

FORESTS AS FOOD PRODUCING HABITATS

An Exploratory study of Uncultivated Foods and
Food & Nutrition Security of Adivasis in Odisha



Living Farms, Odisha



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July 2014

Living Farms, Odisha

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DISHA, Ashiyan Colony, Bisra, Sundargarh

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Abstract

This exploratory study was taken up in the context of ongoing debates of how to ensure food and nutrition security for the most marginalized people in India. In spite of rapid growth in the last decade, a large number of people (42%), particularly women and children continue to be malnourished in the country. The Public Distribution System (PDS), while widespread, has not reached the neediest or addressed the problem of malnutrition. This study examines forests as food producing habitats and its potential to meet the food and nutrition needs of Adivasi communities in Odisha. It also looks at the changes brought about by shifts in land use pattern.

The study was taken up by Living Farms, a community based non-profit organization in Odisha, and conducted in the districts of Rayagada and Sundargarh, with the help of organizations DISHA in Sundargarh, and ASHA and SHAKTI in Rayagada district. It used a mixed methods approach in its objective to understand the issues around collection and consumption of uncultivated foods and the extent of dependence of adivasi communities on such food, for their food and nutrition security.

While secondary literature shows increasing importance accorded by international academic and policy discourse to forest foods, it is seen that there is a serious dearth of research on numerous fronts within India on the subject. Even civil society work has largely ignored the importance of uncultivated foods in their contribution to food and nutrition security of adivasis.

Salient Findings :

This study recorded 121 different kinds of uncultivated foods being harvested between the last week of July 2013 and December 2013 by the sample households. On an average, 4.56 kg of such foods were harvested per household, during each collection foray. This ranged from 6.45 kgs in the three Rayagada villages to 2.55 kgs in the three Sundargarh villages. Across villages of the two districts, it ranged from 2.08 kgs to 8.97 kgs with the diversity ranging from 21 kinds to 69 different kinds of foods. The highest diversity was in mushrooms during the study period, while the largest quantities harvested were that of various tubers.

Similarly, 98 different kinds of uncultivated foods went into the cooked foods consumed by a sub-set of the sample households. Here, Greens exhibited the greatest diversity followed by wild vegetables, shoots, fruits etc., closely followed by mushrooms and tubers. Wild animals also formed a part of the diversity of consumption. On an average, 0.725 kg of uncultivated foods became part of the cooked food consumed per household per day. This was 18.84% of total cooked food consumed. **Since these findings came out of readings from the kitchen, this should be considered as under-reporting given that many such foods are consumed raw (for example, many fruits).** Further, rice constituted a substantial chunk of cultivated foods in all households if this is excluded, the share of uncultivated foods is substantially higher. Across villages, uncultivated foods ranged from 12% to 24.4% of total cooked foods and weighed 0.45 kgs to 1.19 kgs per day on an average. There was variability across months. Overall, it is seen that there is a great deal of diversity in the foods, including in cultivated foods that went into cooking.

Participatory Rural Appraisal (PRA) exercises taken up with the communities studied showed the criticality of uncultivated foods in the perceptions of the adivasi communities. The cultural linkages with forests and forest foods are clear and alive to this day. However, a variety of factors could potentially be playing a role in a general decline on dependence on forest foods, as reported by the adivasi communities.

In terms of a nutritional analysis, it is found that the forest foods could be playing a vital role in terms of micro-nutrients; however, it is seen that mainstream research has not focused on this aspect and our food/nutrition



security discourse does not acknowledge the importance and critical role of uncultivated foods in the lives of adivasi communities. It is clear that the adivasi communities' dependence on uncultivated foods requires more systematic documentation and active protection and promotion for an all-round win-win situation for the communities, state, environment and future generations.

The study team consciously shied away from coming up with any “conclusions”, given that there are numerous unexplored aspects to uncultivated foods and their critical importance. The authors instead choose to present here issues that appear to be clear points worth noting by policy makers, civil society groups and others, that need further exploration and inquiry.

This study shows that uncultivated foods, which still form a very important chunk of Adivasi communities' diets (in variety, quality as well as quantity), have been grossly neglected and ignored by civil society and state actors alike. Our exploration through literature search, field survey and PRAs shows that the following aspects of uncultivated foods are very important to note:

- It appears that in times of stress, whether it is bad (cultivated food production) years, hunger months, or lean weeks within a month when the PDS ration dries up and employment not available, it is the uncultivated foods which form a critical source of food and nutrition. This could be seen through historical accounts as well as anecdotal evidence that people shared. The criticality of these foods is also in terms of their nutritional composition.
- If the forest is being maintained well in all its diversity and if access is good, there is a year-long supply of such uncultivated foods that can be noted. This is especially so with tubers, greens and various fruits. Technical analysis of these foods shows that most such foods are highly nutritious, while it is indeed true that some foods may have anti-nutritional properties. The diversity of these foods is also an important factor to note.
- At a time when income inequities are showing up starkly with rural communities getting impoverished, this is a food source that is not just affordable but completely free, and equitably accessible. If the resource is managed sustainably, it is also a source of income for the communities.
- Food safety is a major emerging concern when it comes to cultivated food, especially of fruits, vegetables and greens. However, here is a source of food where no chemicals or additives come in at the time of growing, or post-production. This food is safer, also in the context where it is well established that toxins like pesticides have a greater adverse impact on already malnourished people.
- Wild species are supposed to be more resilient in this age of climate change, compared to cultivated species. On the other hand, the periods of food stress of communities are also likely to increase due to climate change, if they are dependent only on cultivated foods. Uncultivated foods provide an important fallback mechanism in this context.
- These foods, which do not require a household to incur costs, borrow money, depend on a government dole-out scheme or even seek the permission of others before accessing, lend communities as well as individual households a sense of self-dependence, and therefore, dignity and pride, which are quite dear to Adivasi communities. In our interactions, the lack of reliability of state schemes was repeatedly brought up.
- There is an enormous wealth of biological knowledge associated with these foods with members of the community, including children. Whether it is about where a particular species grows, seasonality, characteristics, identification and appearance, or its nutritive and medicinal properties, properties related to processing or storing, cooking methods and quality, veterinary and livestock uses etc. are all valuable knowledge that community members possess.
- Several of these foods hold great cultural significance for the communities dependent on them. This is also an under-studied and unacknowledged area.



- While in the context of farming for subsistence or farming for cash incomes, there is a tangible degree of unequal access, ownership and decision-making roles for men and women, in the case of wild uncultivated foods, this is fortunately missing. True, there are small gendered dimensions even here when it comes to particular uncultivated foods, or distance traveled to collect such foods. However, there is a greater degree of equality between the sexes when it comes to collecting these foods.

What is unfortunate is that most of these issues have not entered the discourse of even the civil society groups which have worked for Adivasi rights, sustainable forestry models or ones who have sought to address food rights. Needless to say, if they have not entered the discourse, they have not entered into the action plans either. This has been a neglected aspect of many anthropological studies too, related to various Adivasi/forest-dependent communities. In the recent past, it is some biochemistry, ethno-botany and nutrition scientists who have taken some interest in the subject.

The study records a decline in availability and the reasons for the decline appear to be many and some of them include:

- Forest cover declining, and the forests 'moving farther away' from villages
- Forest area being replaced by plantations of various kinds some are by the forest department of monocultures, while yet others are by the people, due to incentives and schemes provided, to replace hill cultivation (podu/shifting) which is another unexplored area as far as understanding regenerative hill cultivation is concerned
- Rainfall patterns affecting some forest foods this has been mentioned in the context of mushrooms and greens, for instance
- PDS rice scheme affecting dietary patterns; bringing in a sense of food security amongst villagers too, while dependability, cultural and nutritional appropriateness of such foods was not questioned
- Elephant herds and forest fires (sometimes set intentionally during kendu leaf season) affecting forests especially bamboo forests
- People's cash incomes rising from other sources purchased food finds more space in the kitchens now
- "Development" in various forms arriving into a community roads and cashew nut plantations, for example

Although not investigated in this study, experience from elsewhere shows that the impact of invasive alien species has also meant decline in availability, and therefore, consumption of uncultivated foods

Elsewhere, where uncultivated foods are gathered from farm fields, chemical agriculture and monocultures have also been a factor affecting availability.

Forests have rarely been looked at as food producing habitats in our policy discourse or implementation of any development efforts related to food security. This is the fundamental shift required, that this study points to. Uncultivated foods are in fact safe, diverse and nutritious food that is in several ways superior to the food security frameworks that rest on intensive agriculture paradigms in particular pockets of the country. The fact that the forest department has always focused on plantation revenues ignoring the real and imputed value of NTFPs and unmarketed forest foods has to be challenged. As a senior bureaucrat pointed out in the course of this study, the forest department has always chosen the more lucrative as well as easy way out in its functioning, and ignored the more challenging conservation function, along with communities. We believe that socio-cultural linkages with forests, including in terms of food, have a great potential to create a more symbiotic relationship once again for forest communities and their forests.

Civil society has a critical and important role to play here, in striking dialogues with communities on this front. PESA (Panchayats [Extension to Scheduled Areas] Act 1996)¹ and FRA² (Forest Rights Act) are constitutional and



legal spaces that are already available, whose full potential has to be actualized. FRA implementation in terms of community claims is still awaited. The shift to a new approach in policy discourse towards forests as food producing habitats should be balanced to ensure that it happens in a non-exploitative and sustainable fashion. The dilemma with pointing out the positive features of such uncultivated foods is the immediate seizure by certain forces for market opportunities for the same, which negates the very nature of such foods. It is apparent that such a shift requires investments in processes of dialogues and knowledge-sharing within the community wherever needed.

In this study, we did not intend to find the inter-linkages between regular lowland cultivation (including cropping patterns and farm technologies used (e.g. GM seeds, synthetic fertilizers, pesticides and farm machinery), shifting/podu cultivation and the wild and uncultivated foods. As noted elsewhere, we realize that it is not enough to look at the nutritional qualities of isolated uncultivated foods that a person might consume but look at the entire diet spectrum. It is also apparent that increased use of chemicals in agriculture will have its own impact on forest diversity, as evidenced in bee colony collapse and local amphibian population eradication by pesticides and herbicides elsewhere. It appears that the jury is not fully out yet with regard to shifting cultivation, especially in a regenerative manner as was practiced by some communities in the past. Admittedly, this did not come out as a major issue in our interaction with villagers, but we would like to flag this as an area for future exploration.

The study makes recommendations to the Government of Odisha, Government of India and Civil Society to protect and develop forests as food producing habitats, along with Adivasi communities.



¹ PESA is a law enacted by the [Government of India](#) to cover the "Scheduled areas", which are not covered in the 73rd amendment or [Panchayati Raj Act](#) of the Indian Constitution to enable [Gram Sabhas](#) to self govern their natural resources.

² The Act seeks to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded.



1. Introduction

It is well known that Colonial Rule in India led to the imposition of laws and practices which gave the rulers a greater control over Forest Resources. While forest-dwelling communities had a symbiotic relationship with the forest, gathering food and other forest resources for fodder and homestead, the colonial laws disrupted people's livelihoods. Some of the significant laws such as the Indian Forest Act were passed in 1865, 1878 and once again in 1927. Post-independence, National Forest Policy 1952 and laws such as the Wild Life Protection Act of 1972 and the Forest Conservation Act of 1980 continued to curtail the local use of forest, further alienating village communities from their resources. In Odisha, adivasi/tribal community constitutes 24% of the state population which is 41,947,358 (Census 2011), with the adivasi/tribal population being 10,067,365.

In Odisha, the forest department maintained control over forest. Initially, attention was given to bamboo and between 1940 and 1950, bamboo was harvested by private companies. In 1960, the Forest Development Corporation managed the forests and it provided cheap bamboo to private industries. In spite of bamboo being nationalized in 1988, this continued to be the case. In 1973, Kendu leaves were nationalized and control of sal seeds taken up in 1983. The Odisha Forest Produce (Control and Trade) Act 1981 continued to give monopoly control over forest produce to the state. In all these years, there was little attention paid to food gathered and consumed from the forest.

Several thousand villages across Odisha have been conserving their forests for generations on their own initiative, much before an official recognition dawned on the importance of involving local communities in forest protection and conservation. Adivasi community and others living close to the forest started the community forest management programmes to conserve forests to ensure access to fuel-wood and fodder and protect the forests for ecological gains. This was a purely community initiative supported by Civil Society Organizations (CSOs) in some areas.

The Joint Forest Management (JFM) programme was aimed at the forest department working in partnership with communities for mutual gain. The JFM was meant to ensure livelihood improvement of the forest dependent people by involving the local communities through re-generation of forests and their rehabilitation. In 1993, the emerging JFM programme visualized a three way partnership between forest department, community and NGO. A review of the functioning of JFM by RM Mallik in 2006 highlighted the following (the study was based on field-survey conducted in two scheduled districts, Rayagada and Mayurbhanj and two partially scheduled districts Kandhamal and Keonjhar, covering 8 blocks, 16 villages from JFM areas and 8 villages from non JFM areas. 321 households from JFM villages and 80 households from non JFM villages were studied):

- Apart from food subsistence collected from the local forests (including protected areas), as much as 28.3% of total per household annual income was derived from sale of NTFPs. Income in Mayurbhanj was 43.8% (Rs. 5173) and in Rayagada, 23.6%. In contrast, 36% of the total annual income per household was derived from NTFPs in the non-JFM villages. The community members collected leaves, fuel wood/charcoal, drugs and medicinal plants, oil seeds, fruits/roots and other miscellaneous products.
- Further when it comes to the annual per household total income, distinct variation across the sample districts from 60.3% in Mayurbhanj to 38% in Rayagada is visible. This is attributed to the major positive impact of protective measures on the livelihood of Forest Dependent Communities under the JFM model introduced in the state.
- In terms of employment however, it was found that 240 person days of employment was generated in JFM villages per annum compared to 275 person days in the non JFM village. More strikingly income per person



day employment in the forestry sector generated only Rs 17.31 (in terms of sale of NTFP), compared to prevailing market wage rate of landless laborer of Rs 38.75 in both JFM and non JFM areas. It is reported that 49% of the NTFP was consumed while the rest is sold.

- The study notes “the local communities depend on forests largely to meet their recurring requirements of food, fodder, fuel wood, small timber, bamboo etc but definitely not for much lump sum income from protected forests in future.” However the study does not examine the impact of JFM on regenerating wild foods which are of critical importance to the community. The study also notes that gender issues needs extra care and that there is a need to develop gender sensitive strategy”.
- The study further highlights that there is a great deal of variation amongst the tribes across the districts in terms of their ethnicity, customary practices with resource use and management, their perceptions towards forest, forest dependence, pattern of consumption, value addition activities etc. It unveils the fact that household income from forest sources per annum of the forest dwellers across the districts and income groups varies a great deal from 24.5% (of total income) in Kalahandi to 59.6% in Dhenkanal. This however doesn't include value of food sustenance, small timber, fuelwood, fodder, medicines etc collected for their own use.³

This study notes that non-dissemination of information on procurement price, lack of adequate primary processing, lack of access to suitable markets, etc made communities more vulnerable. It is noted that Kandha, Mulhar, Kutiakandha, Munda, Bhumij, Juanga communities encountered more storage problems. It was found that primary gatherers disposed of their products at throw away prices against instant payments. The middlemen and the State agencies appropriated profits at the expense of the indigenous communities.

A comparison between JFM and Community Forest Management highlighted that only 38% of respondents viewed the latter as relatively better. This was due to (a) direct involvement of community in management for caring their own food/livelihood security; (b) communities better knowledge of the potential of the resource and its utilization and (c) peoples' greater concern for sustainable forestry that directly determines their suitable livelihood. Government supported JFM was appreciated not only for providing access to the forest for better governance but for seeking favors to implement infrastructural development activities such as roads, drinking water, renovation of tanks, schools, health centers in lieu of protection to nearby emerging forests. Across the tribes, perception of JFM varied, with Munda, Malhar, Bhumij tribes in Dhenkanal feeling that JFM was not people friendly but bureaucratic while Bhumij, Kutia Kandha and Kui Kanda in Kalahandi and Koraput appreciating the role of Government. An overwhelming majority of the respondents in the study reported not to have benefited by the nationalization of a few forest products as it restricted the flow of goods and created harassment, delayed payment and non-revision of price in time.

Micro planning *sans* people's choice

“Before plantation work, Mishra Babu (the Forester) consulted with us on the selection of species and entry point activities. Keeping the food and livelihood options in view we opted for mango, jack fruit, guava, acacia, gambhari and teak, but he had his own micro planning and planted some other trees. If they had to do their own then what is the need of such micro planning?”

Dangu Mahakud, 55, Gouda (OBC), EC Member, Talabahali JFMC. <http://www.worldbanktribunal.org/docs/orissa.pdf>

³RM Mallik and CR Das (2004), “Access to Forest Resource and Management: A Study of Forest/NTFP Policies and Tribal Livelihood”



It was only in 1996 that PESA (Panchayats [Extension to the Scheduled Areas] Act) came into force. The Act provided for the Gram Sabha to manage community resources. It gave powers to manage minor water bodies and also powers to control local plans for development. While the intent was excellent, control over resources remained a distant dream.

In 2006, the Government of India passed the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, which acknowledges, for the first time in India's legislative history, that the 'traditional forest dwellers are integral to the very survival and sustainability of the forest ecosystem. By recognizing the customary rights of "forest dwellers", this Act seeks to ensure livelihoods and food security of the forest villagers, while empowering the people to sustainability use and manage forest biodiversity.

The recorded forest area of Odisha is 37.34% of its geographical area. Reserved forests constitute 45.29%, Protected forests 26.70% and Un-classified Forest constitute 28.01%. Odisha has two National Parks, 18 Wildlife Sanctuaries and two Tiger Reserves covering 9,110.78 sq.kms.

While the debates and efforts for access and control of adivasi communities over forest rights continue, their access to food resources from the forest have become increasingly fragile. Reports of starvation deaths continue from time to time and mortality related to poor nutrition and lack of immunity is high. Study conducted by Samal (2002) highlighted that the distance traveled for food gathering between 1995 and 2000 increased from 3.49 KMs per day to 6.33 KMs per day, an increase of 81.38%. In terms of gathering time, it increased from 3.43 hours per day to 5.91 hours, an increase of 72.3% highlighting the increasing efforts that adivasi community has to make to access uncultivated food from the forest.⁴

Historically, the forest provided plentiful food to its people. Particularly during times of severe droughts, the forest acted as a savior and adivasi people were known to spurn relief works and return to the forest for their food. Valentine Ball noted in the 1880s that he had frequently "seen large numbers of men, women and children grouping in half-dried-up tanks for Singhara (water chestnut), fresh water snails and small sluggish fish. The latter were caught by dragging on shore the weeds in which they lay concealed. These items were very important in local diets for, as he pointed out, 'when compared with the cultivated raiyats they (the adivasis) are less affected by famine for the jungles produce their ordinary food whether there is drought or an abundant rain.'"

In Palamau of Chota Nagpur region, most of the people obtained a good supply of flowers, fruits, barks, roots and tubers which formed important articles of food almost throughout the year and as district officers noted 'to this chiefly is due the immunity of the district from famine'.⁵

While the bounty of the forests is well known, modern 'National Development' and the process of globalization have impacted forest dwellers and made them vulnerable to food insecurity. This is an exploratory study to understand the problem and address the issue.

⁴Samal, Kishor C (2002); Forest and Livelihood: Case Study of Keonjhar District of Orissa, Imimeo), (A Report of the Research Project Funded by CDS, University of Wales, Swansea, UK.), Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar.

⁵As reported by Damodaran, Vinita "Famine in a Forest Tract: Ecological Change and the Causes of the 1897 Famine in Chotanagpur, North India" Environment and History 1, No. 2 (June 1995): 129-58. (<http://www.environmentandsociety.org/node/2827>)



1.1 Importance of Uncultivated Foods : A Literature Survey

As part of this study, a literature survey was undertaken to look at information and data that exists related to uncultivated foods and their importance in the food security of Adivasi communities in particular. These uncultivated foods have been referred to in literature by various terms including wild foods, wild edible plants, forest foods etc.

The mainstream media looks at consumption of uncultivated foods mostly as a sign of backwardness and poverty. Year after year, stories of deaths of Adivasis after eating mango kernel soup are reported in the media. Governments are also seen actively dissuading tribes from consuming such foods. There have been times when opposition parties have used wild foods consumption as a political scorecard point to show that government services have not reached Adivasi communities⁵. To that extent, media stories have mostly focused on the negative aspects of eating uncultivated foods.

Some stories share a few more details on what kind of wild foods are available for consumption during the critical hunger period. For instance, *“the stock of food grain in the household gets exhausted and people manage with starvation fare like mango kernels, the bark of salap tree, tamarind seeds, jackfruit seeds, and roots, fruits and shoots from the jungle like bamboo and mushroom”*. (Sarada Lahangir, “Odisha Adivasi community overcomes starvation by eating mango kernels”).

It has been explained in the above cited media report that the deaths and illnesses are mostly related to the way the foods have been stored even as experts concur that *“mango kernels, mushrooms, and tamarind seeds are rich in carbohydrates and other nutrients”*. However, the consumption of such foods is equated with poverty or even “sub-human conditions”, as understood by the external world.⁷

We discern that the food cultures and food economies of Adivasi communities around wild food biota has usually been a neglected topic of concern in anthropological research. Interviews with leading anthropologists of Odisha also revealed that no significant work has been undertaken to document various aspects related to uncultivated foods (range and diversity, quantities accessed and consumed, seasonality, nutritional or anti-nutritional properties, criticality, cultural significance of such foods etc).

For instance, various publications on the tribes of Odisha or Eastern India have fairly detailed descriptions of clans, culture, (life cycle and religious) rituals, spiritual beliefs, social organization of the community and family, village settings and arrangement of houses, agriculture, the economy etc., but not much on uncultivated wild foods that are consumed. Indebtedness of Adivasis is repeatedly acknowledged in a scenario of depleting natural resources and exploitative external traders. While one school of thinking was around a development pathway that is distinctly different and unique to the Adivasi communities, another school of thinking was always around “integrating” Adivasi communities into mainstream development processes. It is seen that in most such literature too, mention of uncultivated foods is missing or mentioned only in passing.

Verrier Elwin, the famous anthropologist who is known to be driven not just by his academic inquisitiveness but his love of indigenous people and his inclination to address their major problems, wrote on the importance of shifting cultivation in the tribal food economies. He notes that for several Adivasi communities in Odisha like

⁵Samal, 'Mango kernel for Orissa CM, Ministers', The Hindu, September 8, 2001 <http://hindu.com/2001/09/08/stories/0208000t.htm>; 'Orissa dissuades tribals from eating mango kernel', <http://www.rediff.com/news/2001/sep/01oris1.htm>; 'Orissa tribal community overcomes starvation by eating mango kernels' Sarada Lahangir, Dec. 22nd 2010, <http://newsblaze.com/story/20101222130025twfs.nb/topstory.html> Kishor C (2002); Forest and Livelihood: Case Study of Keonjhar District of Orissa, Imimeo), (A Report of the Research Project Funded by CDS, University of Wales, Swansea, UK.), Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar.

⁷Rasheeda Bhagat, 'The spectre of starvation', Frontline, October 13-26, 2001



Lanjihia Saoras, the Bondas and the Gadabas, terrace cultivation is the main source while axe cultivation is a subsidiary means of livelihood; he also says that axe cultivation is a natural and acceptable symptom of a certain stage of cultural development⁸.

While writing about the Baigas, he describes their cultivated crops like millets, maize and sweet potato, and mentions the uncultivated foods⁹:

“The Baiga go out and gather every kind of jungle leaf and herb. Popular among these are the leaves of the chinch (*Corchorus olitorius*), the munga (*Moringa pterygosperma*), the chakaora (*Cassia tora*), the pipal (*Ficus religiosa*), phang (*Rivea hypocrateriformis*), kawa keni (*Combretum nanum*), kajra (*Phoenix sylvestris*), khatua (*Antidesma diandrum*), pakhri (*Ficus infectoria*), amara (*Spondias mangiferae*), the flowers of the birhol (*Indigofera pulchella*), the young shoots of the bamboo and the kachnar (*Bauhinia purpurea*), and the small tender leaves of the amla (*Bauhinia malabarica*). These are nearly always boiled with a little salt and chili. The *karil-chena* (bamboo shoots) are a great delicacy. They are prepared by removing the outer skin and boiling. Then all the water is squeezed out of them and they are pounded a little. Then they are again boiled with salt, turmeric and chili. Pipal leaves are first boiled, and then dried in the sun. Afterwards they are rubbed in the hands, and cooked in buttermilk.... A large variety of roots are collected in the forest. The best of these are the *kanhiakanda*. Other popular *kanda* are *kirchi*, *ktmdru*, *jalia*, *jarungi*, *sua* and *saidu*. They are washed and scraped, then boiled and often eaten without salt or spices. Sometimes, they are cut up and made into curry; or they may be dipped in the sour curry of gram, or *pej* a few days old. Among fruits the most popular is the mango. At the mango season, everybody goes to the jungle, and gathers baskets of the small green fruit: ' often they take it to the bazaar, and sell them at 100 an anna, but they eat a large proportion themselves. Other fruits are jamun (*Eugenia jambolana*), char (*Buchanania latifolia*), khamer (*Gmelina arborea*), tendu (*Diospyros tomentosa*), gular (*Ficus glomerata*), bar (*Ficus bengalensis*), bel (*Aegle marmelos*), bohar (*Cordia myxa*) and many others. The mahua (*Bassia latifolia*) is so valued by the Baiga that they never cut it in their bewar. Its sweet and sickly flowers are dried and made into a gruel or chutney. Its seeds yield an oil that can be used for cooking. The corolla are made into liquor”.

There is also an elaborate description of different kinds of rats (seventeen kinds) and how they are cooked; and also about fish, and other kinds of animals that are eaten.

