. As the present study targets to enquire the dependence on forests (with specific reference to PVTGs), this book was referred to gather the idea on the man and forest relationship. Present study adds to the existing knowledge repository with special focus on the utilization of indigenous knowledge of PVTGs of Odisha for preservation of forest ecology.

Forest Tribes of Orissa (Vol. 1) The DongriaKondh, Mihir K. Jena *et al.*(2002)*(A volume of Man and Forest Series General Editors: Klaus Seeland; Franz Schmithusen)*:** The book depicts an idea about the relevance of indigenous knowledge of various South-Asian tribal communities in sustainable management of forests and local resources. It documents the traditional knowledge among the DongriaKondhof Odisha and use of native knowledge for interacting with their natural environment; classify trees, plants, hills, forests, crops and soil. The book also portraysgeographical landscape, economy, socio-political organizations, oral traditions, beliefs, and other relevant socio-cultural aspects of DongriaKondh of Odisha. The study under consideration has DongriaKondh as a sample and hence this book renders necessary knowledge on DongriaKondh.

Forest Tribes of Orissa (Vol. 3) The Juang, NityanandaPattnaik et al. (2007)*(A volume of Man and Forest Series General Editors: Klaus Seeland; Franz Schmithusen)*:TheJuangisa tribal community in transition. The authorshave tried to document and safeguard its local traditional knowledge of conservation, use and management of forests and natural resources. The book provides an account of how the Juang classify trees and other plants, hills, forests, crops and animals. Their subsistence economy, agricultural system, social organization, religious beliefs and other significant socio-cultural aspects of the Juang have been extensively treated. The Juang is a PVTG sampled for our study. The book delivers a detail account of Juang and hence was reviewed for field expedition and report preparation.

Essential Forest Produce in Odisha, NityanandaPattnaik (2003)*(A volume of Man and Forest Series General Editors: Klaus Seeland; Franz Schmithusen)*: The book highlights the relevance of "Indigenous Knowledge" of various tribal communities in the sustainable management of forest and local resources, more specifically against the growing challenges of economic development vis-à-vis environmental hazards and a declining resource base. Most of the Minor Forest Produces (MFPs) with their use are depicted in the book as Essential Forest Produce (EFP) like fodder, medicinal herbs, fuel wood, edible fruits, seeds, leaves etc. As preservation of forest through indigenous knowledge is a pivotal part of present study, this book was referred in detail where Dr. Pattnaik expresses the inability of tribal communities of Odisha to reach forest collections, exploitations and measures to address these identified problems. Besides, the current study aims to figure out nutritional contents of floral or faunal edibles collected from forest.

Indigenous Knowledge, Forest Management and Forest Policy in South Asia, KaulusSeeland(Ed.) (2003)*(A volume of Man and Forest Series General Editors: Klaus Seeland; Franz Schmithusen)*: The book highlights the relevance of "Traditional Indigenous Knowledge (ITK)" of various South Asian tribes and rural communities in the sustainable management of forests and local resources especially against the growing challenges of economic development vis-a-vis environmental hazards. Not only this volume reiterates the relevance of indigenous knowledge as a development tool in this age of standardized,

modern know-how applications, but also illustrates its enormous impact on the social development in tribal and rural areas.

Ecology, Culture and Health: A Primitive Tribe by Pramod Mishra (2004): This book is based on a study carried out among the Saharia (*the only PVTG of Rajathan*)of Shahabad and Kishangaji tehsils of Barandistrict in Rajasthan. The extensive and intensive fieldwork was carried out by the author across a period of 8 months. The figures and information in the book revealexistence of relationship between ecology, culture and health among Saharia. Current study also looks forward to find out man and forest relationship and preservation of forest ecology using native knowledge among PVTGs of Odisha. This book represents a detailed socio-cultural blueprint of a primitive tribe which is supportive for understanding the culture at one end and ecology at the other.

Primitive Tribes of Orissa and Their Development Strategies by NityanandaPattnaik (2005): The book presents an in-depth study of various measures and provisions adopted, schemes introduced and plans implemented, since the Fifth Five Year Plan (FYP), to redress the problems of the tribal and analyses the on-going attempts in bringing them to the national mainstream through establishment of 17 Micro Projects. Besides, the book presents an extensive detail of the ethnographic features of the entire Primitive Tribes (*now Particularly Vulnerable Tribal Group*) with particular reference to their economic activities, social sanctions and varied problems faced. Though the book is written keeping eye on policy reformations, it also examines the trend of acceptance of developmental interventions among the PVTGs of Odisha. This book provides a bird's eye view on the current status of various PVTGs in Odisha.

Sustainable Food Habits of the Hill Dwelling Kandha Tribe in Kalahandi District of Orissa by Tribhubana Panda &Rabindra N. Padhy(2007): This is an ethno-botanical survey of food practices of an aboriginal, hill-dwelling Kondh tribe of Kalahandi. This piece of research reveals the conventional and other naturally occurring foods consumed by Kondh. This paper clarifies that in addition to their conventional foods, rice, finger millet and a few popular pulses, they use many types of naturally occurring unusual additional food items such as carnal of Mango, several types of Tubers (*Dioscorea)*, Wild Beans (*Mucunautilis), Salap flowers and juice* (*Caryotaurens),* Tamarind seeds *(Tamarindusindica)*, younglings of bamboo (*Dendrocalamusstrictus*) and wild mushrooms. Detailed methods of processing of these items are unique and bitter tasting chemicals (alkaloids) of these food items are removed by repeated boiling and discarding the boiled water are vividly expressed in this research paper. Hence, this paper clarifies the use of foods and food processing by Kondh using their native knowledge. As DangriaKandha are part of the sample of the present study, this literature delivers basic idea on the food practices of Kondh.

Tribes and their Indigenous Knowledge: Implications for Development, by S.N. Choudharyand K.K. Basa (Ed.) (2008): Thisarticle portrays on the current status of structure and functions of indigenous knowledge especially among the tribes. It examines how tribes manage their social and economic life, health and disease, cultural diversities etc., with their own knowledge system which is indigenous and historical. It also examines future of this knowledge system particularly during the era of globalization and World Trade Organization (WTO) regime. Capturing the indigenous knowledge of five PVTGs regarding the floral and faunal use for food and preservation of forests are the two significant scopes of present study. This piece of literature by Choudhary clarifies the genesis and allegorical functionalism of indigenous knowledge of tribes of India. Hence, it delivers necessary insight on existing indigenous knowledge among the tribes and opens method to analyse indigenous knowledge.

Indigenous Herbal Medicines: Tribal Formulation and Tribal Herbal Practices by Dr. Deepak Acharya and AnshuShrivastava(2008): The book have multi-faceted objectives of furthering the knowledge and documentation of the vital yet potentially disappearing practices and people of traditional herbal medicines, as well as pleading for the establishment of respectful institutional structures which will help to preserve the people, their practices and prevent the destruction of an unquantifiable treasure to humanity. Though the present study targets on indigenous knowledge on food, medicinal use of plants is a miniature part of it. Therefore, tribal herbal practices by Dr. Acharya open scopes to gain insight on tribal knowledge on medicine.

Tribals of Orissa: The Changing Socio-Economic Profile by B.C. Ray & A.K. Das (2010): This is a pioneering work to combine the studies and analyses by Historians, Anthropologists, Psychologists, Economists and literary critics on the changing society of the tribes of Odisha. From the historical perspective, the author moves from interactions of non-tribal and tribal culture, absorption of Gods and goddesses from the tribal fold to Hindu pantheon to the abandoned ritual of human sacrifice. The modern processes put up before the tribal by western-urban-industrial-democratic-model, heralding unprecedented change in tribal lifestyle have come in for academic scrutiny. As a combined effort of many academicians the book gives a wide coverage on the study tribes of Odisha to make it a worth, while addition to the available material on the subject. Gathering elements of culture change is the major reason to review this book. ITK is a major immaterial culture of tribes and how culture change impacts the knowledge of natives is the reason for review of this book.

Documenting Indigenous Traditional Knowledge in Odisha, by PriyaRanjanMahalik and Dr. Rabindra K. Mahapatra (2010): The report deals with concept of Indigenous Traditional Knowledge (ITK). It gives a holistic idea about the significance and source of indigenous knowledge. This paper provides insight on ITK and their relevance in culture. As the current study focuses on ITK, this report was a comprehensive source of literature on genesis and evolution of traditional knowledge. However, the current study shall focus on ITK pertaining to foods and forests.

Food Practices among the Adivasi women of Selected Districts Western Odisha by Sarojini Pradhan, Sunita Mishra, S. C. Mohapatra (2011): The report helps us to understand the indigenous foods, consumption pattern, knowledge on nutrient content and calorie value, ecological diversity and associated social life style pattern of Adivasi women. Though the report focuses on the consumption pattern, it envisages foods from both agrarian and forest sources. This paper provides idea on various flora used for food and their nutrient and calorie content. The present study shall extend the consumption pattern to fauna of forest including the nutritional content and assessment of nutritional security thereby.

Use of Plant Diversity in Household and Rituals by Tribal People of district of Dhenkanal, Orissa, India by NibeditaMohanty *et al.* (2011): This study documents traditional knowledge of plants used as household appliances and rituals by tribes of Dhenkanal. It is primarily based on field surveys carried out in villages where dwellers provided information on plant species used as household materials and rituals. The plant parts, viz. leaf, bark, stem wood and whole plant were used for above purpose. Species of 21 botanical families for household and 11 botanical families for rituals covered under this study. The most important families were *Arecaceae, Euphorbiaceae, Poaceae* and *Fabaceae*. These plant resources were used for preparation of broom, mat, basket, measuring device of grains, insecticide to store grains etc. and rituals like marriage, worshiping different trees, Sun God, mother Earth, Goddess Banadurga, *DaluaniDevata* and *JangalDevata* was the crux of the study. This report delivers insight of diverse use of plants among the tribes especially in rituals.

Primitive Tribal Groups of Orissa by A.B.Ota*et al.* (2011): This photo hand-book elaborates socio-economic profile of Particularly Vulnerable Tribal Groups (PVTGs) of Odisha. Besides, this booklet briefs the developmental interventions for PVTGs of Odisha and India. Settlement pattern of all PVTGs of Odisha with their primary and secondary occupation was vividly presented in this booklet with photographs. This booklet was extremely helpful for drawing sample based on the lifestyle of the PVTGs.

Tribal Health and Nutrition, S.N. Chaudhary (2012): This book examines different issues relating to tribal health and nutrition in India in specific context of their culture, local ecology, voluntary efforts and institutional interventions. Assessment of nutritional security among 5 PVTGs of Odisha is an objective of the present study. This book provides factual guidance on the calorie intake and nutritional value. Hence it is referred to capture ideas on nutritional intake among tribes.

Wild Edible Plants used by the Zou Tribe in Manipur, India by H. Esther Gangte*et al* (2013): A survey of wild edible plants used by the Zou tribe was undertaken during 2011-2012 in Manipur. The present study is the first of its kind among the Zou tribe. The Zous are one of the dominant tribes in Manipur (the state has only one PVTG *MorramNagas*) settling along the border of Burma. Oral traditions and culture reveals that most of their economies have been engaged in subsistence agriculture, hunting and gathering. This paper documents 84 plant species belonging to 36 botanical families.

Diversity of food plants used by tribal people of Dhenkanal district, Odisha, India: An ethnobotanical analysis by NibeditaMohanty*et al (2013)*:An ethno-botanical investigation was carried out in Dhenkanal district of Odisha to explore the use of edible food plants among tribes. The tribal people used plant species as food supplement particularly during food scarcity. A total of one hundred and thirty-seven species from sixty families were recorded in the course of investigation. Different parts of plant like fruits (53 types), leaves (40 types), flowers (15 types) and seeds (15 types) and tubers and corns (14 types) were consumed raw or cooked by these tribes. This study provides a better database on past and present relationship between plants and native tribes of Dhenkanal, Odisha. As the present study covers tribal districts of Odisha, this research article provides a warehouse of information and insight on use of various plant species by tribes of Odisha.

Anthropometric Characteristics and Nutritional status based on Body Mass Index of adult Bathudis: a tribal population of Keonjhar District, Orissa, India, Dr. Kaushik Bose and Falguni Chakraborty (2005): This study found prevalence of high undernutrition among Bathudis of Keonjhar and prescribed quick execution various undernutrition programmes among Bathudis. The study specifically highlighted high rate of nutrition among adult Bathudis. The study relies on anthropometric measurements and Body Mass Index (BMI). Status of undernutrition was determined using the standard fixed by World Health Organisation (WHO). Though anthropometric measurements like circumferences and skinfolds are of less interest for the present study, BMI is the indicator taken into account for nutritional assessment.

Dietary Guidelines for Indians: A Manual (2nd Edition) by National Institute of Nutrition (NIN), Indian Council of Medical Research (ICMR), (2011): This is the most comprehensive document for finding out nutrient content and calorie value of major Indian foods. It has also dietary recommendations for children and adults. Besides, reputed documents from World Bank Development Indicator, National Family Health Survey, National Health Profile etc. this manual contains findings from National Nutrition Monitoring Beurau (NNMB) a wing of NIN, ICMR. This manual depicts the susceptibility of undernutrition among Scheduled Castes (SCs) and Scheduled Tribes (STs) and landless labourers. This

document referred to find out the nutrient contents and calorie value of staple foods of PVTGs considered under the study.

Nutritional value of some traditional edible plants used by tribal communities during emergency with reference to central India by Ashok K. Jain and Preeti Tiwari (2012): This research paper focuses on the flora consumed by Gond and Saharia tribes during food scarcity which is termed as "Emergency Food" or "Wild Food". Emergency food plants said to be divided in two groups viz. plants least consumed due to sparse availability and plants frequently consumed for easy availability. Besides, amino acids[4] (essential and non-essential amino acids), sugar and lipid contents of various parts of plant consumed by these tribes. Besides, detail nutritional analysis was performed for select plant species. This piece of research generates factual information of nutritional content of various plant species.

Ethnozoological knowledge of Indian Scheduled Tribe, Scheduled Caste and Rural Communities by P. Pushpangadan and *et al* (2014): This research paper delivers a brief worldview of use fauna in medicine and foods. The article portrays the use of wild and domesticated animals among the tribes and castes as medicines, religious purposes, drugs etc. Various parts of reptiles, vertebrates, mammals with their medicinal use are vividly presented in this research paper. This paper concludes more than 100 animals (including *aves*) which are used as food among tribes of India. Besides, food and medicinal use of zoological species, this paper also highlights use of animals for other purposes among tribes viz. scraper, musical instruments, ropes, fertilizer, bangles etc. This document classifies tribes and animal relationship into prey, predator, parasites, pets, inquilines etc. This document recommends zootherapy as intrinsic part of tribal and rural culture and activist engaged in conservation of biodiversity certainly needs to possess this idea. Present study enquires the medicinal use of animals among five PVTGs of Odisha and therefore this researchpaper was referred.

Sustainable Management of Tropical Forest through indigenous knowledge: A case study of Shompen of Great Nicober Island by Kavita Arora (2010): This research addresses the issue of depleting forests and agrees forests can hardly be preserved without help of indigenous people and their native knowledge. Under this context, PVTG of Andaman island namely Shompen[5] was examined under lifestyle, knowledge about forests, biodiversity and indigenous methods of forest management. The Shompen are mongoloids and live in a nomadic band of 25-30 individuals. This article connotes forest management process of Shompen are simple and part of their daily life which is ignored by the forest managers. The present study enquires the possibilities of blending indigenous knowledge of PVTGs of Odisha with that of modern forest preservation techniques for successful implementation of programmes. In this context, present article delivers some insight on reasons and scope of merging traditional knowledge with modern scientific methods for sustainable implementation of forest preservation programmes.

1.6 Study Objectives

The study was objectively designed to explore the traditional knowledge of the PVTGs on locally available flora and fauna, collection and uses of these flora and fauna for various socio-cultural activities and their overall dependency on forest. On the other side, the study was also having an additional

[4]Amino Acids are Building Blocks of Protein
[5]Also spelled as Shom Pens Annual Report 2013-14, Ministry of Tribal Affairs (MoTA)

objective of looking at the overall consumption pattern of the PVTGs in a scientific manner and assessment of their nutritional intake. Specific objectives of the study were;

1. To critically examine and chronicle the peoples' knowledge on plant community with special reference to wild, domesticated and cultivated food plants which the tribals use and scrupulously guard,

2. To examine their knowledge and the mode of preservation from a field study of thephenomena of their observation and its implication for the environmental crisis,

3. To attempt a close survey of important wild edible plants and their modes of conservation, preservation, cultivation, propagation,

4. To study the impact of deforestation on food culture of tribals people relating to their environmental and social life and

5. To explore the possibilities of blending of the tribals knowledge with that of the modern scientific innovations.

1.7 Approach and Methodology

The approach to the present study is holistic in nature. The role of fauna and flora in the livelihood of the PVTGs would mean that it provides an understanding on the dynamics of the socio-cultural aspects of life of the PVTGs under study. This study also provides ample scope on the coping mechanism of the concerned PVTG people to their respective micro ecological conditions tocombat food scarcity. The food security is directly proportional to the healthstatus of the community. Thus, the study adopted anthropological tools and techniques, including anthropometric measurements for height and weight and calorie intake of the subjects to assess the health status. Since the study covered five broad PVTGs in its purview, it also offered cross-PVTGscomparison on health status for the data collected from four districts.

It briefly outlines the technical aspects like universe & sample,reference period, sample design adopted, study instruments used and methodology adopted for carrying out the project.

1.7.1 Universe and Sample

The universe for the current empirical study constitutes 17 Micro Project areas for 13 PVTGs likeBondo, Didayi, Saora, Lanjia Saora, Dangaria Kandh, Kutia Kandh, Lodha, Hill Kharia, Mankirdia, Birhor, Juang, Paudi Bhuinya and Chuktia Bhunjia.in Odisha.Out of 17 Micro Projects, 13 are located in Tribal Sub Plan and the rest 4 are located outside the TSP area of the state. Out of all Micro Projects, 7 are located in the northen part, 10 are located in the southern part.Out of 13 PVTGs, onlyfive PVTGs likeJuang, Hill Kharia, Mankirdia, Dangria Kandha and Lanjia Saora are covered under the study. Though Hill Kharia and Mankirdia are two different PVTGs, still because of common locality and implementation of development programmesthrough one Micro Project, they were considered as one unit of analysis in this study. The study covers four Micro Projectsin four districts of the State based on the prevalence of these PVTGs.

a) The Juangcovered from the Juang Development Agency (JDA), Gonasika area of Banspal Block of Keonjhar district,

b) Hill Kharia & Mankirdiacovered from the Hill Khadia & Mankirdia Development Agency (HKMDA), Jashipur block of Mayurbhanj district (fringe area of Similipal bio-sphere),

c) Dangria Kandha covered from the Dangaria Kondh Development Agency (DKDA), Parsali area of Kalyansingpur block of Rayagada district.

d) Lanjia Saoracovered from the Lanjia Saora Development Agency (LSDA), Seranga area of Guma block of Gajapati district.

2/3 villages, one nearer to the Micro Project area,and the other farther from the Micro Project area were selected keeping in view the following characteristic features. Besides, villages having cent percent PVTG population have been covered under the study.

1.7.2 Sample Design:

Stratified and purposive sampling has been adopted for the study. The stratification has been made on the basis of the geographical division of the state and percentage of dependency of PVTGs on the forest for their livelihood and on the basis of their more primitiveness.

The study adhered to the purposive sampling method, a sort of Non-Probability sampling, to select PVTGs based on their dependence on the forest (*Purpose 1*), geographical location (*Purpose 2*) and techno-economic practices (*Purpose 3*). Dependency on the forest estimated from the baseline survey of all PVTGs of Odisha conducted by SCSTRTI during 2002 (the baseline survey was an *enumeration* survey including all 13 PVTGs of Odisha). Households with primary and secondary occupation and their dependency on forests are taken into account for the ranking of PVTGs. Techno-economic practices are also taken into account due to variation of native knowledge towards identification and utilization of wild flora and to some extent fauna. PVTGs of two geographical regions viz. Southern and Northern regions of Odisha, are taken into consideration for selection to ensure holistic coverage of different bio-diversity of Odisha. A total of 5 PVTGs (38.46% of total number of PVTGs in Odisha) are selected for sample incorporating 2 PVTGs (Dangria Kandha and LanjiaSaora) from southern geographical zone, 3 PVTGs from northern geographical zone (Hill Kharia, Mankirdia and Juang). Dangria Kandha and LanjiaSaora are selected from the southern region of Odisha due to high dependency on forest. Dangria Kandha are shifting cultivators and LanjiaSaora are shifting–cum-terrace cultivators. LanjiaSaora of Seronga area is sampled compared to LanjiaSaora of Puttasingi due to low urban penetration. Hill Kharia and Mankirdia of Mayurbhanj district are sampled due to their hunting and gathering economy at one end and high forest reliance at the other.Juang is selected from the northen region due to its comparatively more primitive status.Geographical location wise sample PVTGs with their techno economic stages is presented in the statement below.

Table No. 1.1:
Sample Area Characteristics

SN	Name of the PVTG	District	Block	Geographical Zone	Geographical regions	Techno Economic Stages
1	Dangria Kandha	Rayagada	K. Singpur	Eastern Ghat	Southern	Shifting Cultivators,Hoticulturist
2	LanjiaSaora	Gajpati	Gumma	Eastern Ghat	Southern	Shifting & Terrace Cultivators
3	Juang	Keonjhar	Banspal	Northen Plateau	Northern	Shifting Cultivators
4	Hill Kharia & Mankrdia	Mayurbhanj	Jashipur	Northen Plateau	Northern	Hunter Gatherers

The selection of sample PVTG Households on the basis of their forest collection is presented in the statement below.

Table No. 1.2:
Sample Area Specification

Sl.No.	Name of the PVTG	District	Block	Total HHs of PVTG	No. of Households involved in Forest collection	Percentage Households involved in Forest collection
1	Dongaria Kandha	Rayagada	K. Singpur	551	545	98.91
2	LanjiaSaora	Gajpati	Gumma	1241	752	60.60
3	Hill Kharia & Mankrdia	Mayurbhanj	Jashipur	561	396	70.59
4	Juang	Keonjhar	Banspal	1496	440	29.41
	Total			**3849**	**2133**	**55.42**

Source: Base Line Survey,2002 by SCSTRTI

Sampling size is estimated by proportion rule. Total number of households of PVTGs of selected area is 3849 (including all the 5 PVTGs under study). As these PVTGs are Heterogeneous Groups (Techno-Economic Diversities), we shall consider the variability to be more than homogenous groups. Sample size is calculated taking total population (3849) with a desired precision of 0.05 and confidence interval of 95.0 percent (Z value: 1.96) with 80.0 percent response rate.

Accordingly, the sample size is calculated to be 343 households. A sum of 343 households was sampled from the total households 3849 of all 5 PVTGs. Proportionate selections of the households were done for all 5 PVTGs as per the proportion to the total households of 3849. A total of 343 households spreading across all 5 PVTGs were taken proportionately. PVTG wise selection of proportionate household is presented in the following table.

Table No. 1.3:
Selected Village wise total and surveyed PTG Households

Name of the District	Name of the Block	Name of the PVTG	Name of the Village	Total PVTG HHs	Surveyed PVTG HHs
	K. Singpur	Dangaria Kandha	1.Kandsur	14	14 (23.3 %)

Rayagada			2.Patalamba	16	16 (26.7 %)
			3. Sandengneli	30	30 (50.0 %)
			Sub-Total	**60**	**60 (100.0%)**
Gajapati	Gumma	Lanjia Saora	1. Jantar	70	70 (61.9 %)
			2. Mulisahi	21	21 (18.6 %)
			3. Raita Sahi	22	22 (19.5 %)
			Sub-Total	**113**	**113 (100.0 %)**
Keonjher	Banspal	Juang	1. Hatisila	40	40 (27.0 %)
			2. Nadam	42	42 (28.4 %)
			3. Sarai	66	66 (44.6 %)
			Sub-Total	**148**	**148 (100.0 %)**
Mayurbhanj	Jashipur	Hill Kharia & Mankirdia	1. Badajhili	29	29 (50.0 %)
			2. Durdura	29	29 (50.0 %)
			Sub-Total	**58**	**58 (100.0 %)**
			G. Total	**379**	**379**

A total of 2 to 3 villages (to meet the total household criterion) with close proximity to forest were selected after the consultation with the Special Officer, Micro Projects. An enumeration survey of household was conducted after selection of villages. Nutritional Survey was conducted randomly for 3 households in the village for one week. Cooked food for lunch, dinner is measured using weighing machine and ingredients of the cooked food were also noted down. Besides, one Focus Group Discussion (FGD) per village was conducted to assess the variance and depth of indigenous knowledge pertaining to foods from forest collection. Identified as well as unidentified species were preserved through herbarium for identification in future.

The study covered 4 scheduled districts namely Rayagada, Gajapati, Keonjher and Mayurbhanj. From each study district, one block and a total of 11 villages were covered. from the selected four blocks. Three villages were selected from each studied block in Gajapati, Rayagada and Keonjhar district whereas, 2 villages were selected from Mayurbhanj district. For flora and fauna, the study covered a total of 379 households and 254 households (of 379 households) were covered for nutritional assessment in 11 study villages.

TableNo. 1.4:
District wise number of PVTG villages & HHs covered under Nutrition& Flora &Fauna study

Sl. No.	District	Block	No. of Villages	No. of Households / Persons	
A	**Nutrition**			**No.**	**Percentage**
1	Rayagada	Kalyansingpur	3	62	24.4
2	Gajapati	Guma	3	68	26.8
3	Keonjhar	Banspal	3	74	29.1
4	Mayurbhanj	Jashipur	2	50	19.7
	Total		**11**	**254**	**100.0**
B	**Flora & Fauna**				
1	Rayagada	Kalyansingpur	3	60	15.83
2	Gajapati	Guma	3	113	29.82
3	Keonjhar	Banspal	3	148	39.05
4	Mayurbhanj	Jashipur	2	58	15.30
	Total		**11**	**379**	**100.0**

Note: One FGD conducted in each village on Flora and Fauna. So a total of 11 FGDs were conducted in the sample study villages.

The villages were selected for the study based on the discussion with concerned officials of the micro project. Most of the villages were in inaccessible pockets and nearer or within the fringe or core area of the forest. Villages were selected purposefully based on this criteria (villages near the forest) to understand their dependency on forest and also availability of different flora and fauna and its use.

The purposive selection of the study area is exclusively to understand the indigenous knowledge and practices of the selected PVTGs with regard to flora and fauna and to assess their dependency on these natural forest resources. In nutritional aspect, consumption pattern of all the members of 254 households were studied in the entire sample PVTGs for 7 days continuously (covering breakfast, lunch, evening tiffin and dinner/supper).

1.7.2 Reference Period:

The Study which started from Dec' 2014 completed in Nov' 2015. Although,it was initially contemplated to complete the study within a period of nine months,the collection, verification processing, tabulation of data and editing of the report required more time than the stipulated time frame. Temporary research scholars were engaged for 3 months for collection of data from primary and secondary sources. Compilation of data, Preparation of first draft report, its revision and finalization took a little bit more time.

1.7.3 Study Tools

For collection of Primary data, schedules were administered among the five PVTGs Different structured and semi-structured tools were designed to capture required information from different levels. Keeping in view the data requirement, Village Schedule, Household Schedule, FGDs and observation checklist tools were used as the main tools of data collection. The tools were drafted on the basis of major variables, parameters and objectives of the study. All the tools were verified by SCSTRTI and necessary modification were done based on their feedback. After incorporation of feedbacks, all the tools were piloted to check its validity. Further, required modifications were made in the tools based on pilot findings and tools were finalised accordingly for administering at the field level. All the team members were oriented on the tools before its full scale execution. The following techniques were applied for the collection of data.

Household Interview Schedule: This schedule captured the general socio-economic data of the household, flora used for foods, fauna used for foods, flora and fauna used for other purposes like medicine, birth control etc. The household schedule was having two parts, i.e., one part on indigenous knowledge on flora and fauna and the other part was related to food consumption at household level. The household schedule was designed to capture household level knowledge on plant community covering both wild and cultivated plants along with their dependency on local forest for flora and fauna during different parts (seasons) of a year. In this aspect, the household schedule also covered availability of different flora and fauna, accessibility to forest for its collection (regulatory and availability aspects), degree of dependency and amount of annual collection (collection of different flora & fauna by different family members) and overall change (increased / decreased) in the availability of flora and fauna in the locality and reasons thereof.

Focus Group Discussion Checklist: This schedule captured methods of forest preservation, forest regeneration, cultural practices and use of flora and fauna etc.

The FGD checklist was designed to capture the overall opinion of the community on various aspects of the study, like availability of flora and fauna in the nearby forest area, types of flora and fauna that are available in different seasons, key issues associated with collection and marketing of forest produces, uses of different flora and fauna in different occasions etc. The FGD with community helped to understand different aspects related to their dependency on forest, accessibility and availability factors and also the measures taken by the community for sustaining the availability of important flora and fauna.

Village Fact Sheet Format: This schedule captured Demography, available flora and fauna, infrastructure facilities, communication, religious centres and other establishments, drinking water sources, land use pattern etc.The rationale of the village schedule is to collect village specific secondary information that are available at GP / village level to understand the demographic composition, engagement pattern, availability of forest, distance of different institutions from the village / locality and availability of village / community level facilities and services. Mapping of these aspects helped to understand the socio-economic aspects of the studied PVTGs. Apart from all these tools which were executed at the primary level, a consultation checklist was also developed to capture the opinion of the Govt. officials of the micro project area on different aspects of the study by its objective.

Nutritional Survey Schedule: This schedule captured cooked food for breakfast, lunch and dinner for one week with essential nutrients. Separate schedules were designed to collect first-hand information at household level, focus group discussions and food pattern across the PVTGs. Besides, a village factsheet format was designed to capture information on bio-diversity, demography, industrial scenario etc. of the sampled villages. A set of schedules administered during the study is given in Annexure.

1.7.4 Field Survey

The primary level study on collection and utilisation of flora and fauna was conducted in different PVTG villages. A combination of structured interviews and key resource users and focused group discussions (FGD) were carried out involving community. Participatory Rural Appraisal (PRA) techniques were used for conducting inventories of village resources. Household level surveys were conducted in the PVTG villages to study the contributions of flora and fauna to their food items. A total of two FGDs for each PVTG were conducted with the active participation of both male and female PVTG separately. Apart from household schedules and FGDs, the village level information was also collected to understand the overall biodiversity profile of the villages.

1.7.5 Data Analysis

The data, collected from different sources were carefully scrutinized and transcribed before the commencement of data tabulation and interpretation. All the data were entered in the designed data entry template for analysis. The diet quantity was converted to its nutritional value based on the recommended norms of food exchange. The data were analysed by PVTG / study district to understand the consumption pattern and use of different flora and fauna.

1.8 Limitations of the Study

1. In the selected sample village, all the households were covered which consumed a lot of time as the study dependent upon the availability of the respondent (head of the household);

2. Consumption or forest level availability of certain floral species could not be observed due to seasonal variation. As the study was conducted during winter, certain floral species of summer and monsoon period could not be observed. It was collected based on the response of the respondents;

3. Additional component of nutritional assessment during the study of flora and fauna was suggested by SCSTRTI. Nutritional study further consumed major part of the study time;

4. Conversion of some of the consumables of tribals could not be converted to its appropriate nutritional value as its value is not available due to indigenous and localised nature of the diet. The nutritional group value to its approximation was considered for conversion;

5. As tribals are aware about the legal aspects of bio-diversity and wild life conservation measures of the Government, people were reluctant to provide related information on use of different fauna during different period of time. However, certain information related to fauna were collected during FGDs;

6. Dangria Kandha, habituating in Niyamgiri (proposed mining site) were reluctant to participate in study with the fear of evacuation from their home land due to mining activities. The local micro project officials were helpful to the study team for the collection of required data from Dangria Kandha;

7. Identification of specific flora was difficult due to use of local name by the tribals. Local extension workers (AWW, ASHA etc.) were helpful to translate tribals connotations of different plants to Odiya language;

8. Consumption of mother's milk by the infants could not be measured for which value in approximation is considered for computation.

9. In the later stage of the study (during interim review of project progress), measurement of Body Mass Index (BMI) was suggested for incorporation under the scope of the study to compare the BMI values of different PVTGs. However, by that time, field study of two PVTGs, i.e., Juang and Hill Kharia Mankirdia were completed. So, the study could able to take anthropometric measurement of remaining two PVTGs, i.e., Dongarai Kandha and Lanjia Soura which is presented in this report.

10. As hunting remains a sensitive matter and a punishable offence unde the Act, the PVTGs found reluctant to share required information on their haunting practices.

Chapter Two: Study Area Characteristics

2.1 Profile of the Districts andStudyVillages:

For study Tribal area spreads over mainly 2 out of 4 geo physical zones of Odisha. These 2 geo physical zones are Northen Plateau (25.5%) and the Eastern Ghat region (29.2%) which occupies about 55% of the total area of the state. The other 2 geophysical zones i.e the Central Table Land (24.8%) and the Coastal Tract (21.2%) have dispersed tribal population. The Tribal Subplan area of the state lies in the Northen Plateau & Eastern Ghat region.The Northen Plateau lies between 20^0 N latitude and 79^0 and 87^0 East longitude.It includes Mayurbhanj,Keonjher,Anugul,Deogarh,Sambalpur,Sundergarh,and Kalahandi covering anarea of 15030 sq. miles.The Santal, Kolha, Munda, Bhuiyan, Oraon, Gond, Kisan and Bhumij are the predominant Tribal Communities and the Juang, Hill Kharia, Mankirdia, Lodha, Birhor, Paudi Bhuiyan are the Primitive Tribal Groups of the region. TheEastern Ghats Regioncovers the predominant Tribal Communities, like Kandha, Saora, Paraja, Koya, Gond, Gadaba and Primitive Tribal Groups, like Bondo, Didayi, Kutia Kandha, Dangria Kandha, Saora, Lanjia Saora, and Chuktia Bhunjia who dwell in this region. The 5 selected PVTGs for study are living in 4 TSP Districts like Rayagada, Gajapati located in Eastern Ghat region andKeonjher and Mayurbhanj districts located in Northen Plateau region.

Rayagada district is one of the Southern located districts in Odishawhich lies between $82^0$54' to $84^0$2' East longitude and between $19^0$0' to $19^0$58' North latitude. It is bounded by the Kandhamal district in north, Andhrapradesh in South, Gajapati district in the east and Koraput district in the west.The climatic condition of the district is generally hot with high humidity during May and June and cold during November and December. The monsoon generally breaks during the month of June. Annual rainfall of the district was 1165.8m.m in 2011 which is lower than the normal rainfall (1285.9m.m).The district has as area of 7073 sq.kms and 9.68lakhs of population as per 2011 census. The distirct accounts for 4.54 percent of the states territory and spheres 2.31 percent of the states population. The total forest area of the district is 2812.33(39.76%). The density of population of the district is 137 per sq.kms. as against 270 persons per sq.km of the state. It has 2667 villages (including 200 un-inhabited villages) covering 11 blocks, 11 Tahasils and 2 Subdividisions. As per 2011 census the schedule caste population is 139514 (14.4%) and schedule tribe population 541905 (56.0%). The literacy percentage of the district covers 49.8 against 72.9 of the state.

Gajapati district came into being with effect from 2nd October 1992. Prior to this it was a part (Sub-division) of Ganjam district.Gajapati distirct is one of the Southern located districts in Odisha. It lies between 83^0 48' to $84^0$2 7' E longitude and between $18^0$46' N to $19^0$39' N latitude. It is bounded by the Kandhamal district in North, Srikakulam district of Andhra Pradesh in South, Ganjam district in the East, and Rayagada district in the West.The climate condition of the district is generally hot and high humidity during April to May and cold during December to January. The monsoon generally breaks during the month of June. Actual average annual rainfall of the district was 1293.2m.m. during 2011, which is lower than the normal rainfall 1403.3 mm.The district has geographical area of 4325 sq.kmsand forest area of 2468.98(57.09%).As per 2011 census the population of the district is 5.78 lakh. The district accounts for 2.78 percent of the states territory and shares 1.38 percent of the States population. The density population of the distirct is 134 sq.kms. As against 270 persons per sq.km of the state. It has 1619 villages (including 107 un-inhabited villages) covering 7 blocks, 7 Tahasils and 1 Subdivisions. As per 2011

census the schedule caste population is 39175 (6.80%) and schedule tribe population 31374 (54.3%). The literacy percentage of the district covers 53.5 against 72.90 of the State.

Keonjhar distirct is one of the northern located districts in Odisha lies between $85^0$11' to $86^0$22' East lontigude and between $20^0$1' to $22^0$10' North latitude. It is bounded by the Jharkhand State in noth, Jajpur distict in south, Angul district in the east and Mayurbhanj district in the west.The climate condition of the district is generally hot with high humidity during March to July and cold during November to February. The monsoon generally breaks during the month of June. Annual rainfall of the district was 1910.1m.m in 2011 which is higher than the normal rainfall (1487.7 mm).The geographical area of the district is 8303sq.kmsand the forest area is 3097.18(37.30%). As per 2011 census, it has 18.01 lakh population. the district accounts for 5.33 percent of the states territory and shares 4.29 percent of the states population. The density of population of the distirct is 217 per sq. kms. as against 270 persons per sq.km of the state. It has 2122 villages (including 53 un-inhabited villages) covering 13 blocks, 13 Tahasils and 3 Subdivisions. As per 2011 census the scheduled case population is 209357 (11.60%) and scheduled tribe population 818878 (45.40%). The literacy percentage of the district covers 68.20 against 72.90 of the state.

Mayurbhanj district is one of the centrally located districts in Odisha. It lies between $85^0$40' to $87^0$11' East longitude and between $21^0$16' to $22^0$34' North latitude. It is bounded by the Jharkhand state in north, Balasore district in south, West Bengal State in the east and Keonjhar distirct in the west.The climate condition of the district is generally hot with high humidity during April to May and cold during November to December. The monsoon generally breaks during the month of June, Annual rainfall of the district was 1674.4 m.m. in 2011, which is higher than the normal rainfall (1600.6m.m).The geographical area of the district is 10418 sq.kms and the forest area is 4392.13(42.16%).As per 2011 census,the district has 25.20 lakh population. The district accounts for 6.69 percent of the sates territory and shares 6.00 percent of the states population. The density of population of the district is 242 per sq.kms as against 270 people per sq.km of the state. It has 3950 villages (including 202 un-inhabited villages) covering 26 blocks, 26 Tahasils and 4 Ssubdivisions. As per 2011 census the schedule caste population is 184682 (7.30%) and scheduled tribe population 1479576 (58.70%). The literacy percentage of the district covers 63.20 against 72.90 of the state.

2.2 Overview of sample PVTGs:

The primitive tribes live in comparatively inaccessible areas. They are at the lowest rung of educational development and their population size is comparatively lower than that of the advanced section of the tribal groups. Their world-view is fully in consonance with the forest ecosystem. However, for the purpose of development, thirteen tribes /section of the tribes have so far been declared by the government as primitive communities. They are Bondo, Didayi, Saora, LanjiaSaora,Dongaria kondh, Kutia Kondh, Lodha,Juang, HillKharia, Birhor,Mankidia,Paudi Bhuinya and Chuktia Bhunjia and who are segmented into different exogamous totemic clans and are mostly forest dwellers. The totems relate to plants and animals found in their forests. The social sanction prevalent among tribal communities prohibits any harm to the totemic phenomena. In other words, the social system of the tribal people provides a large measure of protection to the forest and propagation of vegetation. Tribal economy in Odisha is subsistence oriented. It shows wide variation in the economic pursuits which are greatly influenced by ecological characteristics of their habitat and own culture and tradition. Basing on their traditional economy the tribes of Odisha may be grouped under (a) hunters and food-gatheers, (b) cattle herders, (c) simple artisans, (d) shifting cultivators, e) settled agriculturalists and (f) industrial workers. Tribal economy still

revolves round agriculture in some form or other and continues to be the mainstay of the people as about 90 per cent of their main workers have returned as cultivators and agricultural labourers in census report.

2.3.1 Dangria Kandha

Dangria Kandha, one of the PVTGs of Odisha, is autochthons of the Niamgiri hill ranges in Rayagada districtwhich is situated on the boarders of Rayagada and Gunupur Subdivision rise steeply from 1000ft.to a number of peaks of which the highest is 4970 ft.above the sea level.They are one of the sections of the numerically preponderant Kondh tribe of Odisha. They normally live in interior forest pockets of the Rayagada district, some live in the foot hills while others on hill top. They speak *Kui*, a Dravidian dialect.

The Dangria Kondh resides in 102 settlements in 7 GPs of 2 Micro Project areas (DKDA, Kurli, & DKDA, Parsali) covering 3 blocks namely Bissam Cuttack, Muniguda and Kalyansingpur. Total geographical area of 2 Micro Projects is 165.35 sq. kms. Total Households of the PTG in 2 Micro Project area is 2106 and their population is 8848 (Male-3761 and Female 5087) showing a favourable sex ratioout numbering their counterpart male population. The density of population is 52.5, average growth rate is 6.21% and sexratio is 1353. Landless household in both the Micro Project area is 1450 and BPL household is 1798.*(Source: Micro Project Profile, SCSTRTI, 2012)*.

Dangria Kandha men and women are quite fashionable in their personal adornments, which make them attractive and distinguish them from others. Dangria men put on a narrow piece of loin cloth and women use two pieces of cloth(*Kapadaganda*),each3-4 feet in length and one and half feet in width. The first piece is wrapped round the waist with a knot in the front. The second piece covers the upper part of the boby like an apron. Dangria men grow long hair.A wooden comb (Kokuya) is fixed at thehair knot of men and women which adorns the hair lock and keeps the hair tight. A tiny knife (pipli) with colourful thread balls at its metal handle,adorns the hair lock of women that also serves the purpose of cutting as and when required.A variety of hair pins and clips enhances the beauty of the unique hair style of men and women.Dangria men and women are very fond of beautifying themselves with a veriety of ornaments. Both the sexes wear earrings and nose rings (murmi) with brass made pointed sticks (Kulti). Men and women put on aluminium neck rings,beads & coin necklaces(Kekodica),finger rings in bunches.In addition to that women wear bangles,anklet and toe rings. From a distance, the men and women look alike. Dangria Kondh family is nuclear,monogamous and patrilineal consisting of parents and their children.

The typical Dangria Kandha houses have low thatched roofs hardly 2-3 ft. above the ground. It consists of a specious rectangular room and another small room (Dhapa) at the back with verandahs infront and back of the house. The living room is used for sleeping and dining.A ceiling like platform is built inside to store food grains and other sun dry articles.

They have linear housing pattern in the Dravidian style. They are organized into strong territorial clan groups. They follow clan exogamy and practice polygyny. Their girls' dormitory, *dashbeta* is functional. Their traditional labour cooperatives are operating. They observe *meria* or *kedu* festival sacrificing buffaloes. They worship earth goddess, *'Dharnipenu'* and '*Kateiwalli'*. Their community house is called '*Sadar'*.The main occupation of the Dangria Kandha is shifting cultivation, which is supplemented by, horticulture, collection and sale of Minor Forest Produces. They are expert horticulturists. They grow pineapples, banana, oranges, turmeric and a variety of cereals and pulses in their swiddens.Their sources

of income are from hill farm cultivation like pulses, jhana, ragi etc. and legumes, like arhar, beans, etc. Oil seeds, like caster, mustard, nizer, til etc., Fruit orchards like Mango, jackfruit, banana, citrus, pineapple etc. and spices cultivation like turmeric, ginger, chilli, etc. and Minor forest collections like yam, hill broom, siali fibre and leaves, sal seeds and leaves, mahua flowers and seeds, tamarind, resin, gum etc. They also collect firewood, timber and forest produce for their own use. Besides, they raise livestocks like buffalo(Kodra), cow(Kodi),goat(Adda),Sheep(Mendha),pig(paji),dob(Neudi),fowl(koyu), and pigeon (parua)for their own use and in ritual occasions.

Dongria Kondh stronglybelieves in the existence of a large number of supernatural beings who exercise control on various aspects of their life. Their pantheon is composed of Gods, deities and spirits-both benevolent and malevolent. Dongrias have many kinds of magico religious functionaries and specialists who act as peoples' representatives to mediate between humans and supernaturals. Meria Festival is the most important festival observed communally in any one of the villages for eight days during the month of January and February. '*Jani',* the priest is the formal secular and ritual head of the village and village council. He presides over the village council meeting. '*Bishmajhi'* is the revenue collector and village fund manager, '*Barik'* is the village messenger who belongs to domb community. The statutory Panchayat Rajsystem has created a set of elected leaders like Ward Member, Sarpanch and Block / Zilla Parishad Chairman. They act as the spokesman of the people and look after development works liasioning between the peple and government and other external agencies.

The impact of planned change and modernization are visible in their way of life. On the other side, their traditional dormitory and kinship organization are weakening. Still the Dongria Kandhas are in a state of flux. Old customs believe and values still hold good. Inspite of the changes their social structure has retained many of its basic characterstics features.

2.3.2 Lanjia Saora

The Saora is one of the mostancient tribes of Odisha. They are widely found all over central India comprising Bihar,Odisha,Andhra Pradesh,Madhya Pradesh,Maharashtra and West Bengal.Though they are found in almost all the district of the state,their main concentration extends over the Parlakhemundi subdivision of Gajapati district and Gunupur subdivision of Rayagada district.This tribe resides in the hilly region of Gajapati. Lanjia Saora is a section of the Saora Tribe. Lanjia Saora constitutes one of the primitive sections of the Saora tribe. They are so called by their neighbours for their distinct style of male dress in which long and narrow strip of male loin cloth is worn in such a fashion that both the red embroidered ends hang down in front and back like a tail (Lanja). Their dialect called Sora.

The Lanjia Saora resides in 41 settlements in 4 GPs of 2 Micro Project areas (LSDA, Serongo,&LSDA, Puttasing) covering 2 blocks namelyGumma & Gunupur. Total geographical area of 2 Micro Projects is 65sq. kms and the forest area is 5819.17 acres. Total Households of the PTGs in 2 Micro Project area is 2439 and their population is 11,820 (Male-5702 and Female6118) showing a favourable sex ratio out numbering their male counterparts. The density of population is182, average growth rate is 2.63% and sexratio is1071. Their literacy rate in both the Micro Projects is 42.5% Landless household in both the Micro Project area is 134 and BPL household is1028. (*Source*: Micro Project Profile,SCSTRTI,2012).

The traditional dress of a Saora woman is a coarse waist cloth with gray / red borders about three feet in length and about two feet in bredth which hardly reaches he knees. Occasionally a man wears a bed necklace. Saora woman do not use too many ornaments. They wear a few bead necklaces, metal neck

rings, round wooden plugs in ear lobes, spiral rings made of bras, bell metal or aluminium in the fingers and toes, little rings in the alae of the nose and metal anklets. These are purchased from local markets.

Lanjia Saora villages are situated on the hill slopes or foot hills often inacceibale, and mostly lie hidden in forest-clad hills. They generally live in small villages. In Saora villages, the houses are either scattered or arranged in rows. In the streets and down the paths leading to the village boundaryone will find shrines for gods and ancestors. Sago and date palms are found everywhere in the village and many villages are well shaded by great trees. The Lanjia Saora houses are rectangular in shape. The roof is proportionately low and the walls of houses are made of stone and mud or of upright pieces of wood or bamboo and covered with a thick plaster of mud. The walls are painted with red earth and the verandah is painted black.There may be a single door or in some houses a back door, right in line with the front door. There is a high frontverandah. The ever burning health is located under this loft at one end adjoining a wall. The household utensils are kept near the hearth. In winter and the rainy rseson all family members and visitors sleep under the loft. In summer some people may sleep on the verandah.

Lanjia Saora social organization is unique for lack of any clan. The smallest socialunit is family and the largest, the extened family called birinda formed of the descendants of a common ancestor of four or five generations back.Significantly a woman's membership of her father's birinda does not change after her marriage and she remains as such till her death after which her own birinda kins may claim the right to perform her funeral rites.Lanjia Saora family is most nuclear and patrineal, generally comprising parents and unmarried children. The Lanjia Saora thrives on a subsistence economy founded on land and forest. Traditionally they are hunters, food gathers and shifting cultivators. The subsistence economy of the tribe rests on slash and burn and terrace cultivation. It is supplemented by seasonal forest collections, wage earning, occasional hunting and fishing. Their socio economic life is their traditional system of labour cooperative (ansir) that ensure them labour supply for swidden cultivation, house construction, terrace making and cultivation, and other community activities in the village.

Sonnum or sunnam is the general name for the Saora deities and spirits. In Saora society there are '*samans'* both male and female called '*Kudanmar' and 'Kudanboi'* respectively who acts as intermediaries between humans and supernatural. To satisfy the gods and spirits, the saora make their famous wall paintings or icons known as italons, initial or idital inside the house. The Lanjia Saora is very artistic people. Thier artistic talents and skills find expression in their colourful and enchanting wall paintings, dance and music. Their traditional Panchayat plays an important role in maintaining law and order in the society. In every village, the people are under the influence of two elders, '*Gomango',* the secular head man the '*Buyya',*the religious headman.Officials designated as '*mundal'* and '*dalbehera'*assist them in handling the village affairs. The village astrologer is called '*disari'*. The '*Gomango'* preside over the meeting and take decision in consultation in the village elders.

For their allround development, two micro projects one located at Puttasing in Rayagada distirct and another at Seranga in Gajapati districts have been established the objective is to rays the living condition of the Lanjia Saora and changes them for a primitive and pre-agricultural stage of shifting cultivation to modern agriculture. They impact is visible in changes effected in their way of life.

They live in difficult terrain somewhere deep inside the hill ranges of Gajapati. Although this tribe lives in such interior forest, they still are quite modernized and have a normal lifestyle. The impact of Christian missionary is quite visible for which they are more mainstreamed. The food habit of Lanjia Saora is more or less like the non-tribals. They consume rice as staple food along with vegetables which they either cultivate or buy from the market. Dependency on forest for this tribe is minimal as they are well

connected with the market places and often go to the market. Consumption of meat is high but collection of meat from forest is not so regular and adequate. The reason for less dependency of forest is the fact that the forest of that area have already deteriorated and not much forest is left which can have different fauna species. So they mainly depend on agriculture and market products. Market accessibility of Lanjia Saora is relatively better for which accessibility to market products is relatively high. Consumption of alcohol by the tribe is high. They use both handmade and extracted and fermented liquor. The plant extract '*Salapa Rasa*' is a common source of alcoholic. These people have learned different methods of cooking rather than just boiling and roasting.

The tribe is now involved in horticultural activities due to Government initiatives. These people do a lot of agriculture but there is a marked difference in the process they adopt. While all the other tribes carry on shifting cultivation, Lanjia Saora go for Contour farming. Terrace cultivation is common in this tribe. They convert the slope in to terrace and bound it from three sides for cultivation. They also make provision for irrigation by diverting the natural stream water to their agricultural fields.

Apart from agriculture, they also avail food grain (rice) support under PDS.Because of better affording capacity, they also buy food material from market during the time of requirement. Both male and female are hardworking and engaged in different economic activities. Food storage method is by using gunny or plastic bags while perishable food items are sun dried and stored. Drying and storing of meat is not observed.

2.3.3 Juang

The Juang tribe found only in Odisha. The community is broadly divided in to two sections,namely Hill Juang and Plain Juang.The Hill Juang is confined to to the hill ranges of Keonjher and Pallahara areas where as the plain Juang is distributed in the plains of Dhenkanal and Keonjher districts. Juang pirh of Keonjhar is considered to be the original abode of the Juangs. In due course of time, they have migrated to adjoining areas of the area of origin and now also found in Anugul and Dhenkanal district. The Hill Juang are still in primitive stage, subsistingmainly on shifting cultivation where as the Juang of the plains have taken to settled agriculture. In Pallara areas,they pursue basket making in addition to their traditional shifting cultivation.Ethnically the Juang are a branch of Munda group.They have their own language known as '*Juang'*.Now-a-days they can speak Odia. According to 2011 census, their population is .47, 095, male is 23,093 and female is 24, 002, their sex ratio is1039, their literacy is 42.85.

The Juang resides in 35 settlements in 6 GPs of the Micro Project area (JDA) covering only one block namely Banspal. Total geographical area of 2 Micro Projects is 641.44 sq. kms and the forest area is 12,086.12 acres. Total Households of the PTG in Micro Project area is 1936 and their population is 8592 (Male-4196 and Female-4396) showing a favourable sex ratio out numbering their male counterparts. The density of population is13; average growth rate is 3.76% (from 2007 to 2010)and sexratio is1047. Their totalliteracy rate in the Micro Project area is 29.75%, male literacy is 40.625 and female literacy is 17.52%. Landless household is nil and BPL household is1836.(*Source*: Micro Project Profile, SCSTRTI, 2012)

The Juang live in homogenous villages located at the foot hills or in the valley surrounded by the forests.The houses are scatteredly constructed. The dormitory house of the Juang popularly known as '*Mandaghar'* is also called '*mazang'*. They have retained in their religious identity and some important socio cultural practices intact till today. Most of the original Juang villages are located in the hill slopes

and valleys. Each Juang villages is a uniclan territorial unit and may consist of hamlets. Their houses are located around the *Mandaghar*. Infront of the *Mandaghar*, '*gramsiri',* the village deity is enshrined with the belief that it will safeguard the people from all dangers. The house structure is rectangular in size and wooden platforms are erected inside the house for storeing various usable items. Their single room is multipurposely used as bedroom, drawing room, store room and kitchen room. They have nuclear family. Previously, they were using leafmade dress; now they use clothes available in the weekly market. The females are very much fund of ornaments. They use jewelleries consist of bangles, anklet, armlet, ear ring, nose ring and toe ring, waist gridle and bead necklaces. They also decorate their bodies with tattoo marks and their hair style with traditional combs. They usually keep tobacco containers and fire making tools at hand whenever they move out. Changu is their famous musical instrument. They usually expert in making artistic and significant traditional combs. The female members keep themselves busy in cooking and household chorus, while the male person gossip among themselves shifting around the sacred fire burnt throughout the year at the center of the '*Mandaghar'*. Juangs are hunters and food gatherers and subsequently practise slash and burnt type of cultivation on rotation basis and later they adopted wet land cultivation. They classify their lands into four types namely:Taila (land for shifting cultivation), Guda(Plain dry land),Badi(Kitchen garden) and Bila(irrigated wet land for paddy cultivation).

The slash and burn type of rotation cultivation is the most popular among the Juang. As shifting cultivation cater to the fulfilment of most esential socio economic needs, a varieties of millets,legumes or pulses,oil seeds and vegitables in *Taila*. The Juangs also depend on the forest for forest produces and hunting games.During lean period, forest supports them to provide basic needs for subsistence. They are very much fund of fish and fishing is apast time rather than a regular economic pursuit. They domesticate animals and birds like cow, goat, pig and poultry for multifarious socio economic purposes. They have labour cooperatives at the village level andthey render free services to the members of the village at the time of need. Some of them have also started working in the mines and a very few are engaged in Government and semi Government jobs.

The tribe store different food item in a traditional way. Paddy is stored in a container made up of Ropes and is stored for a period of one year. Maize is also dried and stored like leafy vegetables. Some family have special rooms for keeping the stored food. Flesh is generally not stored but if at all it is to be stored, it is stored dried. Supply of rice under PDS along with their own collection and production gives them food security. In earlier days, they used to face food scarcity and had to depend on forest for a large part of the year. But after the availability of PDS rice, the situation has improved.

They are adopted goatary. They move to the nearby forest for grazing. The Juang adult male, female and small girls and boys take the goat herd into the jungle for fodder. While grazing they keep the animal at different spots on the proposed slash and burn cultivating slopes so that the land area gets the goat urine and dung as natural fertilizer for the soil.

The Juang believe in supernatural powers and ancestral spirits who are malevolent and benevolentin nature. In order to appease them, they offer sacrifices and ritualistic observances at regular intervals. Dharam deota (Sun God) is regarded as their supreme deity. They also worship Basumatimata(Earth Goddess) and Gramasiri,the village Goddess, who is enshrined and symbolically represented by a wooden post and stones adjacent to Mandaghar.Gramsiri is usually shifted to the new swettlement when the people chang their village site.

The secular head is called '*Pradhan'* and the magico religious head is called '*Nagam'*. Like *Pradhan*, the *Nagam* also plays a vital role in the traditional political council and his decisions are honoured with

sincerity and care. The *Dangua* acts as a messenger,passes on message and summons the villagersto the meeting.

Under the impact of modernization and acculturation,there have been immense change particularly in their adornment pattern,use of modern ameneties and material culture. Juang youths are found engaged in small business and working as wage earners. The dynamics of Mandaghar which was once upon a time a pivotal socio cultural institution has lost its social identity. The most powerful and vibrating kinship organization,inter and intra village relation ship are losing its importance. Due to meagre harvest in slash and burn type cultivation,they have adopted modern techniques and use of high breed seeds as well as pesticides and fertilizers. Development Agencies like ITDA and Micro Project for them have brought a lot of positive impact on development of education,agriculture,irrigation,soil conservation, housing,communication,health and sanitation etc.

2.3.4 Hill Kharia & Mankirdia

2.3.4.1 Hill Kharia

Locally known as *Pahari Kharia*is the highland tribal group among the Kharia community. The other groups are Dhelki and Dudh Kharia. Majority of the Kharia lives in the forest ranges of similipal of Mayurbhanj,Balasore,Keonjher,Sundergarh, Dhenkanal and Sambalpur districts of Odisha. They are semi nomadic group. This group are primarily a forager community in the Similipal forest in Mayurbhanj district. According to 2011 census, Kharia population is 2,22,844, male is 1,09,817 and female is 1,13,027, their sex ratio is1029, their literacy is 58.46%.

According to 2007 survey conducted by SCSTRTI, the Hill Kharia households in the HKMDA, Jashipur (Micro Project) area are 606hact.The total population of the Hill Kharia in all the villages of the Project is 1900.The average size of the household is 3 persons.Out of total population of 1900,the male population is 939 and the female population is 961. The sex ratio is 1023 females per 1000 males. The percentage of literacy among them is 28.89%. The Hill-Kharia people's dress and ornament are very simple. The children upto 3 years remain naked. Adult men were small size dhoti and women were short size cotton saree which falls upto the ankles. Now-a-days the advance section of the tribe is using modern dress.The women adonred themselves with various types of ornaments like brass necklace, armlet, earring, finger ring, iron hair pin, glass or metal bangles. Some young boys also use necklace made of beads.The old ladies decorate their bodies with tattoo marks.

The Hill Kharias claimed themselves as the autochthones of the Mayurbhanj hills, Similipal hill ranges are the hearth and home of the Hill Kharias. As a forager tribal group, the Hill-Kharias live in remote hill and forest areas. Wild animals, like elephant, tiger, bear, deer, monkey, wild dong are seen in the Similipal National Park. The total similipal area is full of big trees like Sal, mahua, karanja, simili and other forest species. The Kharias leave in mult ethenic villages of agricultural communities like Bathudi, Gond and Kolha tribe. Their villages vary in size from 5 to 20 or evern more. Their huts are located in the scattered manner either on the top or slope or even on the foot of the hills. They live in separate hamlet and adjacent to water source. Their house is a small multipurpose rectangular hut with walls made of sal wood nad plastered with mud. The houses have no windows. The roof the hut made out of double slope wooden frame and first with grass or straw. The well to do hill kharia houses are thatched with tiles. The single room is divied by a partition wall into a small kitchen and relatively bigger bedroom. Close to the

house, goat pen, pigsty and cattleshed are constructed separately for domesic animals. The poletry birds are kept in a corner inside the living room.

Hill Kharis use to live in the makeshift leaf huts made out of tree branches and leaves and built away from their permanentsettlement, but adjacent to the collection sites and water source inside the remote forest. The household furniture, tools and aplliances of the Kharias include date palm leaf mats,string cots,earthen vessels,baskets,leaf platesand cups,pestal and mortar, griding stone,bow and arrow,axe and spear.They worship Thakurani,Dharani Devata,sun God and other deities and spirits by offering them sacrifices of goat,fowl,liquor and other ritual food.

They used to settle in the foot hills.They live in small thatched huts.The houses are found scattered. They live in small groups of 20 to 25 families. They prepare ther own hunting implements,bow ansd arrow,agricultural implements,fishing nets and traps.They use lef cups and leaf plates for taking food.

The Hill-Kharia livelihood is determined by forest environment. They preimarily depend on Similipal hills and forest for a living. They do major seasonal collections along with agricultural labour / activity in agricultural season. In the forest habitat they think hunting and food gathering are more reliable than the agricultural pursuit. They usually lead a semi nomadic life and subsist on food gathering and hunting by application offour major techniques, like picking, digging, climing and cutting.

The Similipal forest and hills are a hospitable for naturalgrowth of honey. The Hill-Kharias traditionally living close to the forest take the advantage of collecting honey since time immemorial. They collect two types of honey, bada / bhagua (big) mahu and sana (little) mahu. Big bees build large hives on the rock caves (mahu bhandara) or branch of big and tall sal trees and also their hollow trunks. They in a group of three or morepersons use tools, like axe, rope, tin container, hand made straw torch for making fire and smoke and basket (pachhia) for collection of honey by climbing upto the top of the hill rocks or sal trees. One climbs up and uses the torch for creating smoke to drive out the bees and others at the ground help him for smooth collection of honey. Sometimes it becomes a hazard on part of person to climb up for hoey collection and fall down which may lead to death or serious injuries. Honey at times also is found at different furrows. There the honey combs are collected by digging out the soil with help of hoe (gondra). The honey combs are squeezed to get the honey out and keep then in thins or aluminium pots. The honey is available in plenty for collection and sale in two main periods, first from March to June and then from October to November in a year.

Collection of sal resin (jhuna) is done by them during the months of September to November firstly, and then from March to June. The resin collections for the sale give an additional income to the hill Kharia. Two or three persons move together with knifes, axe and baskets for collection of resins from the forest. One expert makes notches on the matured sal tree trunk and climbs up the tree with axe on his shoulder and a basket hanging down from his waist and then reaching at the resin spot he scraps the resin from the bark with help of the axe and gets it collected in the basket keeping a balance carefully. After collection, they process the resin at home by separating them from the barks before sale.

Wild arrowroot (palua) carries more medicinal value than the cultivated ones. Unlike resin and honey, collection the arrowroot collection bears no life risk but it is tedious process and very time and labour consuming. Traditionally, arrowroot collection by the Hill Kharia, except old and incapacitated, during the months – December to March of a year requires temporary shifting of residence in forest, preferably close to a stream / river side, the arrowroot processing site. The use gandra (digging hoe) ganjia (big net

made up of siali fiber), small knife, a big and new earthen pot and a piece of cloth for collection and processing the arrowroot. In the forest they dig out the arrowroot tubers by help of gandra. They wash and dress the tubers by scraping out the roots and soak them in the stream water in stone or basket enclosures. They they pound the tubers by rubbing on the sand stones. Thereafter the pounded arrowroot is filtered into an earthen pot through a piece of cloth. Then the filtered arrowroot is washed time and again and finally keep them under the Sun till they are completely dried to get the finished product of palua for marketing.

The Hill Kharia are expert hunters. Using bow and arrows, sticks and spears they hunt wild games, like deer and sambar, boar and catch pea-fowls, jungle fowls, snipes, and squirrels. Formerly, the traditional occupation of the kharia was to carry litters. But now-a-days the Hill Khaira foragers principally depend upon food-gathering and hunting. Some of them are also practising cultivation in small chunks of lands. Their major source of income is derived from collection of forest produce, such as resin, wax, honey, tussar cocoon, gum and lac etc. They barter the forest produce with paddy and other cereals.Their habitat provides a little scope to go for fishing. Fishing has been a subsidiary and occasional economic pursuit for the Hill Kharia.Generally, their women weave mats out of date-palm and splits of bamboo for drying mango jelly, rice, minor forest produce and their own use such sleeping and sitting.

The Khariasmake ropes out of jute, sabati fiber and leaves of aloe plant for personal use. They also prepare leaf plates and cups for own use and also for sale. A few of them know the technique of oil pressing by using two wooden planks and siali fiber baskets. They prepare their own hunting implements, bow and arrow, agricultural implements, fishing nets and traps for own use in hunting expedition, agricultural pursuit and catching fish. They also do rear live stock and poultry for their personal consumption, ritual requirements and as saving for meeting the expenses in festival and rituals, like Makara, marriage, birth, death, illness and unforeseen expenditures.

Under the changing circumstances, the Hill Khaira has been pushed out of their foraging activities and adopted some new-occupations, like small business, vending of vegetables, such as potato, onion, dry fish, cycle repairing etc. to eke out their living.

They practice mongogamy and prefer cross causin marriage. The family of Hill Kharia is mostly nuclear type consisting of parents and unmarried children. A few extended families are also found among them. Average size of the family varies from five to six members. The Kharia family is patrilineal and patriarchal. After death they bury the curves all the kutumba members of the deceased person observe death pollution for tenth days. The Hill Kharia celebrates Hindu festival like maker, Raja, Asthami, Manabasa, Nuakhai, Pusparab, Chaiti Parab etc. Makar is the great joy. Unless and until the Maghuanipuja is observed and completed, collection of plant resources is restricted in the forest. Jungle / Forest Puja is observed twice a year once in April-May for bumber hunney collection and then in September-October for sal-resin collection in good quantity and quality. They think the sal trees as sacried because fire of its wood is sacried, leaf provides sacried plate, sal resin is sacried perfume and serves as dish infection. Sal trees believed as abode of deities and spirits. Religiously the Hill Kharia consider the sal (shorea robusta) trees a sacred species and do not cut the trees. Only the Priest go for worshiping it twice a year. The grave yard containing trees are venerated and not cut. Totems and taboos refraim them from cutting trees and killing animals and birds. They worship forests and jahira a patch of sal groves, where the village deity resides to protect the villager and villagers for them every hill in Similipal is regarded as a deity and belive to the custodian of the forest resources. They call the deities as Badambudhi, Ramaraja, Pabanbira, Mahabira, Bhandar Debata, Thakurani, Bauli, Basuli, Basuki, Gramdebi etc.They also worship witch and spirit. Ancestoral spirits and lenease deities are properly

propeciated in rituals and festival for family wellbeing. The forest deities are worshipped for successful food gathering and hunting. In every village there is a sacried place called Jahera, where sal is dominate tree, and the tribals offer worship to satisfy the god. During first collection of honey they perform Bhandarapuja, offering to mother goddess.

They have simple political organisation. Every Kharia village has a panchyat of its own headed by Pradhan / Mukhia among the Hill Kharia. He usually extends advice and settles the matter with the help of other functionaries of the tribe like Dehuri (priest), Chhatia (Messenger), Gunia(Magician). Cases regarding breach of any taboo and disputes about partition, divorce, adultery and the like are dicided in the meeting of the village council.

Encroachment of outsiders into traditional forest based economy of the forager, impact of forest policies and restriction of the project Tiger / Elephant and Biospher Reserve for exploitation of MFP collection in core and reserve areas, planned development interventions by the Government and private agecienes have brought forth changes in the life and livelihood of the Hill Kharia. Thus, the changes have reflected in their social system, techno-economic and religious spheres. In the recent past, some of the Hill Kharia left thierhill dwellings and moved up to other parts of the area in search of livelihood. Now they are living with other peasant communities. All the Hill-Kharia famiies in the villages still depend on the nearby forest for their daily livelihood. However, sharp depletion of the forest cover has posed a major threat to their livelihood. They have taken up economic activities like settled agriculture animal husbandary wage earning and fuel wood collection and timber cutting for sale for their livelihood.

By the Governmental effort a Mirco Project Hill Kharia and Mankirdia Develoment Agency at Jashipur in Mayurbhanj distict has been established and working since 1987for the total development of the Hill Khaira population of eighteen villages. Due to restrictions of Similipal Biosphere Reserve and Project Tiger and over exploitation of forest resources by other communities the Hill Kharia have been constrained to takeup other occupations such as share cropping, wood cutting, small business, wage earning in road and other construction work, contractual labour, motor driving, pickle making, leaf cup and plate making. The multifarious development programmes such as housing under Indira Awas Yojana, drkining water provision, link roads, health and sanitation, education, environment including infrastructure works and packages of benefit schmes both indivisual and in group mode like tailoring, goat rearing, fishing leaf cups and plate making have changed their outlook.

Introduction of modern agriculture, multiple cropping, use of high yielding variety of seeds, provision of irrigation facility, input assistance, horticulture activities including backyard plantations with vegetable intercroppings, marketing of goods, etc. through group approach have brought forth noticeable changes in their life style.After being trained, some educated Hill Kharias have adopted small business and Bee keeping.

2.3.4.2The Mankirdia

The Mankirdia constitute a semi nomadic section of the Birhor tribe. They are one of the most primitive and little known forest dwelling and wandering communities of the state.

Besides Odisha, they are found in Jharkhand. West Bengal, Madhya Pradesh & Maharashtra. In Odisha, small wandering bands of Mankirdia are largely found in Mayurbhanj, Keonjhar, Balasore, Jajpur, Deogarh, Sundergarh and Sambalpur districts. They are mostly distributed in and around the Similipal

hills. According to 2011 census, their population is2, 222, male is 1144 and female is 1078, their sex ratio is 942, their literacy rate is 21.14%.

They are primarily a hunting and food gathering community. For their traditional skillof rope making, trapping and eating monkey, their neighbours call them 'Mankidi' or 'Mankirdia'. In the district of Kalahandi and Sundargarh they are named Mankidi whereas in Mayurbhanj and Sambalpur districts they go by the name Mankirdia. They catch and kill monkeys from the forests and eat monkey's meat. When these monekys create havoc in the rural areas and destroy crops, fruits and vegetables, the local people employ the Mankirdia to catch them.

They wander inside forest in small bands and stay at different *Tandas*, the temporary makeshift settlement, comprising of dome shaped leaf huts known as *Kumbha.* They speak a form of Munda language and some of them are also conversant in Oriya. They shuttle between the market and the forest. They select their settlement sites on the basis of the proximity of water sources,local weekly market andavailability of siali fibers,jute and monkeys.They construct cone shaped leaf huts called '***Kumbha"*** and dwell there. They pursue hunting and gathering economy, make ropes and rope made crafts out of siali fibers and jutes and when needed they work as labourers. They have minimum assets like course clothes,a few silver ornaments,earthen and aluminium utensils,bamboo baskets,axe,knife,bow and arrow,monkey catching nets and date palm mats.

Earlier, the Hill Kharia & Mankirdia were staying inside the Similipal reserve forest. But after the declaration of Similipal as bio-sphere, they were evacuated from the core of the biosphere and rehabilitated outside the forest area but their dependency on the forest still continuing. Because of remaining out of the core forest, they travel a longer distance to collect different forest items. Normally, the male members of the family go a longer distance in the search of work whereas female work in nearby areas.Their food consumption practices are more inclined towards non-tribals food habits. Because of evacuation from their original habitation, Government has been providing required schematic support to them. They avail most the welfare benefits of major government schemes.

Their traditional style of dress and ornaments are plain and simple. They follow the same pattern as the neighbouring Munda speaking tribes like the Santal, Munda, Kol, Ho etc. Men use coarse handloom loin cloth and women wear similar sarees. These white coloured clothes have coloured check pattern and are woven by local weavers. Women put on rew ornaments made of glass, beads and cheap metal. Often women fix a wooden comb in their hair knot.

The temporary settlement of Mankirdia is a small one, called *tanda,* the leaf hutments. After observing the ritual testing of suitability of the site by the *Dehuri,* the priest, a new *tanda* is set up at a place close to forest, water source and weekly *hat*market. Most often the *tanda* is found in the fringe of a village.

Large number of families in a *tanda* affects adversely to their forest and market based economy. So it houses 10 to 15 families comprising about 50 people. Some of the families are related to each other consanguinally and others, affinally. In a *tanda,* besides the *kumbhas* (leaf huts) belonging to the individual families, there are two other huts, called *Dhugala* used by the unmarried boys and *Kudi Ada,* used by the unmarried girls for sleeping at night. In one more *Kumbha* the *tanda* deity is installed.

Most often their tandas are tressed in and around the Similipal Hills of Mayurbhanj districit and Balasore district. In winter season they change the camp 2 to 3 times. The frequent change of settlement is primarily made in search of forest produce i.e. the Siali bark with which they make ropes. They divide

themselves into different groups on thebasis of kinship type and move from place to place in search of forest resources, mainly for availability of the matures siali crippers and money population and prospect of marketing of ropes. During monsoon the Mankiridia stick to a place to avail the employment opportunity in the agricultural opration of the local farmers.

Kumbha the leaf huts in which the Mankirdia leaf are dome shape have been and opening for entrance. It is made of twigs with leafs of sal tree woven in a frame work of wooden saplings tied together with siali fiber. The height of *Kumbha* is 5 inch. Their belongings include few cloths cooking and serving pots and utensils, few implements made of wood and iron used for rope making. A portion inside its serves as kitchen and store. They are so skilled in constructing the *Kumbha* in Mankirdia family takes few hours to collect the required raw materials and built a Kumbha. The craft of rope making is the lifeline of Mankirdia substance economic. They produce good variety of fibers by chopping and striping the bark of seasoned siali crippers. They prepare ropes, slings, nets, bags and small baskets from the siali fiber.

The Mankirdias are skilled monkey catchers.They use large nets made of Siali fibers for catching monkeys. Often, they catchbirds,snares,squirrels,hare,deer,birds and animals with the help of traps and nets. They also work as agricultural labourer in the agricultural field of other communities. The Mankirdia rear domestic animals like goats,fowls,dogs etc to supplement their food and income.During scarcity,they eat mango kernels which are preserved at homefor consumption in difficult time.

The Hill Kharia & Mankirdia Micro Project established in 1986-87 for development of the Hill Kharia & Mankirdia covers 18 revenue villages in 12 GPs and two blocks namely Jashipur and Karanjia. The total geographical area of the Micro Project is 129.78 sq. km and the forest area is6416.6 acres. Out of 18 villages, Mankirdia PVTG returns from 2 villages (Kendumundi of Karanjia block and Durdura of Jashipur block) and Hill-Kahria PVTG from 17 villages from both the said blocks. Only one village (Durdua) has exclusively Mankirdia PVTG population. Similarly, another village (Kendumundi) has population of both the PVTGs (Hill-Kharia & Mankirdia).

The Mankirdia believe in both benevolent and malevolent spirits. Like most of the neighbouring Munda speaking tribes, they worship the Sun God as their supreme deity. Besides, they also worship Logobir and Budhimai. They worship their ancestors for thepurpose of enjoying good heath and achieveing success in hunting and collection of forest produces.

The headman of the Tanda is called *Mukhiya*, who often acts as a priest. Customary matters relating to the Tanda and its member are discussed and decided in the meeting. Due to operation of forest and wild life conservation rules and regulationas their free movements in side the forest and their subsistence activities have been checked. Now they are settled downpermanently upon agriculture and allied pursuits. A micro Project named Hill Khdia & Mankirdia Development Agency has been established since 19987 which has set up two Mankirdia settlement colonies,one at Durdura village of Jashipur block and the other at Kendumundi village at Karanjia block. Due to impact of development intervention,some of them have crossed the poverty line,turned literate and have adopted different activities like business,driving etc. All of them havegiven up their wandering habit and lead a settled life.

By its characteristics, tribal villages are more scattered. The following statement shows village wise total households and population of the selected villages.

Table No. 2.1:
Number of Households and Total Population in the Study Area

Name of the PVTG	Name of the Village	Total no. of Households	Total Population
Dangria Kandha	Kansur	14	71
	Patalama	16	66
	Sana Degeneli	30	118
	Sub-Total	**60**	**255**
Lanjia Saora	Janter	70	295
	Mulisahi	21	84
	Raita Sahi	22	79
	Sub-Total	**113**	**458**
Juang	Nadam	42	210
	Sarai	66	400
	Hatisila	40	198
	Sub-Total	**148**	**808**
Hill Kharia&Mankirdia	Badajhili	29	81
	Durudura	29	84
	Sub-Total	**58**	**165**
Total		**379**	**1686**

The average size of the family in case of Dangria Kandha andLanjia Saora is 4 where as in case of Hill Kharia Mankirdia is 3 and in case of Juang is 5.The domicile, family size and number of BPL of the PTGs are presented below.

In all the studied PVTGs, the family type is mostly nuclear in nature (81.8 %). In Dangria Kandha, 83.3 % families are nuclear and 77.0 % families are nuclear in case of Lanjia Saora PVTGs. Among the Juang's, 79.7% families are nuclear whereas 94.8 % families found to be nuclear in Hill KhariaMankirdia communities.The nuclear characteristic of the family is more attributed to their socio-cultural practices.