Elwin dwells a little bit on the subject of uncultivated foods in Chapter Three of his “Bondo Highlander” descriptions, on their self-sufficient economy (even in this book, the description of the cultivation methods of the Bondos is far more detailed)¹⁰. “For food, the Bondos depend mainly on agriculture. The physical character of their surroundings forced them out of food-gathering stage by providing extensive open country available for cultivation, but not offering sufficient opportunities for the gathering of roots and fruit or the hunting of game.....Mango, tamarind and jackfruit trees are common in the neighborhood of most villages their fruit is eagerly collected; such other fruit trees as are to be found in the scanty forest provide fruit during the hot weather. Roots and tubers are a useful addition to the diet, but they are not as among the Konds its main feature. Wild vegetables, bamboo-shoots, and mushrooms are collected and eaten. The Bondos do not seem to be specially fond of honey.....The Bondos are fond of red ants and even more fond of the date palm grub. Silkworms are regarded as good for any swelling of the stomach. Rats are fattened in cages or hunted and killed at festivals” (Pp 40-41).

⁸ Verrier Elwin (1946). A brief survey of the aboriginal tribes of the districts of Ganjam & Koraput', Orissa Government Press

⁹ Verrier Elwin (1939): The Baiga, Wyman & Sons Ltd, London. Pp 50-51

¹⁰ Verrier Elwin (1950): Bondo Highlighted. Geoffrey Cumberlege, Oxford University Press Bombay



In his description of the Bondo calendar, the festivals associated with new mango kernel feasts etc., give an indication of the importance of mango in their lives. Explaining the details of axe cultivation, it is mentioned that mango, jackfruit, tamarind and sago palms are spared, but everything else is cut. The axe cultivation description, even as it provides a destructive side to the practice, also shows the importance of the forest for cultivated food on these lands (manure from the burnt bamboo, for instance) on the cleared forest patches, they broadcast millets like *Eleusine corocana*, *Panicum miliare*, *Panicum italicum*, *Sorghum vulgare*, *Penisetum typhoideum* and pulses like *Cajanus indicus* and *Dolichos biflorus* along with cucumbers, gourds, castor trees etc. The hunting and fishing rituals are also described in a vivid manner.

Elwin describes several dishes out of uncultivated foods as “strange dishes” roasted rats and mice in Bondo hills, *chutney* of red ants among the Murias, large white palm tree grubs fired in their own fat from the Marias, a pilaf of dog's meat etc¹¹. However, detailed work on understanding the forest as a source of food security is not seen here either.

In this autobiography, Elwin mentions that his unpublished work on “Economics of Kuttia Konds” is on the economic aspect of Kond life food gathering activities, the problem of axe cultivation in great detail, the preparation of food, the economics of social and religious obligation, debt, bon-service and so on. However, this work remains unpublished to this day.

A section of official publications on the “Primitive Tribes” of Odisha occasionally mentions the dependence of many forest communities on mango stones, sago palm pith etc. during lean seasons of the year, but a detailed documentation of uncultivated foods is not available. For instance, in an ethnographic account of the (Lanjia) Saoras, the economic life is mostly described in terms of their three types of cultivation (homestead kitchen gardens, shifting cultivation on the hills and paddy cultivation in terraced fields under irrigated conditions); however, no mention is made of uncultivated foods anywhere¹².

While hunting is inevitably a community or group activity by men (only collective hunting), food gathering can be by any member of the community, albeit predominantly by women.

Provincial Gazetteers of the colonial period and the Famine Commission reports mention the traditional food gathering practices of the Adivasi communities.

One report on Odisha has the following reference, in the context of famine, to uncultivated foods¹³:

“In the district of Ganjam and Vizagpatnam there lived considerable number of people in the hills depending for their subsistence to a great extent, on the product of the jungles. The Khonds and Savares of Ganjam and Konda Doras of Vizagpatnam beyond the Ghats were unaffected by the distress; but the Savaras living on the slopes of the Maliahs in the South of Ganjam were less fortunate. These people were accustomed to supplement their stores of grain with jungle roots and fruits, especially the mango and Mohua. The first season of 1896 was not good and that of 1897 was a failure; the absence of rain reduced the supply of tubers while adding to the difficulty of digging them. Relief was consequently necessary, but there was some difficulty in administering to such rude people; for they refused to sleep out of their villages in the hills or to submit to the discipline required on famine relief works”.

¹¹ Verrier Elwin (1964). The Tribal World of Verrier Elwin, an autobiography. Oxford University Press. Pp. 124-5

¹² Nityananda Patnaik (2005). Primitive Tribes of Orissa and their Development Strategies. DK Print World Pvt Ltd.

¹³ Report of the Fa-97, Vol.1, p.38



In Ganjam, these Adivasi people were set to the clearance of jungle roots for a moderate remuneration. And, with the fall of rains, jungle roots and fruits became again available and the condition of the people rapidly improved and relief was discontinued.

In contrast to the descriptions provided about the distress of “ryots” and the “coolies” or landless rural labour, this description of what the hill/forest communities went through during a severe famine is indeed a great contrast. It appears that the availability of uncultivated foods even during this period is what ameliorated the situation for these communities.

20th Century Gazetteers do have references to uncultivated foods and some of it is reproduced here below, in the context of the two districts that have been chosen for this study (Rayagada and Sundargarh). One of the 1910-published Bengal Gazetteers is specifically on Feudatory States of Odisha, including Gangpur which is modern-day Sundargarh. This was when only 5 towns existed amongst these 24 states (like Athgarh, Baud, Daspalla, Dhenkanal, Kalahandi, Keonjhar, Khandpara, Mayurbhanj, Nayagarh, Patna, Rairakhol, Talcher etc.), when the population density per square mile was just 113 person and when the literacy rate was just 2.7% in the total population. The Chapter on Agriculture describes dahi or jhum cultivation in detail in addition to jami or plough cultivation in the lowlands (description includes the fact that cultivation sites after two or three seasons are abandoned long enough until covered with jungle again usually, this is eight to ten years of rest period, and the expertise shown in skilful terracing and construction of tanks/bandhs for irrigation). In addition to description of rice, cereals, pulses, oilseeds, sugarcane, wheat, cotton, tobacco, turmeric and vegetables, there is a mention of edible roots.

“The forests produce various edible roots, such as the kanda (large yam) and tikhuri (arrow root) the latter is prepared by placing the root in earthen jars with water and then boiling: the aborigines largely subsist on these products”¹⁴. This Gazetteer also asserts that disastrous and widespread famine has been unknown in the state of Odisha.

In the chapter on Natural Calamities, the abundance in the villages and forests of mango, jack, mahua, char and kendutrees that yield favorite articles of food with the people is noted. *“The jungles produce many kinds of edible roots and tubers. The population is very largely composed of indigenous races, who regularly subsist, when short of rice or mandia, on the jungle products and the spoils of the chase. During the season when sal is in flower, the Kols practically eat nothing else, and this, they do from choice. The Kol, Bhuiya and Khond will frequently not take the trouble to cultivate, even though he can readily do so, enough rice or mandia to supply the needs of himself and his family throughout the year”*, this chapter mentions. It is apparent that the scarcity or famine did not descend on these communities because of the wild foods that they had access to.

Coming specifically to Gangpur state, of which Sundargarh was the capital, it is described that the condition of the cultivators on the whole is prosperous, even as the Gazetteer says that *“the substitution of inferior crops for superior ones has not taken place to any appreciable extent; the inferior cereals are grown in Gangpur as in other states not because they are preferred to the better kinds, but because they are harvested at convenient seasons, are supposed to give less difficulty to cultivate by the ignorant aboriginal tribes who are strongly conservative and adverse to any change”*. The advent of railways is reported to have brought in ready markets for surplus stocks and forest products. *“The pinch of severe distress is almost unknown: the better classes have ample stocks and the aboriginals and landless classes live, at most times, to a very large extent, on the products*

¹⁴ L. E. B. Coben-Ramsay (1910): Feudatory States of Orissa. Bengal Gazetteers, Bengal Secretariat Book Depot, Calcutta



of the forests. the landless field labourer obtains sufficiently good remuneration in kind from the farmer and prefers irregular labour eked out by the spoil of the chase or the numerous edible products of the jungle to regular hours and good cash wages”.

A section on Forest (pp.186-7) makes note of the severe destruction of forests for timber, and that a policy of forest reservation is being put into place with a trained forester in charge. It specifically mentions the following twenty-nine plants as “being the most important” forest products:

- | | | |
|----------------------|------------------------------|--------------------|
| 1. Kantalu | 13. Simali Kanda | 25. Keo Kanda |
| 2. Khaukonda | 14. Palsa Kanda | 26. Saigaa |
| 3. Tasaardua | 15. Khamal Kanda | 27. Keshri Kanda |
| 4. Basra or Pitalu | 16. Masia or Gharbasia | 28. Singraa |
| 5. Kundukanda | 17. Chhelchuchi | 29. Saaluk or Vent |
| 6. Kulhia | 18. Saaru | |
| 7. Cherenga | 19. Barhaalendi Saaru | |
| 8. Irbai or Nakwa | 20. Laamgadi Saaru or Pepchi | |
| 9. Nagalia or Chikta | 21. Sankh Saaru | |
| 10. Sanlanga | 22. Tamaa Saaru | |
| 11. Buti | 23. Kandmul or Sakarkand | |
| 12. Barha Kanda | 24. Gacchh Kandmool | |

The list includes a number of species that yield edible fruits and tubers.

Until Independence, the district of Rayagada was one of the four natural geographical sub-divisions of Koraput, consisting of three taluks of Bissamcuttack, Rayagada and Gunupur. The 1945 *Gazetteer* has the following somewhat poetic description of the terrain¹⁵. “The hills are green with forest....and the valleys are undulating, part woodland, part green fields. Among the latter, tamarind, mohwa and other trees stand up singly or in groups and give the country almost the appearance of a huge park, and through them shows up now and again the glint of some broad reach of one of the perennial rivers”.

The tree species occurring in the valleys and hill ranges of Rayagada, as per the *Gazetteer*, include a number of trees and shrubs that yield edible products: *Sal (Shorea robusta)*, *Madhuca latifolia*, *Dillenia pentagyna*, *Dillenia indica*, *Phyllanthus emblica*, *Buchanania latifolia*, *Bauhinia retusa*, *Artocarpus lakoocha*, *Cedrela toona*, wild banana, *Cycas circinalis*, *Coffea bengalensis*, *Wendlandia tinctoria*, and bamboos like *Dendrocalamus strictus* and *Bambusa arundinacea*. As in the *Gazetteer* for Sundargarh and other areas, this *Gazetteer* of 1945 reports that “there has never been a serious failure of the rains, and the district (Koraput) has been completely free from famine throughout its history”. (pp. 19, *ibid*).

This report records an essential characteristic of many tribes in the area: “the Hillman cares little for his individual rights and cannot conceive existence outside the tribe to which he belongs. He has no urge to acquire property, to add field to field or to lay by a store of grain against a year of want. For generations he has been accustomed to do only the minimum of work that will bring him in food sufficient for the day. He has lived in a comparatively rich and sparsely populated country and has been used to extract ample yields from the land by means of the sketchiest sort of cultivation”.

¹⁵ R C S Bell (1945): Koraput, Orissa District \Gazetteers, Orissa Governemnt Press, Cuttack, 1945



There is some description of the forest law that was enacted at the turn of the century, that defined reserved forest, protected land (where shifting cultivation is prohibited) and unreserved land. In the Unreserved Lands, villagers were allowed to graze and remove forest produce for their domestic needs without payment. 24 species of trees were declared to be 'reserved' and 4 species 'prohibited'. 43 tribes of the district were given the status of 'privilege holders' for certain concessions (like felling trees below two feet in girth for their domestic needs provided they obtain specific permission beforehand etc.). A system of fees and cesses on forest products and activities (like grazing or fishing) was brought in. The yearly revenue was estimated at four lakh rupees in that year (with timber mainly for railway sleepers fetching 1.85 lakh rupees and Minor Forest Produce fetching 75,000 rupees). Amongst MFP, myrobalans, tamarind and lac were listed as the main items.

Moving forward, the 1966 District Gazetteer of Koraput describes the occupations, economic activities and food and drink of tribes of the district. Turmeric and Tobacco are listed as important crops for the Khonds, while myrobalan, tassar, silk cocoons and dammar are listed as products of the jungle used for bartering against salt. Honey is also collected, in addition to pursuit of game. The importance of palm tree wine in the lives of Saoras is noted, irrespective of age or sex. Meat, crabs, fish, roots, bamboo shoots, field rats, red ants, mushrooms are all mentioned and it is noted that Saoras have no idea of frying. The importance of mango, tamarind, jackfruit, roots and tubers, wild vegetables, bamboo shoots and mushrooms for other tribes like Bondas (who were reported to mainly depend on agriculture) is described. The fondness for red ants, date palm grubs and carrion is reported. Arrack distilled from Mohua flower, palmyra palms, sago-palm or Solap tree (*Caryota urens*) in addition to beer from cereals like rice, sama and ragi are recorded to be favorite drinks of the people in the district.

Recent studies

In the recent past, there appears to be an increased interest amongst academicians of various subjects in the matter of wild edible foods, or uncultivated foods. There have been studies in Sahel, Senegal, Nigeria etc. to assess the dietary contribution from wild foods to traditional food consumption patterns in 12 indigenous communities from different countries. Overall, these studies indicate a range from 30% to 93% of total dietary energy accrued from wild food biota¹⁶. Many international agencies and universities have dwelled on the contribution of wild plant species to human health and nutrition.

Within India, a majority of studies of uncultivated foods have largely focused on the taxonomic inventorying and nutritional contents of the flora gathered and consumed by different communities. Thus, a wide spectrum of wild edible plants in the eastern States have been reported in various studies in West Bengal, Sikkim and Odisha. A review of the importance of tropical forest as a food resource for the rural communities surmises that it is estimated that 80% of forest dwellers in Bihar, Odisha, Madhya Pradesh, West Bengal and Himachal Pradesh depend on forest for 25 to 50% of their annual food requirements¹⁷.

In Eastern India, some amount of research was specifically undertaken by two institutes: Birsa Agricultural University in Jharkhand (Directorate of Extension Education) and Regional Plant Resource Center in Bhubaneswar. The latter has published a book entitled *Wild Edible Fruit Plants of Eastern India* with color photographs of 150 wild plants plants, and their fruits and flowers¹⁸.

These wild fruits not only provide food but contribute to the quality of eating nutrients, notably vitamins and various forms of carbohydrates

¹⁶ Kuhnlein H, Erasmus B, Spigelski D (2009) : Indigenous people's food systems. FAO, Rome. Centre for Indigenous People's Nutrition and Environment

¹⁷ D N Tiwari (1994): *Tropical Forest Produce*, International Book Distributors, Dehradun. Pp.87.

¹⁸ Ajay K Mahapatra and Pratap C Panda (2009): *Wild Edible Fruit Plants of Eastern India*, Regional Plant Resource Centre, Bhubaneswar.C S



A study of edible wild plants from Darjeeling hill region of West Bengal confined itself to taxonomic identity of the edible plants, and the different edible parts of each plant¹⁹. A recent inventory of Cooch Behar district of West Bengal reveals that the conspectus of edible wild food plants include 2 Pteridophytes, 98 dicotyledonous and 25 monocotyledonous plants, mostly consumed by the Coch, the Kheria, the Oraon, the Rabha and the Santal communities²⁰.

A different segment of research has focused on the nutritional contents of different uncultivated food plants, for example, a study on wild edible flora inventoried in Midnapur district of West Bengal²¹ and in the State of Sikkim²². These studies conducted laboratory analyses of each kind of food, and reported their contents of protein, carbohydrates, lipids and different vitamins per unit quantity. A study by the Regional Plant Resource Center in Bhubaneswar on nutrient analysis of some wild edible fruits showed significance of wild fruit species as important source of nutrients for rural poor²³. The nutritional value of many wild fruits compared well with domesticated popular fruits.

One of the most comprehensive documentations of wild and undomesticated plants and animals for food in eastern India was published in the Proceedings of the SANFEC Conference on Uncultivated Foods, held in 1999. This study made the first comprehensive inventory of wild and uncultivated food from both plants and animals, in the entire State of West Bengal, consumed by all the ethnic groups in the State²⁴. This study included wild plants and undomesticated animals from forests as well as wetlands and farm hedges; identified the edible parts of each of the 317 edible plants and 75 wild animals; indicated the diversity of cultural preferences of different edible species among different communities; and highlighted the importance of undomesticated flora and fauna as a strategy of indigenous societies to ensure food availability in times of scarcity.

Inventorying edible uncultivated greens collected from farmlands and other areas in certain districts of Andhra Pradesh was an area of research interest for Deccan Development Society²⁵.

However, the literature review shows that virtually no study has estimated the quantity of consumption of the uncultivated food biota neither plant nor animal in any State or community. The only research that we have come across which attempts to quantify the consumption of uncultivated foods is from Karnataka, by ATREE (Ashoka Trust for Research in Ecology and the Environment)²⁶. ATREE began looking at the role of these wild edible plants in the context of looking at the role of forests in the lives and livelihoods of forest dwelling communities. Their main findings are presented below:

The present study inventories 92 wild plants, belonging to 68 genera, spread across 38 families. These include leaves, fruits and tubers. Plants from the Amaranthus, Cleome, Solanum and Dioscoria genera: annesoppu (Celosia argentea L.), kaddisoppu (Jasminum pubescens Willd.), sundekai (Solanum species), sodlihanu

¹⁹ R.B. Bhujel, KK Tamang and G S Yonzone (1984): Edible wild plants of Darjeeling district. J. Bengal Nat. Hist. Soc. 3: 76-83.

²⁰ S. Bandyopadhyay and Sobhan K Mukherjee (2009): Wild edible plants of Koch Behar district, West Bengal. Natural Product Radiance 8: 64-72

²¹ D. Das (1999): Wild food plants of Midnapore district, West Bengal, during drought and flood. J. Econ. Taxon. Botany 23: 539-547.

²² Manju Sundriyal and R. C. Sundriyal (2001): Wild edible plants of the Sikkim Himalaya: nutritive values of selected species. Economic Botany 55 (3): 377-390.

²³ Ajay Kumar Mahapatra, Satarupa Mishra, Uday C Basak and Pratap C Panda (2012): Nutrient analysis of some wild edible fruits of deciduous forests of India an explorative study towards non conventional bio-nutrition. Advance Journal of Food Science and Technology 4(1): 15-21, 2012

²⁴ Debal Deb (1999): Wild and uncultivated plants and animals as food resource: the Bengal paradigm. Pp. 18-19 & 109-113. In: SANFEC Proceedings of South Asian Workshop on Uncultivated Food and Plants. 2-4 OCT 1999. Bishnupur, Bangladesh.

²⁵ ddsindia.com/www/unculti.htm accessed on April 29, 2014

²⁶ <http://www.atree.org/node/881> accessed on December 14, 2013



(Scutia myrtina (N. Burman) Kurz, J.), murkihannu (Buchanania lanzan Sprengel, J.) and noregenasu (Dioscorea pentaphylla L.) are particularly popular. These plants are collected from surrounding areas of natural forest, farm lands (where farmers often classify these plants as weeds), fallow lands, grazing lands, roadsides and backyards. A household typically uses 12 to 130 kg of wild plants in its diet per annum, using as many as 25 species collected from the wild per household. Graziers, away from home for the entire day, used to live off the land, on wild edible plants only.

ATREE's research also showed that less intensively cultivated areas harbor more wild edible species; usage is also higher in these areas.

Furthermore, preferences for species vary; collection behaviour favors proximate availability. The relative importance of wild edible species was higher for poorer households than the richer ones. More wild edibles are consumed in times of agriculture production decline. Knowledge about wild edibles varies with gender, age and social status. A decline in the use of edible plants has been reported, mainly because of moving away from land-based livelihoods. PDS and NREGS are reported to be reasons for people spending lesser time in gathering wild foods.

"Changes in agricultural and land use policy, infrastructure development and better access to markets has been a driver of land use change in this region. Shift to market driven commercial crops (maize, tapioca, sunflower etc.) has significantly affected wild edible plants' diversity, availability and use".

The ATREE study concludes that wild edible plant use is more like a living link with the surrounding habitat and a keystone of culture, and not just food and income. *"Therefore, the decline of traditional ways of life and decreased use of wild edible plants are interlinked".* ATREE's work also shows that while WEPs do not bridge the existing gaps in nutrition, without them, this gap would be much wider. It appears that the ATREE project also documented recipes for cooking of the wild edible plants, in addition to plant use and availability status including 'threat status'.

The only available publication on cultivated foods in the State of Odisha is a paper on wild tribal food plants of Odisha, which describes edible leaves from 50 plants, fruits from 46 plants, flowers from 11 species, 14 species of tubers and 5 types of gums consumed by five Adivasi communities (Gond, Sounti, Bhumiz, Kol and Juang) who participated in the study from the districts of Keonjhar, Mayurbhanj and Dhenkanal²⁷. This study recorded that edible leaves of wild flora are mostly consumed in the rainy season; wild fruits are available in different seasons. Most variety of wild flowers were available in summer. Amongst the seeds identified in the study, several are available during summer and they also have a high market value. Tubers are reported to be consumed largely during the lean months.

A 2006 report by Center for International Forestry Research (CIFOR) examines various aspects related to the issue including forest foods and nutrition, forests as food-producing habitats, nutritional status of hunter gatherers, intra-household food distribution, food related health risks, seasonality, the role of culture, etc, with its primary focus being the linkages between forests and human health.²⁸ Pointing out that a good diet requires food availability, reasonable access, diversity, hygiene and appropriate processing, the document points out that any discussion of nutritional significance of forest products has to confront a variety of complexities

²⁷ Rekha Sinha and Valeria Lakra (2005): Wild tribal food plants of Orissa. Indian Journal of Traditional Knowledge, Vol. 4(3), pp. 246-252

²⁸ Carol J Pierce Colfer, Douglas Sheil, Misa Kishi (2006): Forests and Human Health: Assessing the Evidence. CIFOR Occasional Paper No. 45, Center for International Forestry Research, Jakarta



(overall composition of diet for instance). Evidence from micro-studies presented from different parts of the world shows that the picture is mixed, and unclear when it comes to the nutrition potential of forest foods. However, the micro-studies cited in this work indicate the important role of the forest as a source of food during times of stress. Forest foods also serve as supplements to agricultural staples, and increase dietary diversity. Finally, it reports that not enough knowledge has been generated on the nutritional properties of forest foods so far.

The use of biodiversity for food and nutrition requires accurate, reliable and accessible food composition data, and that it is essential for users of such data to be certain of the reliability of identification and naming of food plants which is particularly problematic for lesser-known wild or locally cultivated plants²⁹. The great challenge of losing local knowledge along with erosion of resources and the concerns in the context of healthcare is also widely acknowledged. ***“In the face of economic and environmental changes, increased simplification of the diets of large numbers of people to a limited number of high-energy foods presents unprecedented obstacles to health. Cultural knowledge of the properties of plants erodes at the same time. Conservation of biodiversity and the knowledge of its use, therefore, preserves adaptive lessons for the past and provides the necessary resources for present and future health”***³⁰.

A review of the role of wild foods in agrarian societies suggests that there is a false dichotomy around ideas of the agricultural and the wild: hunter-gatherers and foragers farm and manage their environments just as cultivators use many wild plants and animals³¹. Agricultural and forager communities in 22 countries of Asia and Africa uses about 90-100 species per location, with an aggregate country estimate of 300-800 species, based on estimations from India, Ethiopia and Kenya. The study points out that provision of and access to these sources of food may be declining as natural habitats come under increasing pressure from 'development', conservation-exclusions and agricultural expansion. These foods are excluded from official statistics on economic values of natural resources too. ***“It is clear that wild plants and animals continue to form a significant proportion of the global food basket, and while a variety of social and ecological drivers are acting to reduce wild food use, their importance may be set to grow as pressures on agricultural productivity increase”***.

On the nutrition security front from such wild foods, the FAO acknowledges that the traditional food systems of indigenous people contain a wealth of micro-nutrients that have been poorly described and reported in scientific literature. This lack of scientific coverage prevents the information from being included in health training programmes and public health promotion programmes; traditional knowledge and diverse food resources of indigenous peoples ought to be used to improve their own nutritional status³².

A recent study in Odisha finds that Adivasi women of Odisha process and cook nutritious foods from wild plants, pulses, and cereals, which are likely to be **calorie-limited than similar food plants** cultivated conventionally³³. This study suggested that a systematic documentation, characterization, refinement, validation and value addition of traditional foods are needed, to be interlinked with government policies, education and research systems for providing scientific and technical base for traditional foods.

²⁹ <http://www.kew.org/science/ecbot/papers/Linkingbiodiversityfoodandnutrition.pdf>, Accessed on 26.04.2014

³⁰ <http://archive.unu.edu/env/plec/cbd/Montreal/papers/Johns.pdf>

³¹ Bharucha, Zareen and Pretty, Jules (2010): The roles and values of wild foods in agricultural systems. Phil. Trans R Soc. Lond. B 365: 1554- ??

³² <http://www.fao.org/docrep/005/y8346m/y8346m05.htm>

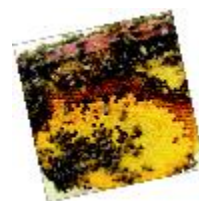
³³ Mishra, Sunita and Pradhan, Sarojini (2011): Traditionally and culturally indispensable food consumed by adivasi women of Kalahandi and Koraput districts of Odisha: a descriptive study. Int. J Sci. Emerging Tech. Vol.1, No.1.



It also appears that the civil society has also largely ignored the nutritional importance of wild foods. While all of this is, literature on importance accorded by the external world to forest foods, it has also been recorded in studies on the subject that it is often access, rather than availability, that limits the harvesting and use of wild and forest foods. One important constraint is the free time required to collect such foods, mediated by travel time to reach the harvesting site and efficiency of harvesting (Kuhnlein and Receveur 1996).

In Summary:

- The quantitative role of wild and uncultivated foods in food security of forest-dependent people is an area that is under-studied, and deserves intensive study. There is paucity of published data pertaining to uncultivated foods of the Adivasi communities of Odisha. There was nothing that the team could access in terms of quantities of such foods accessed and consumed, to use it as a reference for capturing trends. However, studies from elsewhere indicate upto 50% dependence on forest foods for food security of forest-dependent communities.
- Anthropological accounts by people like Elwin showcase a great diversity of uncultivated foods, and the numerous ways of cooking and consuming the same.
- The mainstream food economy mostly considers the consumption of wild and uncultivated foods as a sign of economic and cultural 'backwardness'. Others (mostly civil society groups) who have looked at NTFP have looked at it in a narrow interpretation of "livelihoods" and mainly in the context of marketable commodities from the forests, but missed focus on its contribution to food security. In the civil society discourse, the livelihoods approach does not encompass comprehensive health, food and nutrition security.
- Foods from the wild are critical, especially in times of stress; historical references show that these foods have served as key to people's survival and subsistence especially in periods of food scarcity.
- Uncultivated foods are mostly nutritious, while some might contain some anti-nutritional ingredients as well, such as anti-vitamins; however, the overall nutritional status of the community members will depend on overall diets.
- The variety of, and ease of access to, wild foods is reasonably high in indigenous societies living close to forests, but rapidly depleting in the recent past owing to changed mode of land use.
- The cultural linkages between communities, forests and their food are critical, yet often ignored by state policy and civil society discourse on forest resource use.
- There are inter-regional, inter-household, intra-household and seasonal variations that should be taken into account while looking at uncultivated foods.





2. Study Team, Site Selection and Field Methods

The methodology of the study included literature review, selection of appropriate field sites based on a combination of forest cover and proportion of Adivasi population in the districts and availability of local voluntary organizations willing to participate in the study and conducting the field survey and subsequent data analysis. A preliminary workshop was completed to share the results of the study among the researchers and arrive at a common understanding of data generated.

2.1 The Study Team

Living Farms is a non-governmental organization working with landless and smallholder farmers and consumers in Odisha to improve food and nutrition security, food safety and to uphold food sovereignty. Sustainable agriculture and natural resource management are the key strategies of the organization in its work.

Its work with an Adivasi group, the Dongria Kondhs in the Niyamgiri hill range of southern Odisha, in trying to understand their food systems - brought it in touch with the peaceful and sustainable lives and livelihoods of this community. Here, Living Farms got to witness the food and dietary habits, communitarian ethos and beliefs of this tribe. It was apparent that forest foods were providing a rich and critical supplement to the cultivated-food diets of the communities (which consist of millets grown with pulses, oilseeds, vegetables and other crops).

However, the whole area of uncultivated foods or wild edible foods is an unknown and new area for Living Farms. As it began exploring the issue further, they realized that this area of research is largely under-explored. The organization also understood that rapid changes have been taking place with regard to the availability as well as the pattern of consumption of wildfoods even within the indigenous communities like the Dongria Kondh.

There were many questions that arose in the course of this study: how important is it to protect this tradition of uncultivated foods what are the positive and negative, if any, aspects of such foods? What is the extent of dependence of communities on such foods? Is there enough documented knowledge about these foods? Are the current land use policies and food security policies appreciative of the situation/tradition with regard to such foods? If this dependence on uncultivated foods has to be met in some ways, and sustainability ensured, what needs to be done and who will do what?

A variety of factors are at play here, and to find some limited answers to some of the questions above, Living Farms chose to initiate a study with the following objectives:

- **To assess the current (and past, wherever possible) situation with regard to uncultivated forest foods in terms of diversity, seasonality, collection and consumption**
- **To understand the various factors that appear to be impinging upon the availability and consumption of uncultivated forest foods**
- **To come up with a better understanding on what needs to be addressed now and how, in the context of uncultivated foods and food sovereignty of Adivasi communities.**

A team of four persons were brought together to study the issue further. The team consists of:

- (i) Dr Debal Deb: An ecologist, author, seed conservator who has published widely on forest ecology and management.
- (ii) Dr V Rukmini Rao: a development professional and social activist associated with numerous organizations in Odisha and elsewhere, who has intervened in the area of sustainable livelihoods, including in the context of forest-dependent communities for more than two decades now



(iii) Ms Salome Yesudas: Trained in nutrition science, has been part of the ICAR-KVK (Indian Council for Agricultural Research-Krishi Vigyan Kendra) system for many years, with Deccan Development Society, and published papers on uncultivated foods in the semi-arid Deccan region

(iv) Ms Kavitha Kuruganti: Trained as a Development Communicator, is a farmers' rights activist and campaigner on sustainable agriculture and food rights

It was felt that this combination of technical expertise along with policy analysis would be able to meet the objectives for the study.

2.2 Study Site and Sampling of Households

2.2.1 Selection of Sites

The study team chose the districts first, based on proportion of adivasi population, as analysed at the state level, district-wise. This was sought to be matched with proportion of forest cover. Two such districts, Rayagada and Sundargarh, with high proportion of both forest cover and adivasi population were chosen on this basis. This decision was also partially influenced by the fact that in terms of trends, one district shows a decrease in forest cover while another shows an increase (at least on paper). At the next level, 3 blocks each for both Rayagada and Sundargarh districts were chosen based on the same rationale.

At the state level, 22.85% percent of Odisha's total population is classified as ST (belonging to Scheduled Tribes), as per Census 2011. Out of this, in rural Odisha, the proportion of STs is 25.72% and in urban Odisha, it is just 8.51%.

The top-five districts which have high proportion of rural Adivasi population is given below, based on Census 2011 data:

Table 1: Districts with high proportion of Adivasi Population in 2011

District	Total Rural Households	Total Rural Population	Rural ST Population	%age of Rural ST Population
Sundargarh	312497	1355340	908475	67.03%
Rayagada	191568	820945	522208	63.61%
Mayurbhanj	542726	2326842	1439002	61.84%
Malkangiri	126225	563664	346465	61.47%
Gajapati	112365	507151	308867	60.90%

Nabarangpur, Koraput and Kandhamal follow these five districts in terms of proportion of ST population in the rural population.

Based on the table above, Sundargarh and Rayagada were chosen as the two study districts. Additionally, we also ensured that these districts have adequate forest cover for the study to be meaningful. When it comes to forest cover in 2009 and 2011, as per the India State of Forest Report 2011, the following are the top five districts in Odisha.

Table 2: District Forest Cover in 2011

District	Geographical Area in Sq. Kilometers	Forest Area in Sq. Kilometers	Percentage forest area
Khandamal	8021	5469	68.18%
Gajapati	4325	2487	57.50%
Sambalpur	6657	3309	49.71%
Deogarh	2940	1341	45.61%
Rayagada	7073	3116	44.05%



Nayagarh, Angul and Sundargarh districts follow closely behind these five districts in terms of their forest cover. Compared to the 2009 assessment, these districts have shown changes in their forest cover as follows: Khandamal 15% decline (by 2011, compared to 2009); Gajapati 2% increase; Sambalpur 2% increase; Deogarh no change; Rayagada 10% decline; Nayagarh 1% decline; Angul 2% decline; Sundargarh 11% decline. The chosen districts, therefore, also present a decline in forest cover in the recent past.

Within Rayagada district, the following was the block level proportion of adivasi population within the total population, based on which Gudari, Gunupur and Rayagada blocks were chosen for the field study:

- | | |
|--------------------------|----------------------------|
| 1. Bissamcuttack 63.7%; | 7. Kolanara 72.5%; |
| 2. Chandrapur 67.5%; | 8. Muniguda 40.6%; |
| 3. Gudari 75.8%; | 9. Padmapur 54.4%; |
| 4. Gunupur 84.6%; | 10. Ramanaguda 67.9%; |
| 5. Kalyansinghpur 64.9%; | 11. Rayagada 75.7%. |
| 6. Kashipur 66.6%; | |

Within Sundargarh district, the following was the block level proportion of adivasi population within the total population:

- | | |
|----------------------------|------------------------------|
| 1. Balisankara 66.6%; | 10. Lahunipara 65.3%; |
| 2. Bargaon 62.9%; | 11. Lathikata 77%; |
| 3. Bisra 54.5%; | 12. Lephripara 57.3%; |
| 4. Boneigarh 53.9%; | 13. Nuagaon 64.9%; |
| 5. Gurundia 80.2%; | 14. Rajgangpur 84.2%; |
| 6. Hemgir 46.3%; | 15. Sadar Sundargarh 51.5%; |
| 7. Koida 74.2%; | 16. Subdega 68.9%; |
| 8. Kuarmunda 77.9%; | 17. Tangarpali 50.9%. |
| 9. Kutra 76.6%; | |

The blocks selected were Gurundia, Kuarmunda and Rajgangpur. However, due to some logistical and security issues, Rajgangpur had to be replaced with Bisra later on.

The selection of villages was based on the rapport that chosen local NGOs had, in particular villages. One village per block was chosen, after NGOs were identified at the block level. Recce visits were taken up by two members of the study team going together, to ensure that a diversity of situations exists in the 3 villages to be studied (different Adivasi communities, different scenarios of the forest including dense forests, ones where commercial plantations have come in etc.) per district. In a process of rejection of study villages, ones that are close to towns were not included. The final selection of villages was based also on the consent of the community members, including the Sarpanches. The purpose of the study was explained in each of these villages and support and participation sought for the same. Once the villagers came forward, young enumerators were selected from the same villages for the daily weighment and survey work.

Prior to the initiation of the study, several villages were visited, some shortlisted and then, after seeking permission from the village heads and villagers by explaining the purpose and process of the study, study villages were finalised. Once the village was finalised, 1/3rd (34%) of the households were randomly selected to be included in the sample for the study. Field researchers were recruited from the same villages for data collection for all three methodologies adopted.



The following were the villages that were selected for the study after following the above process.

Table 3: Villages selected for the study in Rayagada and Sundargarh

District	Block	Gram Panchayat	Village
Rayagada	Rayagada	Matikona	Laxmipur
	Gudari	Madhuban	Andherilima
	Gunupur	Talana	Dengakul
Sundargarh	Bisra	Kapatmunda	Baskona = Birkera
	Lathikanta	Ramjodi	Ghettijharan
	Kuarmunda	Kaloshiria	Khadan Basti

Population profiles of the study villages

The table below provides population details of study villages.

Table 4: Population details of Sundargarh study villages

	Total HHs	Total Male	Total Female	Total Population
Khadan Basti	24	59	66	125
Baskona (Birkera)	37	91	96	187
Ghettijharan	59	144	144	288

Table 5: Population Details of Rayagada study Villages

	Total HHs	Total Male	Total Female	Total Population
Laxmipur	57	109	132	241
Andharalima	18	46	43	89
Dengakul	58	128	120	248

2.2.2 Sampling of Households

A cross-sectional design was adopted for the study, to record and analyse the collection and consumption of uncultivated foods by entire households by selecting a one-third sample population in the chosen study villages. Data was collected from the last week of July 2013, to December 31st 2013.

While we did not manage to enlist 34% of households in every village into our sample, across the six villages, our sample size adds up to one-third of the households in the habitations.

Table 6: Data collection with details of Study Households

District	Block	Gram Panchayat	Village	Total No. of HHs In	No. of HHs in sample habitation	Starting date for data collection
Rayagada	Rayagada	Matikona	Laxmipur	57	19	21 st Aug
	Gudari	Madhuban	Andherilima	18	11	25 th Jul
	Gunupur	Talana	Dengakul	58	12	25 th Jul
Sundargarh	Bisra	Kapatmunda	Baskona (Birkera)	37	19	29 th Jul
	Lathikanta	Ramjodi	Ghettijharan	59	12	29 th Jul
	Kuarmunda	Kaloshiria	Khadan Basti	24	12	29 th Jul
	TOTAL (6 habitations in 6 blocks of 2 districts)			253	85 (34%)	



2.3 Methods

A combination of methods was adopted for this study.

- (1) Literature review: as part of this, materials from Odisha State Library, Odisha State Archives, NKCCDS (Nabakrushna Choudhury Centre for Development Studies), RPRC (Regional Plant Resource Centre) libraries in Bhubaneswar were accessed, in addition to many published, and unpublished materials on the internet.
- (2) Interviews with various experts including retired bureaucrats, anthropologists, MFP traders, foresters, NGO workers, activists etc.
- (3) Field Survey: Detailed weighments with spring balances of uncultivated foods collected and consumed by sample households were recorded in the six study villages by dedicated enumerators appointed for a period of five months for this purpose. A more detailed account of the various tools employed here is given in the relevant chapter. This involved Direct Quantification of Food Items wherein all harvested food items were weighed in the field, using a spring balance, at after the harvest. Furthermore, the quantity of consumption of each food item was also determined by direct weighing of the items in the household.
- (4) Participatory Rural Appraisal: In five of the six study villages, group discussions centred around PRA exercises like mapping, matrix scoring, seasonality etc. were taken up to explore different aspects related to uncultivated foods and to assess dependence on them, factors affecting changes in availability and consumption etc.
- (5) Participant observation: Every day, our field assistants accompanied at least a team of villagers visiting the wild lands for collection of wild foods. The group composition, timings, frequency of harvest of each item, and quantity of the food harvested was recorded.

Overall, the effort was to understand the ground level situation better and make correlations, if any with macro issues like particular policies or approaches of the state.

2.3.1 Interviews

The following key people were interviewed in this study:

1. Dr Aurobindo Behera, retired senior bureaucrat of Government of Odisha (in Forest and Revenue departments) amongst others
2. Dr U C Basak, Plant Physiology and Biochemistry expert, Regional Plant Resource Centre, Bhubaneswar, who is studying the nutritional properties of wild edible fruits
3. Dr Balaram Sahu, Veterinary Science expert, Odisha University of Agriculture Technology; also with Honeybee Network, Odisha, who has documented extensively for years now, local traditions, knowledge and innovations
4. Dr Sricharan Behera, Action Aid India, working on forest policy and tribal rights issues
5. Shri Sudhir Patnaik, Journalist and social activist, Samadrushti, working on tribal rights issues
6. Dr Kundan Kumar, Founder, Vasundhara who has worked extensively on forestry issues, presently with the University of Toronto
7. Dr Felix Padel, Anthropologist, who has lived with various Adivasi communities including in Bissamcuttack
8. Shri Nityananda Rout, MFP trader, Bissamcuttack, who has been trading in MFP for more than 3 decades now.

Brief interactions with Dr P K Acharya, Dr Neelakantha Panigrahi and Prof Meher in NKCCDS, (Naba Krushna Choudhury Centre for Development Studies) Bhubaneshwar also helped.



2.3.2 Participatory Rural Appraisal

Several PRA (Participatory Rural Appraisal) exercises were undertaken in the study villages to understand the following:

- An estimate, as per the villager residents themselves, of their dependence on uncultivated foods (this is in the context of family size, occupation, landholding, type of cultivation and crops grown as well as whether a household has a PDS ration card or not) vis-à-vis other sources of food scoring to capture the trends over the years on this dependence
- A scoring matrix of various aspects pertaining to the most important uncultivated foods as per the community, men and women.
- A picture of the diversity and seasonality of availability of various uncultivated foods
- An understanding of the various factors impinging on the availability as well as consumption of uncultivated foods

As part of the PRA exercises and the ensuing discussions, there were discussions on the relationship with the forest department, with the markets as well as understanding coping mechanisms during periods of stress, information on FRA and its implementation, implementation of various food schemes of the government etc.

The following was the schedule for the PRA exercises undertaken as part of the study:

- Mapping of household level dependence in Laxmipur village (Rayagada district), 29th September 2013 (trends of change at the village level captured); in Ghettijharan village (Sundargarh district), 3rd November 2013
- Matrix scoring of important uncultivated foods in Andherilima village (Rayagada district), 1st October 2013; in Baskona village (Sundargarh district), 2nd November 2013
- Seasonal calendar of availability of uncultivated foods in Dengakul village, 2nd October 2013

For the weighed dietary records and food frequency questionnaires, a broad operational definition of Uncultivated Foods was used. This includes:

- Foods from land that is not cultivated such as forests or forest streams
- Foods that are not cultivated but are present in cultivated fields, as 'weeds', on bunds and hedges, commons etc.
- Greens that are available from cultivated plants, where the cultivation of these parts or products was not the explicit objective of such cultivation (the product of interest for the cultivation, especially the marketable commodity, could be different).

2.3.3 Quantification of Uncultivated food harvest/collection

Two enumerators per village, each day, were deployed to accompany groups of villagers (generally) into the forest, or wait for them at the point of return to the village, or sometimes, if needed, wait at a household, to weigh the collection of UCF by using a spring balance. The target for each day would be at least 4 households which were taking up UCF harvesting that day. This was designed keeping in mind that not every household had UCF harvested every day, and that often, several people would go together as a group. After the weighing was done, the field researchers would record the details, date-wise, and household-wise, in notebooks that were maintained for the purpose. Researchers were asked to ensure that they covered all households with regular periodicity. Given that the field researchers were employed from the study villages, they were able to stay in touch with the households to get information on whether some harvesting is being planned by some household or not in the coming days. Data was collected and recorded for several non-sample households too. But the findings that are being presented in this report are those that have been specifically drawn as readings recorded from the sample households, item-wise as per collection.



2.3.4 Quantitative dietary records

Daily consumption of food items, including the uncultivated food items harvested from the wild, was quantified from the kitchens of the sample households. All the ingredients that went into meals of the household of that day were weighed. For each household in the sample where such readings were collected, item-wise weights of what is going into the cooking on the chosen day were recorded, which included uncultivated foods as well as other foods. This is treated as the household's consumption of food for the day. While this is treated so, this clearly is under-reporting since the readings did not record ready-to-eat foods, or raw foods consumed directly like wild edible fruits or children consuming meals through Mid Day Meals in schools or ICDS meals in anganwadis. This method is considered to be one of the most accurate albeit intrusive methods for data collection regarding food consumption in a given household. It is well-appreciated that raw foods which are eaten outside these meals also constitute food consumption of the household, and might be left out of this method.

Orientation and further on-the-job capacity building was taken up for all field researchers on data collection.

2.4 Limitations of the Study

There are some limitations to this study, which prohibit generalization of at least a few of our conclusions made here in.

1. One of the major problems was the inability to get official data on forest cover, and landholding details for the study villages and sample households.
2. The study team did not have all fields of expertise included for instance, anthropologists. Even this initial exploration might have been enriched by the inclusion of other streams of experience and expertise. On the other hand, the study was not equipped to cover all aspects in one go.
3. The study could only glean an overall picture of the situation with regard to uncultivated foods in the study villages, whereas there are so many aspects to look deeper into - apparently, an occasional visit to the village to hold group discussions and interviews was not going to suffice, nor data collection through enumerators to be analysed elsewhere. A more in-depth study is best undertaken by local grassroots organizations.
4. The selection of the study villages was opportunistic to a certain extent it depended on resources, identification of partner organizations, ability to carry out the study etc. How far can general inferences be made on the situation from undertaking the study in these six villages is unclear as yet.
5. Language was a serious constraint even during the group discussions and PRAs. In some places, it was a 2-level translation for external team members who were non-odiya speaking, and the Odiya team members who were non-kui or non-sadari speaking. Even in this report, some terms have been reported back as they were used by the participants and the authors have not been able to put in full efforts to find the botanical names for every term.
6. While the monsoon season was covered to an extent in the study, the hunger season was not fully covered as part of this 6-month effort. Therefore, it is unclear if findings can be extrapolated for the whole year as they are.
7. Because of the fact that there was no baseline information on the variety or quantum of uncultivated foods that people accessed and consumed, trends in the same could not be captured in this study. The data collected in this study can be used as a baseline for the future.
8. Some of the methodologies chosen for the study need to be developed further, to arrive at a more accurate picture with regard to forest foods access and dependency. For instance, frequency of forest foods collection by each sample household was not recorded and this necessitated extrapolation of per-day, per household findings from the study.



3. Results : Field Estimation of the Importance of Uncultivated Foods

3.1 Findings from Participatory Rural Appraisal

In this chapter, we present the main findings from each village, followed by a summary of findings across villages.

3.1.1 Laxmipur Village

Laxmipur village is in Rayagada block of the district with 57 households in all and a total population of 241 persons (109 male and 132 female). SCs are 66 in number with 168 others in the village being STs, as per 2011 Census. In the PRA exercise, 64 households were listed (independent hearths), with 262 population.

The PRA was done, in the presence of the Sarpanch of the village, at one end of the street that separates two rows of housing of the STs in the village on a heavy overcast day (with the rain pouring down soon after we closed the mapping exercise) therefore, rather than a census estimate of dependence on forest produce, we took up a completely random sample of the households.

Households ranged from single-person households (4 such HHs) to ones which had 10 persons (2 such households). 30 of the households exhibited nuclear family characteristics of just 3-4 persons each.

Main points that emerged were:

Most households have at least half an acre of hill land, if not more. It is mostly millets and pulses that are grown here. The ownership of lowland was quite low, with 13 households reporting such land. This ranged from 10 cents to 3 acres in extent.

11 households did not have any kind of ration card while 3 households had contingency/temporary ration cards. It was worth noting that the Sarpanch himself did not have a ration card. 6 ST households and 5 SC households did not have a ration card.

Dependence on uncultivated foods: 33 households came forward to estimate on a score of 1-10 (ten stones kept in the participant's hand, with an explanation that we would like to know how much of the food that they consume is uncultivated/from the forests, vis-à-vis other sources like farming (dongar land as well as low land), purchased food from the market and the PDS). Out of them, 18 indicated that as per their estimate, 40% of their food is from uncultivated sources. Another 9 households indicated 50% dependence, followed by 4 indicating a 30% dependence, on forest foods. One household, where one of the income sources was driving of a jeep, put it at 20% and another household, where no land or PDS card exists, put it at 60%. We understood that dependence on uncultivated foods was mainly dependent on the availability of other sources: like food grown on own land, or PDS ration card supplies or ability to purchase food because of employment opportunities or income opportunities from other sources. The researchers, even as they explained to the participant that this was about quantity of food from forest sources, and not just diversity, found that in at least two cases, there was confusion in understanding the assessment process itself, and the scoring happened on the basis of diversity. Despite this confusion, it is apparent that the overall dependence in this village has to be understood in the context of availability (or lack of it) of private agricultural land, lack of full PDS coverage etc.

In all households accessing PDS food, it is reported the ration lasts for only 7 to 10 days of the month and that for the requirements of the rest of the month, it is a combination of food produced on their own lands and purchased, in addition to forest foods. The villagers said, "by giving BPL card to us, they have taken away forest from us".



While this was at the household level, at the village level, it was reported that the overall consumption has been coming down. The reasons attributed include the fact that availability of wild foods itself is coming down due to destruction of the forest. This, in turn, is because of the plantations by the forest department, according to the participants. In Laxmipur, teak, pongamia, eucalyptus, chakunda, bamboo and “some flower trees” have been planted by the department. The villagers report that they have no information on the extent because the department employs labourers from outside the village for this work. As a rough estimate, the men believed that 40% of the land around the village has gone under plantations by the forest department, while 20% is used by the villagers for podu cultivation and 40% is still pristine and thick forest. The women also reported 20% podu, but felt that the forest department's plantations are on 50% with dense, diverse forests being only on 30% land.

The bigger hill called Kadaganda is still covered with dense forest the reasons cited are that, the distance is more from the village and therefore, villagers also don't disturb the forest here. The height is also more and steep. Further no podu cultivation is possible because of monkeys attacking the crop.

When asked, the villagers exhibited no knowledge of Forest Rights Act.

A small chapatti diagram was attempted to understand the decrease in the consumption of uncultivated foods, when compared to the situation thirty years ago. Villagers report only 30% of the quantity and diversity of wild foods that used to exist thirty years ago, as the present day's picture when it comes to forest foods.

3.1.2 Andherlima Village

This village is in Gudari block, with 18 households (arranged as two rows of houses with a wide mud road in between and total population of 89 persons, all of whom are STs (46 males and 43 females), as per 2011 census. During our visit, the number of households reported was 21, and all of them belonged to the Kondh community.

Here, villagers reported that cashew plantations occupy 20% of their original forest land, with another 20% going under agriculture, and 60% remaining under forest even here, teak, pongamia, eucalyptus and chakunda have been planted. “We are left with only 1/5th of the forest to grow our food it is far too less compared to our requirement; we had to therefore cultivate the forest land under the control of the department”.

The podu cultivation happens mostly on Bamandei hill. The podu system has degenerated into 3-year cultivation cycles followed by only 3-year cycles of leaving the land to regenerate.

Bhadi dongar has eucalyptus plantation. It is Lurnima hill which is bigger and has a denser forest. It is both the distance and the fear of the unknown that have kept the villagers and others away from this hill and its forest, we were told. The other dongars of this village are Muliputtu with its cashew plantation and Godgodiya (which has sisham/rosewood, sal, teak etc., planted by the department).

The diversity of crops in the podu cultivation used to be quite high and this has decreased now. In this small village, most households have ration cards. While 7 have BPL cards and 3 have Antyodaya cards, seven others have temporary ration cards and 4 have no cards.



Table 7: Andherilima Village men estimate their dependence on various sources of food:

Dongar cultivation	40%
Uncultivated foods from the forest	30%
Purchased food from bazaar	10%
Ration food from PDS shops	10%
Food cultivated on medium lands	10%

Table 8: Andherilima village women estimate their dependence on various sources of food

Dongar cultivation	50%
Uncultivated foods from the forest	30%
Purchased food from bazaar	10%
Ration food from PDS shops	10%

The villagers listed out many uncultivated foods that they obtain from the forests which can be broadly classified in the following categories:

- Fruits
- Green leafy foods
- Mushrooms
- Tubers
- Flowers
- Small animals including rabbits, tortoises, rodents (marna moosa, pattu moosa, nala moosa, goriyandi moosa, guyi moosa etc.)
- Fish and crabs

In this village, a matrix scoring exercise around the top ten important uncultivated foods was taken up along various parameters or aspects of such foods: time window of availability, quantity available, nutritional value (perceived), medicinal value (perceived), cultural significance, income or monetary value, criticality of a given food (in terms of survival and subsistence), storeability of a food after some processing, ease of access etc. The foods that were assessed include 1. Kanda (tubers), 2. Bamboo shoot, 3. Sago (greens), 4. Mahua, 5. Tamarind, 6. Mango, 7. Mushroom (that too, bamboo mushroom), 8. Honey, 9. Siyali phal and 10. Wild cashew. The table is reproduced below.