Most of the households in all the PVTGs area having permanent domicile of that particular village due to years of habitation in that locality generation after generation. In case of Dangaria Kandha, about 93.3% families are permanent domicile of the village, in case of Juang it is about 98.6 % families and in case of Lanjia Saora it is cent percent. However, permanent domicile character of Hill Kharia and Mankirdia is less than 63.8 % due to their displacement from the biosphere to the plain area out of the forest area.

Number of families found below the poverty line is relatively high among the PVTGs i.e 93.9 %. Of the total studied families, 93.3 % are below the poverty line among Dangria Kandha, 97.3 % in Lanjia Saora,95.3 % in Juang and 84.5 % in Hill KhariaMankirdia. Though, Lanjia Saora observed to be relatively in a better economic position, still,as per the secondary information (1997 BPL list), thenumber of families in below the poverty line category is high.The socio-economic condition of the Lanjia Saora has changed in last decade due to various development mesures but the BPL list, which was prepared based on the 1997 enumeration, is yet to be upgraded.

2.5 Present Status of Forest in selected Districts:

It is important to understand the existing status of the forest as forest plays an important role in the livelihoods of the tribals. According to India State of Forest Report, 2011, the forest cover in the State is 31.41% of the State's geographical area. Comparing with previous assessment of 2006, the state has gained 48 Km^2 of forest cover. However, different tribals dominated / scheduled districts shows a negative growth in forest cover. According to the report, there is 9 Km^2 reduction in forest cover in Malkangiri, 10 Km^2reduction in Rayagada, 11 Km^2reduction in Sundargarh, 15 Km^2reduction in Kandhamal, 13 Km^2reduction of forest are in Keonjhar However, some of the tribals dominated districts have also gained in terms of forest coverage like Koraput (16 Km^2), Mayurbhanj (2 Km^2), Nawarangpur (7 Km^2) and Gajapati (2 Km^2). Further, as per India State Forest Report (ISFR), 2013, the change in forest percentage in Odisha is 0.93 % (1,444 Km^2).

As per report of the Principal Chief Conservator of the forests, Odisha,(2011) in Rayagada district, the total forest area is 2812.33 sq. kms which constitute 39.76% of the total geographical area of the district. Among the total forest area, Researve Forest area is 771.62 sq. kms, Demarcated Protected Forests area is 1147.19 sq. km,unclassified Forests is 0.96 sq. km and the other forest area is 892.56 sq. km. Similarly, inGajapati district the total forest area is 2468.98 sq. kms which constitute 57.09% of the total geographical area of the district.Among the total forest area, Researve Forest area is 416.89 sq. kms, Demarcated Protected Forests area is 108.15 sq. km, Undemarcated Forest area is 1149.41sq. km, unclassified Forests is 0.13 sq. km and the other forest area is 794.40 sq. km. In Keonjher district,the total forest area is 3097 sq. kms which constitute 37.30 % of the total geographical area of the district.Among the total forest area, Researve Forest area is 1834.09 sq. kms, Demarcated Protected Forests area is 273.64 sq. km, Undemarcated Forest area is 220.79 sq. km, unclassified Forests is 0.26 sq. km and the other forest area is 768.40 sq. km.In Mayurbhanj districtthe total forest area is 4392.13 sq. kms which constitute 42.16 % of the total geographical area of the district.Among the total forest area, Researve Forest area is 3330.14 sq. kms, Demarcated Protected Forests area is 245.06 sq. km, Undemarcated Forest area is nil, unclassified Forests is 2.20 sq. km and the other forest area is 814.73 sq. km.From the report it is found that though the forest area is morein acre in Mayurbhanj district. i.e, 4, 392.13 sq. kms(42.16%),but in terms of percentage it is highest in Gajapati district i.e 2468.98 sq. kms (57.09%). In all of the studied districts, theResearve Forest area is comparatively high than the other forest area in the district.

Hill Kharia and Mankirdia used to stay inside the core of the Similipal reserve forest. But after the declaration of Similipal Reserve Forest as a Bio-sphere, Government took measures to settle them out of the forest so that anthropogenic activities can be reduced inside the forest and wild life related casualities can be reduced. Because of displacement of Hill Kharia Mankirdia from their original habitation, now forest remains at a distant place from their new settlement. Apart from Hill Kharia Mankirdia, availability of forest is on an average of 2-3 Kms from the current settlements of other PVTGs. Name of different forest location and its distance from the selected PTG villages is presented in the table below.

Table No. 2.2:
Village wise name & distance of Forest with No. of dependent villagers

PVTG	Name of the Village	Name of the Forest	Distance from Village (in Km)	No of Dependent Villages
Dangria Kandha	Kandsur	Bamanakuda	1	3

		Tengedabadi	1	4
		Dasarmunda	1	3
		Tangiribadi	1	3
		Nispala	1	4
	Patalamba	Prading Dangara	1	3
		Lahara	1	3
		Kober	1	3
		Jocha Munda	1	3
	Sana Degeneli	Baman Chuan	1	4
		Dashara Munda	2	3
		Salaga Mani	2	4
		Gate Bali	1	3
	Jantar	Adaware	1	2
		Tungsar	2	2
		Egnettoz	2	2
		Jeguda	3	2
Lanjia Saora	Mulisahi		1	2
	Raita Sahi	Ragde Singh	2	
		Ginga	3	
		Siramatap	1	
		Kinasing	4	
	Nadam	Mahapat		6
		Saria	3	5
		Kaliapati	2	5
		Sidhi Matha	1	5
Juang		Bankula		5
	Sarai	Sidhi Matha	1	5
		Saria	1	5
		Mahapat	4	6
		Kaliapati	3	5
		Bankula	3	5
	Badajhili	Jara		2
		Duru	1	3
		Brundabana	10	5
		Haldia	20	4
		Hatimundi	15	5
Hill Kharia& Mankirdia	Durdura	Durudura	14	1
		Haladia		2
		Ghabar	5	2
		Rutu Huduary		1
		Rajaram		1
		Khidia Dayal		1

Number of villages (in the study sites) depending upon the existing nearby forest is relatively high in case of Juang followed by Dangria Kandha. Based on the availability, they collect different flora and fauna from these forests in different seasons. However, there is no such restriction about accessibility of other nearby villagers to these forests.

As observed and revealed during community interaction, almost all the households in the study village depend upon the forest directly or indirectly for different purposes. However, in case of Lanjia Saora, some families were of the opinion that they are not having direct dependency upon the forest due to various reasons like remunerative engagement in other sectors of employment, better affording capacity for the required items etc. Due to increased socio-cultural assimilation, Christian missionary activities and environmental awareness and consciousness, Lanjia Saora found to be more sanskritised in comparison to other PVTGs.

Table No. 2.3:
Number of PVTG Households depends upon the Forest

Name of the PVTG	Name of the Village	Total Number of Households in the Village	No of HouseholdsDependent on Forest
Dangria Kandha	Kandsur	14	14
	Patalama	16	16
	Sana Degeneli	30	30
	Sub Total	**60**	**60**
Lanjia Saora	Jungter	70	63
	Mulisahi	21	21
	Raita Sahi	22	18
	Sub-Total	**113**	**102**
Juang	Nadam	42	42
	Sarai	66	66
	Hatisila	40	40
	Sub-Total	**148**	**148**
Hill Kharia&Mankirdia	Badajhili	29	29
	Durudura	29	29
	Sub-Total	**58**	**58**
	Total	**379**	**332(97.10%)**

2.6 Land Holdings of selected PTG Households

Land holding plays an important role in the livelihoods of the PVTGs.Land holding of tribals families are either hereditary and/or purchased by the family and/or acquired under FRA. With average size of land holding of one to two acres, most of the families of studied PVTGs fall under marginal farmer category. Some of the tribals families are having irrigation sources like open well, stream/nala etc. But most of the cultivated area is rain-fed and farming is influenced by this characteristic. Number of households having land observed increased from 79.05 % to 82.43 % in Juang and from 90.27 % to 91.15 % in Lanjia Saora which means now more tribal families possess land of their own. However, Hill Kharia&Mankirdia does not have any land of their own (excluding land given under FRA) due to displacement. Land holding size of different PVTGs and its irrigation status is presented in the Table below.

Table No. 2.4:
Land Holding by PVTGs and Irrigation Coverage (Own Legal Land)

PVTG	Particulars	Current Status (in Ac.)			Before 5 Years (in Ac.)		
		Irrigated area	Non-irrigated area	Total area	Irrigated area	Non-irrigated Area	Total Area
Dangria Kandha	No. of HH	11	6	15	11	6	15
	% of Total HH	18.33	10.00	25.00	18.33	10.00	25.00
	Average	0.83	1.07	1.03	0.83	1.07	1.03
	Total	**9.08**	**6.39**	**15.47**	**9.08**	**6.39**	**15.47**
Lanjia Saora	No. of HH	63	80	103	62	78	102
	% of Total HH	55.75	70.80	91.15	54.87	69.03	90.27
	Average	0.89	0.63	1.03	0.97	0.61	1.07
	Total	**56.28**	**50.05**	**106.33**	**60.28**	**47.90**	**109.18**
Juang	No. of HH	56	97	122	54	93	117
	% of Total HH	37.84	65.54	82.43	36.49	62.84	79.05
	Average	1.0	0.79	1.09	1.15	0.84	1.19
	Total	**55.89**	**76.84**	**132.73**	**62.18**	**77.83**	**139.56**
Hill Kharia& Mankirdia	No. of HH	-	-	-	-	-	-
	% of Total HH	-	-	-	-	-	-
	Average	-	-	-	-	-	-
	Total	**-**	**-**	**-**	**-**	**-**	**-**

Apart from own land, the PVTGs also cultivate other forest / Government lands, referred here as shifting land. There is no change in the status of shifting land cultivated by Juang. But incase of Dangria Kandha and Lanjia Saora, there is increment in number of households doing farming in shifting land. Hill Kharia and Mankirdia do not have such scope due to their displacement from the forest and resettlement outside of the forest area. Quantum of shifting land cultivated by different PVTGs are reflected in the Table below.

Table No. 2.5
Land Holding by PVTGs and Irrigation Coverage (Shifting Land)

PVTG	Particulars	Current Status (in Ac.)			Before 5 Years (in Ac.)		
		Irrigated area	Non-irrigated area	Total area	Irrigated area	Non-irrigated Area	Total Area
Dangria Kandha	No. of HH	-	36	36	-	25	25
	% of Total HH	-	60.00	60.00	-	41.67	41.67
	Average	-	1.23	1.23	-	1.20	1.20
	Total	-	44.38	44.38	-	29.88	29.88
Lanjia Saora	No. of HH	2	88	89	4	68	72
	% of Total HH	1.77	77.88	78.76	3.54	60.18	63.72
	Average	0.75	1.75	1.74	0.88	1.72	1.67
	Total	1.5	153.71	155.21	3.5	116.71	120.21
Juang	No. of HH	1	95	95	2	94	95

PVTG	Particulars	Current Status (in Ac.)			Before 5 Years (in Ac.)		
		Irrigated area	Non-irrigated area	Total area	Irrigated area	Non-irrigated Area	Total Area
	% of Total HH	0.68	64.19	64.19	1.35	63.51	64.19
	Average	1.00	1.27	1.28	2.00	1.46	1.49
	Total	1.0	120.81	121.81	4.0	137.14	141.14
Hill Kharia& Mankirdia	No. of HH	-	-	-	-	-	-
	% of Total HH	-	-	-	-	-	-
	Average	-	-	-	-	-	-
	Total	-	-	-	-	-	-

Though, Hill Kharia &Mankirdia do not possess any land of their own, but under FRA, land is allotted to them. Other PVTGs are also being covered under FRA. Details of land allotment to different PVTGs and coverage of families are reflected in the table.

TableNo. 2.6:
Land Holding by PVTGs and Irrigation Coverage (FRA & Other Encroached Land)

PVTG	Particulars	Current Status (in Ac.)			Before 5 Years (in Ac.)		
		Irrigated area	Non-irrigated area	Total area	Irrigated area	Non-irrigated Area	Total Area
Dangria Kandha	No. of HH	2	38	40	-	21	21
	Average	1.50	1.95	1.93	-	2.26	2.26
	Total	3.0	74.01	77.01	-	47.51	47.51
	% of Total HH	3.33	63.33	66.67	-	35.00	35.00
Lanjia Saora	No. of HH		2	2	-	34	34
	Average		1.50	1.50	-	0.89	0.89
	Total		3.00	3.00	-	30.12	30.12
	% of Total HH		1.77	1.77	-	22.97	22.97
Juang	No. of HH	9	126	130	-	34	34
	Average	1.76	2.01	2.07	-	0.89	0.89
	Total	15.80	253.64	269.44	-	30.12	30.12
	% of Total HH	6.08	85.14	87.84	-	22.97	22.97
Hill Kharia & Mankirdia	No. of HH	1	1	1	-	-	-
	Average	0.50	0.50	1.00	-	-	-
	Total	0.50	0.50	1.00	-	-	-
	% of Total HH	1.72	1.72	1.72	-	-	-

2.7 Occupational Engagement

The traditional livelihood system of tribal people has been based on shifting cultivation and collection of edible forest produce. Such a system was rendered sustainable by a level and pattern of utilisation of land and forest resources, which ensured their self-generating capacity. Sustainability was also ensured through adoption of a highly diversified pattern of production and shifting cultivation. When shifting cultivation began to decline from about the second decade of the 20th century, and tribal people took to settled agriculture mainly on the uplands, they actively adapted to upland conditions by growing a large varieties of crops. While the physical yield of these crops was quite low in comparison with that of modern mono-crop agricultural practices, it minimised the risk of complete crop failure. Such a livelihood system also provided for a nutritionally balanced food consumption basket. All in all, one may say that tribal people were perhaps the earliest 'social ecologists': Tribal people's economic conditions of existence were rooted in both subsistence and conservation ethics (*Padhi and Panigrahi, 2011*). It can thus be summarized that PVTGs food habits include raw meats, forest fruits and roots in early days have now changed to agrarian produces.

PVTGs depend on forests for foods, medicine, firewood and Non-timber forest Produces (NTFPs). Forest provides food and livelihood to the tribes. Leaves, roots, fruits of flora are generally gathered by tribes while the tribes used hunting equipment for killing fauna for meat, skin and horns. Thus flora and fauna gathered from forests are traditional source of foods for tribes. Identification for wild flora for diet is the indigenous knowledge that passes from generation to generation through culture. Besides, hunting skills for the animals is also passed through culture. The fact can't be denied that the role of flora and fauna as diet is losing its place in the tribal society due to degradation of forests. Species of flora and fauna have been perished or became rare in due course of time.

Agriculture remains to be the primary sector of engagement for majority of PVTG families followed by daily wage and collection of forest produces during different seasons. Some children of sample households are also continuing their education for which they remain out of the workforce. Other sectors of engagement like livestock rearing, fishing, haunting etc. are very less among the PVTGs as it is not considered as primary sector of engagement.Similarly, in secondary occupation, daily wage and forest produce collection remain additional sources of income for the families. Some members also consider agriculture sector engagement as their secondary occupation. Consideration of other sectors as secondary area of engagement is not common as it does not fetch financial return directly.

At the primary level, agriculture remains to be the major source of income (65.38 %) followed by daily wage (19.33 %). Whereas, in secondary engagement, daily wage (61.04 %) is the major source of income which is supplemented by forest produce collection and its selling (30.77 %). Some members in the family also have tertiary sources of income and for them, forest produce collection and its selling remains important (88.53 %). Overall, the engagement pattern shows that forest produce collection (33.89 %), daily wage labour (31.53 %) and agriculture (29.13 %) are the major sectors of engagement and income for the tribals.

TableNo. 2.7:
Different Sources of Income of All the selected 5 PTG Households (Primary)

Areas of Engagement / Occupation	Primary Occupation				
	Juang	**Hill Kharia Mankirdia**	**Dongaria Kandh**	**Lanjia Soura**	**Total**
Agriculture	257	22	108	242	629
Forest Produce Collection	16	23	27	3	69
Daily Wage	80	58	6	42	186
Shepherd	1		3	4	8
Service	4	3	2	6	15
Quack / Local Traditional Healer		1			1
Masson	2				2
Driver	2				2
MDM Cook	5	1	1		7
Contractor	1				1
Household Chorous	32	3	7		42
Total	**400**	**111**	**154**	**297**	**962**

Note: Able bodied persons engaged currently in different primary occupations

TableNo. 2.8:
Different Sources of Income of All the selected 5 PTG Households (Secondary)

Areas of Engagement / Occupation	Secondary Occupation				
	Juang	**Hill Kharia Mankirdia**	**Dongaria Kandh**	**Lanjia Soura**	**Total**
Agriculture	28		4	16	48
Forest Produce Collection	95	56	48	49	248
Daily Wage	202	29	65	196	492
Agricultural Labour	1			2	3
Shepherd	4			2	6
Service				1	1
Petty Shop	2				2
HouseholdChorous		3			3
Total	**332**	**88**	**117**	**266**	**803**

Note: Able bodied persons engaged currently in different secondary occupations

2.8 Kitchen Garden for Food Security:

Kitchen garden has been one of the sources of nutritional food for the tribals. The PVTGs grow about 46 different crops in their kitchen garden which includes mostly vegetables along with some pulses and minor millets / coarse grains. Different crops grown by the PVTGs in the kitchen garden are like Boitalu (pumpkin, Curcurbita moschata), Okra (Hibiscus esculentus), Lau (Lagenaria siceraria), Papaya (Carica papaya), Saru, Katha Kanda, Bargudi, Drumstick, Green Chilly, Banana, Khata Palanga, Saga (leafy

vegetables), Kunduri (Cuccinia cordifolia), Beans, Kandula, Jhudanga, Ragi, Kangu, Brinjal (Solanum melongena) pumpkin,papaya,drumstick, maize,corns,ladies finger,tobacco etc. in the kitchen garden. (Please refer the annexure for details). PTG wise average production and consumption is stated below in the table.

TableNo. 2.9:
Fruits / Vegetable Grown in Kitchen Garden

PVTG	Fruits / Vegetables Grown in Kitchen Garden	Scientific Name
Juang	Boitalu	*Cucurbita maxima*
	Bhendi	*Abelmoschus Esculentus*
	Seema	*Phaseolus lunatus*
	Lau	*Lagenaria siceraria*
	Amruta bhanda	*Carica papaya*
	Saru	*Colocasia esculenta*
	Kadali	*Musa paradisiaca*
	Kunduri	*Coccinia grandis*
	Jhudunga	*Vigna unguiculata sesquipedalis*
	Baigana	*Solanum melongena*
	Janhi	*Luffa acutangula*
	Ruma	
	Sorisa saga	*Brassica juncea*
	Kakudi	*Cucumis sativus*
	Allu	*Solanum tubersum*
	Chhuin	*Moringa oleifera*
	Geda saga	
	Mati allu	*Amorphophallus paeonii*
	Kanta baigana	*Discorea glabra*
	Kalara	*Momordica charantia*
	Dhuduka	
	Piaja	*Allium cepa*
Hilla Kharia & Mankirdia	Boitalu	*Cucurbita maxima*
	Amruta bhanda	*Carica papaya*
	Sajana saga	*Moringa oleifera*
	Kunduri	*Coccinia grandis*
	Janhi	*Luffa acutangula*
	Kalara	*Momordica charantia*
	Kuliari	*Bauhunia varigata*
	Palua	*Curcuma zedoaria*
Dangria Kandha	Boitalu	*Cucurbita maxima*
	Bhendi	*Abelmoschus Esculentus*
	Seema	*Phaseolus lunatus*
	Lau	*Lagenaria siceraria*
	Amrutabhanda	*Carica papaya*
	Kadali	*Musa paradisiaca*
	Jhudunga	*Vigna unguiculata sesquipedalis*
	Baigana	*Solanum melongena*
	Kalara	*Momordica charantia*
	Lembu	*Citrus limonium*
Langia Saora	Boitalu	*Cucurbita maxima*
	Lau	*Lagenaria siceraria*

PVTG	Fruits / Vegetables Grown in Kitchen Garden	Scientific Name
	Amrutabhanda	*Carica papaya*
	Saru	*Colocasia esculenta*
	Bargudi	*Cyamopsis tetragonoloba*
	Sajana saga	*Moringa oleifera*
	Kunduri	*Coccinia grandis*
	Kandula	*Flemingia congesta*
	Baigana	*Solanum melongena*

TableNo. 2.10:
Kitchen Garden by the PVTGs

PVTG	Households		Average Area (in Ac.)	Average Production Per Annum (in KG)	Quantity Consumed (Per KG)	Unit Rate per KG (in Rs.)
	Total HH	HH having Kitchen Garden %				
Dangria Kandha	60	24 (40.00%)	0.007	25-36	23-35	15-22
Lanjia Saora	113	95 (84.07%)	0.035	25-36	24-29	14-16
Juang	112	92 (82.14%)	0.024	31-42	25-33	12-14
Hill Kharia& Mankirdia	58	28 (48.28%)	0.012	16-25	13-22	13-17
Total	**343**	**239 (69.68%)**				

Note: Refer Annexure for Details

The average annual production from the kitchen garden, irrespective of crop types, normally varies between 28 kg to 35 kg. Major part of the production, i.e., 24 kg to 29 kg is consumed at the household level and remaining part of the production is sold out locally or in the nearby market at a price range of Rs.13/- to Rs.15/-. Families with herbal garden, by its concept is not observed except few cases where tribals have herbs in their garden.

2.6 Food Habits of selected PVTGs

2.6.1: Dangria Kondh

Rice is the staple food of the Dangaria Kandha.The Dangria Kandha eat three times a day- morning, mid day and evening.Ragi and other course millets obtained from the shifting cultivation fields along with other Seasonal Cereals,pulses and vegetables, i.e., Maize,Millet,Kandul,Kating,Baila and Jhudunga etc. roots like Rani Kanda and Langala Kanda,Fruits, green leaves and mushrooms are cooked and eaten.In lean season they depend onmango kernel and salap(sago palm powder). The powder is obtained from the dry trunk of the salap tree.They make a gruel out of t and occasionally throw a handful of cerealslike ragi,rice and other course milletinto it,cook again and eat with salt. The intake of quantity and quality of food items varies seasonally. They also take non veg items like fish,chicken,mutton,buffalo meat,pork and beef. They like to take dried fish baked on fire or dried in the sun. They are very fond of Mahua Liquor

(*Irpikalu*) and sago palm juice (*Madakalu*). Besides, they also brew and drink banana liquor (*Kadali Kalu)* and Molasses liquor*(Guda Kalu)* on regular basis and during different rituals and festivals. Liquor is used as medicine and also offer to deities and ancestors to appease them. Besides, they use it to entertain their friends and relatives.They also consume various narcotics and stimulants like Kara (prepared out of raw tobacco leaf and fine ash),Dhungla (raw tobacco),Kundeli and Chunga.

The Dangria Kandha eats three times a day. Seasonal cereals, pulses and vegitables i.e Kandula,kating,Balia and Jhudanga etc. different types of roots,fruits, green leaves and mushrooms are cooked and eaten. Besides, non vegitable items like fish, dry fish, chiken, mutton, buffalo meat, pork and beef. They are fond of mahua liquor (Irpi kalu) Sago Palm Juice (Mada kalu), Kadali kalu (Banana liquor) and Guda Kalu(Molassess liquor).They also consume various narcotics and raw tobacco.

Table No. 2.11:
Different kinds of food item taken by Dangria Kandha during different seasons

Season	Food items	Method of food preparation
Summer	Salap Powder Rice	Cooked with rice to a gruel Boiled with water and at times turned to gruel
	Green leaves	Boiled with salt and chilli
	Certain variety of roots and tubers	Boiled with salt to make it tender
	Pulses	Soiled with salt to make it tender
	Fruits	Taken raw
Rainy	Salap powder mango kernel	Cooked with cereals a) Processed kernel is boiled and water drained b) Roasted
	Tubers of bigger types	Boiled with salt
	Egg of peacock and wild fowl	Baked with salap powder or ragi powder without salt and turmeric powder.
Winter	Koahala	Cooked like rice
	Ragi	Grinded and made into cruel
	Kango	Cooked like rice
	Pulse	Boiled with salt and chilli
	Tamarind seed (Occasionally)	Boiled, pealed and made into gruel with slat
	Salap juice	Warmed and little and taken
	Non-veg. food items	Boiled with the salt and condiments

The sal resin and the leaves of Anla, Neem, Jackfruit, Mango, Bel etc. the thorns of Bel and the barks of Neem are used by the Beju and Bejuni in their task of warding off evil spirits.

2.6.2: Lanjia Saora

The principal food of the Lanjia Saora is gruel (Pej) prepared from the rice,ragi,janha or ghantia.They also take vegetables like papaya, drum sticks,leafy vegetables,beans,pumpkin,cucumbers etc. grown in the kitchen garden,fruits,roots,tubers,leafs,nuts,berries,honey collected from the forest. They engaged themselves in forest collections throughout the year. They mostly prefer non vegetarian foods. Each festival is observed with non vegeraian foods. They like to take beef,chicken, mutton,pork, fish and crabs.They dry the fish in sun and preserve them for future use,especially for lean season. They are very

fond of Mahua Liquor and sago palm juice. They have learned the use of spices and cook like non-tribals. These people also consume packaged food available in market such as chips, fries, etc. Consumption of these kinds of foods is high among the children.

Table No. 2.12:
Different types of food items taken by Lanjia Saora during different seasons

Season	Food items	Methods of food preparation
Summer	Rice & millet	Cooked over time to make a gruel
	Green leaves	Boiled with salt and chilli
	Roots and tubers	Cut into small size and boiled in water with a little salt.
	Fruits	Taken raw
	Jack fruit seed	i) Roasted and eaten ii) Boiled with water and salt to make a gruel
	Green leaves & Mushroom	Boiled or wrapped in broad leaves and roasted
	Roots and tubers	Either boiled or roasted and relished with salt.
Rainy	Green leaves	Boiled in water with salt and chilli
	Mango kernel	Soaked in running water for two days and boiled inwater with a little salt to make a gruel
	Green leaves and Mushroom	Boiled or wrapped in broad leaves and roasted.
	Roots and tubers	Either boiled or roasted and relished with salt
Winter	Small millets	Over boiled to make a gruel
	Pulses	Boiled in water with salt and chilli
	Lentils and legumes	Roasted leisurely and eaten
	Rice	Boiled in water, drained and eaten with simple veg. or Non Veg. curry.
	Non-Veg Food item (Meat)	i) Boiled with spice and salt ii) Roasted

2.6.3: Juang:

Rice is the staple food of the Juang. They cultivate pumpkin,papaya,drumstick, maize,corns,ladies finger,tobacco in the kitchen garden. In their swiddens (Taila),they cultivate paddy, til, pulses, maize, horsegram, ragi, blackgram,greengram,runner greens, millet, Kangu, suan, kantala and other varieties of corns. All these crops are consumed as their food. They also consume different items collected from the forest such as verieties of yams,wild berries, worms,insects,wild meat,ants,termites,mangooes,different types types of leaves like sorisa saga,kuilary saga,pitabali saga,chkunda saga, kurusuni saga,sankhua saga, lainga saga,varieties of forest mushrooms. The Juang women collect forest fruits and plums like black berry(Jamu koli),Charkoli, kendu,bangur(kusum koli,Kusai tena(Dudh koli) lankanai,pudheikoli, Jujube(Barakoli,Guava(pijuli), hogplum(Ambada),Wood Apple(Kaitha) etc. from the forest which add variety to theoir food items.Usually the Juang eat thrice a day but in the lean period they usually take twice. They regularlytake boiled rice and ragi gruel. They also take non-vegetarian food iems in all festive occasions.

In the winter season,the Juangs move in the forest with their spade,crowbar,hatchets and other digging instruments to collect different roots yams, potatoes.They catch fish,crab etc. from the rivers and springs. Their process of fish collection is very interesting.Before catching fish, they collect the bark of of a bitter plant and after boiling the bark,they throw this bitter water to the river.The bitter water either makes the fish senseless or kill them. Then the Juang collect the dead or senseless fishes from the river and eat them

after boiling or burning. Millet is another principal diet of the Juang. The Juangs drink the millet gruel in the morning. They relish different types of cakes prepared out of millet flour. Oats and maize are important food of the Juang people. They take maize after burning or boiling. They prepare soup and gruel out of cornflour which is known as *'Juanna peg'*. They take gruel by adding salt and green chilly. They also eat mango seeds, salap juice, wild roots and wild plums.The Juags prepare 'black gram rice' (biri bhata) using black gram and rice. First they boil the rice and then they add black gram to it and again boil the mixture. They add salt and chilly with it and eat.Green gram is also anoher important food of the Juangs. It is also prepaed in the same way. Rice and green gram are put together and boiled in a container. Cake made of mango seed kernel is popular among the Juangs.

One can't think of the Juang life without liquor. The Juangs forget all their pains of hard labour after consuming country liquor in the evening. Country liquor is the principal drink of the Juangs during the rituals and festive occasions like marriage, community functions etc. In the evening both young men and women drink, dance and enjoy. The Juangs prepare different types of liquor from the vegetations of their natural surroundings. These are mahuli, handia, juani, jinjari, salap, palm, datepalm liquors etc.Besides liquors, they use tobacco for intoxication. They cultivate tobacco and prepare bamboo pipes (bidi) by using *kendu leaf* or *al leaf*. Whenever a guest comes, they treat the guest by offering some kendu and tobacco leaves. Both Juang men and women smoke tobacco pipes.

One cannot think of the Juang life without the mahul tree, its seeds and flowers. This plant is just like god to them and they worship it. The oil extracted from its seed is used as hair oil for the Juang women. The Juang young women make their hairball with this oil through which they express their love to the young men. The liquor produced from mahul flowers (mahuli mada) is a principal and godly drink of the Juang. In every religious and socio-cultural function, they offerMahua liquor (*mahuli)* to their deities and ancestors. They perform a ritual called '*Juripaka*' (offering of mahuli to their supernaturals) in all communal events.

The Juangs – the Hill Juang in particular, are good eaters. Their starch based diet is well supplemented by protein rich pulses, oilseeds and animal protein. As many as seven varieties of green leaves and 13 varieties of roots and tubers obtained from the forest are consumed by them. They prefer roasted food. They are extremely addicted to liquor and hard intoxicants. The males are well addicted to use tobacco preparations like the Dongria Kandha they prefer to ake simple food with little to no spices and condimends added. The food pattern of the tribe varies from one season to the other both quality and quantity wise. The Tab-2.2 shows the usual food intake pattern. According to it simple food items are taken during rainy season.

Table No. 2.13:
Different types of food items taken by Juang during different seasons

Season	Food items	Methods of food preparation
Summer	Rice & millet	Cooked over time to make a gruel
	Green leaves	Boiled with salt and chilli
	Roots and tubers	Cut into small size and boiled in water with a little salt.
	Fruits	Taken raw
	Jack fruit seed	i) Roasted and eaten ii) Boiled with water and salt to make a gruel
	Green leaves & Mushroom	Boiled or wrapped in broad leaves and roasted
	Roots and tubers	Either boiled or roasted and relished with salt.
Rainy	Green leaves	Boiled in water with salt and chilli

	Mango kernel	Soaked in running water for two days and boiled inwater with a little salt to make a gruel
	Green leaves and Mushroom	Boiled or wrapped in broad leaves and roasted.
	Roots and tubers	Either boiled or roasted and relished with salt
Winter	Small millets	Over boiled to make a gruel
	Pulses	Boiled in water with salt and chilli
	Lentils and legumes	Roasted leisurely and eaten
	Rice	Boiled in water, drained and eaten with simple veg. or Non Veg. curry.
	Non-Veg Food item (Meat)	i) Boiled with spice and salt ii) Wrapped in leaf and roasted

The collected or cultured protein rich food items are taken in great quantities in winter season. Starch rich food items are usually taken during summer season. The Juang being the hill tribe, depend on the natural vegetative coverage on hills and plains for sustenance. The women are more engaged in collection of activity than their male counterparts. Some of the items of Minor Forest Produce are sold for cash. Apart from these collected items, quite a number of purchased items are also consumed daily. The economic condition of the Juang depend on the extent of hilly areas put ito the shifting cultivation.

2.6.4: Hill Kharia& Mankirdia

Food practices of both Kharia and Mankirdia is more or less same except consumption of monkey flesh by Mankirdia community. Kharia's peculiarity is having the habit of honey collection. Both the Tribe commonly consume rice as their staple food along with vegetables and leafs of different plants. Because of their habitational proximity to the nearby semi-urban / urban market, they also purchase and consume different packaged food products. Still their dependency on forest is high for different food products and non-consumable NTFPs. They normally consume different types of meat based on its availability. Food storage practices are normal like storing paddy in both gunny bags & Plastic bags. The rehabilitated tribe is less food insecure due to own cultivation as well as food support from Government schemes. The Hill Kharia &Mankirdias are the rehabilitated tribes and do not possess any agricultural land of their own. So agricultural practice is observed to be low.

2.6.4.1 Hill Kharia

The staple food of the Hill-Kharia is rice. The rice is supplemented by mandia, maize and other miner millets (janha) and different seasonal edible roots and tubers, honey, arrowroots, greens, fruits, nuts, berries, flowers, mushrooms, etc. collected from the forest. Besides, their food includes occasional consumption of meat from animal hunting and sacrificial meat of goats and chicken. The Hill Kharia are expert hunters.Using bow and arrows,sticks and spears they hunt wild games like deer and samber,boar,pea fowls,jungle fowls,snipes, squirrels etc. and take their meat.Theyalso catch fish in fresh water of the hill streams mostly for own consumption. They prefer water rice, whichis taken with salt, chilly and edible greens collected from forests. They grow vegetales such as pumpkins, chillies, gourds, bittergourds, etc during rainy seasons mostly for their own consumption.They rarely consume dal. During the rainy season, most of the Hill-Kharia face rice scarcity and they principally depnd on other food stuffs, like maize, edible roots and tubers. During festive occasions they prepare special food, like boiled and baked rice cake and met curry for their own consumption.They procure handia (rice bear) and mahuli (country liquor) from the Kol and Santal tribe in the weekly market and in festive occasions and drink.

Table No. 2.14:
Different kinds of food item taken by Hill Kharia during different seasons

Season	Food items	Method of food preparation
Summer	Salap Powder Rice	Cooked with rice to a gruel Boiled with water and at times turned to gruel
	Green leaves	Boiled with salt and chilli
	Certain variety of roots and tubers	Boiled with salt to make it tender
	Pulses	Soiled with salt to make it tender
	Fruits	Taken raw
Rainy	Salap powder Mango kernel	Cooked with cereals a) Processed kernel is boiled and water drained b) Roasted
	Tubers of bigger types	Boiled with salt
	Egg of peacock and wild fowl	Baked with salap powder or ragi powder without salt and turmeric powder.
Winter	Koahala	Cooked like rice
	Ragi	Grinded and made into cruel
	Kango	Cooked like rice
	Pulse	Boiled with salt and chilli
	Tamarind seed (Occasionally)	Boiled, pealed and made into gruel with slat
	Salap juice	Warmed and little and taken
	Non-veg. food items	Boiled with the salt and condiments

2.6.4.2 Mankirdia

The staple food of the Mankirdia is rice. With the sale proceeds of ropes anf forest produces,they buy their weekly requirements of rice and other provisions from the market.They also buy corn and minor millets in harvest seasons and eat these in addition to cooked rice.They collect various types of green leaves,mushrooms and various types of fruits such as kendu,palm,mango from the forest for their own consumption.During their trip to forest for collection of barks,they dig out roots,fibers and also collect honey which supplement their diet. During festive occasions,they prepare and eat non veg dishes,various kinds of cakes and other delicious items. Most of them like to eat the flesh of monkey.When they kill the monkey and have surplus meat, they dry it under the sun and preserve it for future consumption. They are fond of alcoholic drinklike rice beer(handia),Mahuli liquor. Handia is prepared at home by the women group.Some times they buy and consume drinks available in the market. The subsistence activities of Mankirdia revolves round forest and markets.Therefore, they venerate the natural forest for their safety from the attack of wild animals and for a successful hunt and availability of forest produce. Annually they have agreat ceremonial hunt in the forest.

Table No. 2.15:
Different kinds of food item taken by Mankirdia during different seasons

Season	Food items	Method of food preparation
Summer	Salap Powder Rice	Cooked with rice to a gruel Boiled with water and at times turned to gruel
	Green leaves	Boiled with salt and chilli
	Certain variety of roots and tubers	Boiled with salt to make it tender
	Pulses	Soiled with salt to make it tender
	Fruits	Taken raw
Rainy	Salap powder mango kernel	Cooked with cereals a) Processed kernel is boiled and water drained b) Roasted
	Tubers of bigger types	Boiled with salt
	Egg of peacock and wild fowl	Baked with salap powder or ragi powder without salt and turmeric powder.
Winter	Koahala	Cooked like rice
	Ragi	Grinded and made into cruel
	Kango	Cooked like rice
	Pulse	Boiled with salt and chilli
	Tamarind seed (Occasionally)	Boiled, pealed and made into gruel with slat
	Salap juice	Warmed and little and taken
	Non-veg. food items	Boiled with the salt and condiments

2.7 Edible Plants of selected PVTGs

As per one estimation, there are about 50 types of leaves, 46 types of fruits, 15 types of flowers, 14 types of tubers, 11 type of seeds and 5 type of gums form part of tribal diet in one form or the other. Variety of leaves that are collected by tribals in different seasons, are used as diet. It is cooked or eaten with boiled rice or in raw form. Out of 50 types of leaves, 32 types are very popular among different tribes and frequently eaten in different seasons based on its availability. These leaves are either collected from forest or from fields. Different leaves, collected from forest are like Katai, Chakor, Marmuri, Kikim, Phandri Patra, Ban Poi, Kankoda, Lotni, Mansaru etc. Different leaves collected from agricultural / open field are like Baramashi, Budhidhataran, Bansolotia, Bathua, Daliara, Bilikhuji, Marshi Sag, Kansaree, Kointho, Kachoa, Lehenga, Madranga, Pimpari, Purni, Siramo, Suni area, Zanumari etc. Certain leaves are also sun dried and preserved for use in off-season like Katai, Chakor, Marmuri, Pandri Patra etc.