Table 9: Matrix score of 10 important uncultivated foods

	Roots/ Tubers	Bamboo shoot	Barada Saga	Mahua	Tamarind	Mango	Bamboo mushroom	Honey	Siali ruit	Wild cashew
Time Window of Availability	5 (entire year)	2 (Ashadh & Sravan)	1 (Vaisakh)	2 (Magha & Phagun)	2 (Magha & Phagun)	4 (all stages of fruit)	½ (<1) (only 1 week in Ashadh)	5 (Entire year)	2½ (Magh, Phagun, Chaitr)	2
Quantity	3	2	1	5	4	5	<1	1	<1	1
Nutrition	4	1.5	5	1	1	2	<1	<1	3	2
Medicinal use	-	-	-	2	2	2	-	5	2	3
Cultural value	-	-	-	5	3	3	-	-	-	-
Critical importance at times of hunger	5	½	2	4	1	4	<1	4	2	3
Income	Rs 20/ kg	Rs10/ kg	Rs5/ bundle	Rs 15/ kg	Rs25/kg	Rs12/kg	Don't sell	Rs200/ liter	1kg Siali=1kg rice	1kg Wild cashew =1kg rice
Who collects	Men & women	Men & women	Girls & women	Everyone	Men shake, women collect	Only fallen ones	Girls, mostly	Men	Women	Men
Preservation	1/2	4	1	4.5	4.5	4.5	2	4	5	1

*Score 5 high 1 low

Main findings are:

Time period of Availability: out of the foods chosen as important, tubers are available throughout the year (of different kinds like bagho, mundi, pitta etc); mango is available for 4 months in all its stages of development. While honey is available all year-round, access is indeed difficult, that too after 9 pm. The shortest window of availability is of bamboo mushroom for just a week in the month of Ashaadha/July. However, this is collected, dried and stored for later use.

Quantities available: It is seen that mango and mahua are abundantly available as per the participants; tamarind and tubers follow in that order. The quantities of bamboo mushroom and siyali phal are lowest.

Nutrition: Baroda sago and tubers were scored the highest. Siyali phal gives lots of energy, especially when accompanied by drinking of water with its consumption, as per the villagers. Tamarind helps in digestion, the participants informed.

Monetary value in the market: Honey fetches the highest price and it is usually medical shops in Gudari which are supposed to be procuring from the villagers. However, it was apparent that very few villagers collect honey in the first instance. For some products like wild cashew or siyali seed, the system to this is day is of barter exchange against one kilo of rice usually.



Criticality: The participants coined the term “jeevan rakhya” to understand the concept better and assessed various foods against this. Tubers, Mohua and Mango are rated the highest when it comes to how they come in handy during times of stress. This parameter was also understood in the context of what you can eat raw, when you are hungry, right there in the jungle. In that context, wild cashew was also scored high.

Gendered division of Collection: When asked whether there are any specifically assigned foods for gathering as per sex, or age, it was reported that honey is collected by men alone. Similarly, wild cashew is gathered by men by climbing up the tree. Whereas, when it comes to greens (sago), mushrooms etc., it is mostly women. For tubers, both men and women put in effort the proximity of collection, or the depth for digging out a tuber might depend on the gender. Children also gather various fruits and leaves.

Storability or shelf life: Siyali phal seed can be stored upto seven years or so, participants shared. Similarly, tamarind, mahua and mango (kernel) can also be stored for a long time. Bamboo shoots can last for a year. If Baroda sago is dried, it can be stored for upto 2 months. Bamboo mushroom, despite short and small availability, can be stored upto 8-9 months. Kandas or tubers, while they are available throughout the year, can be stored for only 3 days or so at a time.

Cultural significance: Only mango and tamarind were considered to have any cultural significance during festivals. Liquor prepared from mahua is also used in all festivals and rituals.

Medicinal value: Honey and mahua were listed for their medicinal properties. Mahua paste is used during deliveries, for easier delivery. Some kandas like pidda kanda are also used for treating foot corn. Siyali phal seeds which are very bitter are used for treating stomach ache and nausea. Wild cashew oil has some veterinary uses (for external application for wounds).

Detoxification: That while most wild foods can be eaten raw, while some have to be cooked and eaten. Some have to be de-toxified before consumption. An example given by the villagers in Andharilima is that of *Bagho kanda (tuber)*. This has to be first boiled, then cut into fine pieces, put into a bamboo basket and immersed in running water in a spring for at least 24 hours before it can be consumed.

Overall, the PRA scoring exercise threw up mango, mahua, tamarind and tubers as being very useful and important in the lives of this adivasi community, in various ways. Honey also was scored high, and there was a discussion on chemical farming disrupting the population of honeybees.

In a discussion on government food schemes, villagers reported that they have to get their ration from Madhuban Panchayat, seven kilometers away; this is distributed once in 3 months and occasionally, ration of only 2 months is supplied with the dealer saying that he does not have stock. Sugar is not always given. The village has a mini-anganwadi and mothers go and fetch their ration of porridge once in 15 days from another habitation two kilometers away.

When asked about the last famine that they remember, very few were able to recall such a critical time, around 30-35 years ago. During that time, people are reported to have survived on honey (with some mud), green leaves and tubers, bamboo shoots etc. Raw siali seeds and mahua also came in handy.

To this day, the village maintains a taboo and social regulation on the felling of gooseberry, sago, *harida*, mango, *bahada*, mahua, *masaani challi*, *nimbo* and *jambo kali*. No villagers intentionally cut any of these trees and the significance is mainly related to the fact that these are food-bearing, as per the villagers.

We tried to dwell on any local food classification systems and found that nothing could be discerned as a specific classification system.



3.1.3 Dengakul Village

This is a fully Saora-populated village in Talana Panchayat of Gunupur block of Rayagada district. It has 58 households with a total population of 248 persons (128 male and 120 female), as per the 2011 census. This is a village that has witnessed the arrival of a road (not pucca) to the village only seven years ago, and a school building around five years ago. This was a village that was apparently completely under the control of a local shahukar in a neighboring village for whom they put in a lot of bonded labour. Their own fields always suffered from neglect as well as wild animal attacks, they reported.

The hills around them are called by different names in saora language such as Lai Lai Jadang (which has only cashew plantations now), Tinaling (some cashew and some pigeonpea crop cultivation), Dengakur (cashew), a small hill called Maraimai Tang (with shifting cultivation of pulses), Tabbing, Arangan Tang (rocky hill, with a cave), Guldai Tang (which still has dense forest), Galangda etc. The villagers recalled a time when they would have to appease the forest department with various gifts like hens and some forest produce, so that the villagers' access to the forest was allowed. Now, the visits of the forest department to these villages have almost stopped, they reported.

Shift in land use: Elderly villagers recall a time when their staples were all millets and food would consist of mixing the cooked millet rice with cooked greens.

One villager called Santhano Sabar was the first to bring in cashew for planting, around 20 years ago. The seeds that he planted started yielding in three years and this was a major attraction. There was a rapid spread from 1996-97. Participants informed that there are several who purchased land elsewhere from the income that their new cashew plantations fetched them, with traders coming into the village to collect the produce.

In this village now, cashew cultivation, followed by cotton, horsegram and pigeonpea is seen. Other crops including various millets have more or less disappeared. Vegetables are cultivated with seeds purchased from the market for several vegetables like tomato and bhindi.

Seasonality of Availability of uncultivated foods: An indication of the availability of various uncultivated foods in different seasons is given in the following table:

Table 10: Availability of uncultivated foods in different seasons

Monsoon	Winter	Summer
Tender bamboo	Korsuvalpit (a mushroom)	Mango
Mushroom (<i>arengpen, uring jangpath, banunsur, toropith, muresapith, laaki sapith, udaput, kurgatpit, kurcharput, rogoput</i> etc.)	Bhooti (yam)	Koorgat (jambo)
Tubers (<i>ganai, margudi, ravdagai</i>)		Koorgat (jambo)
Seethaphal		Koorgat (jambo)
Greens (<i>Leerap, Sardaboijap, Gudirulep, Jatidaap, Sanargolai, Usaltangai, Asongtangap</i> etc.)		Tarelan (kendu)
		Taraban (black berries)
		Sindi (khajur)
		Bandru (kusum)
		Luhakur
		Turmandu
		Henger (amla)
		Kulpat (bel)
		Tentuli (tamarind)
		Greens (<i>samtilap, arrandap, urgandop, baradap, rurudap, sarurap</i> etc.)
		[terms used are saora]



Hunger and Starvation: The community members emphasized that no one in their village goes hungry and there has been no bad year, or year of severe distress because the forest has always given them something on which to survive. Subidi Sabara, an elderly lady recalled that when she was very 'young', there was a bad year when they had to survive only on greens and sap.

They all depend on PDS rice mainly for their monthly food supplies except for two newly married families, all of them have Antyodaya cards entitling them to 35 kg of PDS rice per month.

Apart from the occasional bad quality of the PDS rice supplies, the villagers did not have any major complaints against the PDS system, which has set dates twice every month for the villagers from Dengakul to get their ration. They have not experienced any corruption in these transactions, they said. The mini anganwadi runs, so also the mid day meal scheme in the school.

Government schemes and rights: All the households have health insurance cards. These villagers have also accessed MGNREGS though payments have been delayed. Applications from this village have gone for claiming FRA rights and a few households received their pattas.

Dependence on uncultivated foods: The participants estimated that about 30% of their food still comes from uncultivated sources in the forest, with another 30-40% coming from own cultivation. Around 20% is from the Antyodaya PDS. It is seen that in this village, some of the farmers have leased in land of neighboring villages to sow paddy and other crops. Once or twice a year, there is collective hunting in the forests as a tradition that continues.

While they wish that marketing of their cashew can be more organized, there are no thoughts or efforts towards collectivizing themselves along these lines.

3.1.4 Baskona Village

Baskona is a village in Bisra block of Sundargarh district. Participants in the PRA were mainly villagers belonging to the Munda tribe, in addition to Rauthiyas of the 'general category'.

The village, like the Saora village in Rayagada district, presented an unexpected blend of traditional and modern worlds. For instance, hybrid rice has invaded the agricultural fields here. Many species in the original forests were logged and much of the forest destroyed, compared to what it was earlier within the living memory of the participants in the discussion. On the other hand, the dependence of people on the forests has not disappeared completely. There is no sense of inferiority, as expressly asserted to a question too, in the consumption of various uncultivated foods (unlike the kind of lower social status assigned to millets in numerous villages of India today).

When asked about continuing consumption of uncultivated foods from the forests, villagers listed out 12-16 varieties of greens, different mushrooms, kendu, tubers and roots, mahua etc.

Changes over the years: The participants reported that several changes have taken place with regard to the forests around them as well as uncultivated foods the number of varieties available/diversity has reduced. Previously, the forest was closer to them. This meant ease of access. Now, they have to go further to access forest food or firewood. There were also more wild animals in their forest earlier; now, the forest is no longer dense and they are not afraid to go in. Wild animals are rare to see. The forest used to have big mahua and sal trees earlier. However, people from outside (in their words, others from the 'world'/duniya) came to cut the sal, char, kendu, dheuntha, mahua, doka, char and asan trees, as per the participants. The villagers also acknowledged that if there was unity and uprightness about forest conservation in their own village, this would



not have happened. They shared that protecting their forest is not easy since the outsiders have threatened them and people are afraid that the threats might be carried out while away from the village.

Relationship with the forest department: The participants informed that there used to be a time when forest department officials would visit the village on a weekly basis. However, they are not to be seen these days. While the forest department did not take up any plantations on their forest, it also did not help in conservation. “They only ask us to appreciate the importance of the forest and take care of it ourselves”, they said. They also set boundaries so that there are no disputes between villages.

Baskona's forests: The Sengel forest is sacred and reserved for worship. Similar is the case with Amba Kona (Sarna puja). The Pipar is for Sivaratri/Mahadev. The bamboo forest has no bamboo any more. Fire and elephants have destroyed it. While the forests around this village are not as dense as they used to be, there are no plantations, unlike in the case of villages in Rayagada district.

There is an unwritten norm and social regulation around not ever felling certain trees that is followed to this day by the villagers this is about protecting all trees which provide flowers and fruits to the people. “They are like our parents”, one villager remarked.

Dependence on uncultivated foods: with a handful of the participants, randomly selected, we tried to assess the dependence of various households on uncultivated foods. This was done with 10 stones given to each participant and asking them to show us the proportion of dependence on purchased food, PDS food, forest food and cultivated food (on own land). The following was the picture that emerged.

Table 11: Baskona village, estimated dependence on various sources of food

Sl. No	Family profile	Market	Fair price shop	Cultivation	Forest
1	1.5 acres of own land, no PDS card	30%	0%	50%	20%
2	3 acres of land (paddy, vegetables, millets and yam). 5 family members. The food from their own land sustains the family for nearly 6 months. On PDS ration card, the family gets 25 kgs rice per month, sustaining them for a week	20%	20%	40%	20%
3	1.5 acres of land. 5 family members. Cultivate crops like paddy, millets, vegetables and yam. No PDS card	60%	0%	20%	20%
4	No agricultural land. Small nuclear family. Oil, onion, potato, salt, spices etc. from the market.	20%	50%	0%	30%
5	3-member family. 2.5 acres land. Paddy and vegetables like tomato grown. Not all land is cultivated. No PDS card	30%	0%	20%	50%



The last participant explained that he put 50% against forest, since he gets income to buy food with sale of siali leaf plates and other forest produce. From what we could see, he was the only one who interpreted forest 'foods' broadly into forest-derived incomes for food. The fact that 3 persons who had no ration cards volunteered to explain their household situation could be because of the fact that they hoped that the outsiders would be able to intervene to resolve the problem. Out of 83 households in the village, around 35 were represented in the group discussion. 13 persons out of the participants reported that they were without PDS ration cards, out of whom 9 were BPL households. Three people present were absolutely landless.

Important uncultivated foods: The participants listed out mahua, kendu, sal seeds, chahar, tubers, mushrooms (of different kinds like Phatka chatu which is sticky and yellow in color, Dhutu chatu which germinates at night and fluorescent, Mental chatu which is foul-smelling, Patra or bharando chatu that is edible, murgi chundi, Patyari chatu, Jamun chatu which is purple in color, Badka chatu etc)³⁴, greens, jamun, kusum, tamarind, kurlu, mahud (honey), as important uncultivated foods. For instance, mahua lattha is an important food; mahua can also be stored for around 8 months. Tubers ensure their survival in the most severe times of stress/scarcity. They informed that they eat nearly all edible food around them including eggs of red ants, honey, rats etc., and all kinds of birds except mynah.

There was a matrix scoring exercise on the foods that they listed as important uncultivated foods for them. The following main points emerged from the process and discussions (the matrix that emerged is presented at the end of this section):

Time period of Availability of uncultivated foods: While roots, tubers, honey and edible green leaves were available throughout the year, mushrooms of different kinds were available for nearly 6 months, mostly during rainy season and thereafter. Kendu is available for gathering for 3 months (summer), char for 2 months (April and May), Tamarind for 6 months (including its edible leaves, flowers etc), Jamun and Mahua for 2 months (February-April). On this parameter, tubers, greens and honey were scored the highest, with Char, Kusum, Sarai/Sado and Mahua scored the lowest (shortest time windows).

Quantities available: Mahua, various green leaves and sarai/sado scored the highest on this aspect. From this village, at least one truckload of mahua is collected, the participants shared. Kendu is five times more than that, with at least one bag coming per household. At least five bags of tamarind are collected per household. Honey was scored the lowest in terms of quantities. This was followed by Jaam, Kusum and Char (which is available only in alternate years). Mushrooms follow these, and these are not available in years when the rains are scanty.

Criticality of some uncultivated foods: When inquired about on those foods that ensure survival in times of stress, mahua, sarai and tubers were scored the highest. The villagers do remember two occasions about 50 years ago and 35 years ago when during scarcity, government supplied wheat bulgar and maize flour. They also recall stories that the British would prevent people from entering forests even during periods of scarcity.

Nutritional value perceived: On this parameter again, mahua, sarai and tubers are scored the highest, followed by greens and jamun. Char, kusum and tamarind are at the bottom.

Medicinal value perceived: Mahua works like a "tonic", while gethi kanda (a tuber) is used to relieve back pain. It is also used to ease pain during pregnancy. With pepper, this also helps in digestion. Honey is used in various

any milk/sap yielding mushrooms and ones that are fluorescent are avoided since these are poisonous



medicines, to treat ordinary cold, minor wounds, mouth ulcers etc. Jamun improves blood levels while tamarind is used during sunstrokes and also to treat scorpion bites. This also has some veterinary use. Sal seed is used to treat dysentery while various tubers act like appetizers. Kusum oil is used to treat wounds. Honey was scored the highest on this count while many foods did not get scored at all.

Market/monetary value: The participants informed that honey fetches upto Rs. 500 a kilo. However, it has to be noted that honey itself was added to the list of uncultivated foods only upon prodding by the research team. At the same level of five hundred rupees a kilo is Char. Some mushrooms also fetch upto Rs. 100/kilo. Uncultivated tubers have no market.

Storability or shelf life: It was worth noting that most of the foods selected for the scoring exercise were given a score of five out of a 0-5 scale when it comes to storing. This is a combination of the products innate characteristic as well as the knowledge of processing that the people here possess. Only Jamun was scored 0 on this parameter, with mushrooms scored less than 1 and kendu 3. All the remaining were scored at 5, with participants informing that they can store mahua gathered at one point of time upto 3 years.

Cultural significance: Sarai/sal is used in all Pujas; similarly, mahua finds prominence in festivals of Phagun (February/March). Jamun is also used in some festivals (in the month of Aashadh). Villagers also avoid consuming mushrooms during Puja time.

Ease of access: Mahua, kendu and greens are listed on top. Honey, some tubers and kusum are put at the bottom of this list, when it comes to ease of access.





Table 12: Values of ten important Food Items

	Mahua (collected by all)	Kendu (collected by all)	Sal seeds (collected by femela)	Roots & tubers Collected by all)	Mushroom (collected by all)	Edible Green leaves by Women	Jamun (collected by all)	Char (collected by all)	Kusum (collected by all)	Tamarind (collected by all)	Mahud/ honey Collected by male)
Season (which food item is found in every season)	1	1.5	1	5	2.5	5	1.5	1	1	2	5
Quantity (which food item is found more in quantity)	5	3.5	4	3	2	5	1.5	1.5	1.5	1	1
Help during critical situation	5	4	5	5	3	4	3	3	1	2	1
Nutrition (which food has more nutritive value)	5	3	5	5	3	4	4	1	1	1	2
Medicine (which food has more medicinal value)	1	0	1	3	0	0	3	0	2	2	5
Market value (which food item has more market demand & will fetch higher price)	2	2	1	0	3	1	1.5	5	1	2	5
Storage - food items which can be preserved for longer period	5	3	5	5	0	5	0	5	5	5	5
Cultural value (which food has cultural importance)	5	0	5	0	0	0	5	0	0	0	0
Food items easy to collect	5	5	1.5	1	5	5	4	1.5	1.5	2	1
Total	34	22	27	27	18.5	29	23.5	18	14	17	25

*Score 0-5 with five highvalues/maximum availability. Community insisted on the half value

Disappearing foods: When asked specifically which uncultivated foods are not being consumed because their very availability has lessened drastically, participants listed bamboo shoots (their bamboo forest got destroyed by fires and elephants), bamboo mushrooms, gooseberry, some birds, *kurlu*, mango, some greens (katai sag, sarla sag, kuchu sag, koinar sag), *jillor phool* etc.

Trends in consumption: The participants observed that while more than 100 kinds of uncultivated foods would be consumed even 20 years ago, this has now come down to 25 to 30 kinds now. In terms of quantities also, the availability has reduced. They clarified that the status associated with such foods is not the reason for this decline.

We explored issues around various government food schemes and implementation of the same. Not all



households have PDS cards (they could not provide an accurate number of how many families do not have access to the PDS). It was reported that the quality is bad and supply of sugar and oil is unreliable. The mid day meal scheme for children does run and similarly, the anganwadi. FRA is not being pursued by anyone actively or systematically for claiming rights over the forest. However, they also were very clear in asserting that it is not possible to manage their food needs through these schemes or from purchasing food from their earnings. **“Prices of everything are going up, while our income is not growing proportionately”, they said. They emphasized that uncultivated forest foods are quite critical in such a situation.** What if every food need of theirs met by scaling up quantities, we wanted to know. “Even if all of that is done our forest is important for us. It is everything for us. If nothing else, we will need it for our Pujas”, was their response in unison.

With regard to the matrix scoring results, which showed mahua, greens, tubers, sal, jamun and kendu to be very important for them along various parameters, they felt that tubers should have been on top of the list given that they are there to fall back on throughout the year.

3.1.5 Ghattijharan Village

This village is in Lathikanta block of Sundargarh district. The Panchayat is Ramjodi and the village consists of only Munda families.

This village, spread out in a spacious fashion with each house maintained in a very clean and pretty manner is surrounded by low lying forested hills in all directions. The hills are called by various names. Singhle (in Munda, this means fire and the forest was named after the spontaneous fires that used to erupt on this hill), Dingur Gadha (named after a very huge tree that fell down), Tian Tungri (a good place for vegetable cultivation), Murgi bandha (there used to be cock fights with neighboring villages a day after Diwali here), Petra Toppa (named after the pot-bellied man who got killed by a tiger and buried in this forest), Gambhari Dipa (with many light colored timber plants) are some of the hills around.

Villagers pointed out that the forests used to be dense, with many wild animals like tigers, bears, elephants etc. They allege that people from outside came and felled the trees in the forest, mainly sal. There is social regulation in the village not to cut their own forest no live tree can be cut, while deadwood can be brought home; no mining of stone from the forest is allowed. Firewood can be collected for personal use and not for commercial sale etc. People violating these norms get penalised. Ironically however, even as they point out that outsiders have destroyed their forest, participants here said that they go to Jharkhand and fell trees there. Food-bearing trees like mahua, char, mango, jackfruit, kusum etc., are never cut by the villagers. They point out that the variety as well as quantity of uncultivated foods has been declining rapidly.

The community believes that the forest department's visits to the village have stopped mainly because of fear of left wing extremists in the area. They recall a time when they would not be allowed to even take sawai grass or timber for their own housing. The forest department officials would have to be appeased by various bribes like hens, goats and money in those days, they informed. “The forest department has now left the 'risk' of managing the forest to us”, they said. In this village, some households have received FRA individual pattas. These are however less than one acre and there are no collective rights over the forest.

PDS rice entered the village nearly 20 years ago. From the mapping exercise of all the households in the village, we got to know that 7 households have no card and one family has a 10-month-period PLO temporary card. One family is landless, whereas for other households, landholding averaged around 1 acre. While MNREGS works do go on in the village occasionally, ten persons complained that they did not receive payments for work done nearly two years ago.



Participants, through the use of ten stones arrived at a consensus that even around twenty years ago, their food basket consisted of 60% food drawn from uncultivated sources mainly from the forest, whereas it has come down to 40% now. They pointed out that the quantities of mahua and sal seed used to be higher in availability. Now, certain foods have disappeared *bharonda kukdi/chathu* (mushroom), gooseberry, honey, sabai grass, bamboo shoots are no longer available. There is very little mango now.

Participants asserted that they are ready to consume such foods (they affirmed in a very clear voice that there is no sense of inferiority that they attach to the consumption of such foods) however, availability itself has come down.

The forest itself has shrunk for various reasons. Erratic rainfall also affects availability of various foods. Forests are also destroyed by fire intentionally in pursuit of kendu leaf. People obtaining PDS ration cards and rice supply from them has also been a reason, according to the villagers who mentioned the above four as the main underlying reasons for decrease in consumption of uncultivated foods. They have no complaints with the food schemes of the government (except not everyone has cards and sometimes, the quality is not good).

Sharing about the nutritive and medicinal qualities of various uncultivated foods, they reported that tubers and greens improve strength. Gethi kanda improves digestion. The sticky porridge called Latha made out of tamarind seed and mahua flower is very nutritious, they said. Mahua improves iron in the blood, according to the participants. Tubers are the most important of such foods, given that even in the most difficult times, these are available for people to survive on.

What was interesting to note is that in this village, the initial uses mentioned of the forest were around medicines, firewood and datun (tree twigs of some species used for brushing teeth). Only after delving some more did the mention of foods of various kinds emerge. The following is the dependence on various sources of food, as scored by a small sample of participants.

Table 13: Perceived dependence of Ghattijaran Village on different sources of food

Name	Uncultivated Food	Purchased food	PDS	Own farming	Remarks
Sirgun Lagoon	30%	40%	0%	30%	Paddy from own land sustains family for 3 months. No PDS card
Benjamin Topno	40%	30%	10%	20%	PDS rice sustains them for only a week per month. Paddy from own land for only 15 months or so.
Asran Barla	60%	40%	0%	0%	No land, no PDS card
Sugad Topno	40%	30%	10%	20%	70 decimels of paddy land sustains family for 3 months.
Mariam Purti	20%	40%	20%	20%	A pension holder. Harvest sustains family for 3 months.
Habil	40%	40%	10%	10%	No pension, though elderly. Harvest from own land sustains family for just 1.5 months.
Jivan Purti	50%	40%	0%	10%	No ration card. Harvest from farming sustains family for 1 month.
Jivanmassi Purti	50%	10%	20%	20%	Harvest from farming lasts the family for 3 months.
Mukta Kerketta	40%	20%	10%	30%	Cultivation is on leased land



The scoring against uncultivated forest produce was done not necessarily in the context of quantities or variety of foods consumed, but the fact that many products are sold for income and from that income, other food purchased. The villagers asserted strongly that the forest is essential for their survival, since the government is somewhat unreliable and they are unsure how long various services might continue. One person shared that he educated his daughter by selling sal leaves. And that it is the forests that they can fall back on for their survival in any time of stress and distress. They recalled a famine some fifty years ago when it was the forest that supported the community's survival in that period of scarcity.