Besides these leaves, other leaves that are collected by tribals and consumed as per their seasonal availability are Bheru, Bhadaria, Ban Kansuria, Ban Baitharua, Bhadbhadaria (*Olax scandens*), Ban-ole (*Amorphophallus sp.*), Dhela (*Alangium salviifolium*), Karwah (*Carissa paucinervia*), Kongot (*Dregea sp.*), Kolhan (*Ixora arborea*), Neem (*Azadirachta indica*), Onsuria, Pita Ginari, Sukuwa, Sankho, Somla (*Moringa oleifera*) and Tamarind (*Tamarindus indica*).

TableNo. 2.16
Different Flora Collected by PVTGs in Sample Villages and Sold in Market

PVTG	Name of the Village	Edible flora sold in market (local name)	Odia name of the flora	Botanical name of the flora
Juang	Hatisila	Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Sala Seed	Sala Manji	*Shorea robusta*
		Char Seed	Char Manji	*Buchanania lanzan*
		Mahula	Mahula	*Madhuca indica*
		Khandakhai	Khandakhai	
		Akandu Bindu	Akandu Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Palamula Chera	Palamula Chera	
		Jhuna	Jhuna	*Shorea robusta*
	Nadam	Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Sala Seed	Sala Manji	*Shorea robusta*
		Char Seed	Char Manji	*Buchanania lanzan*
		Mahula	Mahula	*Madhuca indica*
		Khandakhai	Khandakhai	
		Akandu Bindu	Akandu Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Palamula Chera	Palamula Chera	
		Jhuna	Jhuna	
	Sarai	Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Sala Seed	Sala Manji	*Shorea robusta*
		Char Seed	Char Manji	*Buchanania lanzan*
		Mahula	Mahula	*Madhuca indica*
		Khandakhai	Khandakhai	
		Akandu Bindu	Akandu Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Palamula Chera	Palamula Chera	
		Jhuna	Jhuna	
Kharia&Mankirdia	Badajhili	Eksira Fala	Eksira Fala	
		Damguru	Damguru	
		Akala Bindu	Akala Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Mahula	Mahula	*Madhuca indica*
		Tola	Tola	
		Chhatu	Chhatu	
		Mango	Amba	*Mangifera indica*
		Jackfruits	Panasa	*Atrocarpus heterophyllus*
		Jhuna	Jhuna	
	Durudura	Siali Daudi	Siali Daudi	
		Phagha	Phagha	
		Dana	Dana	
		Sala Patra	Sala Patra	*Rauvolfia serpentina*
		Mahula	Mahula	*Madhuca indica*
		Agnijhoda	Agnijhoda	
		Jhuna	Jhuna	
		Tola	Tola	
		Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Karanja Seed	Karanja Manji	*Pongamia pinnata*
Dangria Kandha	Kansur	Iripipiyu	Iripipiyu	
		Miricha	Lanka	*Capsicum-annuum*
	Patalama	Iripipiyu	Iripipiyu	
		Miricha	Lanka	*Capsicum-annuum*

PVTG	Name of the Village	Edible flora sold in market (local name)	Odia name of the flora	Botanical name of the flora
	Sana Degeneli	Iripipiyu	Iripipiyu	
		Miricha	Lanka	*Capsicum-annuum*
Langia Saora	Jantar	Terel	Kendu	*Diospyros melanoxylon*
		Aba	Mahula	*Madhuca indica*
		Ulla	Amba	*Mangifera indica*
		Baradam	Barada saga	*Bauhinia variegate*
		Urbargada	Agamati saga	
		Uth	Chattu	
		Bangaru	Kusum	*Schleichera oleosa*
		Tabang	Baunsa karadi	*Bambusa bambus*
			Katha	
		Titel	Tentuli	*Tamarindus indica*
			Jhuna	
		Harida	Harida	*Terminalia chebula*
			Mahu	
		Aar gae	Katha kanda	*Dioscorea spps*
		Gae	Kanda	*Dioscorea spps*
		Bahada	Bahada	*Terminalia bellerica*
		Gada gae	Bhata kanda	*Dioscorea spps*
		Kangara	Khata palanga	
		Panasaa	Panasa	*Atrocarpus heterophyllus*
		Tolo	Tolo	
		Sang gae	Pita kanda	*Dioscorea spps*
			Methi saga	
		Asangtan	Gobori saga	
		Kuragat	Jammun	*Syzygium cumini*
		Sandi	Khajuri	*Phoenix dactylifera*
		Genu gae	Mitha kanda	*Dioscorea spps*
			Jhadu	
		Aarale	Bhalia	*Semecarpus anacardium*
			Pita allu	*Dioscorea wallichii*
			Kaju	*Anacardium occidentale*
		Alumeputh	Lata chattu	
	Mulisahi	Terel	Kendu	*Diospyros melanoxylon*
		Ulla	Amba	*Mangifera indica*
		Aba	Mahula	*Madhuca indica*
		Bardam/ Tubur	Barada saga	*Bauhinia variegate*
		Gae	Kanda	*Dioscorea spps*
			Phula jhadu	
			Sunsunia saga	
		Kurgat	Jammun	*Syzygium cumini*
			Kaju	*Anacardium occidentale*
		Muriap	Miriga saga	
		Barjam	Karada saga	
			Sajana saga	*Moringa oleifera*
		Uth	Chattu	
		Tabang	Baunsa karadi	*Bambusa bambus*
		Panasaa	Panasa	*Atrocarpus heterophyllus*
		Titel	Tentuli	*Tamarindus indica*
		Sandi	Khajuri	*Phoenix dactylifera*
		Genu gae	Mitha kanda	*Dioscorea spps*

PVTG	Name of the Village	Edible flora sold in market (local name)	Odia name of the flora	Botanical name of the flora
			Allu kanda	*Dioscorea spps*
	Raita sahi	Aba	Mahula	*Madhuca indica*
		Ulla	Amba	*Mangifera indica*
		Bardam/Tubur	Barada saga	*Bauhinia variegate*
		Uth	Chattu	
			Katha	
		Titel	Tentuli	*Tamarindus indica*
			Jhuna	
			Kaju	*Anacardium occidentale*
		Bangaru	Kusum	*Schleichera oleosa*
		Tabang	Baunsa Karadi	*Bambusa bambus*
		Panasaa	Panasa	*Atrocarpus heterophyllus*
			Jhadu	
			Tolo	
		Sandi	Khajuri	*Phoenix dactylifera*
			Mahu	
			Kaju	
		Arasal	Salapa	*Caryota urens*
		Sangsang	Haldi	*Corchorus acutangulus*
		Kangara	Khata Palanga	
		Karanja	Karanja	*Pongamia pinnata*
		Bharbangada	Poitundi Saga	

***Note**: Details of different other flora collected and used by the PVTGs are presented in the next chapter*

2.8 Income and Expenditure

Income is not a suitable and appropriate measurable parameter to understand the wellbeing of a family or any community. For this reason, Government of India considered expenditure to compute poverty line taking per day per person expenditure benchmarks separately for rural and urban based on calorie norm. However, income broadly gives a trend on areas of engagement and pattern of income. Here, income of PVTGs are discussed only to understand the overall economic situation of the households and average annual income they derive for family maintenance. It is observed that of the total average annual income, major part of the income of the family comes from primary sources of engagement (61.0 %). Secondary and tertiary engagement fetch about 30.0 % and 9.0 % of the total annual income of the households. The average annual household income from primary sources is about Rs.11, 302.37 (SD: 10, 464.79), Rs.5578.10 (SD: 4410.84) from secondary sources and Rs.1627.20 (SD: 1,782.28) from tertiary sources. On an average, the annual household income of the tribals remain to be Rs.18, 442.51 (SD: 12448.83) with a maximum of Rs.98, 000.00. Perhaps, this is the reason for which about 90 % families are below the poverty line among the PVTGs.

Table No. 2.17
Income of PVTGs from Primary and Secondary Engagements

PVTG	Average Income from Primary Source (in Rs.)	Average Income from Secondary Source (in Rs.)	Average Income from Tertiary Source (in Rs.)	Average Annual Household Income (in Rs.)
Dangria Kandha	6,100.00	3,630.00	2,131.67	11,918.33

Lanjia Saora	14,550.44	7,410.18	2,447.35	24,161.06
Juang	11,541.55	5,405.41	1,233.51	18,180.47
Hill Kharia& Mankirdia	9,745.69	4,464.66	512.07	14,718.97

Note: Income earned directly in cash form from different engagements are taken in to account. Indirect incomes and cost of items collected and consumed at the household level is not taken in to estimation.

Income by PVTG reflects that the average annual income of Dangria Kandha is lowest among four PVTGs followed by hill KhariaMankirdia. Among the four studied PVTGs, Lanjia Saora are having the highest annual average income followed by Juang. Lanjia Saora also have comparatively higher average income from their secondary and tertiary engagements.

Table2.18
Expenditure by Different Heads among PVTGs

Major Heads of Expenditure	Juang	Kharia& Mankirdia	Dangria Kandha	Lanjia Saora	Total
Food	7527.26	6217.86	5921.67	8652.33	7317.76
Clothing	2870.55	1987.50	2215.59	3287.21	2719.94
Health Care	1327.08	1014.71	858.49	851.32	1089.66
Education	1216.22	1993.33	322.73	504.08	994.30
Social Functions	1757.29	1566.67	1446.15	2673.81	1914.79
Electricity	1454.55	405.33	200.00	1110.95	1075.80
Fuel (Cooking / Lighting)	707.93	333.90	305.58	225.76	443.29
Entertainment	1164.66	1228.89	1036.05	1307.94	1188.58
House Repairing	848.46	1071.15	743.33	1114.62	948.64
Utensil & Furniture	722.52	633.33	523.64	1317.50	841.13
Others	1130.61	1621.43	1010.00	2031.43	1598.31
Average Annual Expenditure	**16775.00**	**13968.45**	**12661.00**	**16899.59**	**15731.36**

Note: Higher expenditure than income reflects borrowings from different sources to meet household requirements.

Household expenditure pattern reflects that, of the total annual income, the tribal families incur highest amount of expenditure in food consumption. In one hand amount of income remains low and out of which major part goes to food expenditure. Annual household expenditure pattern reflects that about 55.5% spend more than 40 % of their income in food consumption apart from collected forest produces. Subsidized supply of rice through PDS fare price shops has been a great support to these tribals to manage their required food expenses with low income. Apart from meeting household expenditure, the tribals manage to save certain amount for emergency requirements. Among all the PVTGs, highest average annual savings is reported in Lanjia Saora (Rs.2784.59) and lowest in Dangria Kandha (Rs.807.62). The families belonging to Juang is the second to save high (Rs.2132.44) and average annual household savings of Hill KhariaMankirdia amounts to Rs.1769.70. This small amount of savings, generated by these tribals is primarily attributed to contribution of forest to their livelihoods and Government support.

Chapter-Three: Indegenous Knowledge on Flora & Fauna

3.1 Collection and Sustainable use of Fauna and Flora

Sustainable use of fauna and flora resources refers to a kind of use of these resources such that it regenerates and get conserved more than what could be consumed. There are many factors that contribute to affect the sustainability of the resources such as improvement in soil fertility, conservation of water resources, management of the growth of vegetation, conservation of biological diversity so as to help the food chain function and finally contribute to the conservation of environment. Ever since the dawn of human culture, food, fodder and fuel needs have met by the constant use of land and forest. In recent years the significant increase of mining operation, expansion of road ways and use of water, denudations of forest for industrial and other purposes, increasing pressure of population and the livestock there is a change in quality and quantity of natural resource base. The population and its ratio to survival resources must remain within the carrying capacity of the area.

Similarly, concept of sustainable agriculture refers to agriculture that is economically viable, socially balanced and ecologically sound leading to change in quality of life of people concerned(Zahm etal 2004).For people using pre agricultural technology for livelihood, the sustainable socio-economic condition refers to all that instruments, tools and techniques they use to interact with the nature for collection, hunting, shifting cultivation, etc. must not reach a point of no-return of supply from their micro ecology. To have this people must adopt a conservational strategy through indigenous practices what most tribals were practising. Worshiping totemic object is one of the most known socio-culturally inbuilt strategy the tribal have. They believe that they have been descended from the totemic objects(the fauna / flora) and as part of ancestral soul at the apex they are venerated. Thus, the clan members protect and worship their mystical ancestors.

All the studied five PVTGs have their own strategies and management style to have sustainable supply of fauna and flora for consumptionin their own locality. The indigenous techniques the tribals follow are age-old practices. These reflect in terms of time gap management between the periods of procurement/collection. The PVTGs for generations have established interdependent relationships with the biosphere of their habitat. They exchange elements with their physical habitat. The waste and unused parts of whatever plant or animal products the tribals consume are not disposed off randomly. These get decomposed and ultimately these waste by-products turned into food materials of the plants and animals. Broadly speaking it is the complex chained and balanced cycle of life. Among the Odisha PVTGs, there has been a lot of similarity in their strategy for sustainable use of fauna and flora.The tools and techniques adopted by the specific group are season specific due to scarcity of water and plant products available above the ground in addition to the games in forest that supply food for the tribals. However, the techniques adopted for such a process of interdependence the community and the environment has little variation and symbiotic relation between man and non-man has been found to be community specific.

3.2 Forest Dependency ofSelected PVTGs

The forest in Odisha belong to 5 sub types within the board type of northen Tropical forest.They are (i) Semi Evergrenm, (ii) moist deciduous, (iii) Dry Deciduous, (iv)LitteralSwarup, (v) Mangroove Forest

(Padhi-1985,7-10).The Tribals depends upon former 3 types of forest area.Dependency on forest for different purposes are common among the tribals, especially for the PVTGs because of the nature of their habitationas well as the inadequacy of cultivable landto suastain their livelihood. Though, degree of dependency on forest has reduced to a greater extent, still it remains a way of their living and part of their socio-cultural and economic wellbeing. Reduced degree of dependency on forest can be attributed to a number of factors like increasing degradation of forest resources, regulatory restrictions, increasing livelihoods diversification and improved penetration of Government support systems. However, with improvement in educational status (mostly youths who are not interested to collect certain forest based items) and migration (seasonal or perennial) in search of employment, human pressure on forest seems decreasing. But decreasing forest resource base and increasing awareness on forest related regulatory norms and decreasing human pressure for livelihoods on forest are not in a balancing mode. The rate of degradation of forest, though not in a geometric fashion, but it is in an accelerating mode. On the other hand, decreased human pressure on forest resources due to livelihoods diversification and welfare / development support is not at the same pace. Considering household as the unit who access forest resources, some member of the family may not be harvesting any resources from forest but other members of the household and household in itself remain dependent on forest. As a result, while dependency on forest continues for a larger section of these tribals, amount of collection per season has diminished and thereby economic gain from the forest.

About 90.8 % households are highly dependent on forest for deriving part of their livelihoods, apart from other usable items for household use. Dependency on forest for various purposes, seems has decreased in Lanjia Saora (78.8 %), whereas, it remains high in Juang (93.9 %), Hill KhariaMankirdia (98.3 %) and Dangria Kandha (98.3 %).

Table No. 3.1
Reasons of Forest Dependency

Areas of Forest Dependency	Dangria Kandha		Lanjia Saora		Juang		Hill Kharia & Mankirdia		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Collection of Food Items	59	98.3	111	98.2	145	98.0	57	98.3	372	98.15
Traditional Practices	42	70.0	81	71.7	104	70.3	39	67.2	266	70.18
Collection of Medicines	21	35.0	90	79.6	48	32.4	15	25.9	174	45.91
Collection of Fuel Wood	58	96.7	111	98.2	146	98.6	57	98.3	372	98.15
NTFP Collection	59	98.3	106	93.8	144	97.3	57	98.3	366	96.57
Other Collections	58	96.7	107	94.7	115	77.7	54	93.1	334	88.13
Hunting					2	1.4			2	0.53

Note: Other collections include timber for house construction, soil for mud wall construction, Bamboos etc.

Hunting of wild animals is a matter of sensitivity and open admission may attract legal action. For this reason, tribal families are reluctant to discuss on the matter with regard to their involvement in hunting. However, informal interaction with different other stakeholders' reveals that hunting is still in practice but due to decreased animal population, tribals do not get much from the available forest, apart from small animals. Some of the family members, who were of the opinion of not extracting any livelihood means from forest are because of less availability of food items in the forest due to increasing bio-diversity loss, rice support from government under Public Distribution System (PDS), imposition of restriction by Government and availability of forest resources in a distant place.

Amount of collection of flora in different season is again not uniform and depends upon the availability in the forest, requirement of the collector and his/her family and to certain degree the existing market value of the collection.

3.3 FamilyInvolvement in Collection of Flora

Different family members get involved in collection of flora in different seasons. Involvement if children in collection of different flora is observed in all the PVTGs expect Hill KhariaMankirdia (very less involvement) because of the distance of the forest from the habitation. However, more number of adult members from Hill KhariaMankirdia are involved in collection of different flora from the forest.

Table No. 3.2:
Involvement of Family Members in Collection of Flora

PVTG	Total HH	Children				Youth				Adult			
		Total No of Children	% of HH	Season	Hour	Total No of Youths	% of HH	Season	Hour	Total No of Adults	% of HH	Season	Hour
Dangria Kandha	60	16	27.0	All	3-4	22	25.00	All	3-4	99	88.33	All	3-4
Lanjia Saora	113	11	15.0	All	2-3	70	38.05	All	2-3	187	83.19	All	3-4
Juang	148	22	38.0	All	2-3	169	55.41	All	2-3	165	56.08	All	3-4
Hill-Kharia & Mankirdia	58	10	17.24	All	1-2	5	8.62	All	2-3	93	91.38	All	4-5

Note: Hour refers to average hours of collection per day in different seasons by different PVTGs. Hour of collection is also not on every day basis rather based on their movement to forest and time spend in collection of forest produces.

Involvement of youths in collection of forest produce is relatively less in comparison to adults because of their involvement in education, other farm activities or household level activities performed in the nearby area of the habitation. It is also common to observe that both adult, youth and children are involved in collection of different forest produces from the forest in different seasons. There is no season specific involvement demarcation at household level for the collection of forest produces.

3.4 Quantum of Collection and its Value

The average amount of collection by children varies between 32 kg to 67 kg, irrespective of PVTG category. In case of Juang, the average collection by the children per annum varies between 15 kg to 45 kg where as in Hill KhariaMankirdia, it varies between 4 kg to 8 kg with less involvement of children in collection. In case of Dangria Kandha and Lanjia Saora, average annual collection by children is between 29 kg to 95 kg and 21 kg to 71 kg respectively. Average amount of collection by youths per annum is relatively higher than that of children. The collection on an average varies between 46 kg to 80 kg and lowest collector is Hill KhariaMankirdia for the discussed reasons. On an average, a Juang youth collect 45 kg to 77 kg of forest produced in a year whereas youths of Dangria Kandha and Lanjia Saora collects 38 kg to 158 kg and 39 kg to 67 kg respectively. Collection of different kind of flora by elderly members is relatively high, i.e., on an average in the range of 56 kg to 99 kg. Average annual collection of flora by a Juang adult member varies between 57 kg to 92 kg whereas in case of Hill KhariaMankirdia, it varies between 60 kg to 135 kg. The adult members of Dangria Kandha and Lanjia Saora also collect substantial amount of flora during different seasons, varying in the range of 60 kg to 123 kg and 46 kg to 72 kg respectively.

Table No. 3.3:
Average Annual Collection of Flora by different PVTGs and its Value

PVTG	Average Quantity of Collection by Children (in Kg)	Average Quantity of Collection by Youths (in Kg)	Average Quantity of Collection by Adult (in Kg)	Value (Rs. Per KG)
Dangria Kandha	29-95	38-158	60-123	18-29
Lanjia Saora	21-71	39-67	46-72	19-22
Juang	15-45	45-77	57-92	15-35
Hill KhariaMankirdia	4-8	26-51	60-135	17-23
Total	**32-67**	**46-80**	**56-99**	**20-25**

All the quantity collected is not necessarily sold out in the market. Major part of the collection is consumed as per the necessity of the family and remaining marketable products are sold in the locality / market. The value of the collected produce differs based on the volume of collection in a particular season in a locality and demand of the produce in the market.

Table 3.4:
Different Flora Collected and Sold in the Market by PVTGs

PVTG	Name of the Village	Flora Collected and Sold in Market		
		Local Name	Odia Name	Botanical Name
Juang	Hatisila	Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Sala Seed	Sala Manji	*Shorea robusta*
		Char Seed	Char Manji	*Buchanania lanzan*
		Mahula	Mahula	*Madhuca indica*
		Khandakhai	Khandakhai	
		Akandu Bindu	Akandu Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Palamula Chera	Palamula Chera	
		Jhuna	Jhuna	*Shorea robusta*
	Nadam	Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Sala Seed	Sala Manji	*Shorea robusta*
		Char Seed	Char Manji	*Buchanania lanzan*
		Mahula	Mahula	*Madhuca indica*
		Khandakhai	Khandakhai	
		Akandu Bindu	Akandu Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Palamula Chera	Palamula Chera	
		Jhuna	Jhuna	
	Sarai	Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Sala Seed	Sala Manji	*Shorea robusta*
		Char Seed	Char Manji	*Buchanania lanzan*
		Mahula	Mahula	*Madhuca indica*
		Khandakhai	Khandakhai	
		Akandu Bindu	Akandu Bindu	
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Palamula Chera	Palamula Chera	
		Jhuna	Jhuna	
Kharia&Mankirdia	Badajhili	Eksira Fala	Eksira Fala	
		Damguru	Damguru	
		Akala Bindu	Akala Bindu	

PVTG	Name of the Village	Flora Collected and Sold in Market		
		Local Name	**Odia Name**	**Botanical Name**
		Patal Garuda	Patal Garuda	*Rauvolfia serpentina*
		Mahula	Mahula	*Madhuca indica*
		Tola	Tola	
		Chhatu	Chhatu	
		Mango	Amba	*Mangifera indica*
		Jackfruits	Panasa	*Atrocarpus heterophyllus*
		Jhuna	Jhuna	
	Durudura	Siali Daudi	Siali Daudi	
		Phagha	Phagha	
		Dana	Dana	
		Sala Patra	Sala Patra	*Rauvolfia serpentina*
		Mahula	Mahula	*Madhuca indica*
		Agnijhoda	Agnijhoda	
		Jhuna	Jhuna	
		Tola	Tola	
		Kusum Seed	Kusum Manji	*Schleichera oleosa*
		Karanja Seed	Karanja Manji	*Pongamia pinnata*
Dangria Kandha	Kansur	Iripipiyu	Iripipiyu	
		Miricha	Lanka	*Capsicum-annuum*
	Patalama	Iripipiyu	Iripipiyu	
		Miricha	Lanka	*Capsicum-annuum*
	Sana Degeneli	Iripipiyu	Iripipiyu	
		Miricha	Lanka	*Capsicum-annuum*
Langia Saora	Jantar	Terel	Kendu	*Diospyros melanoxylon*
		Aba	Mahula	*Madhuca indica*
		Ulla	Amba	*Mangifera indica*
		Baradam	Barada saga	*Bauhinia variegate*
		Urbargada	Agamati saga	
		Uth	Chattu	
		Bangaru	Kusum	*Schleichera oleosa*
		Tabang	Baunsa karadi	*Bambusa bambus*
			Katha	
		Titel	Tentuli	*Tamarindus indica*
			Jhuna	
		Harida	Harida	*Terminalia chebula*
			Mahu	
		Aar gae	Katha kanda	*Dioscorea spps*
		Gae	Kanda	*Dioscorea spps*
		Bahada	Bahada	*Terminalia bellerica*
		Gada gae	Bhata kanda	*Dioscorea spps*
		Kangara	Khata palanga	
		Panasaa	Panasa	*Atrocarpus heterophyllus*
		Tolo	Tolo	
		Sang gae	Pita kanda	*Dioscorea spps*
			Methi saga	
		Asangtan	Gobori saga	
		Kuragat	Jammun	*Syzygium cumini*
		Sandi	Khajuri	*Phoenix dactylifera*
		Genu gae	Mitha kanda	*Dioscorea spps*
			Jhadu	
		Aarale	Bhalia	*Semecarpus anacardium*
			Pita allu	*Dioscorea wallichii*

PVTG	Name of the Village	Flora Collected and Sold in Market		
		Local Name	**Odia Name**	**Botanical Name**
			Kaju	*Anacardium occidentale*
		Alumeputh	Lata chattu	
	Mulisahi	Terel	Kendu	*Diospyros melanoxylon*
		Ulla	Amba	*Mangifera indica*
		Aba	Mahula	*Madhuca indica*
		Bardam/ Tubur	Barada saga	*Bauhinia variegate*
		Gae	Kanda	*Dioscorea spps*
			Phula jhadu	
			Sunsunia saga	
		Kurgat	Jammun	*Syzygium cumini*
			Kaju	*Anacardium occidentale*
		Muriap	Miriga saga	
		Barjam	Karada saga	
			Sajana saga	*Moringa oleifera*
		Uth	Chattu	
		Tabang	Baunsa karadi	*Bambusa bambus*
		Panasaa	Panasa	*Atrocarpus heterophyllus*
		Titel	Tentuli	*Tamarindus indica*
		Sandi	Khajuri	*Phoenix dactylifera*
		Genu gae	Mitha kanda	*Dioscorea spps*
			Allu kanda	*Dioscorea spps*
	Raita sahi	Aba	Mahula	*Madhuca indica*
		Ulla	Amba	*Mangifera indica*
		Bardam/Tubur	Barada saga	*Bauhinia variegate*
		Uth	Chattu	
			Katha	
		Titel	Tentuli	*Tamarindus indica*
			Jhuna	
			Kaju	*Anacardium occidentale*
		Bangaru	Kusum	*Schleichera oleosa*
		Tabang	Baunsa Karadi	*Bambusa bambus*
		Panasaa	Panasa	*Atrocarpus heterophyllus*
			Jhadu	
			Tolo	
		Sandi	Khajuri	*Phoenix dactylifera*
			Mahu	
			Kaju	
		Arasal	Salapa	*Caryota urens*
		Sangsang	Haldi	*Corchorus acutangulus*
		Kangara	Khata Palanga	
		Karanja	Karanja	*Pongamia pinnata*
		Bharbangada	Poitundi Saga	

Different flora, including seeds, collected and sold in the market are present in the Table. Certain uncultivated forest produces have high value in the market like Kusum Seeds (*Schleichera oleosa*), Khandakhai, Mahua flower (*Madhuca indica*), different types of Mushrooms, Jhuna, Siali (for rope making) etc.

|Table No. 3.5
Different Fauna Sold in the Market / Locally by the PVTGs

PVTG	Name of the Villages	Edible fauna sold in market (local name)	Parts Sold	Odia name of the Fauna	Botanical Name of the Fauna
Juang	Hatisila	Tasar cocoon		Tasar	*Bombyx mori*
		Bajra Kapta		Bajra Kauta	*Manis ssps.*
		Kutari		Kutura	*Muntiacus muntjak*
	Nadam	Tasar		Tasar	*Bombyx mori*
		Bajra Kapta		Bajra Kauta	*Manis ssps.*
		Kutari	Skin	Kutura	*Muntiacus muntjak*
	Sarai	Tasar		Tasar	*Bombyx mori*
		Bajra Kapta		Bajra Kauta	*Manis ssps.*
		Kutari	Skin	Kutura	*Muntiacus muntjak*
Hill Kharia&Mankirdia	Durudura	Mankada	Skin	Mankada	*Macaca Fascicularis*

Note: As capturing and killing of wild animals prohibited under law, tribals are reluctant to provide information on this aspect. No such shared by Dongaria Kandha and Lanjia Saora.

Apart from flora, the PVTGs also collect / gather different fauna from the forest. As because hunting of wild life is punishable under Wildlife Conservation Act, which these tribals are aware of, most of them found reluctant to share related information. However, informal discussion with different villages reveals that while meat / flesh of different animals hunted in the forest are consumed by the concerned hunting households / community, different parts of the hunted prey, skin is sold in the market with a higher price.

3.5 Seasonalityof Forest Dependency

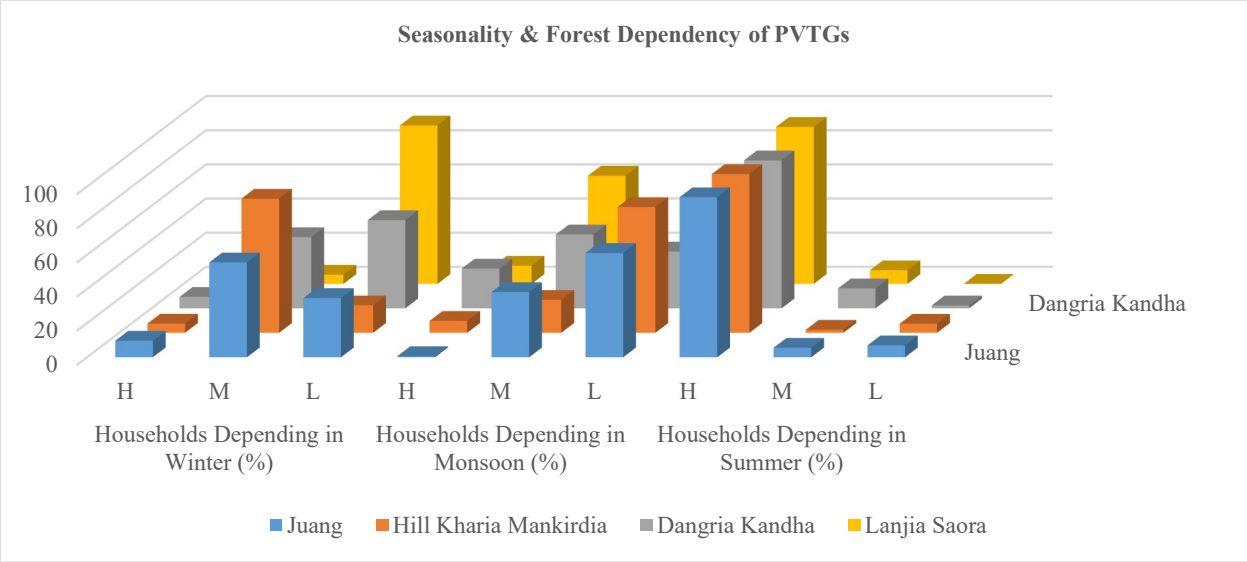
Dependency on forest by season varies to certain degree at household level. In winter, dependency on forest remains low for a majority of households (52.0 %) whereas moderate dependency on forest during winter is also observed in 41.8% cases. Tribal families depending on forest during winter remain high for a very less number of families (6.2 %). More or less similar trend of dependency is also observed during rainy season when 48.0 % having low dependency on forest, 43.7 % depend moderately and 8.3 % are having a higher dependency on forest during monsoon. Summer season is the most important season for the tribals with regard to collection of different forest produces starting from *Mahua* to a number of tubers and seeds. About 92.0 % families heavily depend on forest during this season. Moderate (6.7 %) and low (1.3 %) dependency is quite less during this season.

Table No. 3.6:
Seasonality and Forest Dependency of PVTGs

PVTG	Households Depending in Winter (%)			Households Depending in Monsoon (%)			Households Depending in Summer (%)		
	H	M	L	H	M	L	H	M	L
Dangria Kandha	6.7	41.7	51.7	23.3	43.3	33.3	86.7	11.7	1.7
Lanjia Saora	1.8	5.4	92.8	10.7	63.4	25.9	92.0	8.0	0.0

Juang	9.7	55.6	34.7	0.7	38.2	61.1	93.8	5.6	07
Hill Kharia& Mankirdia	5.4	78.6	16.1	7.0	19.3	73.7	93.0	1.8	5.3
Total	**6.2**	**41.8**	**52.0**	**8.3**	**43.7**	**48.0**	**92.0**	**6.7**	**1.3**

Note: H-High Dependency; M-Medium Dependency; L-Low Dependency



In winter, moderate level dependency on forest is high among the families of Hill KhariaMankirdia (78.6%) in comparison to other PVTGs and lowest level of dependency among the families of Lanjia Saora (92.8%). In Monsoon, high dependency on forest is observed among the families of Dangria Kandha (23.3%) whereas medium and low level dependency is comparatively higher in Lanjia Saora (63.4 %) and Hill Kharia (73.7 %) respectively. In summer seasons, all the PVTGs have high dependency on forest for the collection of different produces.

3.6 Flora as Food

Tribals use different flora as food which is collected from the forest in different seasons. Some of the edible parts are consumed raw while some are cooked for making it suitable for consumption. While some are consumed by the PVTGs available round the year in all seasons and also in nearby areas, some consumable flora is collected from distant places in forest in specific seasons. Use of different flora and its part as food by different PVTGs is presented in the Table.

Table No. 3.7:
Use of Different Flora as Food by PVTGs

PVTG	Plant (Odia Name)	Plant (Botanical Name)	Parts Used for Consumption	Season of Availability	Method of Consumption
Dangaria Kandha	Kandal chattu	*Agaricus spps.*	Fruits	Summer	Raw
	Biliada chattu	*Agaricus spps.*	Entire plant	Rainy	Cooked
	Chara koli	*Buchanania lanzan*	Fruits	Summer	Raw

PVTG	Plant (Odia Name)	Plant (Botanical Name)	Parts Used for Consumption	Season of Availability	Method of Consumption
	Jammun	*Syzygium cumini*	Fruits	Summer	Raw
	Kusum	*Schleichera oleosa*	Fruits, Seeds	Summer	Raw
	Panasa	*Atrocarpus heterophyllus*	Seeds, Fruits	Winter	Cooked
	Amba	*Mangifera indica*	Fruits	Summer	Raw
	Mahula	*Madhuca indica*	Flower	Winter	Cooked
	Chattu (Mushroom)	*Agaricus spps.*	Entire plant	Rainy,winter	Cooked
	Khajuri	*Phoenix dactylifera*	Fruits	Summer	Raw
	Barada	*Bauhinia variegata*	Leaves	Summer	Cooked
	Tentuli	*Tamarindus indica*	Leaves	Summer	Raw
	Kendu	*Diospyros melanoxylon*	Leaves	Summer	Raw
	Bhata kanda	*Discorea spps.*	Leaves	Summer	Cooked
	Anla	*Emblica officinalis*	Leaves	Winter	Cooked
	Kanda	*Dioscorea spps.*	Leaves	All Season	Cooked
	Mati allu	*Amorphophallus paeonii*	Leaves	Summer	Cooked
	Salapa	*Caryota urens*	Leaves, Stem	Winter	Cooked
	Barakoli	*Ziziphus mauritiana*	Leaves	Summer	Cooked
	Pita saga	*Molugo pentaphylla*	Leaves	Summer	Cooked
	Harida	*Terminalia chebula*	Leaves	Winter	Raw
	Tolo		Leaves	Summer	Cooked
	Saru	*Colocasia esculenta*	Leaves,Tubers	Winter	Cooked
	Kankada	*Momordica dioica*	Leaves	Rainy	Cooked
	Kanta saga		Leaves	Summer	Cooked
	Sapuri	*Ananas comosus*	Leaves	Summer	Raw
	Gadheri saga		Leaves	Rainy	Cooked
	Jaba saga		Leaves	Summer	Cooked
	Lembu	*Citrus limonium*	Fruits	Summer, Winter	Raw
	Mala kanda		Tubers	Summer	Cooked
	Barsa chattu	*Agaricus spps.*	Entire plant	Rainy	Cooked
	Baunsa chattu	*Phallus indusiatus*	Entire plant	Rainy	Cooked
	Patra chattu	*Agaricus spps.*	Entire plant	Rainy	Cooked
	Rani kanda	*Discorea spps.*	Tubers	Winter	Cooked
Lanjia Saora	Kandal chattu	*Agaricus spps.*	Entire Plant	Winter	Cooked
	Biliada chattu	*Agaricus spps.*	Entire Plant	Rainy	Cooked
	Baunsa karadi	*Bambusa bamboos*	Entire Plant	Rainy	Cooked
	Angara saga		Entire Plant	Rainy	Cooked
	Agamati saga		Entire Plant	Summer	Cooked
	Chattu	*Agaricus spps.*	Entire Plant	Rainy	Cooked
	Barada	*Bauhinia variegata*	Entire Plant	Summer	Cooked
	Mitha kanda	*Discorea spps*	Entire Plant	Winter	Cooked
	Pita allu	*Dioscorea wallichii*	Entire Plant	Winter	Cooked
	Poi tundi	*Basella rubra*	Entire Plant	All Season	Cooked
	Bhata kanda	*Discorea spps.*	Entire Plant	Winter	Cooked
	Phula chattu	*Agaricus spps.*	Entire Plant	Rainy	Cooked
	Katha kanda	*Dioscorea spps.*	Entire Plant	Winter	Cooked
	Doudi Kanda		Entire Plant	Winter	Cooked
	Anla	*Emblica officinalis*	Entire Plant	Summer	Cooked
	Gobori saga	*Amaranthus lividus*	Entire Plant	All Season	Cooked
	Gada kanda	*Dioscorea spps.*	Entire Plant	Winter	Cooked
	Khata palang	*Hibiscus sabdariffa*	Entire Plant	Winter	Cooked
	Bargudi saga	Cyamopsis tetragonoloba	Entire Plant	Rainy	Cooked
	Kanta leutia	*Amaranthus spinosus*	Entire Plant	Rainy	Cooked

PVTG	Plant (Odia Name)	Plant (Botanical Name)	Parts Used for Consumption	Season of Availability	Method of Consumption
	Ragada chattu	*Agaricus spps.*	Entire Plant	Rainy	Cooked
	Kanda	*Dioscorea wallichii*	Tubers	Winter	Cooked
	Sajana saga	*Moringa oleifera*	Leaves	Summer	Cooked
	Allu kanda	*Discorea spps*	Roots	Winter	Cooked
	Arada saga		Leaves	Summer	Cooked
	Mati allu	*Amorphophallus paeonii*	Roots	Summer	Cooked
	Karada saga		Leaves	Summer	Cooked
	Miriga saga		Leaves	Rainy	Cooked
	Ghumballu	Discorea spps	Roots	Winter	Cooked
Juang	Angara saga		Leaves	All Season	Cooked
	Barada	*Bauhinia variegata*	Leaves	Summer	Cooked
	Gobori saga	*Amaranthus lividus*	Leaves	Summer	Cooked
	Khata palang	*Hibiscus sabdariffa*	Flower	Summer	Cooked
	Sajana saga	*Moringa oleifera*	Fruits, Leaves	Winter	Cooked
	Mati allu	*Amorphophallus paeonii*	Tubers	Winter	Cooked
	Kundai	*Coccinia grandis*	Fruits	Winter	Cooked
	Siali	*Bauhinia purpurea(Mimosa rubicaulis)*	Fruits	Winter	Cooked
	Pita saga	*Molugo pentaphylla*	Leaves	Winter	Cooked
	Gayisi saga	*Leucas aspera*	Leaves	All Season	Cooked
	Mundei allu	*Discorea spps*	Tubers	Rainy	Cooked
	Sankha saga	*Rungia pectinata*	Leaves	Rainy	Cooked
	Kanchan	*Bauhinia variegata*	Leaves, Flower	Rainy	Cooked
	Bhursuni saga		Leaves	Rainy	Cooked
	Kankada	*Momordica dioica*	Fruits	Winter	Cooked
	Palanga	*Spinacia oleracea*	Leaves	Rainy,Winter	Cooked
	Gedu		Leaves	Winter	Cooked
	Janhi	*Luffa acutangula*	Fruits	Rainy	Cooked
	Bhainga	*Dioscorea spps.*	Tubers	Winter	Cooked
	Kuliari	*Bahunia purpurea*	Leaves	All Season	Cooked
	Simba	*Phaseolus lunatus*	Fruits	Winter	Cooked
	Madaranga	*Alternanthera amoena*	Leaves	Rainy	Cooked
	Pala chattu	*Agaricus spps.*	Entre Plant	Rainy	Cooked
	Giliri phula		Leaves	Summer	Cooked
Hill Kharia& Mankirdia	Chara koli	*Buchanania lanzan*	Fruits, Seed	Summer	Raw
	Jammun	*Syzygium cumini*	Fruits	Summer	Raw
	Kusum	*Schleichera oleosa*	Fruits, Seed	Summer	Raw
	Panasa	*Atrocarpus heterophyllus*	Fruits	Summer	Raw
	Mahula	*Madhuca indica*	Flower,Seed	Summer	Raw
	Chattu (Mushroom)	*Agaricus spps.*	Entire Plant	Rainy	Cooked
	Tentuli	*Tamarindus indica*	Fruits	Winter	Raw
	Kendu	*Diospyros melanoxylon*	Fruits	Summer	Raw
	Bhalia	*Semecarpus anacardium*	Fruits	Winter	Raw
	Anla	*Emblica officinalis*	Fruits	Winter	Raw
	Bahada	*Terminalia bellerica*	Fruits	Winter	Raw
	Mati allu	*Amorphophallus paeonii*	Tubers	Summer	Cooked
	Barakoli	*Ziziphus mauritiana*	Fruits	Winter	Raw
	Siali	*Bauhinia purpurea (Mimosa rubicaulis)*	Seed	All Season	Raw
	Pita saga	*Molugo pentaphylla*	Leaves	All Season	Raw

PVTG	Plant (Odia Name)	Plant (Botanical Name)	Parts Used for Consumption	Season of Availability	Method of Consumption
	Harida	*Terminalia chebula*	Fruits	Winter	Raw
	Mundei allu	*Discorea spps*	Tubers	All Season	Cooked
	Aata	*Annona squamosa*	Fruits	Winter	Raw
	Dimiri	*Ficus hispida*	Fruits	Summer	Raw
	Sankha saga	*Rungia pectinata*	Leaves	Summer	Cooked
	Saru	*Colocasia esculenta*	Tubers	Rainy, Winter	Cooked
	Kankada	*Momordica dioica*	Fruits	Rainy	Cooked
	Bhainga	*Semecarpus anacardium*	Tubers	All Season	Cooked
	Pita allu	*Dioscorea wallichii*	Tubers	All Season	Cooked
	Sala	*Shorea robusta*	Seed	Summer	Raw
	Kuliari	*Bahunia purpurea*	Leaves	Summer	Cooked
	Madaranga	*Alternanthera amoena*	Leaves	Winter	Cooked
	Dhana allu	*Discorea spps.*	Tubers	Rainy	Cooked
	Mami saga		Leaves	Winter	Cooked
	Kakadi saga	*Casearia graveolens*	Leaves	Summer	Cooked
	Gayisi saga	*Leucas aspera*	Leaves	Rainy	Cooked
	Bana kalara	*Momordica charantia*	Fruits	Summer	Cooked
	Kasa allu	*Discorea spps.*	Tubers	All Season	Cooked
	Ambada	*Spondias pinnata*	Fruits	Winter	Raw
	Palua	*Curcuma zedoaria*	Fruits	Winter	Raw
	Pingu		Leaves	Summer	Cooked
	Jhaliri saga		Leaves	All Season	Cooked
	Kaintha	*Limonia acidissima*	Fruits	Winter	Cooked
	Nirmuli	*Cuscuta reflexa*	Fruits	Winter	Raw
	Tunga	*Discorea spps.*	Tubers	Summer,Winter	Cooked
	Kanta koli		Fruits	Winter	Raw
	Kanta saga		Leaves	Winter	Cooked
	Khata saga		Leaves	Summer	Cooked
	Mati saga		Leaves	All Season	Cooked
	Rai	*Dallenia pentagyna*	Fruits	Summer	Raw
	Matha		Leaves	Rainy, Winter	Cooked
	Bada chattu	*Agaricus spps.*	Entire Plant	Winter	Cooked
	Karanja	*Pongamia pinnata*	Seed	Winter	Raw
	Lata saga		Leaves	All Season	Cooked

During different ceremonies / cultural festive occasions /observations, the PVTGs use / consume different flora such as *Bela,*i.e., wood apple (*Aegle marmelos*), Mango (*Mangifera indica*), Sal flower (*Shorea robusta*), Nim (Azardirachta indica) etc. Cultural practices and use of different flora during such observationsof rites and rituals seem more or less similar across PVTGs.This may be due to the similar ecological conditions and use value of the flora that remained unchanged across the generations. Use of different flora during different occasions by PVTG category is presented in the Table.