3.2. Learnings from the PRAs and Group Discussions

1. The dependence of communities on uncultivated foods ranged from 20% to 50%, depending on various characteristics of a village and its forests. This is both in terms of diversity and quantity.
2. There is a perceptible variation across villages and across households in terms of consumption of uncultivated foods. It is remarkable to note that not a single household reported that they did **not** consume any uncultivated foods. In some degree or the other, every household accesses such foods if nothing else, these are seasonal fruits, tubers and greens. Factors at the household that determine level of dependence included the occupation and income of the household, landholding and food cultivated on own farm, access to PDS food supplies, size of the household etc. Unfortunately, we were not able to delve into intra-household issues in this effort.
3. It is also apparent that an enormous wealth of knowledge exists with community members, associated with various foods. There is a variance seen here also depending on age and also specific occupations (like healers). However, no gender specific differences in knowledge levels or kinds of knowledge were discernible.
4. When it comes to assessing the level of dependence at the village level, a couple of factors were clearly discernible: the extent of commercial plantations that have come up around a village, which then restricts the access to uncultivated foods; the other factor which was seen in the case of the Lanjhia Saora village is the weaning away by the PDS system, that too with Antyodaya cards for all families.
5. From all the discussions in the study villages it was clear that the forest department's interference when it comes to villagers' access to forest resources has come down drastically. While this has saved the community from giving bribes, the onus of managing the forests has fallen on communities themselves and they are all at differential levels of protecting their forests.
6. In terms of particular foods, tubers and greens appear to be important, along with various edible fruits. Mahua, mango, bamboo shoots feature high on the list.
7. There is a decline in availability and consumption, as reported in all the study villages. Diversity is also eroding and entire species have disappeared from the study villages as reported by villagers. Apart from forests becoming sparse and replaced by mono-plantations, in at least one village, they pointed to changing rainfall pattern affecting availability of uncultivated foods. PDS ration supply was also seen as one contributing factor for the decline in consumption of forest foods. Along with the changes in the uncultivated foods, are changes in cropping patterns, especially reduction of those crops that were grown in podu cultivation (millets, pulses and oilseeds of various kinds). Consumption of these foods has also concomitantly declined.
8. It did not appear that the villagers themselves were attaching any (inferior) value to consumption of wild foods; the transition has been insidious.
9. FRA implementation has been very poor in all these villages the little implementation that one could see was in the case of a handful of individual rights applied for. Community rights have not been actualized anywhere in the study villages.



10. The criticality of forest foods is worth noting. In periods of scarcity during a month (when PDS ration gets over), within a year and in years of stress, it is these foods that help communities survive. It appears that a certain sense of pride and self-dependence was also important for the communities as they kept repeating that they can't rely on outsiders (also pointing out on the undependability of government schemes etc.)

Despite all the changes, certain norms have not changed though: in none of the villages visited have people reported that they are allowed to cut food-bearing trees. There is regulation in place against this everywhere. And this is a very important point to note.

3.3 Findings from Quantitative Estimation of Uncultivated Foods Harvest & Consumption

An important part of the effort put into this study on Uncultivated Foods and Food Security of Adivasis in Odisha was an attempt to quantify the collection and consumption of uncultivated foods, in addition to elaborate listing out of diversity of foods being consumed in the sample households.

Table 14: Profiles of Sample households

Village	Community	Population of sample HHs	Landholding, in acres	PDS-card holding
Andheriilima	Kondh	Adult males: 11 Adult females: 14 Male children: 9 Female children: 10 Total: 44 persons Avg. Family Size: 4.4	Dongar: 6.5; Upland: 12; Medium: 9.5; Lowland: 13.8; Total: 41.8 Avg. Landholding: 3.8 acres/HH	BPL card: 11
Birkera	Munda	Adult males: 29 Adult females: 35 Male children: 24 Female children: 24 Total: 112 persons Avg. Family Size: 5.89	Dongar: 4.23; Upland: 3.46; Medium: 4.91; Lowland: 2.6; Total: 15.20 Avg. Landholding: 0.80 acres/HH	AAY: 2 BPL: 11 No card: 6
Dengakul	Sabara	Adult males: 25 Adult females: 23 Male children: 12 Female children: 16 Total: 76 persons Avg. Family Size: 6.33	Dongar: 108 Upland: 31; Medium: 17; Lowland: 15; Total: 171 Avg. Landholding: 14.25 acres/HH	BPL: 12
Ghettijharan	Munda	Adult males: 19 Adult females: 20 Male children: 11 Female children: 12 Total: 62 persons Avg. Family Size: 5.17	Dongar: 3.95; Upland: 2.48; Medium: 2.79; Lowland: 2.28; Total: 11.50 Avg Landholding: 0.96 acres/HH	AAY: 3; BPL: 6; APL: 3
Kalosiria	Munda	Adult males: 17 Adult females: 18 Male children: 13 Female children: 19 Total: 67 persons Avg. Family Size: 5.58	Dongar: -; Upland: 11.25; Medium: 3.59; Lowland: 7.35; Total: 22.19 Avg Landholding: 1.85 acres/HH	BPL: 11 No ration card: 1
Laxmipur	Kondha	Adult males: 28 Adult females: 28 Male children: 16 Female children: 16 Total: 88 persons Avg. Family Size: 4.63	Dongar: 23; Upland: 14.35; Medium: 5.9; Lowland: 9.75; Total: 53.00 Avg Landholding: 2.79 acres/HH	AAY: 6 BPL: 6 APL: 6 No ration card: 1



Family Size: The average family size in each of the sample villages is Dengakul (6.33), Birkera (5.89), Kalosiria (5.58), Ghettijharan (5.17), Laxmipur (4.63) and Andherilima (4.40).

Official Poverty Estimates: Laxmipur (6 APL HHs out of 19 sample HHs), Ghettijharan (3 APL out of 12 sample HHs) and Andherilima (2 APL out of 11 sample households) are relatively well-off within our sample households, going by the official APL-BPL classifications. Kalosiria and Dengakul have only BPL households in our sample.

Government Ration Cards: In Birkera village 6 of the 19 sample households do not have any ration cards, while in Laxmipur and Kalosiria, one household each reported that they do not have a ration card to access food grains.

Landholdings: As per landholdings reported, which is most probably landholding operated, Dengakul has the largest average per household landholding at 14.25 acres (mostly because of larger holdings of Dongar land), followed by Andherilima at 3.8 acres per household on an average, Laxmipur at 2.79 acres, Kalosiria at 1.85 acres, Ghettijharan at 0.96 and Birkera at 0.80.

The above are of interest since it is assumed that apart from the fact that a diverse forest with uncultivated foods might be available, the factors that could influence actual collection and consumption could be related to family size, poverty status, access to government food supply schemes and access to cultivated foods from own land. While we have collected some baseline data on some of these parameters, this study did not set out to explore correlations between these possible factors and uncultivated foods' collection or consumption. It is plausible that education, proximity to an urban centre, migration etc., could also be other factors that determine the extent of UCF collection and consumption. Further, in an expanded definition of uncultivated foods, as we have used in this study in the case of weighed dietary records for consumption data, agricultural practices and cropping patterns also determine UCF availability, collection and consumption.

Table 15: Number of data points recorded at the uncultivated food sources and sinks/kitchens

Village	No. of sample households	No. of readings from the Sink (kitchen)	No. of readings from the Source of UCF harvest
Andherilima	11	55	144
Birkera	19	95	138
Dengakul	12	60	121
Ghettijharan	12	60	137
Kaloshiria	12	60	100
Laxmipur	19	95	123
Total	85	425	758





The findings presented in the following sections therefore pertain to 85 sample households, and 758 different recordings over slightly more than 5 months related to collection of uncultivated foods estimated at the point of return from the forest, and 406 different recordings of food biomass, taken over 5 months in the kitchens of the sample households. For the Food Frequency Questionnaires used, it was taken up randomly across age groups, with at least one reading per month per sample household in all the study villages.

3.4 Harvest of Uncultivated Foods

It has to be noted that this was limited to the measurement of foods from the forest and does not include an expansive definition of uncultivated foods. However, wild animals and birds are included, in addition to insects and other such foods. The following is the picture related to harvest of different kinds of uncultivated foods from all the six villages over the entire study period. An annexure provides details of the diversity as described in the local language (Annexure I).

Table 16: Variety of Uncultivated Foods in Study Villages

Category of Uncultivated Foods	Number of different varieties/Diversity	Total quantity harvested in kg
Mushrooms	30	440.1
Tubers	23	1214.8
Greens (leafy vegetables)	26	612.4
Wild fruits/vegetables	14	745.8
Wild animals	28	447.8

In all, **121 unique uncultivated foods, amounting to a total quantity of 3460.9 kg were harvested by the 85 sample households.** The village-wise picture is presented below.

Table 17: Uncultivated foods harvested village wise

Village	Diversity of UCF collected (in numbers)	Total quantity harvested over study period in kg	Sale of UCF in kg	Total UCF harvest, per person per collection per day in kg*
Andherilima	33	1294.13	25.25	8.97
Birkeria	69	297.48	Nil	2.16
Dengakul	38	712.79	Nil	5.89
Gettijharan	37	284.79	Nil	2.08
Kaloshiria	21	372.54	Nil	3.72
Laxmipur	49	499.19	Nil	4.06

- Overall, across the two districts of Odisha chosen for the study, in the adivasi households where documentation was taken up, on an average, **4.56 kg** of uncultivated foods are harvested per collection, in a day. ***It has to be noted that assuming that one day's collection lasts for 2-3 days generally, this is more than what the government supplies in its food security schemes.***
- In Rayagada district's villages, this is calculated to be 6.45 kg per harvest, while in Sundargarh, this is just 2.55 kg per harvest.
- The per household, per-collection harvest of uncultivated foods from the forest across the villages ranged from 2.08 kg in Gettijharan to 8.97 kg in Andherilima village. There is therefore, a wide variation across villages.



- It is also seen that the diversity of harvested foods from the forests ranged from 21 different kinds in Kaloshiria, a village in Sundargarh to 69, another village in Sundargarh district.
- Except in Andherilima, there was no reporting of any sale of uncultivated foods collected from the forest, and it is presumed that nearly all the collection of these foods is going into consumption (it has to be noted that the study period did not involve harvest time of major products like mahua, mango or tamarind which are partially sold).

More information presented in the following sections gives a month-wise picture which shows a wide variation across months within a village, as well as a wide variation across different uncultivated foods.

Prima facie, there appears to be no apparent correlation between landholding extents, or family size or official poverty status or even the government ration card coverage, when it comes to inter-village variation in terms of harvest of uncultivated foods. However, a separate study is required to understand the factors that determine the extent of dependency on uncultivated foods across villages and households.

3.4.1 Andherilima

- In Andherilima, the study recorded the collection of 33 different uncultivated foods which included mushrooms, wild fruits and vegetables, tubers, wild animals etc.
- The total quantity harvested by the sample households was 1294.13 kg approximately (this includes wild animals and fish etc.). Only 25.2 kg were sold by the sample households, that too of 5 food items and the rest was consumed by the household.

Table 18 : Uncultivated foods harvested in in Andherilima (month wise)

Month	Diversity/Number of uncultivated food items harvested	Quantity of uncultivated foods harvested in Kg	Quantity harvested per HH, per day in kg*
July (7 readings)	13	032.65	4.66
August (30 readings)	13	172.08	5.73
September (27 readings)	08	111.84	4.14
October (26 readings)	15	298.96	11.49
November (27 readings)	13	438.45	16.23
December (27 readings)	20	240.15	8.89

* each reading is equal to one household's per-day collection in kg

As can be seen above, there is a wide variation with regard to UCF collection across the months studied, with November's collections being four times higher than September, with the lowest quantities harvested. Even in terms of diversity of foods, September recorded only 9 kinds of uncultivated foods while December's food-gathering exhibited 19 different varieties. It is quite possible that the harvested food is not consumed immediately but processed and consumed at a later day.





Table 19: Quantity of different kinds of foods harvested in Andherilima

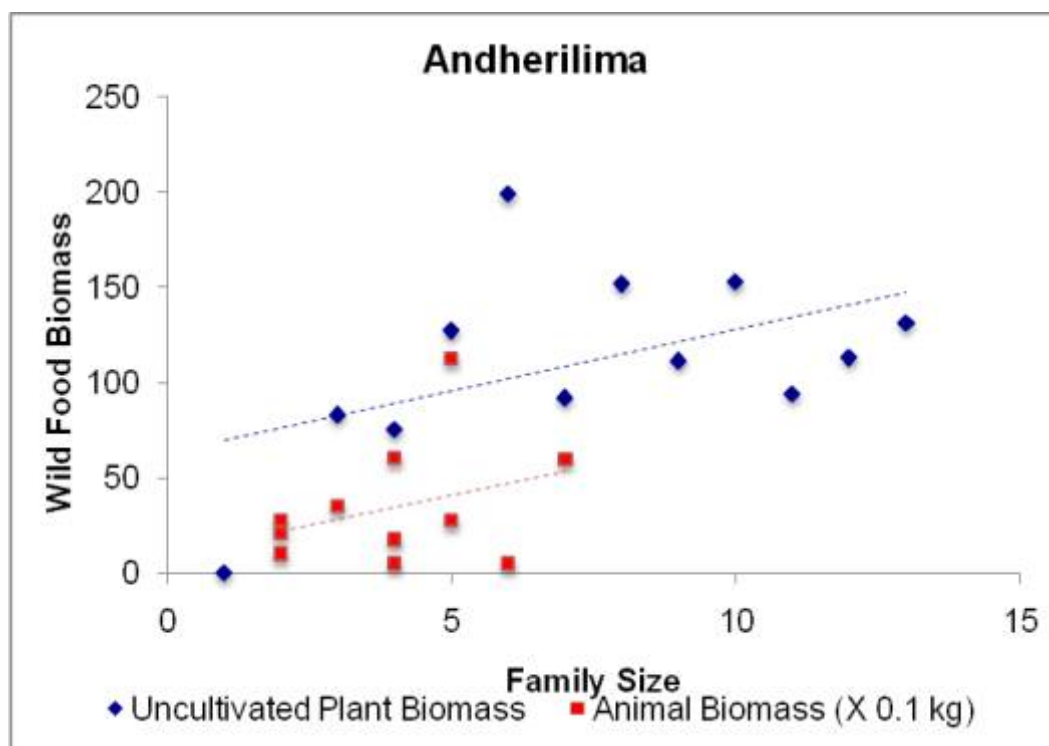
	No. of months obtained, in our sample HHs	Quantity Harvested (in gms)
Mushrooms		
1.Bali Chatu	1 month	1100
2.Srabana Chatu	2 months	23250
3. Jamba Chatu	1 month	2000
4.Balisara Chatu	1 month	1300
5.Bati Chatu	1 month	200
6.Bila Chatu	2 months	5000
7.Baunsa Chatu	1 month	1200
8.Dasara Chatu	4 months	49740
9.Pala Chatu	3 months	5375
10.Khunata Chatu	1 month	500
Greens		
1. Barada Sag	4 months	23380
2.Kanta Sag	6 months	40787
3.Gandri Sag	6 months	16410
4.Bali Sag	5 months	27510
5.Sunsunia Sag	3 months	20375
6.Rassi Sag	2 months	11740
Tubers		
1.Pita Kanda	4 months	100625
2.Serenga Kanda	3 months	12250
3.Pitala Kanda	3 months	593865
4.Mundi Kanda	3 months	37250
5.Murugudi Kanda	3 months	78075
Fruits/Wild Vegetables/Bamboo Shoots		
1.Baunsa Karada	4 months	154650
2.Kankad	3 months	48562
3.Tamarind	1 month	250
Wild Animals/Fish		
1.Kutura Mansa	1 month	5500
2.Chuna Macha	2 months	5250
3. Bana Kukuda	1 month	3000
4. Rabbit	1 month	3000
5. Tortoise	1 month	2600
6. Godhi meat	1 month	3350
7. Rat	1 month	2500

It is seen from the above table that particular tubers like Pitala Kanda and Pita Kanda, in addition to bamboo shoots, followed by some kinds of mushrooms and various greens are the UCF collected in larger quantities. These are also seen to be available for longer periods of time and not just for short windows of time.

The biomass of both the wild food plants and fauna collected appears to be strongly dependent on the family size.



Figure 1: Correlation between Family Size and UCF Collected



3.4.2 Birkera

- In Birkera, the study recorded the collection of 69 different uncultivated foods which included mushrooms, wild fruits and vegetables, tubers, wild animals etc..
- The total quantity harvested by the sample households was 297.5 kg approximately (this includes wild animals and fish etc.).

Table 20: Uncultivated foods harvested in Birkera (month wise)

Month	Diversity/Number of uncultivated food items harvested	Quantity of uncultivated foods harvested in Kg	Quantity harvested per HH, per day in kg*
August (28 readings)	13	25.14	0.90
September (27 readings)	14	56.27	2.08
October (28 readings)	12	52.24	1.87
November (27 readings)	13	72.00	2.67
December (28 readings)	15	91.83	3.28

* Each reading is being equated with one household's average daily collection

We were able to record the weights of the uncultivated foods collected 138 times within the sample households, over 5 months, in this village. Assuming that each reading is equal to a household's daily collection on an average, this works out to **2.16 kg**.



It can be seen that there is a wide variation in the quantities and number of uncultivated foods harvested in different months with August and December exhibiting a manifold variation in quantity as can be seen below.

Table 21: Quantity of different foods harvested in Birkera

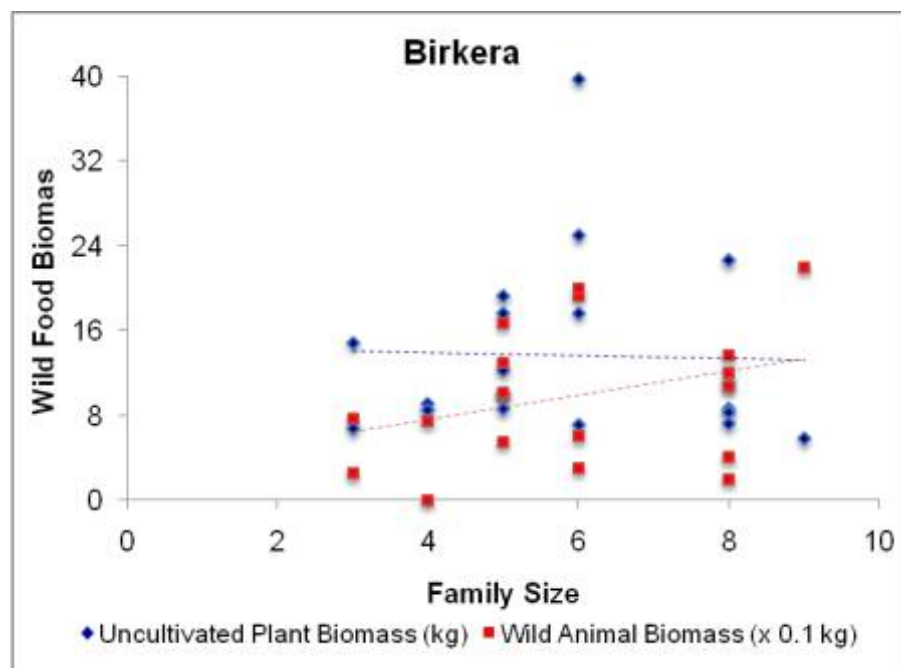
		No. of months collected	Qty Harvested, in gms
Mushroom			
1.	Bali Chhatu	1	300
2.	Varonda Chhatu	2	8205
3.	Patra Chhatu	4	9200
4.	Muchu Chhatu	1	1480
5.	Ui hunka Chhatu	1	500
6.	Sada Chhatu	2	1500
7.	Chirka Chhatu	1	520
8.	Bada Chhatu	3	14735
9.	Sua Chhatu	1	150
10.	Java Chhatu	1	1980
11.	Sara Chhatu	1	300
12.	Gane Chhatu	1	270
Tubers			
1.	Pita Kanda	2	9650
2.	Pitala Kanda	2	11250
3.	Geghi Kanda	2	4500
4.	Gethai Kanda	2	6000
5.	Gethi Kanda	2	23050
6.	Bata Kanda	1	2400
7.	Katei Kanda	1	1500
Greens			
1.	Sunsunia Sag	1	250
2.	Kuchu Sag	1	800
3.	Sajana Sag	4	8775
4.	Matha Sag	3	35200
5.	Katei Sag	2	34770
6.	Barada Sag (Greens) fula	1	1200
7.	Kanta Sag	2	10800
Wild Animals/Wild Birds/Fish/Insects			
1.	Genda (Snail)	2	7350
2.	Fish	3	9225
3.	Bana Kukuda (Wild Fowl)	1	1020
4.	Jia Fish	2	1000
Fruit/ Vegetables/Bamboo Shoots			
1.	Kankada (Wild round bitter gourd)	2	1000
2.	Custard Apple	2	45145
3.	Demta	1	1180
4.	Baunsa Karadi (Bamboo Shoot)	3	11150
5.	Papaya	4	25465
6.	Sura Matha	1	5570
Total		69	297480



In Birkera, Greens and Wild fruits and bamboo shoots form the largest chunk of uncultivated foods collected. It is also seen that one kind of mushroom and one kind of green leafy vegetable were available for collection throughout the five months studied.

The quantity of wild edible biota seems to be independent of the size of the households harvesting them.

Figure 4: Correlation between Wild Food Species diversity to Family Size



3.4.3 Dengakul

- In Dengakul, the study recorded the collection of 38 different uncultivated foods which included mushrooms, wild fruits and vegetables, tubers, wild animals etc..
- The total quantity harvested by the sample households was 712.79 kg approximately (this includes wild animals and fish).

Table 22: Uncultivated foods harvested in Dengakul (month wise)

Month	Diversity/Number of uncultivated food items harvested	Quantity of uncultivated foods harvested in Kg	Quantity harvested per HH, per day in gms *
July (7 readings)	8	43.36	6.19
August (29 readings)	10	200.06	6.92
September (20 readings)	12	112.69	5.63
October (25 readings)	09	102.23	4.09
November (26 readings)	21	170.57	6.56
December (14 readings)	12	083.88	5.99

* Each reading is being equated with one household's one day's harvest here.



Over the study period of 5 months, there were 121 times when collection of uncultivated forest foods by our sample households were measured by the enumerators this works out to a collection or harvest of nearly **5.89 kg** for each recording, or for each such outing by a sample household.

It can be seen that there is a wide variation in this village also, with regard to the quantities and number of uncultivated foods harvested in different months with November exhibiting a great diversity, and August recording greater quantities of harvest.

Table 23: Quantity of different foods harvested in Dengakul

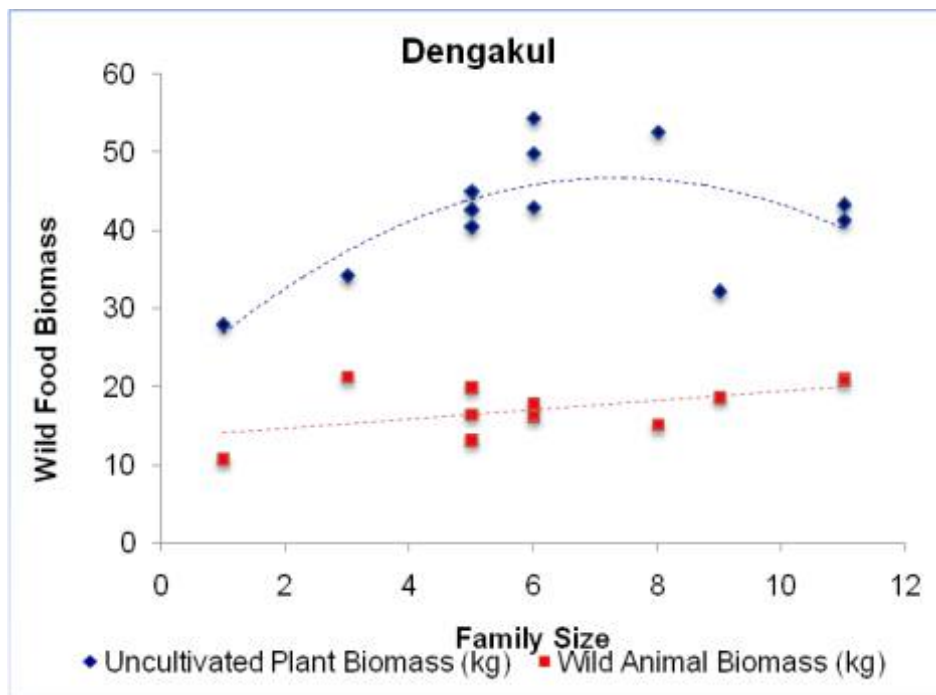
		No. of months collected	Quantity Harvested, in grams
Mushrooms			
1.	Balichhatu	1 Month	645
2.	Baunsa chhatu	3 Months	21925
3.	Srabana Chhatu	3 Months	17556
4.	Dasara Chhatu	2 Months	5386
5.	Khursual Chhatu	1 Month	1741
Greens			
1.	Gandri Sag	2 Months	1200
2.	Kanta Sag	2 Months	9960
3.	Wild Amaranthus	1 Month	1325
4.	Rasi sag	3 Months	6671
5.	Usal ding saga	1 Month	1718
Tubers			
1.	Bhutig Kanda	2 Months	26777
2.	Gada Gai	2 Months	58917
3.	Ganu Gai	2 Months	8023
4.	Khajuri Kanda	1 Month	3110
5.	Margudi Gai	2 Months	42633
6.	Rauda Gai	1 Month	13695
Fruit/ Vegetables/Bamboo Shoots			
1.	Bana Turuda (Forest EveGourd)	2 Months	4930
2.	Round Bitter Gourd	3 Months	28835
3.	Bamboo Shoots	4 Months	251366
Wild Animals/Wild Birds/Fish/Insects			
1.	Tenkra Poka (Insects)	1 Month	200
2.	Fish	5 Months	100281
3.	Prawn	3 Months	7422
4.	Crab	3 Months	5335
5.	Gundri Mansa (Wild Bird)	1 Month	600
6.	Dove	4 Months	14450
7.	Water duck	1 Month	5000
8.	Bat	1 Month	832
9.	Baga (Egret) (Stork)	2 Months	5000
10.	Pigeon meat	2 Months	1500
11.	Forest Chicken	2 Months	7000
12.	Bhuda Sapa Mansa (Snake)	1 Month	2110
13.	Jhinka	1 Month	7500
14.	Monkey	1 Month	10000
15.	Rabbit Meat	1 Month	14000
16.	Tortoise	1 Month	4000
17.	Deer	1 Month	11000
18.	Wild Pig	1 Month	9000
19.	Snail	1 Month	1155



Dengkul's largest uncultivated foods are in the form of wild animals, birds and fish as can be seen in the table above.

Here, both the wild plant and animal food biomass seems to be strongly dependent on the size of the households.