Table No. 3.8:
Use of different Flora by the PVTGs in different Occasions

PVTG	Flora		Social Occasion
	Odia Name	**Botanical Name**	
Dangria Kandha	BELA	*Aegle marmelos*	KICHIRI JATRA
	BELA	*Aegle marmelos*	DAMRIA PARBA
	BELA	*Aegle marmelos*	MARIA PARBA
	Amba	*Mangifera indica*	NUAKHAI
	SALA PATRA	*Shorea robusta*	NUAKHAI
	BELA	*Aegle marmelos*	KANDULA PARBA
	ADA	*Gingiber officinale*	CHAITI PARBA
	AMBA PATRA	*Mangifera indica*	DURGA PUJA
	SALA PATRA	*Mangifera indica*	MANDIA PARBA
	AMBA PATRA	*Mangifera indica*	KANDULA PARBA
Lanjia Saora	SALA PATRA	*Shorea robusta*	AMBANUAKHAI
	SALA PATRA	*Shorea robusta*	BUDHIMA PARBA
	SALA PATRA	*Shorea robusta*	KANDULA NUAKHAI
	KARADA FULA	*Flemingia congesta*	KANDULA NUAKHAI
	BELA PATRA	*Aegle marmelos*	SATSANGHA
	KANGU	*Setaria italic (L.) P. Beauv*	KANGU NUAKHAI
	CHANDAN	*Santalum album*	NUAKHAI
Juang	Amba	*Mangifera indica*	AMBANUA
	KUSUM	*Schleichera oleosa*	ASADHI
	TULASI	*Ocimum sactum*	MORTEUARI
	BELA	*Aegle marmelos*	MORTEUARI
	SALA PATRA	*Shorea robusta*	MORTEUARI
	NEEM	*Azardirachta indica*	MORTEUARI
	KALARA PATRA	*Momordica charantia*	MORTEUARI
Hill Kharia & Mankirdia	SALAFULA	*Shorea robusta*	PHULABHAGUNI
	AMBA	*Mangifera indica*	MAGHA PARBA
	BELA	*Aegle marmelos*	MAGHA PARBA

3.7 Fauna as Food

Apart from flora, different tribals consume different fauna, available in the forest or domesticated. They collect / hunt different animals / birds and consume it. The hunting festival is a part of their socio-cultural life and every year in a particular day, all the male members go out to forest for hunting. However, with increased cultural assimilation and imposition of wildlife conservation measures, such practices seem less benefitting to tribals. However, different fauna used by the tribals, either through hunting or through any other means are presented in the Table.

Table No. 3.9:
Use of Wild Fauna as Food by the PVTGs

PVTG	Fauna (Odia Name)	Fauna (Zoological Name)	Parts Used	Seasonal Availability
Dangria Kandha	Maccha (Fish)	*Antigonia spps.*	Flesh	Summer
	Para	*Columba livia*	Flesh	Summer

PVTG	Fauna (Odia Name)	Fauna (Zoological Name)	Parts Used	Seasonal Availability
	Bana kukuda	*Gallus*	Flesh	All Season
	Mankada	*Macaca Fascicularis*	Flesh	Rainy
	Kutura	*Muntiacus muntjak*	Flesh	All Season
	Mayura	*Pavo Cristatus*	Flesh	All Season
	Birudi anda		Flesh	Rainy
	Kai	*Solenopsis mandibularis*	Flesh	All Season
	Chuna maccha	*Antigonia spps.*	Flesh	Summer
	Baga	*Gruidae Gruiformes*	Flesh	All Season
	Gunduchi musa	*Rodentia Sciurus*	Flesh	Winter
	Gunduri chadei	*Coturnix*	Flesh	All Season
	Harina	*Artiodactyl Cervidae*	Flesh	All Season
	Kapata	*Columbidae Colombiformes*	Flesh	All Season
	Thekua	*Rodentia Rattus*	Flesh	All Season
	Sambar	*Cervis elaphus*	Flesh	All Season
	Chanchana	*Falconidae Falco*	Flesh	Rainy
	Mahu machi	*Apis mellifera*	Flesh	Summer
	Birudi	*Philanthus triangulum*	Flesh	All Season
	Jhinka	*Hystricomorph Hystricidae*	Flesh	All Season
	Baraha	*Sus scrofa*	Flesh	All Season
	Kau	Corvous Corone	Flesh	All Season
	Godhi	*Iguana*	Flesh	All Season
	Musa	*Rattus (*Apodemus sylvaticus*)*	Flesh	All Season
	Bajrakapta	*Manis ssps.*	Flesh	Winter
	Badudi	*Desmodus rotundus*	Flesh	All Season
	Kukuda	*Gallus domesticus*	Flesh	All Season
	Katasa	*Felis chaus / Felis silvestris*	Flesh	All Season
	Neula	*Herpestidae spps.*	Flesh	Winter
	Gurandi chadei	*Coturnix*	Flesh	Summer
Lanjia Saora	Maccha (Fish)	*Antigonia spps*	Flesh	All Season
	Para (Peagon)	*Columba livia*	Flesh	All Season
	Bana Kukuda	*Gallus*	Flesh	All Season
	Mankada (Monkey)	*Macaca Fascicularis*	Flesh	All Season
	Bhalu (Beer)	*Ursidae Carnivora*	Flesh	Occasional
	Kutura	*Muntiacus muntjak*	Flesh	All Season
	Birudi	*Polistes fuscatus*	Egg/Flesh	All Season
	Kai	*Solenopsis mandibularis*	Flesh	All Season
	Mayura (peacock)	*Pavo Cristatus*	Flesh	All Season
	Baga	*Gruidae Gruiformes*	Flesh	All Season
	Gunduchi musa	*Rodentia Sciurus*	Flesh	All Season
	Katha Hana Chadei	*Hemicircus canente*	Flesh	All Season
	Harina (Deer)	*Artiodactyl Cervidae*	Flesh	All Season
	Kapata	*Columbidae Colombiformes*	Flesh	All Season
	Chenga Maccha	*Antigonia spps*	Flesh	All Season
	Koili	*Cuculidae Cuculiformes*	Flesh	All Season
	Thekua (Rabbit)	*Rodentia Rattus*	Flesh	All Season
	Sambar	*Cervis elaphus*	Flesh	All Season
	Chanchana	*Falconidae Falco*	Flesh	All Season
	Kapata mara		Flesh	All Season
	Mahu machi	*Apis mellifera*	Flesh	All Season
	Birudi	*Polistes fuscatus*	Flesh	All Season
	Salapa gacha poko		Flesh	All Season
	Jhinka	*Hystricomorph Hystricidae*	Flesh	All Season

PVTG	Fauna (Odia Name)	Fauna (Zoological Name)	Parts Used	Seasonal Availability
	Baraha	*Sus scrofa*	Flesh	All Season
	Khurandi		Flesh	All Season
	Kanchada		Flesh	All Season
	Netra maccha	*Antigonia spps*	Flesh	All Season
	Kau (Crow)	Corvous Corone	Flesh	All Season
	Godhi	*Iguana*	Flesh	All Season
	Musa (Mouse)	*Rattus (*Apodemus sylvaticus*)*	Flesh	All Season
	Magura Macha	*Clarias magur*	Flesh	All Season
	Mahu Machi Anda	*Apis mellifera*	Egg	All Season
	Pecha (Owl)	*Nocturnalis Strigiformes*	Flesh	Summer
Juang	Para	*Columba livia*	Flesh	All Season
	Bana kukuda	*Gallus*	Flesh	Summer, winter
	Bhalu	*Ursidae Carnivora*	Flesh	Occasional
	Kutura	*Muntiacus muntjak*	Flesh	All Season
	Mayura	*Pavo Cristatus*	Flesh	All Season
	Kai	*Solenopsis mandibularis*	Flesh	All Season
	Baga	*Gruidae Gruiformes*	Flesh	All Season
	Gunduri chadei	*Coturnix.*	Flesh	All Season
	Katha hana chadei	*Picidae spps. (Hemicircus canente.)*	Flesh	All Season
	Harina	*Artiodactyl Cervidae*	Flesh	Winter
	Kapata	*Columbidae Colombiformes*	Flesh	All Season
	Sambar	*Cervis elaphus*	Flesh	All Season
	Chanchana	*Falconidae Falco*	Flesh	All Season
	Mahu machi	*Apis mellifera*	Flesh	All Season
	Jhinka	*Hystricomorph Hystricidae*	Flesh	Summer, Rainy
	Baraha	*Sus scrofa*	Flesh	All Season
	Pecha	*Nocturnalis Strigiformes*	Flesh	All Season
	Kanjar kukuda		Flesh	Summer, winter
	Bilua	*Canis Aureus*	Flesh	Summer
	Salia patini	*Civettictis civetta*	Flesh	All Season
	Bajrakapta	*Manis ssps.*	Flesh	All Season
	Tukula chadei		Flesh	Summer
	Nalitata		Flesh	Summer
	Belera		Flesh	Rainy
	Baya chadei	*Ploceus philippinus*	Flesh	Summer
	Janda	*Hymenopetrous formicidae*	All	Winter
	Dahuka	*Amaurornis phoenicurus*	Flesh	Winter
	Chila	*Aquila Accipitridae*	Flesh	Winter
	Dalua musa	*Apodemus sylvaticus*	Flesh	All Season
	Jhari poko		Flesh	Rainy
	Chinkada chadei		Flesh	All Season
	Badudi	*Desmodus rotundus*	Flesh	Winter
	Benga	*Anura ranidae (Rana Tigrina)*	Flesh	Rainy, winter
	Gunduchi musa	*Rodentia Sciurus*	Flesh	Winter
	Dhamana sapa	*Ptyas mucosa*	Flesh	Summer, Rainy
	Kumbhatua	*Centropus sinensis*	Flesh	Rainy
	Odha	Lutrinae spps.	Flesh	All Season
	Gendalia	*Balearica regulorum*	Flesh	Winter
	Saguna	*Diurnilis Neophron*	Flesh	All Season
	Kukuda	*Gallus domesticus*	Flesh	All Season
	Magura	*Kryptopterus cryptopterus*	Flesh	All Season
Hill Kharia& Mankirdia	Para	*Columba livia*	Flesh	All Season

PVTG	Fauna (Odia Name)	Fauna (Zoological Name)	Parts Used	Seasonal Availability
	Bana kukuda	*Gallus*	Flesh	Summer,Winter
	Mankada	*Macaca Fascicularis*	Flesh	All Season
	Bhalu	*Ursidae Carnivora*	Flesh	Occasional
	Kutura	*Muntiacus muntjak*	Flesh	All Season
	Mayura	*Pavo Cristatus*	Flesh	All Season
	Kai	*Solenopsis mandibularis*	Flesh	Summer
	Baga	*Gruidae Gruiformes*	Flesh	All Season
	Gunduri chadei	*Coturnix*	Flesh	All Season
	Harina	*Artiodactyl Cervidae*	Flesh	All Season
	Kapata	*Columbidae Colombiformes*	Flesh	All Season
	Chenga maccha	*Antigonia spps.*	Flesh	All Season
	Thekua	*Rodentia Rattus*	Flesh	All Season
	Sambar	*Cervis elaphus*	Flesh	All Season
	Mahu machi	*Apis mellifera*	Flesh	Summer
	Birudi	*Philanthus triangulum*	Flesh	All Season
	Jhinka	*Hystricomorph Hystricidae*	Flesh	All Season
	Baraha	*Sus scrofa*	Flesh	All Season
	Godhi	*Iguana*	Flesh	All Season
	Musa	*Rattus (*Apodemus sylvaticus*)*	Flesh	All Season
	Pecha	*Nocturnalis Strigiformes*	Flesh	All Season
	Bilua	*Canis adustus*	Flesh	All Season
	Bajrakapta	*Manis ssps.*	Flesh	Rainy, Winter
	Badudi	*Desmodus rotundus*	Flesh	Rainy
	Gunduchi musa	*Rodentia Sciurus*	Flesh	All Season
	Dhamana sapa	*Ptyas mucosa*	Flesh	All Season
	Kumbhatua	*Centropus sinensis*	Flesh	Winter
	Gendalia	*Balearica regulorum*	Flesh	Winter
	Kukuda	*Gallus domesticus*	Flesh	Summer
	Pati mankada	*Macaca Fascicularis*	Flesh	All Season
	Neula	*Herpestidae spps.*	Flesh	All Season
	Potoko		Flesh	All Season

In different occasions / social observations, the PVTGs use different wild fauna like Barha (*Sus scrofa*), Peason (*Columba livia*) etc. including domesticated animals such as Buffalo (*Bison bonasus*), Fowl (*Gallus domesticus*) etc. Different occasions and use of different fauna for consumption / sacrifice are presented by PVTG in the Table.

Table No. 3.10:
Different Fauna used by the PVTGs during Social Observations

PVTG	Fauna Used		Occasion
	Odia Name	**Scientific Name**	
Dangria Kandha	PODA	*Bison bonasus*	KICHIRI JATRA
	PODA	*Bison bonasus*	MARIA PARBA
	KUKUDA	*Gallus gallus domesticus*	NUAKHAI
	PARA	*Columba livia*	AMBA NUAKHAI
	PARA	*Columba livia*	KUDUR PARBA
Lanjia Saora	PODA	*Bison bonasus*	Christmas, Kandula Nuakhai, Kangoo Nuakhai, Meria Parab

	Ghusuri	*Sus scrofa*	Kangoo Nuakhai
	KUKUDA	*Gallus domesticus*	Doda
	Gai	*Bos taurus*	Christmas
Juang	BARHA	*Sus scrofa*	NUAKHAI
	BANA KUKUDA	*Gallus gallus spps*	ASHADHI
Hill Kharia &Mankirdia	KUKUDA	*Gallus gallus domesticus*	MAGHAPARBA

3.8 Pre-Consumption Rituals and Offerings

Different rituals are followed by tribals before consumption of wild edible flora but it is not followed mandatorily by certain tribal families across the PVTGs (8.8 %). First fruit of the season is worshiped to God (21.8 %). The converted tribals (converted to Christianity) take the first fruit of the season to Church where it is worshiped to Lord and after that it is consumed (18.9 %). On the eve of *Amba Nuakhai*, *Kangoo Nuakhai*, *Kandula Nuakhai*. A hen is sacrificed and worshiped in worship place (*puja mandap*) or banyan tree (*Baragacha*), then the food items are consumed (8.5 %). Kusum fruit is taken after sacrificing a pig in Rajo (0.3 %). Some also consume fruits after Nuakhai (3.7 %). Tribals also offer first fruit of the season to Dharani (13.0 %) and then consume it.

When different animals / birds are captured live, it is first sacrificed in the *sala* (place of worship) before the God and then taken for consumption. Normally head of the animal is worshiped to the God (5.7 %) and remaining part of the body is taken for consumption. However, with changing practices; which is a result of cultural assimilation, improved exposure and conversion to different belief system; majority of the PVTGs, irrespective of their belongingness to different tribal community, do not practice any such rituals (62.9 %). Different practices adopted by PVTGs before the consumption of different fauna is presented below.

3.9 Flora as Medicines

Plants have been used as a source of medicine since ancient times. These medicines are considered to be safe and environment friendly. According to WHO about 80% of the world's population depends on traditional medicine for their primary health care. In case of tribals, no health care services or poor availability of health care facilities may be one of the reasons for which the tribals still have higher dependency on traditional health care practices. A study in Deogarh district of Odisha (Sahu et al) reveals that plants like *Cuscuta reflexa*is used by the tribals for hydrocele, *Uraria picta*for sterility, *Woodfordia fruticosa* for irregular menstruation, and*Gloriosa superba* against piles[6].

The tribals concentrated pockets / districts are having abundant plant species that cater to the health care need of the tribals. An exclusive study in Mayurbhanj district of Odisha divulges a variety of plants that are used by tribals for treatment of joint diseases. Some of these plants and method of preparation is presented below.

[6] *Sahu S.C., Dhal N.K, Mohanty R.C; Potential Medicinal Plants Used by the Tribals of Deogarh District, Orissa, Natural Products Department, Institute of Minerals and Materials Technology and P.G. Department of Botany, Utkal University*

1. Bhuin Neem (*Andrographis paniculata*): Roots are pasted with the roots of *Premna herbacea* and applied externally on rheumatic and gout affected parts of the body. It is also pasted with soaked rice and made half-baked chapattis and taken internally for one week for quick recovery.

2. Arakh / Sweto Arkho (*Calotropis procera*): Leaves are ground with the leaves of *Ricinus cummunis*, *Datura metel* and alum (after exude out water by heating on hot iron) in equal quantity and made pills. Each pill (3 gms) is given in the morning and evening with hot water for 15-20 days in the treatment of rheumatism. Leaves are coated with mustard oil and slightly warmed and tied as bandage on the paining joint of the body.

3. Pingu Kujri (*Celastrus paniculatus*): The seed oil is extracted and applied externally to keep body warmth in the winter season. It is also applied to relieve pain and proper circulation of blood in the body. Seed oil is massaged on the part affected by gout and rheumatism up to the complete cure.

4. Jhumka (*Crotalaria prostrata*): Plants are pasted and applied externally on rheumatic pains for 30 days.

5. Amba Ada / Amoda (*Curcuma amada*): Rhizomes are pasted with bulbs of *Urginea indica* and mixed with hot oil and applied 2-3 times daily for 5 days on joint pains and half portion gout.

6. Krishna Haldi (*Curcuma caesia*): Rhizomes are cooked with mustard oil or sesame oil and the prepared paste is applied externally on rheumatism and paining part of the body.

7. Sisu (*Dalbergia sissoo*): Stem bark is pasted and applied externally on the waist for 15 days to cure lumbago.

8. Mejo-Jhuti / Mayurchuda / Morchuda / Mayur-Jhuti (*Elephantopus scaber*): Leaves are boiled with oil of *Schleichera oleosa* and the prepared paste is applied externally on gout affected part of the body.

9. Bandriya Phool / Nahnugudia / Islagudia / Orga Baha / Kalihari / Agnishika / Jhagdayee (*Gloriosa superba*): Rhizomes are pasted along with garlic and onion and then boiled in mustard oil until it becomes foamless. The prepared lotion is used for massage on the body for 4-5 day for the treatment of rheumatism and arthritis.

10. Dangrakata Jamun (*Hygrophilla auriculata*): Leaf paste is applied externally on rheumatic affected part of the body for two weeks.

11. Saparkachu / Bada Sarpunkha (*Kaempferia galangal*): Tubers are pasted with water and applied externally on paining parts of the joints.

12. Hathikana / Hathkan (*Leea macrophylla*): Fresh roots are pasted with water and applied externally on waist in the treatment of lumbago.

13. Chayalee / Chaily (*Morinda tinctoria*): Stem bark is pasted with water and applied locally on the paining part of the joints of domestic animals as well as human beings.

14. Ban Tulsi / Tunag Tulsi (*Ocimum basilicum*): All parts including seeds are boiled with mustard oil and the prepared lotion is applied on joint pain for two to four days.

15. Gandhali / Gandhadi (*Paederia foetida*): Leaf paste is applied externally on rheumatic parts of the body until the complete cure. Leaves are cooked with rice and taken one or two days in the treatment of rheumatism and gout. Plant extract is also taken internally for 8-10 days in joint pain.

16. Devdaru (*Polyalthia longifolia*): Stem bark is dried, powdered and given orally in the treatment of gout for 7 days.

17. Barahakani (*Pterospermum heyneanum*): Flowers/ fruits or stem bark is pasted with water and the prepared paste is applied on gout-affected parts of the body for 3-4 days.

18. Kusum / Baru / Pagada (*Schleichera oleosa*): A piece of garlic and ginger is soaked in seed oil (100 Gm) of the plant for 7 days. This oil is used to massage on the body of patient suffering from rheumatism and gout till cure.

19. Bazramuli (*Sida rhombofolia*): Roots are pasted with water and applied on the paining joints of human beings.

20. Baheda / Robl (*Terminalia bellerica*): The fruits are dried and powdered with fruits of *Terminalia chebula* and *Embelica officinalis* and taken for three weeks in the treatment of lumbago.

21. Loha Jhad (*Turnera ulmifolia*): Leaves are pasted with mustard oil and applied externally on the waist pain.

22. Mandirika-Jhada / Kathkamjanga / Kakadagod (*Viscum articulatum*): Whole plant is grounded with water and the paste is applied on the part affected by gout for two days.

23. Baigunia Sinduri / Baigana Sinduwar (*Vitex negundo*): Dried leaves are roasted in iron bowl (Karahi) and prepared powder. It is put inside a piece of cloths and tied over the knee in the treatment of rheumatism and gout 3-4 times for 2-3 days. Tender leaves (20 Gm) is pounded with black pepper (10 Gm) and made pills (gram seed size). Three pills are taken orally daily for 4-5 days in the treatment of joint pain.

A study in Deogarh district of Odisha (Sahu et al) identified certain plants that have medicinal value for different diseases like Eczema, kidney problem, blood dysentery, piles etc. A list of identified plants and its application for different diseases are presented in the Table.

Table No. 3.11:
Different Plants and its use for different Diseases

SN	Scientific Names	English Name	Odiya Name	Disease/Condition
1	*Abrus precatorius*	Rosary pea	Kaincha/ Gunj	Stomach disorder
2	*Alangium salvifolium*	Sage-leaved alangium	Ankola	Conjunctivitis
3	*Argemone mexicana*	Mexican poppy	Siyal kanta	Eczema
4	*Atylosia scarabaeoides*	Showy pigeonpea	Bana kolatho	Indigestion
5	*Boerhavia diffusa*	Red hogweed	Gadha-canda	Kidney problem
6	*Careya arborea*	Wild Guava	Kumbhi	Joint pain

7	*Combretum decandrum*	Bush willow	Atandi lai	Acne
8	*Curcuma amada*	Mango ginger	Amba ada	Joint pain
9	*Dillenia pentagyna*	Dog teak	Rai	Blood dysentery
10	*Gloriosa superba*	Flame lily	Agnishika/ Puraphul	Piles
11	*Hemedesmus indicus*	Indian sarsaparilla	Anantamula	Eczema
12	*Plumbago zeylanica*	Lead wort	Dhobchintamul/ Chitrak	Leucorrhoea
13	*Soymida febrifuga*	Indian redwood	Rakta rohani	Spermatorrhoea
14	*Streblus aspera*	Sand paper tree		Piles

Source: Sahu S.C. et al; Potential Medicinal Plants Used by the Tribals of Deogarh District, Orissa, India

Traditional uses of plants for delivery problem in Bargarh district was studied (Sen S.K et al, 2015)[7] to understand use of different plants by tribals for delivery related issues. About 14 plants were identified which is having such importance and have been used by tribals. The plants that have been used are as below.

1. *Aristolochia indica*(Pan-airi): Equal amount of root and leaves are crushed together and the paste (5g) is taken 2 times to get relief from post-delivery pain

2. *Diplocyclos palmatus*(Shivling): Root is collected during solar or lunar eclipse. It is tied to left arm of a woman during labour pain for smooth delivery.

3. *Erythrina suberosa*(Paldhua): Root is collected on Saturday or Sunday and tied on the waist of pregnant woman during labour pain for smooth delivery

4. *Ficus racemosa*(Dumer): Equal amount of root of the plant, *Ficus religiosa* bark, *Raphanus sativus* seeds and *Ficus benghalensis* bark are crushed together and boiled in water to obtain decoction. The decoction (half a cup) is taken once during labour pain for smooth delivery.

5. *Helicteres isora*(Murmuri): Root (4 inches) paste is taken once daily for 3 days to cure post-natal weakness.

6. *Heliotropium indicum*(Hatisundh): Root of the plant crushed with polished rice washed water and the paste (1-2 teaspoon) is taken twice daily to cure post-natal pain.

7. *Marsdenia tenacissima* (Medha-mud): Root of the plant crushed with polished rice washed water and the paste (2-3 teaspoon) is taken twice daily to cure post-natal pain.

8. *Pergularia daemia* (Uturli): Equal amount of leaves and roots are crushed together and applied over navel of the pregnant woman for smooth delivery during labour pain.

9. *Plumbago zeylanica*(Dhobchintamul): Root powder (5g) with honey is taken during labour pain for smooth delivery.

10. *Ricinus communis*(Jada): Seeds of the plant and polished rice are grinded with water and is applied externally on the affected part to cure back-pain after delivery.

[7]Sen S.K., Pattnaik M.R., Behera L.M; Ethino-medicinal uses of plants related to delivery problem in Bargarh district of Western Odisha, International Journal of Herbal Medicine, 2015.

11. *Sida acuta*(Bajarmuli): During labour pain the root of the plant is collected, washed with water and cut into seven pieces and these pieces are touched across the whole body from head to toe for seven times to induce smooth delivery.

12. *Tinospora cordifolia* (Gulchi): Stem (250g) is boiled in water (one litre) to obtain a decoction (250 ml). The decoction (one cup) is taken during delivery pain for smooth delivery.

13. *Tagetes erecta*(Ganja): A piece of root of the plant is collected during labour pain. It is cut into seven pieces and touched to the body of the patient from head to toe.

14. *Trigonella foenum-graecum*(Methi): Fruit powder (2gm) with warm water is taken 3 times daily to cure post-natal pain.

There has been renewed attention and increasing interest to use traditional medicines globally. The World Health Organisation (WHO) also of the opinion that traditional medicine is an important contributor to achieve health goals. According to WHO, today around 80 % of the world's population and 65 % of Indian population in rural area depends upon traditional medicine which covers medicinal plants. There are considerable economic benefits in the development of indigenous medicines and use of medicinal plants for the treatment of various diseases. Preserving and enhancing the plant knowledge and its use is equivalent to rescuing a global heritage[8]. It is widely acknowledged that herbal medicines are comparatively safer than synthetic drugs. Phyto-medicines (medicines from plant and their derived products) have been an integral part of traditional health care system in Odisha and more particularly among the tribals. Odisha with varied climate regions (10 agro-climatic zones) has rich and diverse flora that have been used as medicine

Table No. 3.12:
Use of Different Flora as Medicines by PVTGs

Flora (Odia Name)	Flora (Botanical Name)	Disease for which it is used	Part Use
Dangaria Kandha			
Jada	*Ricinus communis*	Fever, Hair problem,Head ache	Seeds
Siali	*Bauhinia purpura (Mimosa rubicaulis)*	Skin allergies	Seeds
Pita kanda	*Discorea spps*	Muscle pain	Rhizoms
Bela	*Aegle marmelos*	Head ache	leaves,
Patala garuda	*Rauvolfia serpentina*	Body Worms, Pali Jara, Dysentery/Loose motion, Vomiting.	Stem Bark
Bichina		Cut wound	Stem Bark
Sunari	*Cassia fistula*	Head ache	Fruits
Gangasuili	*Nyctanthes arborescences*	Fever, Cut wound, Malaria.	Leaves
Masani		Cut wound	Stem Bark
Karanja	*Pongamia pinnata*	Skin allergies	Seeds
Musakani chera		Stomach ache	Root
Bana haldi	*Corchorus acutangulus*	Malaria	Leaves
Baunsa ganthi	*Bambusa bamboos*	Cut wound	Tubers
Harateri		Pali Jara	Root
Baghamunda Gacha		Skin allergies	Root

[8]*Lambert J, Srivastav J and Vietmeyer N, Medicinal Plants, Rescuing a Global Heritage, The World Bank, 1997*

Flora (Odia Name)	Flora (Botanical Name)	Disease for which it is used	Part Use
Karanja	*Pongamia pinnata*	Skin allergies	Seeds
Amba	*Mangifera indica*	Loose motion	Stem Bark
Pita kanda	*Discorea spps*	Muscle pain	Rhizoms
Khada	*Amaranthus viridis*	Cut wound	Stem Bark
Lanjia Saora			
Gangasuili	*Nyctanthes arborescences*	Pali Jara, Cold, Typhoid, Fever	Leaves
Pitamari	*Naregamia alata*	Dental Pain (*Danta Bindha*)	Stem Bark
Pijuli patra	*Psidium guajava*	Loose motion	Leaves
Gheekuari	*Aloe vera*	Head ache, Head reeling,Muscle pain	Leaves
Raga gacha		Dental Pain (*Danta Bindha*)	Leaves
Soma chali		Cut wound	Stem Bark
Thalkudi	*Centella_asiatica*	Head ache, Stomach ache.	Leaves
Satabari	*Asparagus racemosus*	Jaundice	Root
Sajana saga	*Moringa oleifera*	Head reeling	Leaves
Bana haldi	*Corchorus acutangulus*	Skin allergies	Root
Karanja	*Pongamia pinnata*	Skin allergies	Oil
Neema	*Azardirachta indica*	Skin allergies	Leave
Amba	*Mangifera indica*	Loose motion	Stem Bark
Harida	*Terminalia chebula*	Cold (*Thanda*)	Leaves
Chatuari chali		Jaundice	Rhizomes
Bela	*Aegle marmelos*	Chicken Pox	Leaves
Tangasiri		Head ache	Root
Black berry	*Rubus fruticosus*	Diabetics	Seeds
Patala garuda	*Rauvolfia serpentina*	Loose motion	Root
Lembu	*Citrus limonium*	Vomiting	Leaves
Juang			
Akala bindu	*Stephania hernandifolia*	Headache,Loose motion,Malaria, Cold	Root
Gangasuili	*Nyctanthes arborescences*	Fever, Malaria.	Leaves
Patala garuda	*Rauvolfia serpentina*	Snake bite, Stomach, Skin allergies	Root
Karanja	*Pongamia pinnata*	Cold (*Thanda*)	Stem Bark
Gopokahu		Impotency	Root
Mania kanta		Stomach ache	Root
Sabala gacha		Stomach ache	Root
Anla	*Emblica officinalis*	Heat problem	Fruits
Kusum	*Schleichera oleosa*	Skin allergies	Oil
Mathura chera		Fits	Root
Gedu saga		Blood production	Leaves
Nali jagi		Cold (*Thanda*)	Leaves
Neema	*Azardirachta indica*	Skin allergies	Leaves,Steem Bark
Jammu	*Syzygium cumini*	Loose motion	Leaves,Seeds
Harida	*Terminalia chebulla*	Cough	Fruits
Kumbhi	*Careya arborea*	Abortion	Stem Bark
Bela	*Aegle marmelos*	Stomach ache, Dysentery	Leaves
Kandha khai		Cut wounds	Stem Bark
Gandhi		Cut wounds	Leaves
Apamari	*Achyranthes aspera*	Head ache	Root
Tentuli	*Tarmaridus indicus*	Heat problem	Fruits

Flora (Odia Name)	Flora (Botanical Name)	Disease for which it is used	Part Use
Tulasi	*Ocimum sactum*	Cold (*Thanda*)	Leaves
Bana ada	*Gingiber officinale*	Bone fracture	Root
Kala dudura		Muscle pain	Fruits
Apamaranga	*Achyranthes aspera*	Head ache	Root
Nirmuli	*Cuscuta reflexa*	Good health	Oil
Bana kankada		Muscle pain	Seeds
Benga saga		Eksira	Fruits
Pijuli patra	*Psidium guajava*	Fever	Leaves
Kuluchi gacha		Stomach ache	Tubers
Gunduri		Cut wound	Leaves
Amsekara		Loose motion	Root
Nageswari	*Messua ferrea*	Impotency, Good health	Stem Bark
Pitamahaphala		Bone Fracture	Root
Mali chera	*Jasminum sambac*	Easy Delivery	Root
Gopa kanhu		Impotency	Root
Bhuin nimba	*Andrographis_paniculata*	Skin allergies	Root
Podi		Fever	Root
Fagun maricha		Skin allergies	Root
Manjuati	*Lawsonia inermis*	Hair problem	Leaves
Kanta saga	*Amaranthus spinosus*	Blood production	Leaves
Padma chakra		Impotency	Root
Palasula		Stomach ache,Loose motion	Leaves
Hill Kharia & Mankirdia			
Karanja	*Pongamia pinnata*	Cold,Stomach ache, Muscle pain, Loose motion	Seeds
Gangasuili	*Nyctanthes arborescences*	Malaria, Fever,	Leaves
Sunari	*Cassia fistula*	Stomach ache	Fruits
Aata	*Annona squamosa*	Dental Pain (*Danta Bindha*)	Fruits
Tulasi	*Ocimum sactum*	Cold (*Thanda*), Cough	Leaves
Kusum	*Schleichera oleosa*	Cold (*Thanda*)	Seeds
Neema	*Azardirachta indica*	Skin allergies, Fever	Oil
Hati kena		Muscle pain,Loose motion	Fruits
Patala garuda	*Rauvolfia serpentina*	Snake bite	Root
Kuluta		Headache	Leaves
Bhalia	*Semecarpus anacardium*	Headache	Seeds
Bela	*Aegle marmelos*	Loose motion	Leaves
Kochila	*Strychncos nux-vomica*	Skin allergies	Seeds
Tentuli	*Tarmaridus indicus*	Snake bite	Seeds
Sahada	*Streblus asper*	Muscle pain,Headache	Stem Bark
Rai	*Dallenia pentagyna*	Cough	Leaves
Bhuin kamala		Loose motion	Root
Matha jhari		Head ache	Root
Bhuin nimba	*Andrographis_paniculata*	Loose motion	Root
Masani allu		Muscle pain	Tubers
Palua	*Curcuma zedoaria*	Loose motion	Root
Sala	*Shorea robusta*	Skin allergies	Stem Bark
Bandara kali		Stomach ache	Root
Agni jhada	*Premna integrifolia*	Skin allergies	Root
Thobodu		Fever	Root

Flora (Odia Name)	Flora (Botanical Name)	Disease for which it is used	Part Use
Katnech		Stomach ache	Root
Bana haldi	*Corchorus acutangulus*	Skin allergies	Tubers
Anla	*Emblica officinalis*	Stomach ache	Seeds

The PVTGs have been using different flora for different diseases. The healing practices using different flora are more traditional in nature and a way of life of tribals. Parts of different flora used for curing different diseases are presented in the table. Most of the diseases for which this florais used are common diseases and commonly prevalent in rural areas. It is also observed that different types of plants are used for a common health alignment like Bela (*Aegle marmelos*) is used for stomach pain as well as *Mania Kanta* and *Sabala Gacha* for the same purpose.

3.10 Fauna as Medicines

Different fauna area also used by the PVTGs for preventive or curative health care purposes. Most of such uses are curative in nature. Types of fauna used for different diseases are presented in the Table.

Table No. 3.13:
Use of different Fauna as Medicines by PVTGs

PVTG	Type of Fauna (Odia Name)	Type of Fauna (Zoological Name)	Part Used as Medicine	Disease
Dangaria Kandha	Gai (Cow)	*Bos indicus*	Blood shortage, Weakness	Flesh
	Badudi	*Desmodus rotundus*	Asthma, Cold	Flesh
	Kukuda	*Gallus gallusdomesticus*	Blood shortage, Dysentery	All parts, Blood, Oil, Flesh
	Bana Kukuda (Forest Hen)	*Galloperdix spadicea / Gallus*	Witch craft, Piles, Indigestion	Bone, Skin
Lanjia Saora	Bhalu	*Ursidae carnivora*	Flesh, Oil	Chicken Pox
	Kai Pimpudi	*Solenopsis mandibularis*	Flesh	Motiabindu (Cataract), Eye disease
	Kankada	*Brachyura spps.*	Flesh, All parts	Bone disease, Rheumatism, Motiabindu (Cataract)
	Ghusuri	*Sus scrofa*	Flesh, oil	Chicken Pox, Pihula
Juang	Bhalu	*Ursidae Carnivora*	Flesh, oil, blood	Chicken Pox, Rheumatism, Cold, fever, Muscle pain, Bata,
	Kai Pimpudi	*Solenopsis mandibularis*	Flesh	Cold
	Bajrakapta	*Manis ssps.*	Cold	Flesh
	Ghusuri	*Sus scrofa*	Fur, Bone	Witchcraft
	Barha	*Sus scrofa*	Cold	Flesh
	Jhinka	*Hystricomorph Hystricidae*	Flesh, Oil, Fur	Stomach pain, Bata, Rheumatism, Paralysis, Weakness, Sperm disease, Dysentery, Muscle pain

PVTG	Type of Fauna (Odia Name)	Type of Fauna (Zoological Name)	Part Used as Medicine	Disease
	Mayur	*Pavo Cristatus*	Fur	Stomach pain, Indigestion
	Gunduri chadhei	*Coturnix*	Flesh	Weakness, Chicken Pox, Good health, Pre-natal care
	Godhi	*Iguana*	Oil, Flesh	Sperm disease, Asthma
	Badudi	*Desmodus rotundus*	Flesh	Cold, Asthma, Ear problem
	Kantei chadhei		Flesh	Good health
	Jia	*Lumbricina spps.*	All parts	Milk problem
	Chemeni	Columba livia	Feather	Ear problem
	Para	*Columba livia domestica*	Flesh	Fever, Asthma
	Benga (Frog)	*Rana tigrana(Anura ranidae)*	Flesh	Stomach pain
Hill Kharia & Mankirdia	Bhalu	*Ursidae carnivora*	Oil, Flesh, Fur	Fever, Cold, Rheumatism, Bata, Muscle pain
	Godhi	*Iguana*	Flesh, Oil	Rheumatism, Muscle pain, Good health, Good health of mother
	Badudi	*Desmodus rotundus*	Flesh	Fever, Cold
	Ghusuri	*Sus scrofa*	Oil, Flesh, Fur	Muscle pain
	Jhinka	*Hystricomorph hystricidae*	Flesh, Oil	Pihula, Sperm disease
	Sarali		Flesh	Rheumatism
	Nakuala pakhi		Flesh	Bata, Rheumatism
	Kochila khai		Headache	Flesh
	Bana kukuda	*Galloperdix spadicea*	Flesh	Cold, Fever, Muscle pain
	Hanu mankada	*Macaca Fascicularis*	Flesh	Fever
	Pati mankada	*Macaca Fascicularis*		Bata, Rheumatism

3.11 Use of Flora in Social Ceremonies

Tribals celebrate different ceremonies like *Nuakhai*, *Laxmi Puja*and *Gambha Purnima* etc. and use different flora during these occasions. Common tradition of worship also uses different varieties of flora / plants in different worshiping and social ceremonies. Different ceremonies observed by the PVTGs and use of different flora are presented in the Table.

Table No. 3.14:
Use of different Flora in Social Ceremonies by PVTGs

PVTG	Plant (Odia Name)	Plant (Botanical Name)	PartsUsed	Ceremonies
Dangria Kandha	Sal	*Shorea robusta*	Leaves, Entire Plant	Pusa Masa & Mandia Rani Parba, Kango Nuakhai, Kudur, Dharani

PVTG	Plant (Odia Name)	Plant (Botanical Name)	PartsUsed	Ceremonies
				Puja
	Bela	*Aegle marmelos*	Leaves	Nuakhai, Kandula Nuakhai, Kudur, Pusa masa, Meria
	Amba	*Mangifera indica*	Leaves & Others	Nuakhai, Pusa Masa, Kandula Nuakhai, Kudur, Ghanta Parab, Kango Nuakhai, Meria
	Anla	*Emblica officinalis*	Leaves	Nuakhai
	Kanda	*Discorea spps.*	Leaves	Nuakhai
	Duba	*Cynodon dactylon*	Leaves	Nuakhai
Lanjia Saora	Sal	*Shorea robusta*	Gum, Flower, Leaves, Tubers, Gum, Others	Dushera, Budhima Parava, Kandula Nuakhai, Budhima Parava, Dushera, Nuakhai, Kandula Nuakhai
	Amba	*Mangifera indica*	Fruits, Leaves	Amba Nuakhai, Laxmi Puja, Kandula Nuakhai
	Kanda	*Discorea spps.*	Tubers, Leaves	Kanda Nuakhai, Kandula Nuakhai
	Siali	*Bauhinia purpurea(Mimosa rubicaulis)*	Leaves, Others	Amba nuakhai, Kandula Nuakhai
	Karanja		Flowers	Nuakhai & Amba Nuakhai
	Bela	*Aegle marmelos*	Leaves	Nuakhai, Satsanga
	Kandula	*Flemingia congesta*	Leaves	Kandula Nuakhai
	Chandan	*Santalum albam*	StemBark	Nuakhai
	Kangoo		Fruits	Kangoo nuakhai
Juang	Bela	*Aegle marmelos*	Leaves	Nuakhai, Amba Nuakhai, Mage
	Tulashi	*Ocimum sactum*	Leaves	Nuakhai
	Amba	*Mangifera indica*	Leaves & Roots	Nuakhai, Marriage, Gamba Parab, Mage
	Sal	*Shorea robusta*	Leaves	Laxmi puja & Mage
	Anla	*Emblica officinalis*	Others	Dushera
	Kusum	*Schleichera oleosa*	Leaves	Dushera
	Kadali	*Musa paradisiaca*	Leaves, Fruits	Nuakhai, Mage, All Ceremony
	Barakoli	*Ziziphus mauritiana*	Leaves	Nuakhai, Mage
	Duba	*Cynodon dactylon*	Leaves	Dushera, Mage
	Chandan	*Santalum albam*	Stem, Bark	Amba Nuakhai
	Siali	*Bauhinia purpurea(Mimosa rubicaulis)*	Leave	Mage
	Mahula	*Madhuca indica*	Flowers	Dushera

PVTG	Plant (Odia Name)	Plant (Botanical Name)	PartsUsed	Ceremonies
Hill Kharia & Mankirdia	Sal	*Shorea robusta*	Leaves, Roots, Flowers	Mage, Marriage, Rajo, Phula Ani Parav
	Tulashi	*Ocimum sactum*	Leaves	Nuakhai, Phula Ani Parav, Mage, Gambha Parab
	Giliri		Flowers	Nuakhai
	Duba	*Cynodon dactylon*	Leaves	Nuakhai
	Bela	*Aegle marmelos*	Leaves	Nuakhai, Mage
	Amba	*Mangifera indica*	Leaves	Gamha Parba, Mage, Rajo, Phula Ani Parav
	Mahula	*Madhuca indica*	Flowers	Nuakhai
	Barakoli	*Ziziphus mauritiana*	Leaves	Nuakhai

3.12 Use of Fauna in Social Ceremonies

Like flora, the PVTGs also use different fauna in different social occasions / celebrations. Some of these birds / animals are captured from the nearby forest apart from the use of domesticated animals for celebration. Different birds / animals used for celebration / observation of different social ceremonies by the PVTGs are highlighted in the Table.

Table No. 3.15:
Different Fauna used in Social Ceremonies by PVTGs

PVTG	Fauna (Odia Name)	Fauna (Zoological Name)	Part Used	Used for
Dangria Kandha	Podho	*Bison bonasus*	Blood, Others	Meria Parab, Kandula Nuakhai, Kudul, Chaiti, Nuakhai
	Kukuda	*Gallus domesticus*	Flesh, Blood	Nuakhai, Kandula Nuakhai, Akhaya Trutia, Pusa Parab, Mandia Rani Parab, Kudul, All Ceremonies
	Gai (Cow)	*Bos indicus*	Flesh	Nuakhai, Mandi Rani Parab
	Poti		Flesh	Meria Parab,
	Para	*Columba livia*	Flesh, Blood	Nuakhai, Kandula Nuakhai, Kudul, Amba Nuakhai, Mandia Rani Parab, All Ceremonies
	Bana Kukuda	*Gallus*	Blood, Flesh	Kudul, Kandula Nuakhai, Mandia Rani Parab, Nuakhai, All Ceremonies
	Andua	*Chamaele ontidate*	All	Kichiri Jatra
	Cheli (Goat)	*Capra Hircus*	Flesh	Neta Puja, Nuakhai, Kandula Nuakhai, Kudul

PVTG	Fauna (Odia Name)	Fauna (Zoological Name)	Part Used	Used for
Lanjia Saora	Podho	*Bison bonasus*	Flesh, Blood	Amba Nuakhai, Christmas, Doda, Kandula Nuakhai, Kangoo Nuakhai, Meria Parab
	Ghusuri	*Sus scrofa*	Flesh	Amba Nuakhai, Kandula Nuakhai, Doda, Christmas
	Gai	*Bos taurus*	Flesh, Blood	Christmas, Amba Nuakhai, Kandula Nuakhai, Kangoo Nuakhai
	Kukuda	*Gallus domesticus*	Flesh	Amba Nuakhai, Doda, Christmas
Juang	Kukuda	*Gallus gallus domesticus*	Blood, Flesh, Bone	Nuakhai, Amba Nuakhai, Dhana Nuakhai, Dushera, Ashadi Parab, Marriage, Magha Parab
	Barha	*Sus scrofa*	Flesh, Others	Nuakhai, Amba Nuakhai, Ashadi Parab, Dhana Nuakhai, Magha Parab
	Boda	*Boa*	Flesh, Blood	Akhaya Trutia, Nuakhai, Magha Parab, Dhana Nuakhai
	Ghusuri	*Sus scrofa*	Blood	Dhana Nuakhai, Asadhi Parab
	Cheli	*Capra Hircus*	Blood, Flesh	Nuakhai, Dhana Nuakhai
Hill Kharia & Mankirdia	Kukuda	*Gallus domesticus*	Blood, Flesh	Nuakhai, Dhana Nuakhai, Magha Parab, Rajo
	Ghusuri	*Sus scrofa*	Flesh	Magha Parab
	Bana Kukuda	*Gallus*	Flesh, Blood	Magha Parab
	Boda	*Boa*	Blood	Christmas
	Cheli	*Capra hircus*	Blood	Nuakhai
	Para	*Columba livia*		Rajo

In order to appease God, the PVTGs sacrifice different animals / birds such as Fowl (*Gallus domesticus*), Forest Fowls (Gallus spps) etc. It is a traditional belief that by such sacrifices, God will be pleased and keep them safe and healthy. Animal sacrifices made by the PVTGs in different occasions are presented in the Table.

Table No. 3.16
Different Animals Scarified by the PVTGs to Appease God

PVTG	Odia Name	Scientific name	Occasion of sacrifice
Dangria Kandha	Endua	*Chamaeleo chamaeleon*	Maria Parba
Dangria Kandha	Mainsi	*Bison bonasus*	Maria Parba
Lanjia Saora	Podho	*Bison bonasus*	Nuakhai
Lanjia Saora	Ghusuri	*Sus scrofa*	Kandula Nuakhai
Lanjia Saora	Gai (Cow)	*Bos taurus*	Christmas
Lanjia Saora	Kukuda	*Gallus domesticus*	Doda

Juang	Jangali Kukuda	*Gallus spps*	Nuakhai
Juang	Barha	*Sus scrofa*	Nuakhai
Hill Kharia &Mankirdia	Kukuda	*Gallus domesticus*	Nuakhai

3.13 Flora in Mortuary Rites

Apart from consumption, different flora is also used to complete the mourning rituals / mortuary rites of the dead. In the overall mourning rituals performing process, different parts of the plants are used in different occasions like leaves, fruits etc. The plants that are used for performing mortuary rites are presented in the Table.

Table No. 3.17:
Different Flora used during Mortuary Rites by the PVTGs

PVTG	Plant Name (Odia)	Plant Name (Botanical Name)	Part used	Used for
Dangaria Kandha	Amba	*Mangifera indica*	Stem bark, Leaves	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Kendu	*Diospyros melanoxylon*	Leaves	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Kadali	*Musa paradisiaca*	Leaves	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
Lanjia Saora	Kadali	*Musa paradisiaca*	Leaves, Entire plant	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Neemba	*Azardirachta indica*	Leaves, Tubers	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Amba	*Mangifera indica*	Tubers, Stem bark, Leaves	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Chanda	*Santalum albam*	Tubers, Stem bark	Purification Rituals (Tradition Based)
	Jamu	*Syzygium cumini*	Seeds	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Tulasi	*Ocimum sactum*	Fruits	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Dhana kunda	*Oryza sativa*	Fruits	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
Juang	Neemba	*Azardirachta indica*	Leaves	Purification Rituals (Tradition Based)
	Kalara	*Momordica charantia*	Leaves, fruits	Purification Rituals (Tradition Based)
	Jamu	*Syzygium cumini*	Stem bark, tubers, leaves, seed, Entire plant	Preventing Soul from Coming Back
	Dubaghasa	*Cyanodon dactylon*	Leaves, entire plant, roots	Purification Rituals (Tradition Based)
	Tulasi	*Ocimum sactum*	Leaves	Purification Rituals (Tradition Based)
	Sala	*Shorea robusta*	Leaves, barks	Purification Rituals (Tradition Based)
	Saraka		Tubers	Purification Rituals (Tradition Based)
	Sunari	*Cassia fistula*	Entire plant	Purification Rituals (Tradition Based)

PVTG	Plant Name (Odia)	Plant Name (Botanical Name)	Part used	Used for
	Bela	*Aegle marmelos*	Leaves	Purification Rituals (Tradition Based)
Hill Kharia & Mankirdia	Neemba	*Azardirachta indica*	Leaves	Purification Rituals (Tradition Based)
	Amba	*Mangifera indica*	Leaves	Purification Rituals (Tradition Based) So that the soul does not come back
	Dhana Kunda	*Oryza sativa*	Roots, Kunda	Purification Rituals (Tradition Based)
	Mahula	*Madhuca indica*	Gum	Superstition
	Sorisa		Seeds	Preventing Soul from Coming Back
	Dubaghasa	*Cynodon dactylon*	Leaves, roots	Purification Rituals (Tradition Based)
	Tulasi	*Ocimum sactum*	Leaves, Kunda	Purification Rituals (Tradition Based)
	Sala	*Shorea robusta*	Gum, Tubers	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)

3.14 Use of Fauna in Mortuary Rites

Along with flora, the PVTGs also use different fauna during performing last rights / mourning rituals of their family members. Normally different birds / animals are sacrificed in the occasion as a part of purification ritual or it is used as a ritual to remain a part of the community by terminating social isolation, culturally imposed during the mourning period, and returning back to normal community life. Different fauna used by the PVTGs during performing mourning rituals / mortuary rights are presented in the table.

Table No. 3.18:
Different Fauna used for Mortuary Rights by PVTGs

PVTG	Animal		Part used	Used for
	OdiaName	Zoological Name		
Dangaria Kandha	Kukuda	*Gallus domesticus*	Flesh	Purification Rituals (Tradition Based)
	Podho	*Bubalus bubalis*	Flesh	Purification Rituals (Tradition Based)
	Cheli	*Capra hircus*	Flesh	Purification Rituals (Tradition Based)
	Ghusuri	*Artiodactyla suidae*	Flesh	Purification Rituals (Tradition Based)
	Bana kukuda	*Gallus gallus*	Flesh	Purification Rituals (Tradition Based)
	Genda	*Cornu aspersum*	Flesh and Head	Preventing Soul from Coming Back;
	Gai (Cow)	*Bos indicus*	Flesh	Purification Rituals (Tradition Based)
Lanjia Saora	Kukuda	*Gallus domesticus*	Flesh	Purification Rituals (Tradition Based)
	Podho	*Bubalus bubalis*	Flesh	Purification Rituals (Tradition Based)
	Gai (Cow)	*Bos indicus*	flesh	Purification Rituals (Tradition Based)
	Ghusuri	*Artiodactyla*	Flesh	Purification Rituals (Tradition Based)

PVTG	Animal		Part used	Used for
		suidae		
	Cheli	*Capra hircus*	Head, Flesh	Purification Rituals (Tradition Based)
	Barha	*Sus scrofa*	Fur, Bone	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Boda		Bone	Purification Rituals (Tradition Based)
Juang	Kukuda	*Gallus domesticus*	Flesh, Blood	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Mayur	Pava Cristatus	Flesh	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Jhinka	*Hystricomorph h ystricidae*	Flesh	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Ghusuri	*Artiodactyla suidae*	Flesh	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Cheli	*Capra hircus*	Flesh	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Barha	*Sus scrofa*	Flesh	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Kankad a	*Scylla serrata*	All	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Boda		Flesh	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
Hill Kharia & Mankirdia	Kukuda	*Gallus domesticus*	Flesh, blood	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Cheli	*Capra hircus*	Flesh	Purification Rituals (Tradition Based)
	Bana kukuda	*Gallus*	Flesh, bone, blood, Head	Preventing Soul from Coming Back; Purification Rituals (Tradition Based)
	Jhinka	*Hystricomorph h ystricidae*	Flesh	Purification Rituals (Tradition Based)

3.15 Use of Flora during Pregnancy

Different flora used by women during pregnancy are presented in the table.

Table No. 3.19
Use of different Flora during Pregnancy by PVTGs

PVTG	Type of Flora (Odia Name)	Type of Flora (Botanical Name)	PartsUsed	Used for
Dangaria Kandha	Sunsunia		Leaves, seeds	Consumed for better health of both mother and child, Availability if vitamins, For strength, Increase blood production
	Kendu	*Diospyros melanoxylon*	Fruits	Availability of vitamins, For strength
	Khada saga		Leaves	Consumed for better health of both mother and child, increase blood production

	Baunsa karadi		Shoots, Fruits	Prevent worms, Consumed for better health of both mother and child
	Bana saru		Tubers	Availability of vitamins
	Gandheri saga		Leaves	Consumed for better health of both mother and child
	Gaji saga		Leaves	Increase blood production
	Mundi Kanda		Tubers	Consumed for better health of both mother and child
	Amruta bhanda	*Carica papaya*	Leaves, Fruit	Consumed for better health of both mother and child, Availability if vitamins, For strength, Increase blood production
	Sajana saga	*Moringa oleifera*	Leaves	Consumed for better health of both mother and child
	Bhata kanda		Tubers	Consumed for better health of both mother and child, Availability if vitamins
	Pita allu		Tubers, Rhizomes	Consumed for better health of both mother and child, Availability if vitamins, For strength
	Kuliari		Leaves	Consumed for better health of both mother and child, increase blood production
	Mati allu		Tubers, Rhizomes	Consumed for better health of both mother and child, For strength
	Kanta saga		Leaves	Consumed for better health of both mother and child
	Siali	*Mimosa rubicaulis*	Seeds	Consumed for better health of both mother and child, Prevent skin disease
Lanjia Saora	Mitha kanda		Leaves, Tubers	Consumed for better health of both mother and child, Availability of vitamins
	Agamati saga		Leaves	Consumed for better health of both mother and child, Availability of vitamins, For strength
	Barada saga		Leaves, Fruit	Consumed for better health of both mother and child, Availability of vitamins, For strength, For better milk production
	Khata palanga		Leaves, Fruit	Consumed for better health of both mother and child, Availability of vitamins, For better appetite of mother
	Katha kanda		Tubers	Consumed for better health of both mother and child, Availability of vitamins
	Mandia	Eleusine coracana	Seeds, Fruits	Consumed for better health of both mother and child, Availability of vitamins, For strength, For better milk production, For better appetite of mother
	Poitundi		Leaves	Consumed for better health of both mother and child

	Amruta bhanda	*Carica papaya*	Leaves, Fruit	Consumed for better health of both mother and child, Availability of vitamins, For strength, For better milk production, For increased blood production
	Gobori saga		Leaves, Fruit, Tubers	Consumed for better health of both mother and child, Availability of vitamins, For increased blood production
	Sajana saga	*Moringa oleifera*	Leaves, Tubers	Consumed for better health of both mother and child, Availability of vitamins, For increased blood production
	Bhata kanda		Tubers	Consumed for better health of both mother and child, Availability of vitamins
	Palanga saga	*Spinacia oleracea*	Leaves, Fruit, Tubers	Consumed for better health of both mother and child, Availability of vitamins, For increased blood production
	Ganga		Leaves, Fruits	Consumed for better health of both mother and child
	Karada saga		Leaves	Consumed for better health of both mother and child, Availability of vitamins
	Gantia		Fruits	Availability of vitamins
Juang	Kalara	*Momordica charantia*	Fruits	Prevents skin diseases, Immunity
	Gedu saga		Leaves	Consumed for better health of both mother and child, Increase blood production
	Mali (Jasmin)	*Jasminum sambac*	Roots	Easy delivery
	Mari saga		Leaves	Consumed for better health of both mother and child
	Pita saga	*Molugo pentaphylla*	Leaves	Increase blood production
	Kusum	*Schleichera oleosa*	Fruits	Prevents skin diseases
	Poitundi	*Basella alba*	Leaves	Prevents skin diseases
	Amruta bhanda	*Carica papaya*	Fruits	Consumed for better health of both mother and child, Availability of vitamins
	Sajana saga	*Moringa oleifera*	Leaves	Consumed for better health of both mother and child, Availability of vitamins
	Patala garuda		Roots	Immunity
	Suniaria		Stem bark, Tubers, Leaves	Consumed for better health of both mother and child, Easy delivery, Increase blood production, Immunity
	Hunumatia		Leaves, fruit	Consumed for better health of both mother and child
	Ambda		Fruits	Consumed for better health of both mother and child, For better appetite of mother, for strength, Immunity
	Kamala		Fruits	Consumed for better health of both mother and child, Availability of

				Vitamins
	Dumuri		Fruits	Consumed for better health of both mother and child
	Mandei allu		Roots, Tubers, Fruits	Consumed for better health of both mother and child, Availability of Vitamins, Increase blood production, immunity
	Madaranga		Leaves	Increase blood production, for strength, Consumed for better health of both mother and child
	Kanta leutia		Leaves	Consumed for better health of both mother and child, For strength
	Pita allu		Fruits	Consumed for better health of both mother and child
	Sorisa saga		Leaves, fruit	Consumed for better health of both mother and child, Availability of vitamins, Prevent skin diseases
	Kuliari		Leaves	Consumed for better health of both mother and child, Availability of Vitamins, Increase blood production, immunity
	Tentuli	*Tamarindus indica*	Fruits	Consumed for better health of both mother and child, For better appetite of mother, for strength, Immunity
	Amba		Fruits	Consumed for better health of both mother and child
	Bhainga		Tubers	Consumed for better health of both mother and child, Availability of vitamins
	Kanta allu		Tubers	Consumed for better health of both mother and child
	Mati allu		Roots	Consumed for better health of both mother and child
	Karanja		Oil	Immunity
	Benga saga		Leaves	Consumed for better health of both mother and child, Increase blood production, Prevent skin disease
	Akala bindu		Roots	Consumed for better health of both mother and child
Hill Kharia & Mankirdia	Rai		Fruits	Consumed for better health of both mother, Availability if vitamins
	Matha gacha		Leaves	Consumed for better health of both mother
	Mati saga		Leaves	Consumed for better health of both mother, Easy delivery
	Kanta saga		Leaves	Consumed for better health of both mother, Easy delivery
	Khatha saga		Leaves	Consumed for better health of both mother, Easy delivery, For better appetite of mother
	Siali	*Mimosa rubicaulis*	Fruits, seeds	Consumed for better health of both

				mother, Easy delivery
	Rimindi seed		Fruits, seeds	For better appetite of Mother
	Amruta bhanda	*Carica papaya*	Fruits	Consumed for better health of both mother and child
	Sajana saga	*Moringa oleifera*	Leaves	Consumed for better health of both mother and child
	Madaranga		Leaves	Consumed for better health of both mother and child, Increase blood production, For strength
	Pita allu		Tuber	Consumed for better health of both mother and child
	Kuliari		Leaves	Consumed for better health of both mother and child
	Tentuli	*Tamarindus indica*	Leaves	Consumed for better health of both mother and child
	Amba		Flower	For strength
	Karanja		Fruit	For strength
	Ambda		Fruits	For better appetite of Mother
	Kalara		Leaves	Consumed for better health of both mother and child, increase blood production, Prevent skin diseases
	Mari saga		Entire plant	Prevents skin diseases
	Pita saga	*Molugo pentaphylla*	Leaves	Prevents skin diseases
	Kusum	*Schleichera oleosa*	Seeds, Fruits	Prevents skin diseases, Immunity
	Kunduri		Leaves	Consumed for better health of both mother and child, Immunity
	Mami saga		Leaves	Consumed for better health of both mother and child, Immunity, For better health of mother
	Birikani		Leaves	Consumed for better health of both mother and child, Immunity
	Sankha saga		Leaves	Consumed for better health of both mother
	Kankada		Leaves	Consumed for better health of both mother
	Gayisa		Leaves	Prevents skin diseases
	Garidi		Leaves	Consumed for better health of both mother
	Boitalu		Leaves	Consumed for better health of both mother
	Amla		Fruits	For better appetite of mother

3.16 Use of Fauna during Pregnancy

Pregnancy is a critical stage in the life of a women which needs utmost care, for both mother and the foetus. The PVTGs well understand this and adopt different traditional health care measures for the pregnant women. Different fauna used by / for the pregnant women for better health of mother and child is presented in the table.

Table No. 3.20
Use of different Fauna during Pregnancy by PVTGs

PVTG	Animal Name Odia	Zoological Name	Part Used	Used for
Dangaria Kandha	Gai (Cow)	*Bos taurus*	Flesh	For increased blood production, For immunity, For better health of both mother and child
	Chuna macha (Fish)		Flesh	For better health of both mother and child
	Kukuda	*Gallus gallus domesticus*	Flesh, Egg	For more strength, For immunity, For better health of both mother and child
	Bana Kukuda	*Gallus gallus*	Flesh	For increased blood production, For better health of both mother and child
	Mahu machi	*Apis mellifera*	Egg	For better health of both mother and child
	Cheli	*Capra Hircus*	Flesh	For immunity, For better health of both mother and child
Lanjia Saora	Podho (Buffalo)	*Bison bonasus*	Flesh	For more strength, For better health of both mother and child, For increased blood production,
	Mayur	*Pavo Cristatus*	Flesh	For better health of both mother and child
	Bana Kukuda	*Gallus gallus*	Flesh, Egg	Better protein supplement, For better milk production, For more strength, For increased blood production, For better health of both mother and child
	Magura macha (Fish)	*Clarias* magur	Flesh	For better health of both mother and child
	Gai (Cow)	*Bos taurus*	Flesh	For increased blood production, For better health of both mother and child
	Harina	*Artiodactyl Cervidae*	Flesh	For better health of both mother and child
	Chuna macha (Fish)		Flesh	For more strength, For better health of both mother and child, For increased blood production,
	Kukuda	*Gallus gallus domesticus*	Flesh	Improvement in child's growth and weight, For better milk production, For better health of both mother and child
	Baraha	*Sus scrofa*	Flesh	For better health of both mother and child
	Neula	*Herpestidae spps.*	Flesh	For better health of both mother and child
Juang	Kukuda	*Gallus gallus*	Flesh	For better health of mother and

		domesticus		child, For Immunity
	Mayur	*Pavo Cristatus*	Flesh, Egg	For better health of both mother and child
	Harina	*Artiodactyl Cervidae*	Flesh	For better health of both mother and child
	Gunduri chadei	*Coturnix coturnix*	Flesh	For better health of both mother and child
	Macha (Fish)		Flesh	For increased blood production
	Baraha	*Sus scrofa*	Flesh	For better health of both mother and child
	Jhinka	*Hystricomorph Hystricidae*	Blood, Flesh	For better health of both mother and child, Easy delivery
	Kantei chadhei		Flesh	For better health of both mother and child
	Badudi	*Desmodus rotundus*	Flesh	Vitamin supplement
	Kutura	*Muntiacus muntjak*	Flesh	For better health of both mother and child
	Kai	*Solenopsis mandibularis*	Flesh	Vitamin supplement
Hill Kharia & Mankirdia	Harina	*Artiodactyl Cervidae*	Flesh	For better health of both mother and child, Improvement in child's growth and weight
	Kukuda	*Gallus gallus domesticus*	Flesh, Egg	For better health of both mother and child, For more strength
	Bhalu	*Ursidae Carnivora*	Flesh	Improvement in child's growth and weight
	Kutura	*Muntiacus muntjak*	Flesh	For better health of both mother and child, Improvement in child's growth and weight
	Godhi	*Iguana Iguana*	Flesh	For increased blood production, For more strength, For better health of both mother and child, Improvement in child's growth and weight
	Thekua	*Rodentia Rattus*	Flesh	For better health of both mother and child
	Mahu machi	*Apis mellifera*	Egg	For better health of both mother and child

3.17 Use of Flora during Post-Natal Period

Table No. 3.21
Use of different Flora during Post-Natal Period by PVTGs

PVTG	Flora (Odia Name)	Flora (Botanical Name)	Part Used	Used for
Dangaria	Amruta Vanda	*Carica papaya*	Fruits	Vitamin Supplement, For milk

Kandha				production, For better Health, For Strength
	Sajana Saga	*Moringa oleifera*	Leaves	For milk production, For better health
	Khamba Alu	*Dioscorea Spp.*	Rhizomes, Tubers	For better health, Vitamin Supplement, For Strength
	Baunsa Karadi	*Bambusa bamboos*	Leaves, Fruits, Shoots	Vitamin Supplement, For milk production, For better health
	Sunsunia Saga		Leaves	For better health, For increased blood production, For Strength
	Siali	*Bauhinia purpurea*	Seeds	Preventing skin diseases, Worm
	Khada		Leaves, All Parts	For better health, For increased blood production
	Kanta Saga	*Amaranthus spinosus*	Leaves	For milk production, For better health, For increased blood production
Lanjia Saora	Gobari Saga		Leaves	Vitamin Supplement, For milk production, For better health
	Amruta Bhanda	*Carica papaya*	Fruits, High quality of protein	Vitamin Supplement, For milk production, For better health, For increased blood production, High quality of protein
	Sajana Saga	*Moringa oleifera*	**Leaves**	Vitamin Supplement, For milk production, For better health, For increased blood production
	Mitha Kanda	*Discorea spps*	Tubers	For milk production
	Barada Saga	*Bauhinia variegata*	Leaves	Vitamin supplement
	Kandamula		Roots, Tubers	Vitamin supplement, For milk production, For increased blood production, High quality of protein
	Kadali	*Musa paradisiaca*	Fruits	Vitamin supplement, For better health, For increased blood production
	Mandia	*Pennisetum glaucum*	Seeds	For milk production
	Panasa	*Artocarpus heterophyllus*	Fruits	For milk production, For better health
Juang	Kansiri Saga		Leaves	For better health, High quality of protein
	Kuliari Saga	*Bauhunia varigata*	Leaves	For better health, Vitamin Supplement
	Madaranga Saga	*Alternanthera amoena*	Leaves	Vitamin Supplement, For better Health, For Strength, For increased blood production, High quality protein, For milk production, Immunisation
	Giliri Saga		Flowers	Vitamin Supplement
	Ganthi Mircha		Seeds	For better health

	Sorisa		Leaves	For better health, Vitamin Supplement
	Karanja	*Pongamia pinnata*	Fruits, Shoots, Tubers, Steam Bark, Roots	Immunisation, Preventing Skin diseases, For better health, For milk production, High quality of protein
	Ambada	*Spondias pinnata*	Tubers, Fruits	For Strength, For better health
	Mundei		Fruits	Vitamin Supplement, For better health, High Quality of protein
	Kalara	*Momordica charantia*	Leaves	Preventing skin diseases, For better health, Immunisation, For strength
	Tentuli	*Tarmaridus indicus*	Fruits	For Strength, For better health, Immunisation
	Muchukani	*Pterospermum acerifolium*	Leaves	For milk production
	Kanta Saga		Leaves	For better health
	Gedu Saga		Leaves	For increased blood production, Immunisation, For Strength
	Amruta Vanda	*Carica papaya*	Fruits	For milk production
	Kusum	*Schleichera oleosa*	Fruits	Preventing skin diseases
	Mari Saga		Leaves	For better health
	Kunduri	*Coccinia grandis*	Fruits	Vitamin Supplement
	Dumuri		Fruits	Vitamin Supplement, For better health
	Baitalu Saga	*Cucurbita maxima*	Leaves	For better health
	Bhursuni		Leaves	For better health
Hill Kharia & Mankirdia	Amruta Vanda	*Carica papaya*	Fruits	For better health, Vitamin Supplement
	Ganthi Maricha		Leaves	For better health
	Madaranga Saga	*Alternanthera amoena*	Leaves	For increased blood production, For Strength, For milk production, For better health
	Karanja	*Pongamia pinnata*	Leaves, Seeds, Steam Bark	For better health, for milk production, Immunisation, Vitamin Supplement, preventing skin diseases
	Kalara	*Momordica charantia*	Leaves	For milk production, Preventing skin diseases
	Gayisa	*Leucas aspera*	Leaves	Preventing skin diseases, For better health, Immunisation, For increased blood production
	Neema	*Azadirachta indica*	Leaves, Seeds, Steam Bark	For better health, Vitamin Supplement, Immunisation, Preventing Skin Diseases
	Matha Gachha		Leaves, Fruits	For better health, Vitamin Supplement
	Mati Gachha		Leaves	For better health

	Sal	*Shorea robusta*	Steam Bark	For better health
	Mari Saga		Leaves	Preventing skin diseases
	Tulasi	*Ocimum sactum*	Leaves	Immunisation
	Pita Saga	*Mollugo pentaphylla*	Leaves	Preventing skin diseases
	Kunduri	*Coccinia grandis*	Leaves	For Strength
	Kolatha		Seeds	For Strength

3.18 Use of Fauna during Post-Natal Period

Table No. 3.22:
Use of Different Fauna during Post-Natal Period by the PVTGs

PVTG	Odia name	Zoological Name	Part Used	Used for
Dangaria Kandha	Gai (Cow)	*Bos taurus*	Flesh	For better blood production, it is consumed after 1 month of delivery for better health and blood production, For Strength, Better milk production
	Chuna Machha		Flesh	For better Milk production
	Kukuda	*Gallus gallus*	Flesh	For better Milk production
Lanjia Saora	Podho	*Bison bonasus*	Flesh	It is consumed after 1 month of delivery for better health and blood production, For better Milk production, For better blood production, For Strength
	Thekua	*Rodentia Rattus*	Flesh	For better blood production
	Chenga Machha	*Sparus aurata*	Flesh	For better blood production
	Gai	*Bos taurus*	Flesh	For better blood production, For better milk production
	Neula	*Herpestidae spps.*	Flesh	For better blood production
	Anda (Egg)		Others (All)	It is consumed after 1 month of delivery for better health and blood production, For better Milk production, For better blood production, Good for child's brain development
	Kukuda (Fowl)	*Gallus gallus*	Flesh	It is consumed after 1 month of delivery for better health and blood production, For better Milk production, For better blood production, Good for child's brain development, For strength
	Machha (Fish)		-	For better Milk production, Good for child's brain development
	Mayura	*Pavo Cristatus*	Flesh	For better blood production, For strength
Juang	Pecha	*Nocturnalis Strigiformes*	Flesh	For Strength, Immunity

PVTG	Odia name	Zoological Name	Part Used	Used for
	Kutura	*Muntiacus muntjak*	Flesh	For Strength
	Arala chadei		Flesh	For Strength
	Jia	*Lumbricina spps.*	Flesh	Better Milk production, For better blood production
Hill Kharia & Mankirdia	Godhi	*Iguana Iguana*	Flesh	It is consumed after 1 month of delivery for better health and blood production
	Kukuda	*Gallus gallus*	Flesh	Immunity
	Badudi	*Desmodus rotundus*	Flesh	It is consumed after 1 month of delivery for better health and blood production, For Strength, Immunity
	Balada	*Bos taurus*	Flesh	For Strength, it is consumed after 1 month of delivery for better health and blood production
	Bataka	*Anatidae Anseriformes*	Flesh	It is consumed after 1 month of delivery for better health and blood production, For Strength
	Pati Mankada	*Ateles paniscus*	Flesh	It is consumed after 1 month of delivery for better health and blood production, For Strength
	Mankada	*Macaca Fascicularis*	Flesh	For Strength

3.19 Use of Flora for Narcotic / Alcoholic Purpose

Use of different sedatives / narcotics is a part of socio-cultural life of tribals. The PVTGs use different floras for alcoholic / narcotic purposes to get intoxicated. Both male and female use liquor and different narcotics at the time of requirement. Use of such items is very common and it is used on daily basis. Different parts of these classified plants are used to get intoxicated and for the purposed identified parts are used like cell sap of Salapa tree (*Caryota urens*), Fruits and flowers of Mahua (*Madhuca longifolia*) plant, roots of Patal Garuda (*Rauvolfia serpentina*). Different flora and its parts used for narcotics / alcoholic utility is presented in the Table.