Figure 7: Correlation between Family Size and Wild Plant/Animal Biomass



3.4.4 Gettjharan

- In Gettjharan, the study recorded the collection of 37 different uncultivated foods which included mushrooms, wild fruits and vegetables, tubers, wild animals etc.
- The total quantity harvested by the sample households was 284.79 kg approximately (this includes wild animals and fish etc.).

Table 24: Uncultivated foods harvested in Gettjharan (month wise)

Month	Diversity/Number of uncultivated food items harvested	Quantity of uncultivated foods harvested in Kg	Quantity harvested per HH, per day in Kg *
July (7 readings)	7	32.37	4.62
August (20 readings)	20	72.45	3.62
September (15 readings)	15	48.55	3.24
October (11 readings)	11	28.97	2.63
November (15 readings)	15	49.40	3.29
December (13 readings)	13	53.05	4.08

* Each reading is being equated here with a household's daily collection.



The enumerators were able to measure uncultivated foods' harvest by the sample households in this village 137 times. From these readings, it can be seen that on an average, per household, **2.08 kg** of uncultivated foods are collected per day.

It can also be seen that there is a wide variation in Gettijharan too, in terms of quantities harvested during different months. While July exhibits the largest quantities harvested, October was the lowest. However, August displayed the largest diversity of foods collected.

Table 25: Quantity of different foods harvested in Gettijharan

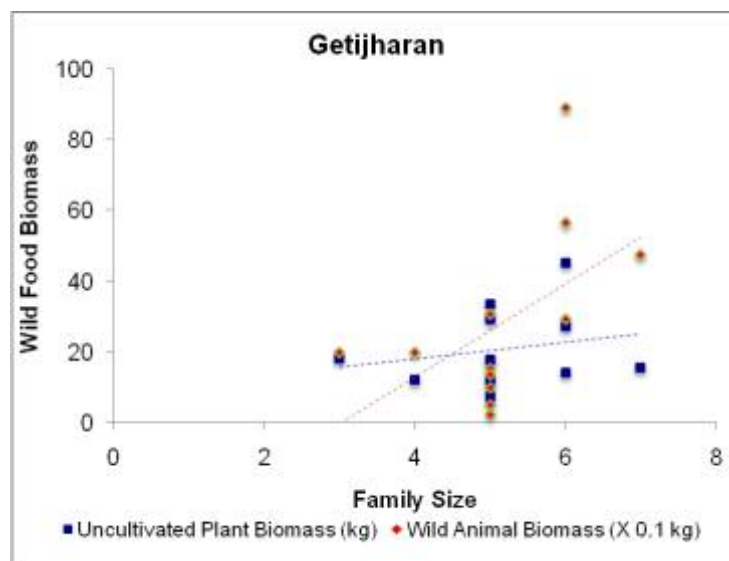
	No. of months collected	Quantity Harvested in grams
Mushrooms		
1. Bali chhatu	3	6385
2. Bhoranda chhatu	3	12325
3. Chirko chhatu	3	10760
4. Gende chhatuu	3	7565
5. Patiari chhatu	3	26770
6. Ruguda chhatu	2	3570
7. Suga chhatu	2	1330
8. Gambha chhatu	2	12800
9. Gene chhatu	3	7450
10. Jamun chhatu	1	1600
11. Lahara chhatu	1	880
12. Dasahara chhatu	1	13400
13. Karama chhatu	1	1000
Greens		
1. Bhaji saga	2	875
2. Biradi saga	1	4000
3. Katai saga	3	15050
4. Koinar saga	4	9075
5. Kuchha saga	5	9277
6. Chakunda saga	2	1650
7. Kalami saga	3	21725
8. Mata saga	2	28000
9. Sajana saga	1	500
10. Sunsunia saga	2	1000
11. Bhata saga	1	3375
12. Machuru saga	1	1000
13. Kainat phula & saga	1	750
Fruit/ Vegetables/Bamboo Shoots		
1. Burudi (Fruits)	1	500
2. Kalara (Wild Bitter Gourd)	1	1375
3. Wild Amla	2	1250
4. Bamboo Shoot	3	28055
Tubers		
1. Gethi kanda (Tuber)	1	8000
Wild Animals/Wild Birds/Fish/Insects		
1. Crab	3	4845
2. Demta (Red Ants)	4	9535
3. Snail	4	14770
4. Fish	4	12600
5. Wild Rat	1	375
6. Baga mansa	1	1375



Gettijharan was unusual in its lack of dependence on tubers. Greens and Mushrooms constituted the largest chunk of uncultivated foods here, with 13 different kinds of greens and mushrooms specifically identified and collected.

The quantity of wild edible food plants and animals are both strongly related to family size.

Figure 10: Correlation between wild food biomass and family size



3.4.5 Kaloshiria

- In Kaloshiria, the study recorded the collection of 21 different uncultivated foods which included mushrooms, wild fruits and vegetables, tubers, wild animals and fish.
- The total quantity harvested by the sample households was 372.54 kg approximately (this includes wild animals and fish).

Table 26: Uncultivated foods harvested in Kaloshiria (month wise)

Month	Diversity/Number of uncultivated food items harvested	Quantity of uncultivated foods harvested in kg	Quantity harvested per HH, per day in Kg *
July (3 readings)	5	6.78	2.26
August (26 readings)	13	91.32	3.51
September (22 readings)	10	73.63	3.35
October (24 readings)	8	50.23	2.10
November (15 readings)	4	66.75	4.45
December (10 readings)	3	83.83	8.38

* Per reading is assumed here to be equal to quantity harvested per household per day

In all, from 100 readings, 372.54 kg of uncultivated foods were recorded to be collected by the sample household villagers. This works out to **3.72 kg** per reading, which is being equated with one household's one day's collection on an average. December's quantities per collection were manifold higher than other months' and mainly due to one green leafy vegetable. However, we found no evidence of such collections being sold in the market. In terms of diversity of uncultivated foods, August exhibited the largest diversity.

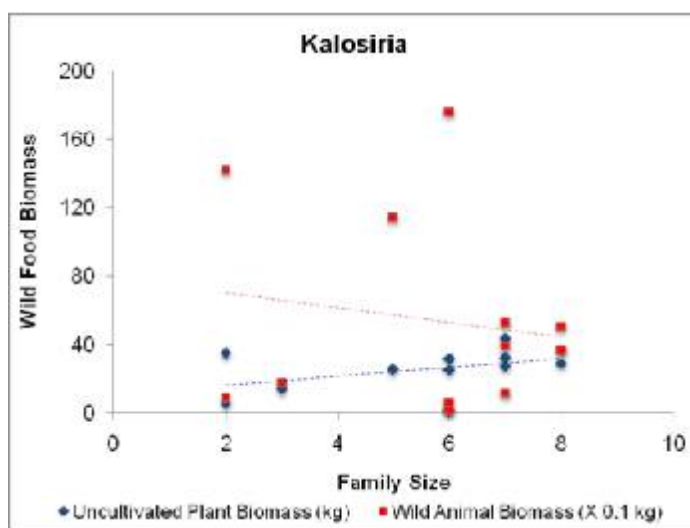


Table 27: Quantity of different foods harvested in Kaloshiria

		No. of months collected	Quantity Harvested in grams
Mushrooms			
1.	Bali Chhatu	2	2510
2.	Chirka Chhatu	3	9214
3.	Paatiari Chhatu	2	17335
4.	Ruguda Chhatu	2	1759
5.	Varanda Chhatu	2	1055
6.	Jamba Chhatu	1	375
7.	Lahara Chhatu	1	275
8.	Suga Chhatu	1	100
9.	Bada Chhatu	2	14330
10.	Gende Chhatu	2	237
11.	Tultula Chhatu	1	115
Fruit/ Vegetables/Bamboo Shoots			
1.	Bamboo Shoots	2	74425
2.	Custard Apple	3	25137
3.	Kankada (Wild Round Bitter Gourd)	1	108
Tubers			
1.	Pita Kanda	2	14803
Greens			
1.	Matha Saga	2	144070
2.	Chakunda Gunda	1	1066
Wild Animals/Wild Birds/Fish			
1.	Guda Musa (Wild Rat)	4	3845
2.	Fish	5	36209
3.	Samuka	1	350
4.	Snail	3	25225

While mushrooms exhibit the largest diversity in terms of uncultivated foods collected in Kaloshiria, it is a particular kind of wild green leafy vegetable (Matha Saga) of which the largest quantities have been collected. The quantity of wild edible food plants collected is strongly related to family size.

Figure 13 : Correlation between collected wild food biomass and family size





3.4.6 Laxmipur

- In Laxmipur, the study recorded the collection of 49 different uncultivated foods which included mushrooms, wild fruits and vegetables, tubers, wild animals and fish.
- The total quantity harvested by the sample households was 499.19 kg approximately.

Table 28: Uncultivated foods harvested in Laxmipur (month wise)

Month	Diversity/Number of uncultivated foods harvested in Kg	uncultivated food items Quantity harvested per	harvestedQuantity of HH, per day in Kg
July (4 readings)	12	022.74	5.68
August (25 readings)	26	135.48	5.42
September (22 readings)	35	154.60	7.03
October (20 readings)	28	107.02	5.35
November (23 readings)	18	046.20	2.57
December (29 readings)	25	033.15	1.14

It is seen that on an average, per collection session per household, in Laxmipur village, around **4.06 kg** of uncultivated foods were harvested by our sample households. However, there were significant differences in quantities harvested per household over different periods of time in the study months. December was at a low of 1.14 kg only, with September exhibiting more than seven kg of collection of uncultivated foods per household per day. Similarly, remarkable differences in the range of diversity was found across months, with September exhibiting 35 different varieties of uncultivated foods that were collected, while November had only 18 such foods.

Table 29: Quantity of different foods harvested in Laxmipur

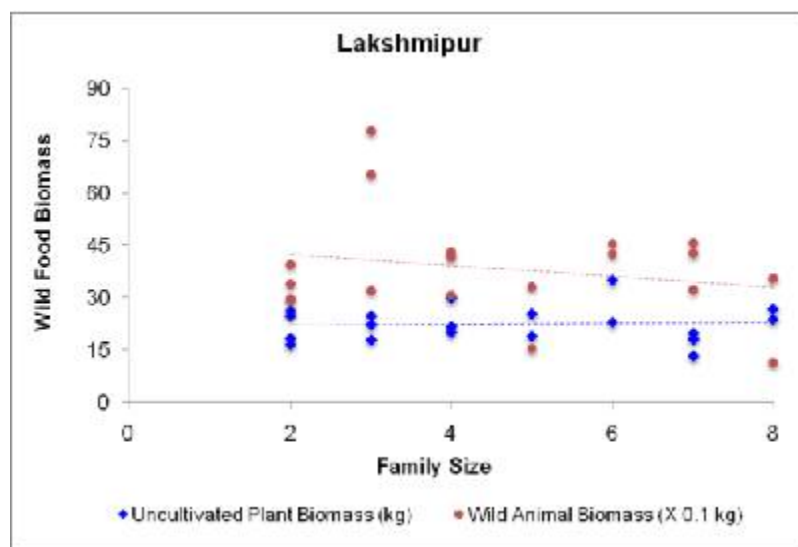
	No. of months collected	Quantity Harvested, in gms
Mushrooms		
1. Basa Chhatu	3	60545
2. Bali Chhatu	3	12410
3. Baunsa Chhatu	2	16875
4. Dasahara Chhatu	3	4470
5. Mendha Chhatu	3	6275
6. Ui Chhatu	2	6675
7. Palo Chhatu	1	745
Greens		
1. Ghurudi Saga	6	39557
2. Bharada Saga	4	8200
3. Gandhiri Saga	4	11816
4. Garki Saga	3	7090
5. Kanta Saga	5	13385
6. Mangi Saga	4	6825
7. Patni Saga	4	2925
8. Sunsunia Saga	5	3295
9. Siti Saga	2	625
10. Kaloma Saga	1	620
11. Munika Saga	2	3185
12. Chakunda Saga	1	250
13. Drumstick leaves	2	3575
14. Tumbi Saga	3	1550
15. Hatua Saga	2	620



16.	Leutia Saga	1	224
17.	Vija Saga	1	230
18.	Vata Saga	1	1000
19.	Ct Saga	1	395
Tubers			
1.	Pita Kanda	6	24861
2.	Raadi Kanda	5	45755
3.	Bhata Kanda	5	57546
4.	paridi Kanda	5	12185
5.	Leko Kanda	3	5020
6.	Cherenga Kanda	4	11735
7.	Katha Kanda	2	4560
8.	Tarla Kanda	1	1500
9.	Hiru Kanda	1	60
10.	Dakli Kanda	5	9715
11.	Khata Kanda	1	120
Fruit/ Vegetables/Bamboo Shoots			
1.	Bansa Karadi (Bamboo Shoot)	4	28480
2.	Chhiadi (Fruit)	3	750
3.	Zizyphus	1	50
4.	Maya Phula (Flower)	3	5695
Wild Animals/Wild Birds/Fish			
1.	Ranga kai (Red Ants)	5	2820
2.	Fish	6	19852
3.	Kankada (Crab)	6	51259
4.	Bhunki machhi (Insects)	3	2200
5.	Chingudi (Prawn)	1	250
6.	Bhunki machhi (Insects)	1	245
7.	Genda (Snail)	3	1050
8.	Lakti machhi (Insects)	1	125

The quantity of wild edible food plants and animals does not seem to be significantly related to the family size.

Figure 16:Correlation between wild food biomass and family size





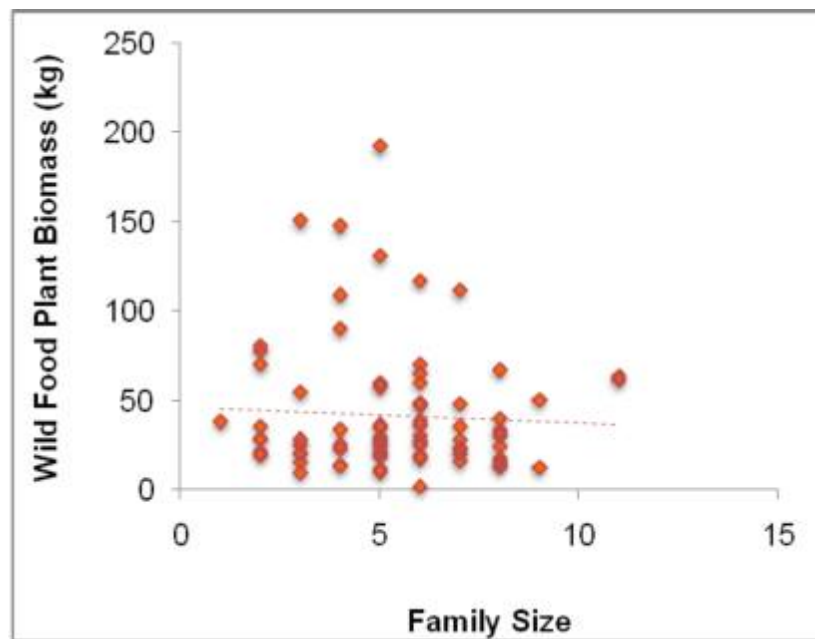
3.5 The Overall Pattern of Harvest of Wild Edible Plants and Animals across 6 Villages

Both the number of species and quantities of wild and uncultivated food biota appear to depend primarily on the family size. However, the pattern of dependence varies widely in the 6 villages. Thus, the number of wild animals hunted is directly related to the family size in Andherilima, Birkeria and Getijharan ($p < 0.05$), while the relationship is insignificant for the other two villages.

The difference between the villages in terms of wild food harvest is not consistent in the two districts of Rayagada and Sundergarh, implying that geographic or administrative boundaries do not account for the differences in the villages under study.

When all the village data are collated, the pattern of dependence of the overall wild food harvest on family size appears indeterminate ($p > 0.15$).

Figure 19: Correlation between wild food harvested and family size



3.6 Consumption of Uncultivated Foods As Cooked Food (Measured in Kitchens)

In addition to findings related to collection of uncultivated foods over the study period across the sample households of the six villages, we also attempted to quantify the consumption of uncultivated foods in the diet of the sample households. Each sample household was visited at least five times over the study period (one day per month per sample household in each study village). There were a total of 425 readings of measuring ingredients in a day's cooking, both cultivated and uncultivated, from 85 households.





Table 30: Share of Uncultivated Foods in Cooked Food Consumed:

Village	Number of readings of cooked food,	Total cooked food in Kgs	uncultivated Food in cooked food, in kg	Percentage	Per Day, per HH, in Kgs*
Andherilima	55	241.39	43.83	18.16%	0.80
Birkera	95	231.30	42.77	18.49%	0.45
Dengakul	60	293.94	71.68	24.39%	1.19
Gettijharan	60	202.74	27.08	13.36%	0.45
Kaloshiria	60	243.37	29.13	11.97%	0.48
Laxmipur	95	349.95	79.90	22.83%	0.84

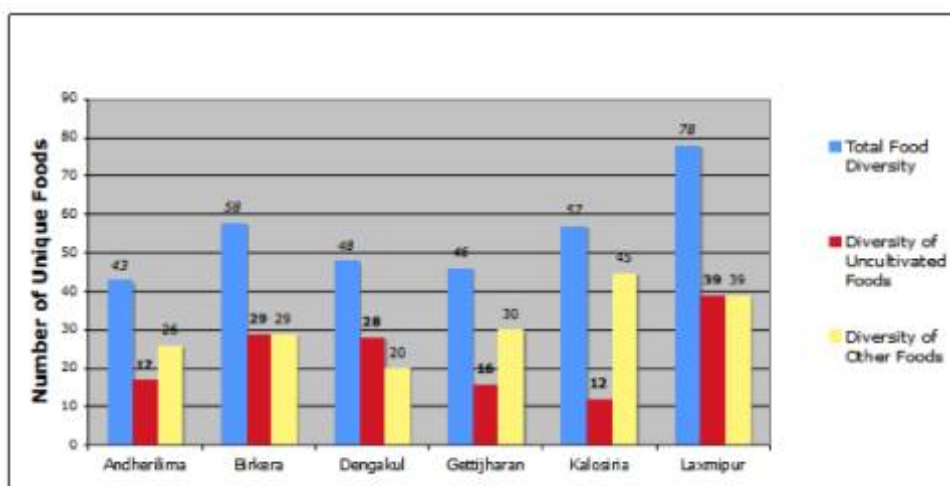
* Each reading is being considered here as equal to a day's consumption by a household; actual consumption of total food as well as uncultivated food could be higher.

In all, 294.39 kgs of uncultivated foods went into consumption in the cooked foods of the families studied. **This is about 0.725 kg per household per day (per reading) across all the villages.** This also constitutes **18.84%** of the total cooked foods consumed by the sample households. Overall, uncultivated foods constitute 12% to 24.4% of the total foods consumed in the sample households across all study villages.

There is inter-village variation seen of course, as shown in the last column of the table above, ranging from 0.45 kg per reading (which can be treated as one day's consumption of one household on an average) in Birkera and Gettijharan villages in Sundargarh district to 1.19 kg in Dengakul village in Rayagada district.

In all, fruits of 21 wild plants, roots and tubers from 13 plants, 20 species of fungi and leaves from 33 plants were recorded in this consumption documentation.

Figure 22: Total Food Diversity in Study Villages (Consumed by Cooking)



There was also variation seen in UCF consumption across months, expectably. This is the percentage of uncultivated foods, within the total cooked food.

The initial period of the study (last week of July and the month of August) witnessed high consumption of uncultivated foods, which then declined in all villages. This was as high as 45.9% in Dengakul, 38.8% in Laxmipur, 27.2% in Andherilima and 27.1% in Gettijharan. The percentage of uncultivated foods within total cooked food fluctuated dramatically in all villages across the months studied.

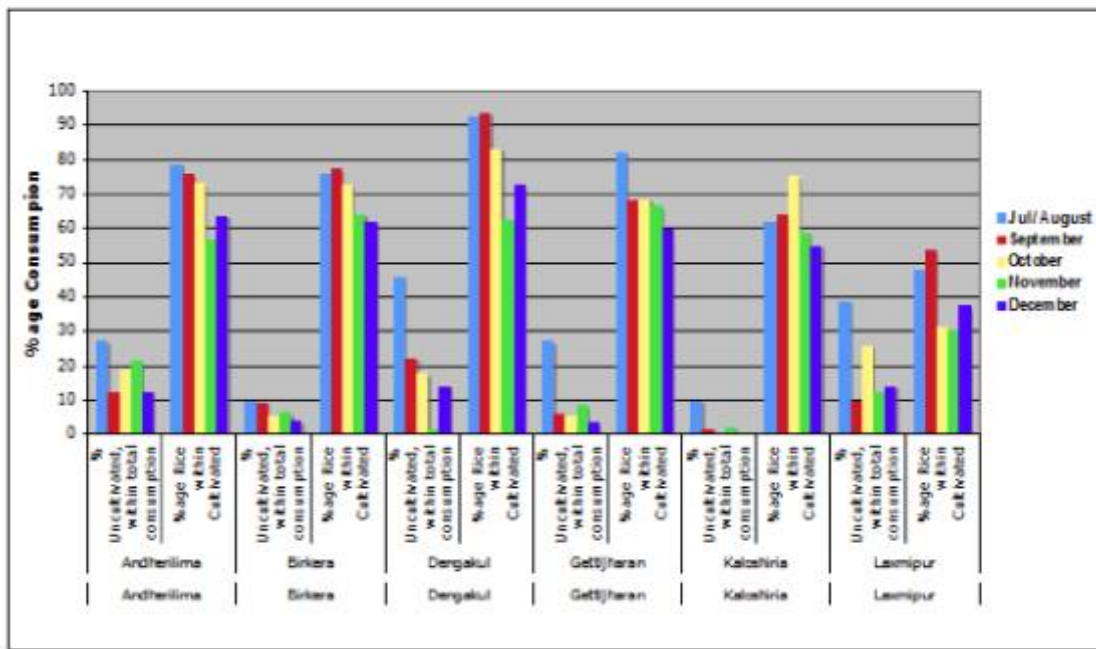


Rice is the single most important staple of the total cooked food. We present here the percentage of rice within the cultivated food, across months in all the six study villages. With the exception of rice, **the quantity of uncultivated foods within the cooked diet of all villages is considerably high.**

However, the proportion of rice consumption appears to fluctuate in different periods of the year. The proportion of rice in cooked food plummeted to 31% in Laxmipur in October and November, while it was 94% in Dengakul in September.

This also gives us a picture of cultivated foods' diversity within the study villages across months, pointing out that diversity itself is an important factor in the diets, both in cultivated and uncultivated foods. Within what is calculated as cultivated foods are a variety of leaves and other foods, which can be treated as uncultivated foods in an expanded definition of such foods. This includes watermelon leaves, mustard leaves, pumpkin flower and leaves, bittergourd leaves, bhindi leaves, cowpea leaves etc. Some scholars have argued that even these constitute uncultivated foods, given that the cultivated crop is primarily for a primary plant product (e.g. fruit), whereas the food culture is also consuming other parts of the plant as incidental by-products of the same plant as food.

Figure 23: Consumption Data of UCF within Total Cooked Food and Rice within Cultivated Food



The above picture of variation across months could have been because of a variety of factors both related to availability as well as factors at play within a household. For instance, the need to work in cultivated lands could affect collection and consumption of uncultivated foods; further, harvests of agricultural produce from the cultivated lands could also affect consumption of uncultivated foods seasonally. This is quite apart from the availability of particular uncultivated foods.

The variation across villages could also be because of a variety of factors including availability, kind and extent of forest area, cultivated landholdings and the diversity and production of crops there. Schooling levels and proximity to urban centres could affect diets, coverage and implementation of various food schemes of the government etc.



Based on the findings from the primary research, we present below the per capita daily consumption of uncultivated foods vis-à-vis other kinds of foods. The per capita figures include both adults and children.

Table 31: Average consumption of different food groups by individual member of sample family

Village	Per capita daily consumption of UCF in g	Per capita daily consumption of cereal in g	Per capita daily consumption of pulses in g	Per capita consumption of non-vegetarian food in g
Andherilima	200	568	71	5
Birkerera	140	387	28	12
Dengakul	190	484	29	18
Gettijharan	80	398	37	30
Kaloshiria	130	347	22	3
Laxmipur	180	492	46	22

Table 32: Percentage of Recommended Daily Allowance

Village	Per member cereal consumption in g	Per member pulses consumption in g	Per member non-veg consumption in g	Energy Kcal	% of RDA met	Protein g Per member	% of RDA met
Andherilima	568	71	5	2221	85 %	19	31%
Birkerera	387	28	12	1473	56%	10	16%
Dengakul	484	29	18	1831	70%	11.75	19.5 %
Gettijharan	398	37	30	1604	61%	16.75	27.91 %
Kaloshiria	347	22	3	1281	49%	6.25	10 %
Laxmipur	492	46	22	1932	74%	17	28 %

The calorie requirement is 2,600 Kcal per day per head for normal man and 60 g of protein per day the Recommended Daily Allowance.