Table No. 3.23:
Use of Different Flora and its Parts as Narcotics by the PVTGs

PVTG	Odia Name	Botanical Name	Parts used	Taken
Dangaria Kandha	Salapa	*Caryota urens*	Cell sap	For intoxication
	Khajuri gacha	*Phoenix dactylifera*	Cell sap	For intoxication
	Mahula	*Madhuca longifolia*	Flower,	For intoxication
	Sunari		Roots	For intoxication
	Pita allu		Tubers	For better intoxication
	Panasa	*Artocarpus heterophyllus*	Fruits	For intoxication
	Amba	Mangifera indica	Stem Bark	For intoxication
Lanjia Saora	Salapa	*Caryota urens*	Cell sap	For intoxication

	Khajuri gacha	*Phoenix dactylifera*	Cell sap	For intoxication
	Mahula	*Madhuca longifolia*	Flower,	For intoxication
	Anguthi gacha		Leaves	For better intoxication
	Kandu saga		Leaves	For better intoxication
	Siris		Roots	For intoxication
	Bhalia (Bark)	*Semecarpus anacardium*	Stem Bark	For intoxication
	Pita mara	*Naregamia alata*	Leaves	For better intoxication
Juang	Salapa	*Caryota urens*	Cell sap	For intoxication
	Mahula	*Madhuca longifolia*	Fruits, Flower	For better intoxication
	Bhuin neemba	*Andrographis_paniculata*	Plant, Roots, Leaves	For intoxication
	Patal garuda	*Rauvolfia serpentina*	Roots	For intoxication
	Akal bindu	*Stephania hernandifolia*	Roots	For intoxication
	Badi champa		Roots	For intoxication
	Bhuin kakharu		Roots	For intoxication
	Niali		Roots	For intoxication
	Dhuan patra	*Cannabis sativa / Cannabis indica*	Leaves	For intoxication
	Saanra dhana chera		Roots	For intoxication
	Malika chera		Roots	For intoxication
	Bana kakharu		Fruits	For intoxication
	Fena fena		Gum	For intoxication
	Pala mula gacha		Roots	For intoxication
	Ganjei	*Cannabis sativa / Cannabis indica*	Leaves	For intoxication
	Padma chakra		Tubers	For intoxication
	Kurei chera		Roots	For intoxication
Hill Kharia & Mankirdia	Bhuin neemba	*Andrographis_paniculata*	Roots	For intoxication
	Patal garuda	*Rauvolfia serpentina*	Leaves	For intoxication
	Akal bindu	*Stephania hernandifolia*	Roots	For intoxication
	Malika chera		Roots	For intoxication
	Bana kakharu		Roots	For intoxication
	Pala mula gacha		Roots	For intoxication
	Bharada fala		Roots	For intoxication
	Agni jhado		Roots	For intoxication

Preparation process of different narcotics / alcohol varies which is based on parts of the plant used. While, country liquor (*Handia*) is prepared using fermentation process, sun exposed Salapa (*Caryota urens*) extract is consumed raw for intoxication. For increasing the narcotic impact, they mix different plant parts in to country liquor (*Handia*) and Salapa (*Caryota urens*) extracts. Tribal also use different leaves / roots for intoxication. Use of different flora for narcotics purpose and its preparation and use process is highlighted in the table.

Table No. 3.24
Preparation Process of Narcotics / Alcohol by PVTGs

PVTG	Flora (Odiya Name)	Flora (Botanical Name)	Preparation & Use Process
Dangaria Kandha	Salapa gacha	*Caryota urens*	Collection of cell sap by cutting the stem of the plant; The leaves are used along with *Mahuli*; Roots are used in *Salapa* juice; Bark of the plant is used along with *Salapa*
	Khajuri gacha	*Phoenix dactylifera*	Collection of cell sap by cutting the stem of the plant
	Mahula	*Madhuca longifolia*	Flower of the tree is cooked in a special process (Fermentation) and the liquid is Extracted for consumption; Leave juice is used along with *Mahuli*
	Sunari		Collection of cell sap by cutting the stem of the plant; Roots are used in *Salapa* juice Dried roots mixed with *Handia* (Country Liquor).
	Panasa	*Artocarpus heterophyllus*	Pulp is fermented, cooked and eaten
Lanjia Saora	Salapa gacha	*Caryota urens*	Collection of cell sap by cutting the stem of the plant
	Khajuri gacha	*Phoenix dactylifera*	Collection of cell sap by cutting the stem of the plant; The leaves are used along with *Mahuli*
	Mahula	*Madhuca longifolia*	Collection of cell sap by cutting the stem of the plant; Flower of the tree is cooked in a special process (Fermentation) and the liquid is Extracted for consumption
	Anguthi gacha		The leaves are used along with *Mahuli*; Leave juice is used along with *Mahuli*
	Kandu saga		Leave juice is used along with *Mahuli*
	Siris		Roots are used in *Salapa* juice
	Bhalia	*Semecarpus anacardium*	Bark of the plant is used along with *Salapa*
	Bhalia	*Semecarpus anacardium*	Used along with *Mahuli*
	Pita mara		Roots are used in *Salapa* juice; Used along with *Mahuli*; Roots used
Juang	Mahula	*Madhuca longifolia*	Flower of the tree is cooked in a special process (Fermentation) and the liquid is Extracted for consumption
	Bhuin neemba	*Andrographispaniculata*	Roots used; Dried roots mixed with rice to prepare tablets; Dried roots mixed with *Handia* (Country Liquor).
	Patal garuda	*Rauvolfia serpentina*	Flower of the tree is cooked in a special process (Fermentation) and the liquid is Extracted for consumption; Leave juice is used along with *Mahuli*;

			Roots used Dried roots mixed with rice to prepare tablets; Dried roots mixed with *Handia* (Country Liquor).
	Akal bindu	*Stephania hernandifolia*	Used along with *Mahuli*; Roots used; Dried roots mixed with rice to prepare tablets; Dried roots mixed with *Handia* (Country Liquor).
	Badi champa		Roots used
	Bhuin kakharu		Dried roots mixed with *Handia* (Country Liquor).
	Niali		Used along with *Mahuli*; Dried roots mixed with *Handia* (Country Liquor).
	Dhuan patra	*Cannabis sativa / Cannabis indica*	Dried roots mixed with *Handia* (Country Liquor).
	Saanra Dhana Chera		Dried roots mixed with rice to prepare tablets; Dried roots mixed with *Handia* (Country Liquor).
	Malika chera		Dried roots mixed with rice to prepare tablets; Dried roots mixed with *Handia* (Country Liquor).
	Bana kakharu		Dried roots mixed with rice to prepare tablets; Dried roots mixed with *Handia* (Country Liquor).
	Pala mula gacha		Dried roots mixed with *Handia* (Country Liquor).
	Ganjei	*Cannabis sativa / Cannabis indica*	Dried leaves
	Padma chakra		Dried roots mixed with rice to prepare tablets
Hill Kharia & Mankirdia	Bhuin neemba	*Andrographispaniculata*	Dried roots mixed with *Handia* (Country Liquor).
	Patal garuda	*Rauvolfia serpentina*	Dried roots mixed with *Handia* (Country Liquor).
	Akal bindu	*Stephania hernandifolia*	Dried roots mixed with *Handia* (Country Liquor).
	Malika chera		Dried roots mixed with *Handia* (Country Liquor).
	Agni jhado		Dried roots mixed with *Handia* (Country Liquor).

Different sedative plants have strong bearing on economic life of tribals as well as part of their day to day functioning. Salapa (*Caryota urens*) tree is also known to be given as bride price and also an item of sell with a high price tag. Consumption of these sedative plants as narcotics is mostly in raw form which is having negative impact on health. Mixing one sedative / narcotic element with other for higher degree of intoxication is common in all the PVTGs which has been one of the reasons of deaths reported from time to time in the media. Very recently, in Juang, taking narcotics / alcohol is strictly prohibited for school going children and also it is banned for consumption by female members of the tribe. This can be considered an affirmative step towards bringing change in the age old socio-cultural practices which has been enforced due to increasing awareness on the demerits of these narcotics.

3.20 Use of Flora for Family Planning

The PVTGs use different types of flora for birth control / family planning. Roots, flowers and fruits of different identified plants are used for this purpose. Even, for abortion, stem bark of Kumbhi (*Careya arborea*) is used by Juang. Different plants used for birth control /family planning is presented in the Table.

Table No. 3.25

Different Flora used for Family Planning

Plants Used (Odia Name)	Botanical Name	Parts Used	Preparation Process	Consumed by	Used for
Dangaria Kandha					
Sita paru		Root & Leaves	Root is grinded and juice is taken; Leave is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
Laja patra		Root & Leaves	Root is grinded and juice is taken; Leave is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
		Root & Leaves	Root is grinded and juice is taken; Leave is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
Lanjia Saora					
Akala bindu	*Stephania hernandifolia*	Root	Root is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
Neem leaves	*Azardirachta indica*	Root & Leaves	Leaves Boiled Consumed; Root is grinded and juice is taken	Male	Delay / Avoid Pregnancy (Not Conceiving)
Juang					
Gandhuri Ghasa		Root	Root is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
Chakunda		Root & Flower	Root is grinded and juice is taken; Flower is boiled and eaten	Female	Delay / Avoid Pregnancy (Not Conceiving)
Pitabali		Root	Root is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
Mandar		Root, Leaves & Flower	Root is grinded and juice is taken; Leaves Boiled Consumed; Flower is boiled and eaten	Female	Delay / Avoid Pregnancy (Not Conceiving)
Tulasi	*Ocimum sactum*	Leaves	Leave is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not

					Conceiving)
Kumbhi	*Careya arborea*	Stem	Direct use of stem	Female	Abortion
Niali		Root	Root is grinded and juice is taken; Consumed with hot water	Female	Permanent Family Planning
		Root, Leaves & Flower	Root is grinded and juice is taken; Leaves Boiled Consumed; Flower is boiled and eaten; Leave is grinded and juice is taken; Direct use of stem; Consumed with hot water	Female	Delay / Avoid Pregnancy (Not Conceiving)
Hill Kharia Mankirdia					
Gandhuri Ghasa	Root	Root is grinded and juice is taken	Female		
Chakunda		Root & Flower	Root is grinded and juice is taken; Flower is boiled and eaten	Female	Delay / Avoid Pregnancy (Not Conceiving)
Siali	*Bauhinia purpurea*	Stem Bark	Consumed with hot water	Female	Delay / Avoid Pregnancy (Not Conceiving)
Giliri		Root	Root is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
Gaichira		Root	Root is grinded and juice is taken	Female	Delay / Avoid Pregnancy (Not Conceiving)
		Root & Flower	Root is grinded and juice is taken; Flower is boiled and eaten Consumed with hot water	Female	Delay / Avoid Pregnancy (Not Conceiving)

Note: Based on the inputs from local Quacks (Disari / Jani) and Users

A study on traditional knowledge on medicinal plants against birth control by the tribals and other rural people in Bargarh district of Odisha (Sen et al., 2012)[9] identifies 13 different plants that are used as contraceptives by the tribals and other rural people. These plants are used in different forms like consumable, external use etc. The plants that are used for such purposes are presented in the Table.

Table No. 3.26

[9]*Sen S.K, Pradhan R., Pattnaik M.R., Behera L.M.; Traditional knowledge of medicinal plants against Birth control by the tribals and other rural people of Bargarh district in western Odisha, India*

Ethno medicinal Plants used as Contraceptives by Tribals

Botanical Name	Local Name	Ethno-Medicinal Uses
Abrus precatorius L.	Gunj	Seed (White variety) paste or powder with honey is taken once in empty stomach on the fourth day of the menstruation. This is used as contraceptive for one month.
Azadirachta indica	Leem	Before intercourse seed oil (3–4 drops) is applied over male sex organ to check possibilities of pregnancy
Butea monosperma	Phalsa	Seed ash (1 g) with milk is taken once daily in empty stomach for 3 days from the day of menstrual bath to ensure permanent sterility. Root powder of the plant and fruit powder of *Piper longum* are mixed together and is taken once daily in empty stomach for 10 days from the 4th day of menstrual cycle to prevent pregnancy for a period of 3 years.
Crataeva religiosa	Barun	Bark paste (5 g) is taken once daily in empty stomach for 3 days from 5th day of menstrual cycle. Repeat it in next 3 years gap for permanent sterility.
Curcuma longa L.	Haldi	A piece of rhizome is grinded and taken once daily in empty stomach for 2 weeks from 5th day of menstrual cycle to check possibilities of pregnancy for a period of one year.
Cynodon dactylon	Dubla	Whole plant extract (2 teaspoon) with curd (2–3ml) is taken in its own palm and swallowed on the day of menstrual bath. This is used as contraceptive for at least six months.
Embelia ribes	Bidang	Fruit of the plant, fruit of *Piper longum* and gum of*Acacia catechu* are mixed together in equal amount and the powdered (5 g) is taken once daily in empty stomach for 5 days from the day of menstrual bath to ensure permanent sterility.
Hibiscus rosesinensis L.	Mandar	Red flower (1 number) crushed with 'kanjimani' (fermented rice water) and is taken in empty stomach for 3days from the 1st day of menstrual cycle to ensure sterility for 3 years. Flower (red variety) paste with molasses (24 g)is taken for 14 days from the 4th day of the menstrual cycle to ensure sterility for 3 years. Root (6 g of white variety) paste is taken in empty stomach once daily for 7 days from the 4thday of menstrual cycle to ensure sterility for oneyear.Root paste (1.5 g) of the plant (white variety) is given to woman once daily in empty stomach in the morning of the 5th day of the menstrual cycle to ensure sterility for one year.
Jasminum sambac	Malli	Root paste (5 g) is taken once daily for 7 days after menstrual cycle for 3 months to induce sterility
Mentha arvensis L.	Pudina	Leaf powder (10 g) is taken by woman sometime before sexual relationship to delay conception for at least six months.
Ricinus communis L.	Jada	Seed coat is removed and powdered. It is taken in empty stomach after the menstrual bath to remain sterile for a period of one year. Seed without seed coat (3 numbers) has to swallow after the menstrual bath. Women will not be pregnant at least for a period of 3 years.
Sesamum indicum L.	Rayesh	Immediately after sexual relationship *rayesh-tel*(1 teaspoon- seed oil of the plant) with a pinch of rock salt is given to woman. It is used as temporary contraceptive.
Tephrosia purpurea	Harkulthia	Root (12 g) paste is taken once daily in empty stomach for 7 days from the day of menstrual bath to prevent pregnancy.

Source: Sen S.K, Pradhan R., Pattnaik M.R., Behera L.M.; Traditional knowledge of medicinal plants against Birth control by the tribals and other rural people ofBargarh district in western Odisha, India

The same study (Sen S.K. et al, 2012) also identifies seven different plants that have been used by tribals and other rural people in Bargarh district for abortion. Different parts of these plants are used independently or in combination with other plant parts in a hand processed form for abortion. The plant species used for abortion and method of application is presented in the Table.

Table No. 3.27
Ethno medicinal plants used by Tribals as Abortive

Botanical name	Local Name	Ethno-medicinal Uses
Erythrina suberosa	Paldhua	A slightly crushed leaf petiole (2 in numbers) is placed on the female sex organ and a piece of cloth is wrapped over it. Besides, a small piece of root is crushed and is taken with jaggery to induce abortion.
Bambusa bambos L.	Baunsh	Stem powdered (10 g) is boiled in a glass of water and filtered and half a cup of the filtrate and "fitkiri" or alum (1 g) are mixed together and taken in empty stomach regularly for 3–10 days to induce abortion.
Gloriosa superba L.	Puraphul	Tuber paste is applied below the naval to induce abortion.
Pergularia daemia	Uturli	Root paste (6 g) is taken in empty stomach once daily for 3–4 days from the 4th day of menstrual cycle to induce abortion.
Piper betle L.	Pan	The epidermal layer of the leaf petiole (3numbers) is removed and inserted into the femalesex organ during bedtime at night to induce abortion even after 2–3 months of pregnancy
Sapindus trifoliatus	Ritha	Seed pulp paste (6 g) is taken in empty stomach once daily for 3–4 days from the 4th day of menstrual cycle to induce abortion.
Solanum nigrum L	Kak-machi	Root paste (10 g) is applied below the naval to induce abortion.

Source: Sen S.K, Pradhan R., Pattnaik M.R., Behera L.M.; Traditional knowledge of medicinal plants against Birth control by the tribals and other rural people ofBargarh district in western Odisha, India

Similar study on Gond tribe of Bastar region of Chhattisgarh identifies a number of plant species that are used by the tribals to induce anti-fertility and fertility. Such plants identified are discussed below.

3.20.1 Plants used to induce anti-fertility

1. Roots of small tree plant *Calotropis gigantea* and *Mimosa pudica* are collected from forests by the tribals. About 45 pieces of the roots of both the plants are dried and powdered separately and then mixed in equal parts with candy sugar. One *tola* (Ten Gms) roots of each plant is weighed and then tablet is prepared from the paste. Three tablets are administered orally for 2-3 months regularly, empty stomach early in the morning by the women bearing 2-3 months' pregnancy. It is reported that this treatment causes abortion in women having 2-3 months' pregnancy.

2. Roots of *Abrus precatorius* and Aloe Vera are collected from forests. About 5-6 pieces of roots of size 15-20 cms in length are crushed and mixed to and paste is prepared. About 50 g of molasses of 1-2 years old is mixed in the paste. The paste is divided into three equal parts and is

administered orally for three consecutive days in empty stomach early in the morning by the tribal women bearing 2-3 months' pregnancy. It was observed that this treatment causes abortion in women having 2-3-month pregnancy.

3. The roots of *Amaranthus spinosus* are collected from forest. About 1015 g of the roots are powdered and mixed with 15-20 ml of rice water and kept overnight. This decoction water is regularly administered orally from third consecutive day after menstrual period, empty stomach early in the morning by women. It has been observed that root powder extract possesses anti-ovulatory properties and inhibits enzymatic activity which avoids pregnancy.

4. Roots of herbal plant *Plumbago zeylanica* are collected from forests. About 5-6 pieces of such roots, weighing 10-12 Gms, are powdered and mixed with 10-15 ml. rice water and is kept overnight. This water is regularly administered orally for three consecutive days during menstrual period empty stomach early in the morning by tribal women. It has been observed in tribal community that root powder of the shrub causes sterility in women.

5. The rhizomes of *Curcuma longa* are collected from forest. About 8-10 pieces of rhizomes are washed, dried and powdered. About 5-6 g of powder is mixed with 5 g of jaggery and is regularly administered orally for 4-5 days during menstrual period empty stomach early in the morning to women. The uses have been found to be very good herbal contraceptive.

6. Rhizomes of *Curcuma longa* are collected from forest by tribals, dried and crushed into fine powdered. About 10-12 gram of *haldi* (turmeric) powder prepared from rhizome was mixed with fresh milk of cow and boiled. The milk on boiling when became warm was given 250 ml to women to drink early in the morning empty stomach right from the third day after menstruation for a period of about 10-12 days. It is reported by tribals that this treatment purifies blood and destroys pathogen. It has been found in tribals community that *haldi* powder is very good oral herbal contraceptive.

7. The tubers of *Dioscorea bulbifera* are collected from forests. About 8-10 tubers are washed, dried and crushed. One tuber is regularly administered orally for 4-5 days during menstrual period empty stomach early in the morning to women. It has been found that tuber powder of climber acts as herbal contraceptive.

8. Leaves and branches of *Mentha arvensis* are boiled and mashed. The extract is filtered with a piece of cloth and allowed to cool. This extract is administered orally to women two hours before performing sexual intercourse. It is said that this extract acts as anti-ovulatory and inhibits enzymatic activity which avoids pregnancy. The extract has been observed as an excellent herbal contraceptive popular among tribal localities.

9. Leaves of *Cuscuta reflexa* are boiled and mashed. The extract is filtered with a piece of cloth and allowed to cool. The filtered extracted is again boiled for 2-3 h and allowed to cool. The extract is regularly administered orally to women, early in the morning empty stomach right from the third day after menstruation for 21 days. It has been observed that this extract acts as anti-ovulatory and avoids pregnancy and makes tribals women permanently sterile.

10. About 10-12 g of leaves of shrub *Plumeria rubra* are boiled and kept over-night in 250 ml of water. The leaves are crushed in the morning and extract is filtered. The filtered extract is

regularly administered orally to women, early in the morning empty stomach right from the third day after menstruation for 15 days. It has been observed that this extract acts avoids pregnancy and acts as herbal contraceptive.

11. Fruits of climbing creeper *Cucurbito pepo* are collected from forests by tribals and cut into small pieces of 5-6 cms length. One piece is daily soaked in water over-night. The soaked pieces are mashed, the extract is filtered and mixed with 250 ml of water and is again soaked for second consecutive night. This extract is orally administered for a period of 8-10 days' empty stomach early in the morning to the women of 2-3 months' pregnancy. It has been observed that fruit extract causes abortion in women having 2-3 months' pregnancy due to presence of anti-fertility agents.

12. Seeds of small tree *Vitex negundo* are collected from forest by tribals, dried and crushed to powdered. About 10-12 Gms of this powder administeredorallyto men for a period of 8-10 days in empty stomach early in the morning. It has been observed that seeds powder of *Vitex neugundo* when consumed causes sterility in men.

13. Seeds of tree species *Ficus religiosa* are collected from forest by tribals, dried and mixed with seeds of small tree *Embelia ribes*. These seeds are roasted with suhag (borax) and are orally administered for a period of 8-10 days' empty stomach early in the morning to women after 5th day of menstrual period. It has been observed that the seeds when consumed acts as herbal contraceptives which avoids pregnancy.

14. Seeds of tree species *Azadirachta indica*, collected from forest by tribals, are crushed and oil is expelled from local *ghani* available in tribal villages. The extracted oil is applied for 10-12 days in genital parts of men and womb (uterus) of tribal women 1-2 h before sexual inter-course. This treatment is given to women right from 3rd day onwards of menstruation till the date or period pregnancy is to be avoided. The oil extracted from *Azadirachta indica* contains Azadirachtin which possesses enzymatic activity for preventing conception. It has been observed that the oil acts as herbal contraceptives and avoids pregnancy.

15. Gum exudates are collected from bark in trees species *Butea monosperma*. About 5-6 Gms of gum, collected from bark of trees, are mixed with cow-milk. This mixed milk is regularly administered orally to women, early in the morning empty stomach right from the first day after menstruation for consecutive three days. It is said that by drinking such milk some enzymatic activity takes place in women which prevents or inhibits conception. It has been observed that milk mixed with gum purifies blood and destroys pathogen, avoids pregnancy and acts as herbal contraceptives.

16. The bark is collected from trees of *Crataeva nurvala* and is powdered and regularly administered orally to tribal women, early in the morning empty stomach right from the first day after menstruation for three days. It is reported by tribals that this treatment purifies blood, destroys pathogen, avoids pregnancy and acts as herbal contraceptives.

3.20.2Plants used to Induce Fertility

1. Plant leaves, dried tuberous roots and gum exudates are used by tribals to induce and restore fertility in women. These herbal treatments are presented below.

2. Tribals collect dried tuberous roots of climber *Asparagus adscendens* from forests. About 10-12 roots are boiled in 1000 ml. of water for a period of 2-3 h. The tuberous roots are mashed and extract is allowed to cool. After cooling extract is filtered. About 250 ml. of this filtered extract is administered orally to women, early in the morning empty stomach to restore fertility. This process is repeated till conception takes place. It has been observed that this extract has restored fertility among tribal women who had failed earlier to conceive.

3. Tribals also collect dried tuberous roots of rhizomatous herb *Curculigo orchioides* from forests. The tuberous roots are baked under the fire and mashed. About 5-6 mashed roots are administered orally to women, early in the morning empty stomach for a period of 10-12 days to restore fertility. It has been observed that baked tuber of species has restored fertility among tribals women who had failed earlier to conceive.

4. About 10-15 leaves from small tree species *Ardisia axyphylla* are collected from forest. The leaves are boiled in 500 ml of water for 1-2 h. The boiled water is filtered by a clean piece of cloth. About 20-25 ml of this filtered extract is administered orally to women, early in the morning empty stomach right from the fifth day after menstruation for a period of about 10-12 days. It has been observed that extract of species restores fertility in women who had earlier failed to conceive.

5. Gum resins are extracted from tree species *Butea monosperma* from the bark of the tree. This gum-resin is applied 2-3 times daily in the uterus (womb) of women to strengthen female organs. It has been observed that in tribal women regular application of gum resins had restored fertility in women who had earlier failed to conceive.

3.21 Consumption of Flora/Fauna and Diseases

Consumption of different flora and fauna also leads to different diseases. Though laboratory testing and scientific evidences are required to prove this, but the findings are based on experience of tribals on these food items. Identified causes of different common diseases because of the consumption of different flora and fauna may be one of the causes coupled with other factors like quality of drinking water, chemical reaction of consumed flora and fauna with other food items, aggravating earlier illness because of the consumption of these flora and fauna and also the consumption method (boil / parboiled / burnt / baked / raw consumption etc.).

Table No. 3.28:
Restricted Use of Flora by PVTGs

PVTG	Villages	Name of Flora (Odia Name)	Name of Flora (Botanical Name)	Consumption Restriction	Reasons of Restriction
Dangria Kandha	Kansur	Sarusaga	*Colocasia esculenta*	Pregnant Women	Diarrhoea
		Chota Dimbiri	*Ficus hispida*	Restriction for All	Poison
	Patalama	Panasa	*Atrocarpus*	Male Child & Pregnant	Diarrhoea

			heterophyllus	Women	
		Sarusaga	*Colocasia esculenta*	Male Child & Pregnant Women	Causes Diarrhoea if consumed more
		Chota Dimbiri	*Ficus hispida*	Restriction for All	Poison
	Sana Degeneli	Panasa	*Atrocarpus heterophyllus*	Male Child & Pregnant Women	Causes Diarrhoea
		Sarusaga	*Colocasia esculenta*	Male Child & Pregnant Women	Causes Diarrhoea if consumed more
		Chota Dimbiri	*Ficus hispida*	Restriction for All	Poison
Lanjia Saora	Janter	Chhatu (Mushroom)		Pregnant Women	Not eaten if the woman is pregnant
Juang	**Hatisila**	Mankad Kendu		Male Child	Causes Dysentery
		Bada Chhatu		Pregnant Women	Causes Fever
	Nadam	Mankad Kendu		Male Child	Causes Dysentery
		Bada Chhatu		Pregnant Women	Causes Fever
	Sarai	Mankad Kendu		Male Child	Causes Dysentery
		Bada Chhatu		Pregnant Women	Create Fever
Hill Kharia&Mankirdia	Badajhili	Phatua Phala		Restriction for All	Poison
		Bhalia	*Semecarpus anacardium*	Female Child	Itching
		Gila		Restriction for All	Poison
		Katha Chhatu		Restriction for All	Poison
	Durudura	Phatua Phala		Restriction for All	Poison
		Bhalia	*Semecarpus anacardium*	Female Child	Itching
		Gila		Female Child	Poison

Based on traditional knowhow and years of experience, there are certain flora which are prohibited for consumption. Some flora has gender specific prohibition due to its characteristics like girl child are restricted from consuming Gila and Bhalia whereas male child is restricted from taking Mankada Kendu. Some flora is also restricted for consumption for all whereas a variety of flora are restricted for pregnant women as it may have negative effect on mother and foetus in the womb. A list of restricted flora by PVTG and its reasons of restriction are presented in the Table.

3.22 Intake of Expired / Decomposed Food

Taking decomposed food is not a common practice among the studied PVTGs (99.7 %). The earlier practice, as reported many times about consumption of decomposed food by the tribals seems more situation specific and occasional in nature rather than a regular practice. Only in certain cases with Lanjia Saora, it is observed that a few families (0.3 %), at the time of requirement take decomposed flora collected from the nearby forest. Major reasons of not taking decomposed flora are because of diseases and health issues caused due to consumption of decomposed forest floras.

Table No. 3.29
Reasons of not taking Decomposed Flora and Fauna by the PVTGs

Sl. No.	Reasons of Not Taking Decomposed Food Items	Flora		Fauna	
		No. of Households	Percentage	No. of Households	Percentage
1	Illness	194	51.19	142	37.5
2	Susceptible to different diseases	103	27.18	87	23.0
3	Foul Smell	51	13.46	89	23.5
4	Causes Dysentery	43	11.35	73	19.3
5	Causes Vomiting	35	9.23	51	13.5
6	Stomach ache	24	6.33	24	6.3
7	Causes Pali Jara	18	4.75	27	7.1
8	Crate Cough	9	2.37	9	2.4
9	Skin Diseases	1	0.26	3	0.8
	Total Households	**379**	**100.0**	**379**	**100.0**

Like Flora, decomposed Fauna, collected from forest, is also not consumed by the PVTGs (100.0%). As adults do not consume, children are also not provided decomposed food items for consumption.

Education brings certain degree of awareness and consciousness among people. Increasing level of education, awareness and exposure have also motivatedtribals to diverse their livelihoods and minimizing dependency on forest for collection of food items through gathering and haunting activities. Coupled with increasing legal restriction and social welfare support from Government, such activities have decreased in the locality to certain degree. Usually, the educated children in the family hesitate to go for collection of flora (90.4 %) and fauna (84.3 %). The main reasons for not going to forest for collection of different flora and fauna are related to less interest on their part for venturing to forest for hunting and gathering work, meaningful allocation of time for study for which less time to go to forest, distance of forest from the habitation and less safety in forest areas due to LWE activities. The current legal framework for wildlife conservation, as per wildlife (protection) act 1972 and further amendments, also restrict people in general to venture in to forest as and when required and haunt wild animals. With the execution of Biological Diversity Act, 2002, there has been increasing importance to maintain the bio-diversity of the ecosystems and hence restricted access to certain areas that are rich in biodiversity.

3.23 Flora and Fauna Conservation Measures

It is wrong to think that the relationship exist between forest and tribe is one sided and the tribe is always at receiving end.The symbiosis between the two is well gauged by considering the

human activity-within the ethics,leaving the matured and dead plants,clearing the undergrowth andguarding the vegetative growthfrom the exploitative and profit motive of the non tribals of te neighbouring villages.Thedomesticated animals while grazing facilitate the seedsto hit the ground and germinate.

3.23.1Traditional Methods

Many plants are conserved in their natural habitat by tribals due to magico - religious belief.They perceive that sacred groove areas and a few spots with thick forest are the habitat of Gods and Goddess.Plants and flowers have a profound influence on tribals. Tribals worship trees and offer flowers to the deities as they believe that God and Goddesses reside with them (Rai R. and Nath V, FAO).Many tribes have imitated the religious beliefs of the neighbouring groups.The plants that are worshiped by tribals in different parts of India including Odisha are presented in the Table.

Table No. 3.30:
List of Plants Worshiped and Conserved by Tribals

SN	Local Name	Vernacular Name	Scientific Name	Name of God / Goddess Residing in Plants
1	Aam	Amra	*Mangifera indica* Linn.	Lord Vidhyadhara
2	Arjun	Arjun	*Terminalia arjuna* W &A	Lord Brahma
3	Bijapura	Nibu	*Citrus medica* Linn	Lord Brahaspati
4	Bilva	Bel	*Aegle marmelos* Corr	Lord Shiva
5	Nimba	Name	*Azadirachta indica* A. Juss.	Serpent King
6	Basil	Tulsi	*Ocium santum* L	Goddess Lakshmi
7	Baka	Agasti	*Sesbania grandiflora* (Linn) pers	Lord Narayan
8	Karavira	Kerabi	*Nerium indicum* Mill	Lord Ganesh
9	Nilapadma	Kamal	*Nelumbi nucifera* Gaertn	Goddess Ambika
10.	Sweta_Padma	Madar	Calotropis gigantean (L) R. Br	Lord Shiva

Source: Rai R and Nath V; Tribals Flora and Fauna; The role of ethnic and indigenous people of India and their culture in the conservation of biodiversity; FAO.

Tribals follow environmental conservation rule in harvesting edible plants which establishes ecological prudence.Tubers of edible plants are harvested by tribalsscientifically and based on the requirement they consume and rest they sale. They depend upon several wild species for fruits, seeds, pulps, roots and tubers which are used for edible purposes.Citrus plants are also used by the Dangrias. Due to government intervention, a few DangriaKandha families who are expert horticulturists have also gone for cashew-nut plantation recently.They also take conservation measures for specific plants, based on its importance for their socio-cultural and economic benefit.Natural resources are brodly categorised into food and non food types which include the animals,plants and other inmate material objects of the forest.They are utilized through various activities like hunting,gathering,fishing,fowling,snaring etc.

The Dongria Kondh,Lanjia Saora, Juang &Hill Kharia &Mankirdia use different traditional methodsfor preservation of different cereals,pulses leaf,tubers,non-veg items for their use in scarcity time. All the selected tribal communities collect different types of tubers like *Nangili Kanda* (Khamba Alu),*Kuna Kanda*(Round size Alu),*Rani Kanda(*Sweet Patato*),Katha Kanda(*Topiaca*),Palua,nuts and berries,leafs*from the forest during different seasons of the year for their consumption.Besides,they collect different types of mushrooms, tender stumps of bamboo to use them as food. They usually put the cereals

and pulses in the bamboo container and keep above the ceiling in the kitchen room where they always come in contact with the smokes so that the insects in cereals and pulses automatically die and it is preserved for a long period. The Dogria Kondh put the meat and fish cut in pieces over the hearth so that they are dried and kept and used during necessity. At the time of collectionof tubers, Kanda, Turmeric,*Palua*(Arraroot),Ginger etc., the rizome of it is left in the spot for their regeneration. They are again collected in the next year in the same process.Any type of edible leafs arecollected from the forest during their availability and taken as food items. In case of sufficient collection, they are dried and stored for future use. Even if, Dongria Kondh, Juang and Lanjia Saora who are practising shifting cultivation, never cut the fruit trees or trees whose seeds and leves are used by them for various purposesand in different rituals. All the PTGs love trees and take care to protect the fruit plants like Date palm,Tamarind,Jackfruits,Mango,Mahul,Ramphal,Sitaphal,Salap etc. in their village or in the vicinity of the forest.

Now a days hunting of animals have declined drastically because of new Forest Policy and conservation measures taken up by the Government for protection of wild animals. Hunting is always done in a group.The tribal people are rarely getting chance to hunt small animals like rabbit,kutra,wild pig, fowl, other wild animals and birds as they are not available in huge number. Still for ritual purposes, they practise the communal hunting which occurs once or twice in a year where they kill one animal if they found. In case of Hill Kharia people who are expert in honey collection, they collect the honey from March to June & Oct to Nov.They collect different types of honey namely *Badamahu/Baghua Mahu,sana mahu & Ghara mahu* produced by three different types of bees. The collection of '*Bada mahu'* is highly precarious job that involves climbing to the top of the high clips of Sal trees on which hives are located.They never fell down the trees where the bees build nest for the purpose of honey collection,as by this process, hives along with the honey all will be destroyed by falling down on the ground. They climb the tree covering their face with a towel andtake smokes with a stick to drive out the bees and the person collect honey and send it to the ground inthe container tiedwith a sling. They never kill the queen bee and leave that combs where the queen bee lives. The other honey combs are collected and squeezed to get the honey out and are kept in tin or aluminium pots for consumption and selling purposes.

In case of collection of resin, anexpert make notches on the matured sal tree trunk and climbs up the tree with axe on his shoulder and a basket hanging down from his waist and then reaching the resin spot,he scraps the resin from the barkcarefully with the help of the axe and gets it collectedin the basket.After collection they processs the resin by separating them from the bark and then sell it in the market. During collection of resin, they never bring harm to the tree. Mankirdias usually collection the Siali Fiber from the forest, for preparation of siali rope, slings and other usable products, but they never cut the whole crepper. They cut the creeper leaving 3-4 ft above the root so that the creeper will grow andregenerate again for future use.Bamboo is considered the most useful itemsuse for house builing and other purposes.It is a common species found in almost all forest areas. Some of the plants that are normally protected by tribals in different tribal communities of India are presented in the following Table.

Table No. 3.31:
Plants Conserved by Tribals for Edible Purpose

SN	Scientific Name	Local Name	Uses
1	Aegle Marmelos	Bel	Fruits are roasted and eaten
2	Amorphosphallus paenonflodium	Suran	Petiole/ Bulb as vegetable
3	Achyranthus Asper	Chirchita	Tender shoots as vegetable
4	Bauhinia Purpuea	Keolar bhaji	Leaves, Flowers, Seeds as Vegetable

5	Bahhinia vahlii	Sehar	Leaves as Vegetable
6	Dioscorea alta	Dudhia aru	Tubers as Vegetable
7	Curculigo Orchioides	Kali musli	Roots and Tubers as vegetable
8	Xylia xylocrpa	Jambu	Seeds asvegetable
9	Entada pursaetha	-	Seeds as vegetable
10	Dioscorrea bulbifera	ratalu	Tubers as vegetable

Source: Rai R and Nath V; Tribals Flora and Fauna; The role of ethnic and indigenous people of India and their culture in the conservation of biodiversity; FAO.

3.23.2 Modern Methods

Looking at degradation of forest and thereby flora and fauna, afforestation seems an essentiality. Afforestation work is normally done by forest department and afforestation by tribals is very less however, watch and ward is practicised by Juang, Hill Kharia/Mankirdia and Dangria Kandha. Different measures taken by PVTGs for afforestation / forest conservation are highlighted in the Table.

Table No. 3.32:
Afforestation / Forest Conservation Measures taken by PVTGs

Particulars	**Dangria Kandha**		**Lanjia Saora**		**Juang**		**Hill Kharia & Mankirdia**	
Afforestation Measures	**No. of HH**	**Percent**	**No. of HH**	**Percent**	**No. of HH**	**Percent**	**No. of HH**	**Percent**
No Specific Measure/s	54	90.0	113	100.0	103	69.6	47	81.0
Abiding Dept. ban on cutting					23	15.5	6	10.3
Doing new plantation					6	4.1		
Fear of punishment restricts timber cutting							1	1.7
Protecting local forest					1	.7		
Mango tree planting (DKDA)	1	1.7						
Planting and watching	5	8.3			13	8.8	3	5.2
Group Decision for no cutting					1	.7		
Less / No Shifting cultivation							1	1.7
Support JDA for plantation					1	.7		
Total	**60**	**100.0**	**113**	**100.0**	**148**	**100.0**	**58**	**100.0**
Forest Conservation								
No Specific Measures								
No Tree Cutting	60	100	113	100.0	136	91.9	49	84.5
Protection of Forest					9	6.1	8	13.8
Only Bring Dry Woods					2	1.4		
Plantation					1	0.7	1	1.7
Total	**60**	**100**	**113**	**100**	**148**	**100**	**58**	**100**

While, domestication of wild flora and fauna is difficult, PVTGs normally grow different plants in their backyard using available patch of land. To meet the requirement of animal protein, they domesticate different birds and small / large ruminants. They also trap birds, rodents, reptiles and catch monkeys in forest for consumption.They also catch fish and turtle from nearby water bodies. In annual festivities, they consume liquor, gruel, beef, chicken, mutton etc. depending upon the economic strength. There are certain rituals where it is the birds and animals offered to the spirits and are consumed in group.

Table No. 3.33
Domestication of Fauna and Plantation in Home Yard / Own Field

Domestication	Dangria Kandha		Lanjia Saora		Juang		Hill Kharia & Mankirdia	
	No. of HH	Percent	No. of HH	Percent	No. of HH	Percent	No. of HH	Percent
No Domestication	54	90.0	113	100.0	108	73.0	44	75.8
Banned for hunting animals & fear of punishment					6	4.1	3	5.2
Cultivating instead Hunting	1	1.7			3	2.1	1	1.7
Domesticate birds & animals in own house					19	12.8	7	12.1
Planting Mango, Jackfruit trees in home garden	5	8.3			12	8.1	2	3.4
Seeds supplied by Govt. for agriculture							1	1.7
Total	**60**	**100.0**	**113**	**100.0**	**148**	**100.0**	**58**	**100.0**

Hunting in specific occasion remains a part of tribal culture. But due to the imposition of wild life protection measures, hunting is claimed to be reduced to a larger extent. Apart from this, availability of wild animals has also reduced with decreasing dense forest cover. But discussion with different tribal groups reveals that hunting is still continuing however its frequency has condensed. Any hunting in the locality by the tribals is less discussed externally and hunting events normally kept concealed.

Table No. 3.34
Hunting Restriction and Wild Animal Protection Measures by PVTGs

Hunting Restriction	Dangria Kandha		Lanjia Saora		Juang		Hill Kharia	
	No. of HH	%	No. of HH	%	No. of HH	%	No. of HH	%
No Specific Measures	50	83.3	6	5.3	92	62.16	36	62.1
Only Forest Produce Collection	1	1.7						
Hunting in Special Occasions Only					2	1.35		
No Hunting			107	94.7	4	2.70		

Minimised Hunting Fearing Punishment	9	15			49	33.11	22	37.9
Forest Restoration for Increasing Animal Population					1	0.68		
Total	**60**	**100**	**113**	**100**	**148**	**100**	**58**	**100**

However, tribals were of the opinion that in most cases, either hunting has stopped or it has reduced drastically. Fear of punishment has also been one of the causes of reduced hunting apart from less availability of wild animals. Tribals are taking different measures for the protection of flora and fauna like; leave a part of the forest to grow trees and animals, reduced access to forest for hunting and taking up watch and ward in some parts of the forest for protection.They are aware of the fact that flowering plants attract honey bees and big plants provide safety space for honey combs.

Chapter Four: Food Security and Nutrition:

4.1 Food Security of PVTGs

Food security is defined as access by all people at all times to enough quantities of nutritionally adequate and safe food for an active and healthy life10 In Odisha, the food insecure districts are more concentrated in the southern and south-western region. All these food and nutritional insecure districts are having high concentration of Scheduled Tribes population11. Majorly, the studied PVTGs also fall in to these high food and nutritional insecure pockets of the State. According to Odisha Human Development Report, Scheduled Caste (SC) and Scheduled Tribe (ST) people suffer from anaemia more than others because of food and nutritional insecurity.

Government interventions to ensure food and nutrition provisioning can be broadly classified into: (a) subsidised distribution of food grains, (b) nutrition provisioning through Anganwadis, and (c) Food for Work programme. The Public Distribution System (PDS), Mid-Day-Meal and the Integrated Child Development Services (ICDS) are important public interventions for providing food security coverage.

A study on food practices of tribals women in western Odisha12 reveals that the local traditional food is still consumed frequently and remain important part of tribals diet. Along with this, knowledge of tribal women regarding nutritional practices for children and adults found to be poor. So there is a requirement to provide nutritional awareness to the tribals women on nutritional practices to improve their living status for a healthy life. There is also a need to preserve traditional food practices and conserve the traditional habits of tribal community.

While traditional consumption practices remain important, it is also a reality that tribals are in a state of transition with regard to food consumption pattern. Increasing cultural assimilation; development mainstreaming approach of Government for inclusive growth; improving mobility, social interaction and exposure; improvement in educational status; increased penetration of development scheme; food support of Government through different welfare measures (PDS, MDM etc.), increasing inclination of tribals to non-tribals food consumption system are key responsible factors in the current transition state. Changing tribal agricultural practice like focusing more on cereal crops rather than the traditional pulses and minor millets has also impacted upon current state of transition.

Besides own production and collection, the PVTGs also have access to different welfare schemes of the Government. About 49.6 % families have been enrolled as below the poverty line and they avail highly subsidized BPL rice at Rs. 1/- per KG. Under Supplementary Nutrition Programme of ICDS (Take Home Ration), identified members of 20.6 % tribal families avail the free food due to their poor nutritional status. Antodaya Anna Yojana has also been accessed by 47.8 % tribal families. The Mid-Day-Meal scheme run in schools also provide food and nutritional security to school going children. So, as far as availability of food is concerned, apart from own production and collection, tribals also have other schematic avenues to access food. With poor affording capacity and less consciousness of the quality, accessibility to different food items through welfare measures of government has been found beneficial

[10] *World Food Summit, Rome, 1996.*
[11] *Food Insecurity in Odisha, World Food Programme*
[12] Pradhan S. et al, Food Practices Among and Adivasi women of Selected Districts of Western Odisha, Indian J. Prev. Soc. Med. Vol. 42 No.3, 2011, ISSN- 0301-1216.

for PVTGs.

The food items produced and collected is found sufficient for the whole year for 45.8 % tribals families whereas remaining 54.2 % take different measures to cope with food insecure situation. Of the total food insecure families, about 4.5 % families remain food insecure for about one month, 40.7 % for two months, 22.1 % for a quarter of a year and remaining 32.7 % remain food insecure for more than 3 months in a year.

Food insecure households adapt food consumption patterns depending upon whether it was a time of plenty or a time of scarcity. The content, intra-household distribution, and frequency of food intake varied significantly during normal and scarce period. People of all income groups, especially the most vulnerable, reported long-term trends towards eating less preferred foods as a means of adapting to reduced income levels13. In the context of present study, the food insecure families adopt different coping mechanisms to deal with the situation such as doing wage, borrowing money from others, consuming *salapa* powder which is prepared from the dried stem of the salapa tree, seeking support from relatives / other villagers, consuming dried mango seeds / power of mango seeds, consumption of tubers / bamboo shoot collected from forest, increasing collection of food items from forest etc.

4.2 Food Consumption

The PVTGs consume different food items under different food categories, i.e., cereals, pulses, vegetables, milk and milk products, meat / fish, fat / oil and fruits. Some of these food items are uncultivated foods, collected from forest whereas remaining are either cultivated or collected through PDS and markets. Increased penetration of PDS has influenced the food habit of tribals and consumption of rice has emerged as most staple food for the PVTGs. It is consumed round the day both in breakfast, lunch and dinner along with some green vegetables / leafy vegetables. Consumption of pulses, which are rich in protein, has reduced to a greater extent. Consumption of coarse / minor millets is still a food habit of the tribals and Ragi is prominent among them which are consumed along with rice or independently during different times of a day. Change in forest ecology has changed the quality and quantity of edible substances affecting the health of the PVTGs. However different food items consumed by the tribals, apart from uncultivated forest collections, are presented in the Table

Some of the food items consumed during different parts of the day remain more or less same at the household level like Ragi, Rice, leafy vegetables / vegetables etc. Quantum of consumption of cereals and coarse grains / minor millets is normally remaining high in comparison to vegetables, pulses and non-vegetarian food items (meat/fish/egg). Different food items consumed by the PVTGs during different parts of a day are presented in the Table.

Table No. 4.1:
Different Food Items Consumed in Different Parts of a Day by PVTGs

Dangaria Kandha		
Breakfast	**Lunch**	**Dinner**
Bhata (Rice)	Bhata (Rice)	Bhata (Rice)
Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)

[13] *Odisha Human Development Report, 2004*

Rice Water	Rice Water	Tarakari (Mixed Vegetable)
Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)	Saga Bhaja (Leafy Vegetable Fry)
Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)	Dali (Dal)
Dali	Dali	Biscuit
Biscuit	Biscuit	Dalma (Mixed Curry)
Dalma (Mixed Curry)	Dalma (Mixed Curry)	Khata
Roti	Khata	Mandia Jau (Ragi)
Mudhi (Popped Rice)	Roti	Khichudi
Mandia Jau (Ragi)	Mandia Jau (Ragi)	
Khichudi	Mada (Liquor)	
Lanjia Saora		
Breakfast	**Lunch**	**Dinner**
Bhata (Rice)	Bhata (Rice)	Bhata (Rice)
Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)
Rice Water	Rice Water	Rice Water
Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)
Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)
Dali (Dal)	Dali (Dal)	Dali (Dal)
Biscuit	Biscuit	Biscuit
Tea	Lanka (Chilly)	Dalma (Mixed Curry)
Dalma (Mixed Curry)	Mandia Jau (Ragi)	Khata
Mandia Jau (Ragi)	Milk	Lanka (Chilly)
Milk	SNP	Mandia Jau (Ragi)
	MDM	Milk
Juang		
Breakfast	**Lunch**	**Dinner**
Bhata (Rice)	Bhata (Rice)	Bhata (Rice)
Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)
Rice Water	Rice Water	Rice Water
Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)
Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)
Dali (Dal)	Dali (Dal)	Dali (Dal)
Biscuit	Biscuit	Biscuit
Tea	Dalma (Mixed Curry)	Dalma (Mixed Curry)
Dalma (Mixed Curry)	Chhattua	Chhattua
Chhattua (Food Mix)	Poda (Burned Vegetables)	Chatani
Poda (Burned Vegetables)	Pitha (Cake)	Sija (Boiled Vegetable)
Pitha (Cake)	Chatani	Masia Phala
Chatani	Handia (Liquor)	Dahi (Curd)
Handia (Liquor)	Lanka (Chilly)	Bara (Purchased)
Pakudi	Roti	
Sija (Boiled Vegetable)	Kakudi (Cucumber)	
Bharata	Bara (Purchased)	
Roti		
Kakudi (Cucumber)		
Mitha (Sweets)		

Sun Pampadi (Sweet)		
Bara (Purchased)		
Mandia Jau (Ragi)		
Hill Kharia & Mankirdia		
Breakfast	**Lunch**	**Dinner**
Bhata (Rice)	Bhata (Rice)	Bhata (Rice)
Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)	Bhaja (Vegetable Fry)
Rice Water	Rice Water	Rice Water
Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)	Tarakari (Mixed Vegetable)
Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)	Saga Bhaja (Leafy Vegetable Fry)
Dali (Dal)	Dali (Dal)	Dali (Dal)
Biscuit	Dalma (Mixed Curry)	Biscuit
Tea	Khata	Dalma (Mixed Curry)
Dalma (Mixed Curry)	Chhattua	Khata
Khata	Handia (Liquor)	Poda (Burned Vegetables)
Chhattua		Handia (Liquor)
Poda (Burned Vegetables)		Sija (Boiled Vegetable)
Pitha (Cake)		Roti
Chatani		Aata (Fruit)
Handia (Liquor)		Masia Phala (Fruit)
Pakudi		Bara
Sija (Boiled Vegetable)		
Bharata		
Kakudi (Cucumber)		
Mitha (Sweets)		
Sun Pampadi (Sweet)		
Bara		

Note: Infants and Children feed on mother's milk. Children also take solid food along with mother's milk.

4.3 Changing Food Habit

Apart from availability, culture ofthe people living in a particular geography influence food habit. The consumable items that are available or produced in the locality also influence the food habit of the people. Apart from welfare measures, food habits of tribals normally get influenced by own production and availability and collection of consumables from the forest. Food habit may also vary from season to season depending upon the availability of the food-stuffs. Food habits of a population / people in a geographical set up gets changed in due course due to various factors like cultural assimilation, scarcity in supply of a particular food item, less production of desired food item due to climatic or other changes like policy, desired change induced in food habit looking macro scenario etc.

Food habits of tribal people have undergone major change because of a number of factors. Supply of subsidised rice under PDS / AAY has been one of such factors in this regard. Availability of rice at such a cheap price has induced the tribal communities to shift gradually from the highly nutritious millets to rice consumption. The reasons for declining health conditions among the tribal communities can be attributed to some degree to the desired shift in their eating habits from foods that include protein rich millets / pulses to carbohydrate rich paddy.

The Hindu (Andhra Pradesh, Visakhapatnam, September, 19, 2012) reported, based on the inputs of Green Vision NGO, that the haemoglobin level of an average tribal woman was 7 grams to 9 grams. Regular use of millets can lead to significant health benefits and might help in reducing the incidence of cardiovascular diseases, constipation, diabetes, and in improving the overall health of people. During the past one decade, tribal people got accustomed to consumption of rice and in the process, brought down consumption of millets as well as their cultivation. Based on inputs from another NGO Vikas, The Hindu reported that introduction of rice in the PDS at subsidised price led to the tribal people shifting from millet-based food systems to rice. Besides, the availability of rice at Re.1 a kg is an irresistible temptation to opt for rice. The media report also recognize a number of other factors such as hardship in hand processing of millets, coupled with the absence of millet processors and psychological factors such as pride in consuming rice over millets led to the decrease in diverse food base.

In the study area, food habits of tribal people have undergone a major change (98.7 %) because of number of factors. Non-availability of desired flora and fauna (25.3 %), less collection of consumable flora and fauna due to decreasing forest cover (8.2 %), increased availability of rice through PDS (96.6 %), increasing farming activities and production of other crops (24.0 %), change in lifestyle (61.5 %), change in taste (44.9 %) and gradual change in consumption pattern at household level (50.9 %) are reasons of change in food habits.

Change in food habits is common to observe in all the PVTGs. There are different factors that are responsible for such outcome like increased availability of subsidised rice through public distribution system, better availability of market products in the locality, increasing cultural assimilation, improved education and health awareness etc. Some of the key reasons of change in food habits by the PVTGs are highlighted in the Table.

Table No. 4.2:
Changing Food Habits of PVTGs

PVTG	Name of the Villages	Changes in Food Habits	Reasons of such Change
Dangaria Kandha	Kandsur	Increased use of Snacks, Biscuits and related consumables	Available at nearby market
		Increment in rice intake	PDS supply and its easy availability in the market
		Increment in non-veg items	Easy availability in the market
	Patlamba	Increment in rice intake	PDS supply and its easy availability in the market
		Increment in non-veg items	Easy availability in the market
		Increased use of Snacks, Biscuits and related consumables	Available at nearby market
	Sana Dengnil	Increased use of Snacks, Biscuits and related consumables	Available at nearby market
		Increment in rice intake	PDS supply and its easy availability in the market

PVTG	Name of the Villages	Changes in Food Habits	Reasons of such Change
Lanjia Saora	Janter	Increase rice intake	PDS Supply
		Use of vegetables	Increase vegetable cultivation
		Meat, Egg & Fish	Available at nearby market
		Snacks, Biscuits uses increased	Available at nearby market
	Mulisahi	Increase rice intake	PDS Supply
		Use of vegetables	Increase vegetable cultivation
		Meat, Egg & Fish	Available at nearby market
		Snacks, Biscuits uses increased	Available at nearby market
	Raita Sahi	Increase rice intake	PDS Supply
		Use of vegetables	Increase vegetable cultivation
		Meat, Egg & Fish	Available at nearby market
		Snacks, Biscuits uses increased	Available at nearby market
Juang	Hatisila	Increase Rice Intake	Available
		Boiled Flesh to Cooking Curry	Available
		Bhanga not take	Health
		Amba takua (mango seed) not taken	Health
		Bhata(rice) intake	Health
	Nadam	Increase Rice Intake	Available
		Boiled Flesh to Curry	Available
		Bhainga not take	Health
		Amba takua (mango seed) not take	Health
		Bhata(rice) intake	Health
	Sarai	Increase Rice Intake	Available
		Boiled Flesh to Curry	Available
		Bhainga not take	Health
		Amba takua (mango seed) not take	Health
		Bhata intake	Health
Hill Kharia&Mankirdia	Badajhili	Increase Rice Intake	Availability of Rice through PDS
		Boiled Flesh to Curry	Available
		Bhainga not take	Health
		Bharada not take	Health
	Durudura	Increase Rice Intake	Available
		Boiled Flesh to Curry	Available
		Bhainga not take	Health

PVTG	Name of the Villages	Changes in Food Habits	Reasons of such Change
		Bharada not take	Health

4.4 Nutrition

Nutritionaldeficiency has been a major health issue in India for centuries. Chronic hunger and under-nutrition is the worst tribulation of the poverty that still plagues millions of households in India. India, in recent past, has made a considerable progress in social and economic fronts but improvement in nutritional status especially of the women is found to be lagging behind (Ghosh et al 2009, 13-20).

Food and nutritional security still remains a national concern. Recently, Government has introduced an Act to ensure food security of the vulnerable population of the country. At the national and state context, tribals and more particularly the PVTGs remain vulnerable to food insecurity and malnutrition. Different factors remained responsible for this situation which are more related to geographical isolation, issues of appropriate targeting and extension of welfare measures, inadequate health care facilities and certain traditional belief systems and cultural practices.

Higher prevalence of undernutrition in tribal population is due to a number of elements like traditional food habit which is gradually changing, poor affording capacity which consequently gives rise to undernutrition, lack of awareness about health and nutrition, poor environmental sanitation and safe drinking water etc.During food scarcity period, tribals also consume cheaply available food in the locality to meet their dietary requirement.

4.4.1 Calorific Value of Consumption

To measure the amount of consumption per day, by age categories, irrespective of diet type, 7 days' measurement was taken for 254 persons covering 72 households in 11 study villages. The age classification is made based on the dietary guideline of ICMR-National Institute of Nutrition. The average mean quantum of consumption per day in adult category (>17 years) observed to be high in Hill KhariaMankirdia followed by Lanjia Saora. Age wise mean consumption per day (averaged out taking measurement for 7 days) is presented in the Table.

Table No. 4.3:
Average Quantum of Consumption (in gm) per Day by PVTGs

Age Classification	Dangria Kandha		Lanjia Saora		Juang		Hill Kharia & Mankirdia	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1-3 Year	792.83	596.21	256.00	265.87	549.88	372.91	323.78	275.71
3-6 Year	1076.38	249.71	1355.67	258.81	1263.00	899.03	702.20	287.23
6-9 Year	1310.67	290.36	2431.00	1141.27	1127.67	8.39	1129.00	-
9-12 Years	1328.00	-	1679.75	825.99	1328.00	6.93	-	-
12-15 Years	1501.33	234.55	2356.00	769.36	2349.00	-	1588.00	-
15-17 Years	-	-	2992.50	669.63	2087.00	-	-	-

> 17 Years	2801.36	566.95	3254.22	732.91	2985.98	678.56	3410.41	547.31

In terms of Calorific value of consumed items, it is observed that calorie intake of male is less than that of female in overall situation, irrespective of PVTG category. Further, in children categories, there is a marginal gain in calorie consumption in the age group of 4-9 years whereas there is less calorie intake in 10-15 years' age group. Calorific value of consumption by age and sex is presented in the Table.

Table No. 4.4
Calorie Intake by the PVTGs as per Age Classifications

Particulars	Sex & Age	Recommended Calorie Intake Norm	Actual Calorie Intake	Calorie Difference
Adult	Male	3490	3165	(-) 325
	Female	2850	2880	(+) 30
Children	1-3 Years	1060	668	(-) 392
	4-6 Years	1350	1394	(+) 44
	7-9 Years	1690	1848	(+) 158
	10-12 Years	2190	1636	(-) 554
	13-15 Years	2750	1623	(-) 1127

Note: The quantum of consumption is converted to calorific value as per the cooked value norms. It is the average value of 7 days' intake measured at the household level.

Average calorie intake by female in Dangria Kandha is comparatively higher than male whereas in rest PVTGs, calorie intake of male is higher than female. However, there is less calorie intake by male from the recommended intake in Dangria Kandha and Juang. But calorie intake by female is at par or higher than recommended calorie intake. This is because of quantity of consumption and consumption varieties. In case of children, there is deviation in calorie consumption across PVTGs.

Table No. 4.5:
Calorie Intake by the PVTGs as per Age and Sex Classifications

Sex & Age	Recommended Intake	Dangria Kandha		Lanjia Saora		Juang		Hill Kharia &Mankirdia	
Adult		**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Male	3490	3363	753	4120	1308	3384	793	3817	787
Female	2850	3554	1624	3605	1193	2942	607	3512	399
Children									
1-3 Years	1060	1319	854	965	589	845	417	509	339
4-6 Years	1350	1239	329	1847	197	1674	852	923	238
7-9 Years	1690	1646	243	-	-	1264	35	1242	-
10-12 Years	2190	1664	-	2083	724	1480	4	-	-
13-15 Years	2750	1752	392	2803	1096	2629		1761	-

In Dangria Kandha, in 10-15 years, calorie consumption observed to be less whereas in Juang, less calorie consumption than the recommended intake is observed in 7-15 years range. The similar pattern is also observed in Hill Kharia and Mankirdia but Lanjia Saora are relatively in a better situation in comparison to other PVTGs. Improved adaptation to better food habit due to greater cultural assimilation, increased

awareness through missionary activities and greater exposure are the major attributes for the nutritional status of Lanjia Saora.

4.4.2 Body Mass Index

Among different methods of assessment, the body mass index (BMI) is widely used to understand the nutritional status. The Body Mass Index (BMI) or Quetelet Index quantify the amount of tissue mass (muscle, fat, and bone) in an individual and help to categorize the person as underweight, normal weight, overweight, or obese based on derived value. BMI provides numeric measure of a person's thickness or thinness. For categorization of individuals as per BMI, the value recommendations are as follow are: a BMI from 18.5 up to 25 indicate optimal weight, a BMI lower than 18.5 suggests the person is underweight, a number from 25 up to 30 indicate the person is overweight, and a number from 30 upwards suggests the person is obese. Commonly accepted BMI ranges are underweight: under 18.5, normal weight: 18.5 to 25, overweight: 25 to 30 and obese: over 30.This section presents the anthropometric characteristics and determine the nutritional status of two PVTGs of Odisha.

Table No. 4.6:
Mean BMI and Prevalence of Under Nutrition among the Tribes of Eastern India

Tribe	Mean BMI (Kg/m^2) (SD)		Under Nutrition (BMI < 18.5 Kg/m^2) (%)	
	Male	Female	Male	Female
Oraon	18.8 (2.0)	19.7 (2.4)	47.0	31.7
Lodha	19.5 (2.7)	19.3 (2.6)	45.2	40.7
Dhimal	19.5 (2.5)	19.1 (2.6)	27.0	46.4
Santal	18.5 (2.1)	18.7 (2.3)	55.0	52.5
Bhumij	18.9 (2.6)	18.5 (2.0)	48.4	58.3
Mankirdia	19.3 (2.2)	18.6 (2.8)	48.4	59.5
Juang	19.4 (2.7)	18.3 (2.9)	51.9	62.9
Bathudi	18.4 (1.9)	17.9 (2.5)	52.7	64.5

An anthropometric study on Juangs, based on BMI highlights that the BMI of the Juang males (19.4 kg/m^2) is relatively higher than the females (18.3 kg/m^2)[14]. Thus a significant sex difference of mean BMI is observed among the Juangs. The rate of under-nutrition found to be high among the Juangs among different PVTGs. The study reflects that the extent of under-nutrition among the females (62.9%) is very high which indicate that the Juang women is under serious nutritional stress. The report also highlights, with reference to other studies (Bose and Chakraborty 2005, 3-7; Mittal and Srivastava, 2006, 385; Adhikary, 2007; Mondal, 2007; Datta Banik et al 2007, 348-352; Ghosh and Malik 2007, 143-149; Goswami, 2011; Goswami 2012) that the rate of undernutrition among the Juang women is much higher than other tribals population of Eastern India.

[14] Goswami M., Prevalence of Under-nutrition among the Juangs, A study on a particularly vulnerable tribals group of Odisha, India

Table No. 4.7
BMI of Male and Female (>17 Years) in PVTGs

PVTG	Normal		Under Weight	
	Male	Female	Male	Female
Dangria Kandha	58.8	63.6	17.6	22.7
Lanjia Saora	59.1	74.1	9.1	14.8

Same parameter of categorization / classification is used for Dangria Kandha and Lanjia Saora (two out of four PVTGs under study). In Dangria Kandha, percentage of female in the underweight category (22.7%) is higher than male (17.6%) which reflects that women are more undernourished in the PVTG than male. The same trend is found in Lanjia Saora, where about 9.1% male and 14.8% female are found underweight (all are measured in adult category in the age group >17 years).

4.5 Family Sickness

Illness of members in the family is because of various reasons where nutritional insecurity playing an important role (21.1 %). Unhygienic condition at the household and surrounding (47.2 %) has been one of the key factors for frequent illness of the family members followed by consumption of unsafe drinking water (58.6 %). The wrath of God is attributed to the illness is quite marginal (4.0 %). Family members falling sick once in a year is more common (28.2 %). In some families' members also become sick twice (18.5 %) and thrice (12.1 %) in a year because of various factors. Suffering from sickness for more than thrice in a year is also observed in certain cases (8.2 %). However, no sickness is also observed in a number of cases (33.0 %), may be due to better health care.

Chapter Five: Conclusion and Recommendations:

5.1 Conclusion

Indigenous knowledge on selection and sustainable utilisation of local fauna and flora for food by PVTGs of Odisha are, by and large, tradition bound. It is stated thathigher is the biodiversity greater is the security of the people of that area. The food security and environmentalsecurity cannot be understood through a short spanobservation within the narrow passage of space. For centuries theylived at the lap of nature. Indue course of time, the internal demographic pressure and external pressures coupled with the forces of market, the tribe is not remained free from exploitation and discrimination.

Odisha is rich in biodiversity. The valuable natural resources which are being degraded due to exogenous factors need controlled and managed for conservation. Not only have different patterns of development in the state led to decline in the frequency of availability of fauna and flora but also factors like growth of population in the specified geographical area and the frequent intervention of nontribal contribute for the degradation of rich biodiversity. The tribal poverty level and unsustainable activities adopted by the natives have become crucial for the loss or thinning of the floral population. Often PVTG members become the instrument by the unscrupulous timber traders who use the services of the tribal for their own economic gain. It was also realised that policy in certain context is non contextual. The failure of policy and institutional intervention in some cases opened flood gate of dishonesty. The incentives offered to the PVTGs in the study areas are all short term benefits and this adversely affect the local environment. The dependable syndromes created by the state by providing the essential goods seem to have contributed in erosion of their traditional eco-management system of knowledge.

This study is an attempt to understand dependency of four PVTGs of Odisha on forest, its flora and fauna. The study also looks at the nutritional aspect of these PVTGs in sample households measuring different diet they consume. It is observed that forest has been one of the major sources of livelihoods for the tribals. Contribution of forest to the tribal economy is well recognised in different studies and again this study found its critical importance to PVTGs. However, this study has helped to generate a list of flora and fauna that have been used by specific PVTGs in four different locations. But availability of different flora and fauna and the pattern of use remain more or less same across PVTGs. Similarity also observed in terms of use of different flora and fauna in social functions and cultural activities.

Health use of available flora is more common in all the PVTGs. They have been using a variety of flora for different diseases that are common in nature which also increases morbidity rate among the tribals. Apart from traditional knowledge on health care management by using available flora and fauna, they also use certain plant and plant products for family planning measures and pregnancy termination. This traditional knowhow needs to be explored further and scientifically examined and if it does not have adverse healthproblem, it should be propagatedfor the benefit of others.

Use of plant products and sacrificing animal for the wellbeing of the community has been a cultural practice since time immemorial. For PVTGs, such socio-cultural acclaimed practices remain in the core of the PVTGs way of life. Different flora and fauna and/or part thereof collected from forest, play important role while celebrating festive occasions and annual rituals.Some of the fauna and flora are the totemic objects and considered with difference. They believe that any form of insult or ignorance to these objects

might lead to loss of property and life of men and cattle. Thus, they assume ritual significance. Perhaps, this is one of the reasons for which these PVTGs also take care of such flora in a limited way. But taking care of available flora and fauna by the PVTGs in the nearby forest is limited. However, in Lanjia Saora, there is decreasing incidence of human activities in the nearby forest area due to economic diversification and increased education and awareness.

5.2 Recommendations

1. Systematic and comprehensive documentation of regularly used uncultivated foods and ones which the communities depend upon, needs further documentation in a scientific manner. This requires systematic year-round documentation of all such foods collected, processed, preserved and consumed.

2. The issue of processing and storing of collected NTFPs is a key requirement. Certain measures have already been taken at the tribal concentrated areas for storage but establishment of processing units like decocting unit, cleaning and drying units etc. may be helpful to reduce drudgery, minimize physical labour, time and more benefitting investment of time in other productive activities.

3. Improving economic condition of the tribals has been one of focus of Government. Different measures have been taken in this regard. But more concentrated focus on skill development measures is essential, especially for the youths. Tie-up with National Skill Development Council by the Ministry / Department and exclusive measures will be helpful in creation of employment in service and other sectors of engagement. It will also help to minimize forest dependency and thereby reduction of anthropogenic activities in the forest areas.

4. Many products collected by the tribals from the forest are yet to be covered under scientific taxonomy. So, required measures may be taken by the Government for ascertaining the phylogenetic position in taxonomy of all wild foods that are yet to be covered.

5. Allocation of land under Forest Rights Act (FRA) has been helpful for the PVTGs to possess their own legal land and bringing more gender equity. It has also created scope for settled cultivation and thereby minimizing forest dependency for having own land and production system. So, attempt may be taken to cover the left out families under FRA and thereby minimizing human activities inside the forest.

6. Agriculture has been one of the major sectors of engagement for the tribals. But agricultural practices are more traditional in nature. If it is expected that agricultural production has to increase and tribals get a remunerative return from the cultivated area, it is important to promote scientific agricultural practices. In order to achieve that the tribal peasants are to be trained appropriately and extension services to be strengthened. So, appropriate measures may be taken in this direction by which share of cultivated food items in the diet pattern increases and share of uncultivated food items reduced. In other way, it will also be helpful to improve bio-diversity and restoration of flora and fauna.

7. Decreasing availability of fauna remains a reality in the nearby forest where tribal settlements are there. To meet the flesh related diet requirements of the tribals, promotion of animal husbandry

can be helpful. Under different schemes, ITDAs have been taking measures in this direction. But further effort can be taken to concretize the current initiatives and develop a geographically marked cluster for different flesh based items. Backyard poultry measures can be further augmented with increased scale of production.

8. Poor nutritional intake and related undernourishment of tribals remain a concern. Special measures for nutritional improvement may be taken, for the identified undernourished children, pregnant women, lactating mothers, adolescents andadults. A systematic anthropometric study may help to develop a database of all PVTGs and taking nutritional improvement measures accordingly.

Bibliography:

Acharya, D.and Shrivastava, A.
2008, Indigenous Herbal Medicines: Tribal Formulation and Tribal Herbal Practices.

Agarwal V.P.
1990, Forest in India: Environmental and Production Frontiers.

Arora, K.
2010, Sustainable Management of Tropical Forest through indigenous knowledge: A case study of Shompen of Great Nicober Island.

Biswas, P.K.
Forest, People and Livelihoods: The need for Participatory Management.

Bose, K. and Chakraborty, F.
2005.; Anthropometric Characteristics and Nutritional status based on Body Mass Index of adult Bathudis: a tribal population of Keonjhar District, Orissa, India.

Chaudhary, S.N.
2012 Tribal Health and Nutrition, Concept Publishing Company, New Delhi

Choudhary, S. N. and Basa,K.K.
2008,Tribes and their Indigenous Knowledge: Implications for Development, Food Insecurity in Odisha, World Food Programme

Gangte, H. E. et al;
2013,Wild Edible Plants used by the Zou Tribe in Manipur, India.

Goswami, M.
2010, Prevalence of Under-nutrition among the Juangs, A study on a particularly vulnerable tribal group of Odisha, India

Jain, A.K.and Tiwari P.
2012 Nutritional value of some traditional edible plants used by tribal communities during emergency with reference to central India, 2012.

Jamir, N.S.and Lal, P.
2005, Ethnozoological Practices among Naga tribes.

Jena, M. K. et al.
2002; Forest Tribes of Orissa (Vol. 1) The Dongria Kondh,

Lambert, J. Srivastav, J. and Vietmeyer, N.
1997 Medicinal Plants, Rescuing a Global Heritage, The World Bank,

Mohammad,A. et al;
2013 Livelihood Contribution of Forest Resources to the Tribal Communities of Jharkhand; Indian Journal of Fundamental and Applied Life Sciences ISSN: 2231-6345 (Online); Vol. 3 (2).

Mahalik, P.R.and Mahapatra, R.K.
2010; Documenting Indigenous Traditional Knowledge in Odisha.

Mishra, P.
2004, Ecology, Culture and Health: A Primitive Tribe

Mohanty, N. et al;
2013,Diversity of food plants used by tribal people of Dhenkanal District, Odisha, India: An ethnobotanical analysis.

Mohanty, N. et al;
2011,Use of Plant Diversity in Household and Rituals by Tribal People of district of Dhenkanal, Orissa, India.

Mukherjee,B.M.
1990, Technology for sustainable development, GGD University, Publication Bilashpur

ICMR
2011, Dietary Guidelines for Indians: A Manual (2nd Edition), New Delhi

NIN
2011, Dietary Guidelines for Indians, National Institute of Nutrition, Hyderabad

Odisha Human Development Report, Bhubaneswar
2004

Ota, A.B et al;
2011, Primitive Tribal Groups of Orissa, SCSTRTI, Bhubaneswar.

Padhi, S.and Panigrahi, N.
Tribal Movements and Livelihoods: Recent Development in Odisha,Working Paper No. 51

Panda, T.and Padhy, R.N. Sustainable Food Habits of the Hill Dwelling Kandha Tribe in Kalahandi District of Orissa, 2007

Pattnaik, N.
2003,Essential Forest Produce in Odisha, 2003

Pattnaik, N etal
2007, et al.; Forest Tribes of Orissa (Vol. 3); The Juang, THRTI, Orissa

Pattnaik, N.
2005, Primitive Tribes of Orissa and Their Development Strategies, SCSTRTI,Orissa

Planning Commission, Government of India
2010, Migration of Tribal Women: Its socio-economic effects, an in-depth study of Chhattisgarh, Jharkhand, MP and Odisha, October.

Pradhan, S. et al,
2011, Food Practices Among and Adivasi women of Selected Districts of Western Odisha, Indian J. Prev. Soc. Med. Vol. 42 No.3, ISSN- 0301-1216.

Pradhan, S., Mishra, S.and Mohapatra, S.C
2011.; Food Practices among the Adivasi women of Selected Districts Western Odisha,

Pushpangadan, P. et al
2014, Ethnozoological knowledge of Indian Scheduled Tribe, Scheduled Caste and Rural Communities,

Rai, R. and Nath, V.
Tribals Flora and Fauna; The role of ethnic and indigenous people of India and their culture in the conservation of biodiversity; FAO.

Rathore, M.
2009, Nutrient content of important fruit trees from Arid Zone of Rajasthan.

Ray, B.C and Das, A.K.
Tribals of Orissa: The Changing Socio-Economic Profile, 2010.

Sahu, S.C., Dhal, N.K, and Mohanty, R.C.
Potential Medicinal Plants Used by the Tribals of Deogarh District, Odisha, Natural Products Department, Institute of Minerals and Materials Technology and P.G. Department of Botany, Utkal University

Seeland, K.
2003., Indigenous Knowledge, Forest Management and Forest Policy in South Asia,

Sen, S.K, Pradhan, R., Pattnaik, M.R.and Behera, L.M.

2014,Traditional knowledge of medicinal plants against Birth control by the tribals and other rural people of Bargarh district in western Odisha, India

Sen, S.K., Pattnaik M.R., Behera L.M;
2015Ethinomedicinal uses of plants related to delivery problem in Bargarh District of Western Odisha, International Journal of Herbal Medicine.

Srivastava, V.K.
2009 "Tribal Scene in India-Past and Present: An Overview Analysis of Situation"*in* Tribal Development Since Independence edited by Chaudhary, S.N, Concept Publishing Company New Delhi,Pp 284-336

Zahm,F.Viaux, P.Vilain, L.Girardi, P. and Mouchent,C
2004 La methode IDEA(indicateur de durabilite des exploitations agricoles in peer conference) Nov 2004Helsinki, cited by ,Willaim, A , Malla, Geldenhuys Cj and Prabhu, R. in paper '*Farmers knowledge of soil fertility bio ecological indicators influencing land use management at forest – agriculture interface in southern Cameroon,*published in Edited R.N Pati , S Shukla and L Chanza Traditional Environmental Knowledge and Biodiversity, Sarup Book Publishers Pvt Ltd , New Delhi(2004)