The present diets did not meet the RDA and therefore there is need to improve these diets, Specially protein requirement can be improved by conserving natural forest which includes water bodies thus increasing access to fish, snail, crab and prawn etc.,

The Uncultivated Foods recorded to have been consumed in the sample households during the study period include:





Table 33 : List of UCF consumed

Wild Fruits/Flowers		Mushrooms		Greens		Tubers		Wild Animals/birds/insects	
1	Wild Ridge gourd	1	Beli chhatu	1	Amaranthu	1	Bhata kanda	1	Boar
2	Willd round Bitter gourd	2	Balisura chhatu	2	Bali Saga	2	Butid guy	2	Crab
3	Ambdo fruit (wild fruit)	3	Basa chhatu	3	Bandhuri sag	3	Cherenga kanda	3	Dry fish
4	Bamboo shoot	4	Baunsa chhatu	4	Barada saga	4	Dakli kanda	4	Duck
5	Bitter Gourd	5	Bhoranda chhatu	5	Bittergourd	5	Godod guy	5	Fish (diff kinds)
6	Boiled custard apple	6	Chirko chhatu	6	Chakunda gunda	6	Geti kanda	6	Pigeon
7	Chhiadi (Wild Fruit)	7	Dasahara chhatu	7	Colocasia Leaf	7	Katha kanda	7	Prawn
8	Colocasia	8	Gamha chhatu	8	Cowpea leaf	8	Langala kanda	8	Rabbit Meat
9	Custard Apple	9	Ganne chhatu	9	Drumstick leaf	9	Margudi guy	9	Red Ant
10	Demta (Fruit)	10	Gende chhatu	10	Gandhiri saga	10	Phalo kanda	10	Snail
11	Dry mango	11	Jamu chhatu	11	Garki saga	11	Pita kanda	11	Wild Chicken
12	Gangra (UC gourd)	12	Jawa chhatu	12	Gurudi saga	12	Pitala Kanda		
13	Guava	13	Muccho chhatu	13	Hatua saga	13	Raadi kanda		
14	Jack fruit	14	Patiary chhatu	14	Jaba saga				
15	Jack fruit seed	15	Patra chhatu	15	Kakro sag				
16	Koyanar phula (Wild Flower)	16	Reguda chhatu	16	Kalmi sag				
17	Mango	17	Srabana chhatu	17	Kamara sago				
18	Maya fulo (Wild Flower)	18	Suga chhatu	18	Kanta saga				
19	Papaya	19	Taropitt chhatu	19	Katai saga				
20	Tamarind	20	Termide Mushroom	20	Koda sa				
21	Wild Evegourd			21	Kola sag				
				22	Koyanar sago				
				23	Kurdum sag				
				24	Mali saga				
				25	Manji saga				
				26	Matha saga (dry)				
				27	Matha saga				
				28	Muda sag				
				29	Patni saga				
				30	Rasi sag				
				31	Siti saga				
				32	Sunsunia saga				
				33	Tumbi saga				

In terms of absolute quantities of uncultivated foods consumed through cooked food, bamboo shoots, one kind of tuber (pitala kanda) and different kinds of fish dominated.

3.7 Results and Discussion

Our study constitutes the first quantitative documentation of uncultivated foods, both in terms of their collection and consumption, in two districts of Odisha. The sample villages chosen covered different adivasi communities (Kondhs, Mundas, Lanjia Savaras) and different kinds of forest situations (dense to sparse, near to distant), while the sample households themselves were randomly chosen they represent households of varying landholdings, family sizes, and economic strata.

This cross-sectional study clearly brings out that the dependence of the adivasi villages on uncultivated edible plants and animals for food is indeed very high and significant. The greatest diversity of food appears to ensue



from the wild habitats and not from cultivated sources. The quantity of uncultivated food, across all the villages studied, ranged from 12% to 25% of the total cooked food consumed by sample households, although in certain months, the proportion could be >25%. This estimate leaves out the consumption of uncooked items of the uncultivated foods, such as wild fruits. An estimation of the total uncultivated foods are present in the collection or harvest data that we presented in the first part of this chapter. What is also interesting to note is that in the Participatory Rural Appraisal exercises, similar findings as the ones in the field survey emerged. Foods that were listed as important, as available over longer time windows and to an extent, even the extent of dependency shows similarities between different methodologies adopted, in this mixed-method, cross-sectional study.

Needless to say, the extra-agricultural, wild sources of food are of particularly great value to the hungry and the malnourished. However, it is seen that these foods are not being emphasized upon, either in our land use debates or forestry approaches or food security discourse. There are certain important elements to the above findings that we would like to highlight in this section, which deserve the attention of policy makers and communities alike.

1. Nutritional importance of uncultivated foods: The uncultivated foods found to be consumed, by this study, include vegetables, fruits, roots and tubers, greens, small mammals and birds, fish and other aquatic life and various kinds of mushrooms. Because fruits, vegetables and animal source foods are important sources of micro-nutrients, they make an important and critical contribution to local diets even in small amounts. These types of foods, compared to starchy staples cultivated through agriculture or the PDS system and snacks obtained through purchases, have higher density of most micro-nutrients relative to energy, carbohydrates and sugars. Since data on nutrient composition of all uncultivated foods is lacking, direct comparisons between these and cultivated foods is difficult. Moreover, nutrient content of various fruits and vegetables can be extremely variable, depending on factors like variety, climate, harvest and storage factors.

It is acknowledged that consumption of animal source foods is a preferred strategy for improving micro-nutrient status (linked to children's growth and cognitive development) in developing countries in our study; we came across numerous wild animal species consumed by the sample households.

Coming to the greens, while several are considered as 'weeds' by modern agriculture science, these are respected as foods by the locals. The consumption of uncultivated greens is also found to be quite high in this study. In fact, mushrooms, greens and tubers exhibited great diversity during the study period.

An analysis showed that amongst energy-giving foods (also termed as "Go Foods", which are energy providing), 75% are cultivated and 25% are uncultivated (tubers mostly) as given below.





Table 34 : Nutritional Values of Cultivated and Uncultivated foods

Food item Units	Protein g	Fat g	Fibre g	Energy Kcal	Calcium mg	Iron mg
Cultivated foods						
1. Maida	11.0	0.9	0.3	348	23	2.7
2. Sugar	0.1	0.1	0	398	12	0.1
3. Wheat	11.8	1.5	1.2	346	41	5.3
4. Rice bean	8.3	1	4.2	345	20	0
5. Rice	6.8	0.5	0.2	345	10	0.7
6. Ragi	7.3	1.3	3.6	328	344	3.9
7. Maize	11.1	3.6	2.7	342	10	2.3
8. Potato	1.6	0.1	0.4	97	10	0.48
9. Foxtail Millet	12.3	4.3	8	331	31	2.8
10. Little Millet	7.7	4.7	7.6	341	17	9.3
11. Barnyard Millet	6.2	2.2	9.8	307	20	5
12. Oil	0	100	0	900	0	0
Uncultivated foods						
1. Colocasia	3	0.1	1	97	40	0.4
2. Yam elephant	1.2	0.1	0.8	79	50	0.6
3. Yam Ordinary	1.4	0.1	1	111	35	1.19
4. Yam wild	1.2	0.3	1	110	20	1

In the case of what are commonly termed as “Grow Foods”, which are foods that enhance growth and development, and are protein-rich, it has been found that cultivated and uncultivated foods have a 50%-50% share in the local diets. The following table gives a more detailed picture.

Table 35: Nutritional values of Protective Glow Foods***

Body building / grow foods Units	Protein g	Fat g	Fibre g	Energy Kcal	Calcium mg	Iron mg
Uncultivated foods						
1. Chicken	25.9	0.6	0	109	25	0
2. Egg (hen)	13.3	13.3	0	173	60	2.1
3. Egg (duck)	13.5	13.7	0	181	70	2.5
4. Prawn	19.1	1	0	89	323	5.3
5. Wild pig	18.7	4.4	0	114	30	2.2
6. Crab	11.2	9.8	0	169	1606	0
7. Fish	16.1	0.9	0	100	330	0.8
8. Red ant	13.4	4.6	0	131	104	0
Cultivated foods						
1. Cowpea dal	24.1	1	3.8	323	77	8.6
2. Soya bean	43.2	19.5	3.7	432	240	10.4
3. Peas	7.2	0.1	4	93	20	1.5
4. Bengal gram dal	20.8	5.6	1.2	372	56	5.3
5. Pigeon pea dal	22.3	1.7	1.5	335	73	2.7
6. Beans	1.7	0.1	1.8	26	50	0.61
7. Field bean	24.9	0.8	1.4	347	60	2.7
8. Goat meat	21.4	3.6	0	118	12	0
9. Lentil	25.1	0.7	0.7	343	69	7.5
10. Horse gram dal	22	0.5	5.3	321	287	6.7

The last category of foods may be classified as “Glow Foods”, which are rich in vitamins, and protect us from different diseases. During the study period, it was seen that around 41 different kinds of greens in addition to a variety of wild fruits were being consumed by the sample households. Food composition data is available for only 16 of these greens. It is important that food composition analysis is taken up for all the remaining uncultivated foods in this category to take up proper planning for overcoming micro-nutrient deficiencies.



Table 36: Nutritional values of Protective Glow Foods

Protective/glow foods Units	Scientific name	Protein g	Fat g	Fibre g	Energy kcal	Calcium mg	Iron mg	Carotene µg	Vit C mg
Uncultivated foods									
Guruda Saga	<i>Celosia argentia</i>	3.9	0.3	2.1	49	398	20.9	3967*	125.45
Jumbo	<i>Syzygium heyneanum (Duthie)</i>	1.3	0.5	3.8	37	30	4.3	48	18
Kankoda	<i>Momordica dioica Roxb. ex Willd</i>	3.1	1	3	52	33	4.6	1620	
Mango	<i>Mangifera indica</i>	0.6	0.4	0.7	74	14	1.3	2743	16
Tamarind seed	<i>Tamarindus indica L.</i>	16.1	7.3	1	387	121	0	0	0
Sunsunia Saga	<i>Marsilea minuta L.</i>	3.7	1.4	1.3	46	53	0	0	0
Muchakani Sag	<i>Cocculus hirsutus (L.)</i>	9.1	1.9	7.6	189	1152	10.7	4305*	232.17
Kusum kol	<i>Schleichera oleosa (Lour.) Oken</i>	1.5	0.8	0.6	53	15	0	0	0
Ivy gourd	<i>Coccinia cordifolia</i>	1.2	0.1	1.6	18	40	0.38	156	15
Tamarind	<i>Tamarindus indica L.</i>	3.1	0.1	5.6	283	170	17	60	3
Drum stick leaf	<i>Moringa oleifera</i>	6.7	1.7	0.9	92	440	0.85	6780	220
Pumpkin	<i>Cucurbita maxima</i>	1.4	0.1	0.7	25	10	0.44	50	2
Mushroom		3.1	0.8	0.4	43	6	1.5	0	0
Pumpkin Leaf	<i>Cucurbita maxima</i>	4.6	0.8	2.1	57	392	0	0	0
Bamboo Shoot	<i>Bambusa arundinacea</i>	3.9	0.5	0	43	20	0.1	0	5
Jack fruit (seeds)	<i>Artocarpus heteroehyllus</i>	6.6	0.4	1.5	133	50	1.5	175	7
Bottle gourd	<i>Lagenaria bulgaris</i>	0.2	0.1	0.6	12	20	0.46	0	0
Colocasia Leaf	<i>Colocasia esculenta (L.)</i>	3.9	1.5	2.9	56	227	10	10278	12
Papaya	<i>Carcia papaya</i>	0.6	0.1	0.8	32	17	0.5	666	57
Custard Apple	<i>Annona squamosa</i>	1.6	0.4	3.1	104	17	4.3	0	37
Poi sag	<i>Basella rubra L.</i>	2	0.7	0.6	26	73	1.1	7440	87
Gogu	<i>Hibiscus cannabinus</i>	1.7	1.1	0	56	172	2.2	2898	20
Radish leaf	<i>Raphanus sativus</i>	3.8	0.4	1	28	265	0.09	5742	106
Garuida saga	<i>Alternanthera sessilis</i>	5	0.7	2.8	73	510	1.63	1926	17
Matta saga	<i>Antidesma acidum</i>	7.2	4.8	13.5	303	1717	-0	0	
Siali seed	<i>Bauhinia vahlii</i>	27.3	29.9	1.1	493	302	6.8	0	0
Bathua sag	<i>Chenopodium album</i>	3.7	0.4	0.8	30	150	4.2	1740	35
Kada sag	<i>Amaranthus caudatus</i>	3	0.7	1	26	200	0	0	0
Mustard leaf	<i>Brassica napus L. var</i>	4	0.6	0.8	34	155	16.3	2622	33
Cow pea leaf	<i>Vigna catjang</i>	3.4	0.7	1.2	38	290	20.1	6702	4
Barada sag	<i>Bauhinia purpurea L.</i>	3.6	1	5.5	62	312	0	0	0
Kundri sag	<i>Coccinia grandis (L.)</i>	3.9	0.3	2.1	49	398	20.9	3967	125.45
Bittergourd leaf	<i>Momordica charantia</i>	4.5	4.5	4.5	73	207	3.2	3985	65
Kalamasag	<i>Ipomoea aquatica</i>	2.9	0.3	2.2	31	70	3.3	2741	28
Kanta sag	<i>Amaranthus spinosus L</i>	3.0	3.0	1.1	43	800	22.9	3564	81
Mahula	<i>Madhuca indica Gmel.</i>	1.4	1.6	-	111	45	0.23	307	40
Gandhiari sag	<i>Amaranthus caudatus</i>	3.0	0.7	1	26	200	-	-	
Cultivated foods									
Tomato		1.9	0.1	0.7	23	20	1.8	351	27
Brinjal		1.4	0.3	1.3	24	18	0.38	74	12
Radish		0.7	0.1	0.6	17	35	0.4	3	15
Onion		1.8	0.1	0.6	101	50	0.5	15	2
Ridge gourd		0.5	0.1	0.5	17	18	0.39	33	5
Cucumber		0.4	0.1	0.4	13	10	0.6	0	7

It is quite apparent from the above tables that these uncultivated foods are a rich and free source of micro-nutrients for the adivasi families.



Table 37: Comparative chart of nutrient values of some cultivated and uncultivated fruits ***

Nutrient	Units	Uncultivated and gathered in the study area										
		Cultivated or purchased		Apple	Banana	Amla	Guava	Jambo	Mango	Sithaphal	Papaya	Zizyphus
Minerals	g		0.3	0.8	0.5	0.7	0.4	0.4	0.9	0.5	0.3	0.9
Fiber	g		1.0	0.4	3.4	5.2	0.9	0.7	3.1	0.8	-	1.1
Carbohydrate	g		13.4	27.2	13.7	11.2	14	16.9	23.5	7.2	17	19.8
Energy	kcal		59	116	58	51	62	74	104	32	74	88
Calcium	mg		10	17	50	10	15	14	17	17	4	20
Phosphorous			14	36	20	28	15	16	47	13	9	41
Iron	mg		0.66	0.36	1.2	0.27	0.4	1.3	4.3	0.5	0.5	0.56
Carotene	µg		0	78	9	0	48	2743	0	666	21	175
Thiamin	mg		-	0.05	0.03	0.03	0.03	0.04	0.07	0.08	0.02	0.03
Riboflavin	mg		-	0.08	0.01	0.03	0.01	0.03	0.17	0.09	0.05	0.13

Table 38: Comparison of nutritional value between cultivated and uncultivated tubers ***

Nutrient	Units	Uncultivated and gathered in the study area						
		Cultivated or purchased		Potato	Sweet potato	Colocasia	Yam elephant	Yam ordinary
Protein	G		1.6	1.2	3.0	1.2	1.4	2.5
Fat	G		0.1	0.3	0.1	0.1	0.1	0.3
Minerals	G		0.6	1.0	1.7	0.8	1.6	1.4
Fiber	G		0.4	0.8	1.0	0.8	1	1
Carbohydrate	G		22.6	28.2	21.1	18.4	26	24.4
Energy	Kcal		97	120	97	79	111	110
Calcium	Mg		10	46	40	50	35	20
Phosphorous	mg		40	50	140	34	20	74
Iron	mg		0.5	0.2	0.4	0.6	1.19	1
Caroteneg	µg		24	6	24	260	78	565
Vitamin - C	mg		17	24	0	0	0	1
Folate	mg		7.0	0	54	0	17.5	0

***Nutritive value of Indian Foods 2007, NIN, ICMR, Hyderabad India; www.mcgill.ca/cine

The nutritional diversity that the uncultivated foods present themselves in, as well as the abundance of availability in the case of rich forests is a very important and neglected answer to micro-nutrient deficiency among adivasi community.

2. Need for Food/Nutritional Composition Analysis of Uncultivated Foods: The analysis related to nutritional composition of many uncultivated foods has not been taken up systematically yet by any state agency. It is apparent from even the small amount of analysis that has been done that there is a great potential in these foods to address hunger and malnutrition problems, especially amongst adivasi communities. A wider analysis will help policy discourse move in the right direction and will also facilitate grassroots dialogues in re-



popularising and reinforcing these foods in local diets.

It is felt that a judicious combination of people's knowledge and scientific nutritional data to spread the virtue of uncultivated foods is necessary.

3. Protection of Uncultivated Food sources: From our field visits and interactions, it was clear that availability of uncultivated foods itself is getting affected because of changes in forests, cropping patterns and agricultural technologies/models adopted (monocultures, herbicides, pesticides etc.). Additionally, there is the issue of access of the available sources by the local communities, which in turn is also getting affected by numerous factors including socio-cultural changes. It is very important that existing sources of uncultivated foods are kept protected since herein lies (in uncultivated foods) the most important solution in dealing with the food and nutrition security of adivasis.

There is a clear need for re-integration of cuisine, culture, agriculture and forests.

3.8 Salient Findings

This study was taken up by Living Farms, a community based non-profit organization in Odisha, was conducted in the districts of Rayagada and Sundargarh, with the help of organizations DISHA (Sundargarh), ASHA and SHAKTI (Rayagada). It used a mixed methods approach in its objective to understand the issues around collection and consumption of uncultivated foods and the extent of dependence of adivasi communities on such food for their food and nutrition security.

While secondary literature shows increasing importance accorded to international academic and policy discourse of forest foods, it is seen that there is a serious dearth of research on numerous fronts within India on the subject. Even civil society work has ignored the importance of uncultivated foods in their contribution to food and nutrition security of adivasis, in addition to forest conservation.

This study recorded 121 different kinds of uncultivated foods being harvested between the last week of July 2013 and December 2013 by the sample households. On an average, 4.56 kg of such foods were harvested during each collection foray per household. This ranged from 6.45 kgs on an average in the three Rayagada villages to 2.55 kgs on an average in the three Sundargarh villages. Across villages, it ranged from 2.08 kgs to 8.97 kgs per household, per foray, with the diversity ranging from 21 kinds to 69 different kinds of foods. The highest diversity was in mushrooms during the study period, while the largest quantities harvested were that of various tubers.

Similarly, 98 different kinds of uncultivated foods went into the cooked foods consumed by a sub-set of the sample households. Here, Greens exhibited the greatest diversity followed by wild vegetables, shoots, fruits etc., closely followed by Mushrooms and tubers. Wild animals also formed a substantial part of the diversity of consumption. On an average, 0.725 kg of uncultivated foods became part of the cooked food consumed per household per day. This was 18.84% of total cooked food consumed. Since these findings came out of readings from the kitchen, this should be considered as under-reporting given that many such foods are consumed raw (for example many fruits). Further, rice constituted a substantial chunk of cultivated foods in all households if this is excluded, the share of uncultivated foods is substantially higher. Across villages, uncultivated foods ranged from 12% to 24.4% of total cooked foods weighed (0.45 kgs to 1.19 kgs). Overall, it is seen that there is a great deal of diversity in the foods, including in cultivated foods that went into cooking.

Participatory Rural Appraisal (PRA) exercises taken up with the communities studied showed the criticality of uncultivated foods in the perceptions of the adivasi communities. The cultural linkages with forests and forest foods are clear and alive to this day. However, a variety of factors could potentially be playing a role in a general decline on dependence on forest foods, as reported by the adivasi communities.



In terms of a nutritional analysis, it is found that the forest foods could be playing a vital role in terms of micro-nutrients; however, it is also seen that mainstream research has not focused on this aspect and our food/nutrition security discourse does not acknowledge the importance and critical role of uncultivated foods in the lives of adivasi communities.

It is clear that the adivasi communities' dependence on uncultivated foods requires more systematic documentation and active protection and promotion for an all-round win-win situation for the communities, state, environment and future generations.

The study team consciously shied away from coming up with any “conclusions”, given that there are numerous unexplored aspects to uncultivated foods and their critical importance. What the authors would like to present here are some issues that appear to be clear points worth noting by policy makers and civil society groups, and others that need further exploration and inquiry.

- 1. Importance of uncultivated foods:** This study shows that uncultivated foods, which still form a very important chunk of Adivasi communities' diets (in variety, and therefore, quality as well as quantity), have been grossly neglected and ignored by civil society and state actors alike. Our exploration through literature search, field survey and PRAs shows that the following aspects of uncultivated foods are very important to note:
 - 1.1. Critical supplement:** It appears that in times of stress, whether it is bad (cultivated food production) years, hunger months, or lean weeks within a month when the PDS ration dries up and employment not available, it is the uncultivated foods which keep communities alive. This could be seen through historical accounts as well as anecdotal evidence that people shared. The criticality of these foods is also in terms of their nutritional composition.
 - 1.2. Year long supply:** If the forest is being maintained well in all its diversity and if access is good, there is a year long supply of such uncultivated foods that can be noted. This is especially so with tubers, greens and various fruits.
 - 1.3. Nutritious diverse foods:** Technical analysis of these foods shows that most such foods are highly nutritious, while it is indeed true that some foods may have anti-nutritional properties. The diversity of these foods is also an important factor to note.
 - 1.4. Not just affordable, but free:** At a time when income inequities are showing up starkly with rural communities getting impoverished, this is a food source that is not just affordable but completely free. If the resource is managed sustainably, it is also a source of income for the communities.
 - 1.5. Safe food:** Food safety is a major emerging concern when it comes to cultivated food, especially of fruits, vegetables and green. However, here is a source of food where no chemicals or additives come in at the time of growing, or post-production. This food is safer, also in the context where it is well established that toxins like pesticides have a greater adverse impact on already malnourished people.
 - 1.6. Climate Change:** Wild species are supposed to be more resilient in this age of climate change, compared to cultivated species. On the other hand, the periods of food stress of communities are also likely to increase due to climate change, if they are dependent only on cultivated foods. Uncultivated foods provide an important fallback mechanism in this context.
 - 1.7. Dignity:** These foods, which do not require a household to incur costs, borrow money, depend on a government dole-out scheme or even seek the permission of others before accessing, lend communities as well as individual households a sense of self-dependence, and therefore, dignity and pride, which are quite dear to Adivasi communities. In our interactions, the lack of reliability of state schemes was repeatedly brought up.



- 1.8. **Associated knowledge:** There is an enormous wealth of biological knowledge associated with these foods with members of the community, including children. Whether it is about where a particular species grows, seasonality, characteristics, identification and appearance, or its nutritive and medicinal properties, properties related to processing or storing, cooking methods and quality, veterinary and livestock uses etc., are all valuable knowledge that community members possess.
- 1.9. **Cultural importance:** Several of these foods hold great cultural significance for the communities dependent on them. This is also an under-studied and unacknowledged area.
- 1.10. **Gender equality:** While in the context of farming for subsistence or farming for cash incomes, there is a tangible degree of unequal access, ownership and decision-making roles for men and women, in the case of wild uncultivated foods, this is fortunately missing. True, there are small gendered dimensions even here when it comes to particular uncultivated foods, or distance traveled to collect such foods. However, there is a greater degree of equality between the sexes when it comes to collecting these foods.

What is unfortunate is that most of these issues have not entered the discourse of even the civil society groups which have worked for Adivasi rights, sustainable forestry models or ones who have sought to address food rights. Needless to say, if they have not entered the discourse, they have not entered into the action plans either. This has been a neglected aspect of many anthropological studies too, related to various Adivasi/forest-dependent communities. In the recent past, it is some biochemistry, ethno-botany and nutrition scientists who have taken some interest in the subject.

About government's acknowledgement of this important source of food, there is nothing much to be said since it appears that no such acknowledgement exists at all, in land use, forestry, agriculture, rural development or food policies. If it has been acknowledged at times, it is mostly in the context of seeing this as "backward" and "primitive", and as a failure of the government's services. This complete absence from the discourse, understanding and policy approaches is truly baffling and worrisome.

2. **Decline in availability and consumption of uncultivated foods:** This effort at assessing the dependence on uncultivated foods for a community or household's food security was seriously limited given the fact that there was no baseline to fall back on. The only indication of the quantities that used to exist 3-4 decades back and now, is a picture presented by some local traders, and the perceptions shared by villagers. It is apparent even with this limitation that the availability and consumption diversity as well as quantity has declined. This has been insidious, without any debate or discussion even within the community. The reasons for the decline appear to be many and some of them include:
 - (i) Forest cover declining, and the forests 'moving farther away' from villages
 - (ii) Forest area being replaced by plantations of various kinds some are by the forest department of monocultures, while yet others are by the people, due to incentives and schemes provided, to replace podu shifting cultivation
 - (iii) Rainfall patterns affecting some forest foods this has been mentioned in the context of mushrooms and greens, for instance
 - (iv) PDS rice scheme affecting dietary patterns; bringing in a sense of food security amongst villagers too, while dependability, cultural and nutritional appropriateness of such foods was not questioned
 - (v) Elephant herds and forest fires (sometimes set intentionally during kendu leaf season) affecting forests especially bamboo forests
 - (vi) People's cash incomes rising from other sources purchased food finds more space in the kitchens now



- (vii) “Development” in various forms arriving into a community roads and cashew nut plantations
- (viii) While this was not seen in our current study, experience from elsewhere shows that the impact of invasive alien species has also meant decline in availability, and therefore, consumption of uncultivated foods
- (ix) Elsewhere, where uncultivated foods are gathered from farm fields, chemical agriculture and monocultures have also been a factor affecting availability.

When there is a loss of habitat, this leads to a loss of availability of such foods. When there is lack of availability, it leads to loss of knowledge. It also leads to a decline in value accorded to a resource. These contribute to lack of consumption. This leads to erosion of cultures. There is a vicious cycle set off in the process of each feeding into the other. Here, it is important to reiterate one of the most important findings that we came across during the effort: that in village after village, participants in the study reported that fruit trees are never felled and are protected.

There are very few hindrances in terms of access that the forest department poses and villagers readily admit that this is so. However, when the nature of forest itself has been changed by the department, then access being allowed for uncultivated foods does not signify anything.

In several villages associated with this study, participants asserted firmly that there is no inferiority associated with these foods, which is a very positive sign. In other locations, such a hierarchy of values has already entered food consumption beliefs unfortunately, and this is seen quite clearly in the case of millets, called as “coarse grains”, that too when it comes to what are called as “minor millets”. The social status accorded to these grains and their consumption is so low that people's consumption habits have been affected because of this factor. This was a factor noticeably lacking in the case of uncultivated foods, as reported by villagers.

3. **Variations:** Any work on uncultivated foods has to factor in the apparent variations in availability as well as consumption of these foods. Variations are due to:
 - a. Regional distribution and local abundances (as a literature search shows),
 - b. Depending on the community (the Lanjia Saora village studied has had many more investments on that community through special projects by the government they have been weaned away from many millets too, over the years. The food habits here have changed compared to what they used to be; similar would be a difference between communities that have been mainly categorized as “hunter gatherers” and ones that were into settled agriculture, and ones that had been pastoralist)
 - c. As per the forest models adopted in a location (plantations of teak, bamboo, pongamia, cashew etc. in several locations meant a decline in availability and access) and forest cover (if it has thinned and moved farther away from the village, villagers are content with gathering (or not) whatever is in the vicinity rather than taking the difficult path of going into distant places)
 - d. Depending on the household's situation with regard to landholding, crops being grown, yields from such crops, access to PDS ration card existence and ration supplies etc. Family size also is a determinant.
 - e. Depending on the season: rainy season is when there is highest availability as well as consumption.
 - f. Depending on the associated knowledge: needless to say, the actual gathering and consumption will vary depending on the knowledge associated with these foods this begins from identifying them in the wild, knowledge about cooking or processing and so on.

This study did not focus on intra-family situation and we were unfortunately not able to glean anything on intra-household variations as part of this study and flag this as an issue to be studied further.



In this context, it would help greatly to map out vulnerabilities in terms of specific categories of individuals, specific households, particular communities and locations, so that any future interventions are more focused.

It also appears that while there is a regular set of uncultivated foods that are consumed usually, there is another set of uncultivated foods in each location, that are especially supportive in times of stress. In discussions around these foods, the latter have to be paid attention too because these are foods that support survival in times of extreme stress.

4. Safety and anti-nutritional properties of uncultivated foods: Uncultivated foods are safe and organic, when it comes to chemical residues from pesticides and so on. However, both as per the community's knowledge and understanding, as well as modern science's analysis, there are some uncultivated foods that are toxic or anti-nutritional or might prove harmful in some circumstances, or fully. This might depend on the part used, the growth stage of the plant, the way the food is prepared, the season, the individual consuming it, as scientific literature also shows. It is also seen that prolonged consumption of certain fruits containing natural toxins could manifest in symptoms such as stunting, indigestion and aggravation of malnutrition (FAO, 1995). Anti nutritional factors like oxalates, phytates, saponin and tannin which interfere with metabolic processes so that growth and bioavailability are negatively influenced. Communities themselves know which foods to avoid, which foods to de-toxify before consumption. However, there is also the issue of lack of safety entering the picture during processing and storage. The classic case of deaths and illnesses after mango kernel consumption is related to this, bringing much notoriety to wild foods.

Bio-availability of the positive nutritional features of these foods is another question. Some of the Adivasi communities are known to eat most of their food boiled, with very little use of a cooking medium such as oils. In the study villages, in at least two villages, the apparent malnutrition of some of the children was striking. It has to be seen if there are any issues pertaining to the bioavailability, as well as quantities of consumption of the uncultivated foods.

It is very apparent that any further studies into uncultivated foods have to take these factors into account.

5. Forests as food producing habitats: Forests have rarely been looked at as food producing habitats in our policy discourse or implementation of any development efforts related to food security. This is the fundamental shift required, that this study points to. Uncultivated foods are in fact safe, diverse and nutritious food that is several ways superior to the food security frameworks that rest on intensive agriculture paradigms in particular pockets of the country. The fact that the forest department has always focused on plantation revenues ignoring the real and imputed value of NTFPs and unmarketed forest foods has to be challenged. As a senior bureaucrat pointed out in the course of this study, the forest department has always chosen the more lucrative as well as easy way out in its functioning, and ignored the more challenging conservation function, along with communities. We believe that socio-cultural linkages with forests, including in terms of food, have a great potential to create a more symbiotic relationship once again for forest communities and their forests.

Civil society has a critical and important role to play here, in striking dialogues with communities on this front. PESA and FRA are constitutional and legal spaces that are already available whose full potential has to be actualized. FRA implementation in terms of community claims is still awaited. The shift to a new approach towards forests (as food producing habitats) should be balanced to ensure that it happens in a non-exploitative and sustainable fashion. The dilemma with pointing out the positive features of such uncultivated foods is the immediate seizure of certain forces for market opportunities for the same, which negates the very nature of such foods. It is apparent that such a shift requires investments in processes of dialogues and knowledge-sharing within the community wherever needed.



It is not out of place to remark here that the causal links between forests and human health need greater exploration with a convergence between various related departments. This is in the context of uncultivated foods (their nutritional and anti-nutritional properties if any), forest derived medicines and healthcare systems as well as the lack of provisioning of certain services for forest communities which could be negating or nullifying the positive effects of their plentiful bounty.

6. Cultivation, including Shifting cultivation: In this study, we did not intend to find the inter-linkages between regular lowland cultivation (including cropping patterns and farm technologies used (e.g. GM seeds, synthetic fertilizers, pesticides and farm machinery), shifting/podu cultivation and the wild and uncultivated foods. As noted elsewhere, we realize that it is not enough to look at the nutritional qualities of isolated uncultivated foods that a person might consume but look at the entire diet spectrum. It is also apparent that increased use of chemicals in agriculture will have its own impact on forest diversity, as evidenced in bee colony collapse, and local amphibian population eradication by glyphosate herbicides. It appears that the jury is not fully out yet with regard to shifting cultivation, especially in a regenerative manner as was practiced by some communities in the past. Abolition of hill (*dongar*) cultivation itself might have its impacts on uncultivated foods' collection and consumption. Admittedly, this did not come out as a major issue in our interaction with villagers, but we would like to flag this as an area for future exploration.

7. Some areas for future studies:

- Systematic and comprehensive documentation of regularly used uncultivated foods, and ones which the communities depend on, during hardships all over the state, and India. This requires systematic year-round documentation of all such foods collected and consumed. The current study covered only around five months of the year further, the issue of processing and storing for future use was not captured, and the processes from collection to consumption were not documented fully. This also requires taxonomical classification of all wild foods that are encountered, in addition to nutritional analysis.
- Intra-household dynamics when it comes to uncultivated foods, if any if more equitable conditions are found in the case of access and consumption of uncultivated foods, as opposed to the food security schemes administered by the state, this could be one more very important reason to stress on uncultivated foods.
- Time use surveys to look at uncultivated food collection patterns, time-wise, given that some studies from elsewhere indicate that availability is not an issue, whereas access, mostly pertaining to time for collection, is.
- Nutritional and anti-nutritional properties of uncultivated foods; factors affecting bio-availability, if any
- Ensuring safety of uncultivated foods after gathering and processing
- Associated communities ecological knowledge and its in-depth documentation of uncultivated foods
- Past and existing cultural linkages to uncultivated food biota
- Invasive species, if any and impacts of the same on the forests biodiversity, with special reference to the wild edible species.
- Inter-community variations in dependence on UCF with a specific focus on those communities that were categorized as hunter-gatherers even in the 20th century
- Impacts of climate change on the availability of uncultivated foods, in the context also of its impacts on cultivation
- Connections, if any, between agriculture department's (coupled with market forces left unregulated by the department) promotion of particular crops and chemical farming technologies and implications for availability and consumption of wildfoods



In Conclusion:

We conclude that it is an absolute imperative that the importance of uncultivated foods has to be incorporated into policy discourse, whether it is related to food security, or forest livelihoods and forest rights, or that of agriculture. It is also important to highlight the positive aspects of these foods in the general public, and particularly amongst forest-dependent communities. Popularising such foods without conserving the habitats that provide such foods will be meaningless. These have to go hand in hand. When communities re-connect with these resources through food, there will be an all-round win-win situation for the forests, for the forest department, for the communities and for the government. The linkages have to be acknowledged, more fully understood and preserved.

In terms of action, what does this imply? Are we talking about dismantling of the PDS supply systems? No. It means an appreciation of the limitations of the current food security or forest development models. It requires methodical, people-evolved land use plans, and implementation of the same, by looking at FORESTS AS FOOD PRODUCING HABITATS (and not simply looking at “forest cover” irrespective of the nature of that forest).

This requires state, civil society and community action together. This requires convergence between the departments of agriculture, forest, rural development, tribal affairs, and Gramy Panchayat Raj, so that new approaches can be incorporated into their work. This has to begin with *palli sabha (Village Community)*-upwards land use and forestry-related planning and implementation.





4. Revisiting Policy Issues

4.1 Odisha's Land Use Shifts

Odisha reports total geographical area of about 155.71 lakh hectares. Agriculture contributes to about 17.5% of the Gross Domestic Product of the State (Economic Survey 2012-13, GoO). It provides employment, both direct and indirect, to about 60% of the total population. From the physiographic point of view, the State is divided into four Zones, viz. (i) the Northern Plateau (ii) the Eastern Ghat zone (iii) the Central Table lands and (iv) the Coastal zone. On the basis of climate, soil, rainfall, topography and cropping patterns the State has been delineated into ten Agro-Climatic Zones: North-western plateau, North-central Plateau, North-Eastern coastal plain, East and South-Eastern coastal plain, North-Eastern Ghats, Eastern Ghats highland, South Eastern Ghats, Western undulating zone, Western-Central table land and Mid-Central table land. The State has different soil types ranging from fertile alluvial deltaic soils in the coastal plains, mixed red and black soils in Central tableland, red and yellow soils with low fertility in the Northern Plateau to red, black & brown forest soils in Eastern Ghat region. The state's agriculture sector is prone to various natural disasters, frequently this includes cyclones, droughts and flash floods. The food production figures vary accordingly. Further, the net sown area has been declining steadily in the state (though the area sown more than once has been generally increasing). The area under food grains has also declined (by 10.8 percent, from 5319 thousand hectares in 2010-11 to 4744 thousand hectares in 2011-12). Year after year, significant chunks of forest area are being diverted to non-forest use. The following few pages try to capture these shifts and draw out the implications of the same.

4.2 Land Utilization Pattern over the Years, Odisha

Table 39: Land Utilization Pattern over the Years, Odisha (in '0000 HA)

Year	Geographical area	Forest area	Misc. tree	Perm pasture	Culturable waste land	land put to non-agri	Barren and unculturable	Current fallow	Other fallow	Net sown area
1990-91	15571	5476	859	726	597	746	499	150	214	6304
1995-96	15571	5722	715	514	435	858	553	241	323	6210
2000-01	15571	5813	482	443	392	999	843	430	340	5829
2005-06	15571	5813	482	443	392	999	843	474	434	5691
2010-11	15571	5813	342	494	375	1298	840	773	229	5407
2011-12	15571	5813	342	494	375	1298	840	888	229	5292

Source: Economic Survey 2012-13, Government of Odisha

The following are the main points to note from the table above:

- Forest area, which occupied 35.2% of the total geographical area in 1990-91, shows an improvement with 37.3% of the total geographical area in 2011-12 being under Forests. It is however important to then discuss what kind of forests do these forest lands actually have, in reality.
- Area under miscellaneous trees and groves fell drastically by 5.17 lakh hectares over the past two decades. Where they were 5.5% of the total geographical area, today they constitute only 2.2%.
- Permanent pastures have also shown an overall decline, though they have recovered from the drastic decline that was there in the 2000s. From 4.7% of the total geographical land in 1990-91, today they are 3.2%, with an overall reduction of 2.32 lakh hectares.
- Land put to non-agricultural use has increased enormously from 4.8% of the total geographical land in 1990-91 to 8.3% today. This is an increase of 5.52 lakh hectares over two decades. This is a 74% jump taking away land from food production.



- Fallows (both current and other fallows) have also been showing an increasing trend. The area under current fallows has increased by 7.38 lakh hectares. This is almost a six-fold increase in the past twenty years.
- Alarming is the trend of the decline of net sown area too: Compared to the net sown area in 1990-91, there has been a decrease of 10.12 lakh hectares by 2011-12. From occupying 40.5% of the total geographical area in 1990-91, this is now only 34%.

These land use shifts in Odisha over the past two decades, present an alarming picture when it comes to food and livelihood security of the poor the greater the fallows, the lesser the employment potential from farming, obviously. Area under pastures and trees and groves fell by nearly 7.5 lakh hectares once again, this has livelihood ramifications, including for livestock-rearing. Decline in net sown area along with steadily increasing diversion of land to non-agricultural use is a matter of concern.

Diversion of forest area to non-forest use:

Odisha's forest land covers around 58,136 square kilometers this includes 45.29% reserve forests, 26.7% of protected forests and 28.01% of unclassified forests. The actual forest cover was 48,903 square kilometers as per the last records available. Medium Dense Forest and Open Forest cover the larger areas within the forest area of Odisha. 11,542 sq km of forest land has been assigned to 12,158 VSSs for protection. Further, 462 Eco Development Committees have been formed in the protected areas.

The per capita recorded forest area of the State is 0.14 hectares, compared to 0.06 hectares at the national level. Most of Odisha's forest type falls under Tropical Dry Deciduous forest, followed by Tropical Moist Deciduous Forest and some small extents of Tropical Semi Evergreen Forest and Littoral and Swamp Forest.

The following table gives the official picture of forest area diverted to non forest use, which could include mining, irrigation, industry and other miscellaneous uses (roads, bridges, railways etc.).

Table 40: Diversion of Forest Land to Non Forest Use

Year	Forest area diverted to non-forest use, in '000 Ha
2005-06	2.21
2006-07	0.91
2007-08	1.80
2008-09	0.71
2009-10	2.31
2010-11	0.92
2011-12	0.83

Source: Economic Survey 2012-13, Government of Odisha, pp. 100

It is reported that compensatory afforestation has been raised on over 39,436 hectares (largely on non-forest land), against the diversion of 39,720 hectares by the end of 2011. It may be noted that the afforestation programmes usually meet economic purposes with regular tree felling or create orchids, cashew plantations etc do not recreate forest environments. The loss of uncultivated foods becomes irreversible.



Table 41: Extent of afforestation in Odisha under different programmes in the past 3 years

Name of Programme	2009-10 HA	2010-11 HA	2011-12 HA
Economic Plantation	3903	1800	2000
RLTAP in KBK Districts	3491	3650	-
Compensatory Afforestation	2898	4285	4188
National Afforestation Programme through FDAs	14980	2784	2240
Odisha Forestry Sector Development Project (JICA)	51735	78220	25745
Industrial Plantation	295	290	55
Support to VSS	611	12071	-
National Bamboo Mission	774	1040	1023
NREGS and other schemes	12316	9543	146935
Avenue Plantation (in running kilometers)	133	241	769
	91003 Ha	113683 Ha	182186 Ha

Source: Economic Survey 2012-13, Government of Odisha. Pp. 142

Within the cultivated area, it is interesting to note the shifts in cropping patterns.

4.3 Cropping Pattern Shifts

Table 42: Change in Cropping pattern, extent of area under different crops

	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Rice	4273	4501	4492	4479	4451	4452	4455	4365	4226	4005
Wheat	5	5	4	3	4	6	5	4	3	1
Maize	43	56	62	64	61	74	67	81	117	103
Ragi	77	70	64	66	65	68	66	59	66	55
All Cereals	4445	4673	4660	4648	4613	4631	4622	4539	4440	4193
Total Pulses	601	716	653	809	790	849	806	867	879	551
Total food grains	5046	5389	5313	5457	5403	5480	5428	5406	5319	4744
Total Oilseeds	268	309	325	271	257	264	242	355	403	251
Total Fibres	70	76	84	92	96	87	89	106	101	128
Other Crops	115	117	118	115	124	124	115	112	114	116
Grand total	5499	5891	5840	5935	5880	5955	5874	5979	5938	5239

Source: Economic Survey, Odisha, 2012-13. Pp. 108-09

Some points worth noting from the table above are:

- Area under Paddy and Ragi has been coming down in general; the area of Maize however has been steadily increasing from being less than 1% of the cultivated area, it has touched around 2%, about 70 thousand hectares in absolute terms. Overall, area under Cereals has come down.
- Area under Pulses, after having increased for a while, showed a decline in the last year this decline shows in the overall food grains area too, after some increases.
- Area under Fibres is increasing, and this is mostly on account of Cotton, which has seen an increase of nearly forty thousand hectares in the recent past.

Both cotton and maize, in their hybrid and GM versions (in the case of the former) pose their own economic and environmental risks to the cultivators. Further, it is also apparent that these are not food crops and do not directly add to the food security of the cultivator households the maize being cultivated mainly for chicken liveskock feed.



The Role of Agricultural Modernization

It is not just shifts in the crops per se but the technological approaches adopted that become important too, in the context of nutrition security, food safety and livelihood security.

In Paddy for instance, there is large scale shift towards HYV Paddy over the past decade or so, with the government focusing on Seed Replacement Rates as a major strategy. It is seen that fertilizer consumption in Odisha has gone up from 39 kg per hectare in 2001-02 to 61.50 kg/Ha in 2008-09. Nabarangpur exhibits a high intensity of fertilizer consumption at 175.37 kg/ha amongst all districts, followed by Sambalpur with 139.59 kg/ha. Bargarh is the third most intensive fertilizer- consuming district at 127.69 kg/ha (all figures for 2011-12).

Farm mechanization is on the rise, with the government adopting a policy of promoting easy availability of appropriate farm machinery at substantially subsidized rates. This then has its own implications on uncultivated greens from agricultural fields. Weedicides are making slow inroads into the agricultural landscapes, which bring in direct health and livelihood impacts in addition to impacting the availability and consumption of uncultivated greens.

4.4 Land use Shifts, District-wise during 1998-99 and 2010-11

Below we describe the broad trends in land use patterns in the state of Odisha during the decade between 1998-99 and 2010-11. This period was chosen in view of the clear shift in India's economic policy towards liberalization, privatization and globalization in this phase. The area covered in reporting on land use is around 15.57 million hectares or 1.55 crore hectares (equal to 3.74 crore acres, roughly).

4.4.1 Forest Area

In Odisha, land classified under Forest has increased slightly from 36% of the reporting area to 37.3%, covering 58.13 lakh hectares by 2010-11 though the nature of the forests has changed.

It is interesting to note that different districts present a varying picture of change over the years, with some districts showing a decline in their forest area (Khurda, Rayagada, Kalahandi, Bargarh, Gajapati etc.) while others have posted an impressive increase of forest area (Deogarh, Malkangiri, followed by Nawapara and Nawarangpur).

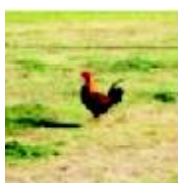




Table 43: Changes in forest cover across districts in Odisha

	Total Reporting Area		Forest Area				Percentage Change
	1998-99	2010-11	1998-99	%age	2010-11	%age	
Angul	623000	555682	351000	56.3	271682	48.9	-7.4
Balasore	363000	372221	26000	7.2	33221	33221	8.91.8
Bhadrak	268000	248707	2000	0.7	9707	3.9	3.2
Bolangir	657000	649385	165000	25.1	154385	23.8	-1.3
Boudh	345000	309717	112000	32.5	127717	41.2	8.8
Burgarh	584000	565613	192000	32.9	121613	21.5	-11.4
Cuttack	373000	378790	76000	20.4	78790	20.8	0.4
Deogarh	278000	250022	110000	39.6	156022	62.4	22.8
Dhenkanal	460000	444762	183000	39.8	173762	39.1	-0.7
Gajapati	385000	507898	229000	59.5	246898	48.6	-10.9
Ganjam	871000	852990	308000	35.4	314990	36.9	1.6
Jagatsinghpur	197000	180292	9000	4.6	13292	7.4	2.8
Jajpur	289000	316527	42000	14.5	72527	22.9	8.4
Jharsuguda	220000	171244	42000	19.1	20244	11.8	-7.3
Kalahandi	836000	742801	385000	46.1	253801	34.2	-11.9
Kendrapara	255000	251805	20000	7.8	24805	9.9	2.0
Keonjhar	830000	795718	253000	30.5	309718	38.9	8.4
Khurda	289000	311867	107000	37.0	61867	19.8	-17.2
Koraput	790000	677953	191000	24.2	187953	27.7	3.5
Malkangiri	619000	624588	196000	31.7	335588	53.7	22.1
Mayurbhanj	1042000	1030213	468000	44.9	439213	42.6	-2.3
Nawapara	341000	396969	112000	32.8	184969	46.6	13.8
Nawarangpur	529000	595273	158000	29.9	246273	41.4	11.5
Nayagarh	424000	421097	200000	47.2	208097	49.4	2.2
Phulbani/Kandhamal	765000	863983	446000	58.3	570983	66.1	7.8
Puri	305000	280710	20000	6.6	13710	13710	4.9-1.7
Rayagada	758000	748233	393000	51.8	281233	37.6	-14.3
Sambalpur	670000	656177	336000	50.1	363177	55.3	5.2
Sonepur	234000	213578	51000	21.8	41578	19.5	-2.3
Sundargarh	971000	1056732	423000	43.6	495732	46.9	3.3
	15571000	15471547	5606000	36.0	5813547	37.6	1.6

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Government of India http://lus.dacnet.nic.in/dt_lus.aspx

It may be noted that while tree cover may have increased in some districts, this is due to monoplantations which would affect the habitat of uncultivated foods.

4.4.2 Net Area Sown

When it comes to shifts in Agriculture land (net area sown), the following are the changes at the state level, district wise. It is indeed a matter of concern that except for 3-4 districts, all other districts post a decline in the net area sown. While this might also have to do with the particular years chosen to compare the changes, the overall declining trend holds good at the state level too.



Table 44: Changes in District wise Net Area Sown

	Total Reporting Area		Net sown area		%age net sown area within total reporting area		
	1998-99	2010-11	1998-99	2010-11	1998-99	2010-11	Change
Angul	623000	555682	211000	106000	33.9	19.1	-14.8
Balasore	363000	372221	243000	214000	66.9	57.5	-9.4
Bhadrak	268000	248707	181000	158000	67.5	63.5	-4.0
Boudh	345000	309717	76000	75000	22.0	24.2	2.2
Cuttack	373000	378790	176000	146000	47.2	38.5	-8.6
Dhenkanal	460000	444762	203000	101000	44.1	22.7	-21.4
Ganjam	871000	852990	393000	293000	45.1	34.3	-10.8
Jajpur	289000	316527	179000	134000	61.9	42.3	-19.6
Kalahandi	836000	742801	342000	267000	40.9	35.9	-5.0
Keonjhar	830000	795718	298000	192000	35.9	24.1	-11.8
Koraput	790000	677953	300000	206000	38.0	30.4	-7.6
Mayurbhanj	1042000	1030213	405000	292000	38.9	28.3	-10.5
Nawarangpur	529000	595273	207000	239000	39.1	40.1	1.0
Phulbani/Kandhamal	765000	863983	129000	67000	16.9	7.8	-9.1
Rayagada	758000	748233	168000	134000	22.2	17.9	-4.3
Sonepur	234000	213578	108000	106000	46.2	49.6	3.5
	15571000	15471547	6048000	4682000	38.8	30.3	-8.6

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Government of India http://lus.dacnet.nic.in/dt_lus.aspx

It can be seen that in 2010-11, districts like Bhadrak, Balasore, Kendrapara, Puri, Jagatsinghpur, and Bargarh had at least 50% or more of their reporting area under crop cultivation, sown at least once. However, at the state level, only 30.3% of the reported land is under crop cultivation (net sown area), with this area having decreased by nearly 8.5% since 1998-99. The reduced sown area certainly did not go into increased forest land. The following is a table that shows shifts in land put to non-agricultural use.



4.4.3 Area under Non-Agricultural Use

Table 45: District wise change of land under non-agriculture use

	Reporting Area		Land under Non Agricultural use		Percentage of reporting area		
	1998-99	2010-11	1998-99	2010-11	1998-99	2010-11	Change
Angul	623000	555682	15000	40000	2.4	7.2	4.8
Balasore	363000	372221	17000	46000	4.7	12.4	7.7
Bhadrak	268000	248707	17000	36000	6.3	14.5	8.1
Boudh	345000	309717	29000	24000	8.4	7.7	-0.7
Cuttack	373000	378790	60000	81000	16.1	21.4	5.3
Dhenkanal	460000	444762	22000	42000	4.8	9.4	4.7
Ganjam	871000	852990	46000	79000	5.3	9.3	4.0
Jajpur	289000	316527	24000	50000	8.3	15.8	7.5
Kalahandi	836000	742801	38000	52000	4.5	7.0	2.5
Keonjhar	830000	795718	35000	50000	4.2	6.3	2.1
Koraput	790000	677953	43000	44000	5.4	6.5	1.0
Mayurbhanj	1042000	1030213	40000	62000	3.8	6.0	2.2
Nawarangpur	529000	595273	48000	21000	9.1	3.5	-5.5
Phulbani/Kandhamal	765000	863983	15000	18000	2.0	2.1	0.1
Rayagada	758000	748233	38000	26000	5.0	3.5	-1.5
Sonepur	234000	213578	16000	26000	6.8	12.2	5.3
	15571000	15471547	838000	1247000	5.4	8.1	2.7

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Government of India http://lus.dacnet.nic.in/dt_lus.aspx

Some worrisome changes seem to be happening on this front, with land put to non-agricultural use going up in nearly all districts. In Cuttack, Jagatsinghpur and Puri, the land put to non-agricultural use is more than 20% of the total reported area. Jharsuguda, Puri and Kendrapara show significant increase in this category of land use, compared to the situation in 1998-99. Reduction in agriculture land will infect food production as well as reduce livelihood options for a large section of rural poor.



4.4.4 Other Uncultivated Land

In Odisha, in 1998-99, 11.3% of the total reported land was classified under this category, which consists of permanent pastures, other grazing lands and land under trees and groves. This was equal to 17.53 lakh hectares in absolute area. However, this was reduced to 12.53 lakh hectares by 2010-11, which is 8.1% of the total cultivated area. The district wise picture is given below.

Table 46: District wise change of land under non-agriculture use

	Total reporting are		Other Uncultivated (permanent pastures, other grazing lands, land under misc. tree, crops etc.		% of total reporting area		
	1998-99	2010-11	1998-99	2010-11	1998-99	2010-11	% age change
Angul	623000	555682	19000	44000	3.0	7.9	4.9
Balasore	363000	372221	30000	50000	8.3	13.4	5.2
Bhadrak	268000	248707	42000	25000	15.7	10.1	-5.6
Bolangir	657000	649385	83000	61000	12.6	9.4	-3.2
Boudh	345000	309717	43000	41000	12.5	13.2	0.8
Burgarh	584000	565613	17000	46000	2.9	8.1	5.2
Cuttack	373000	378790	31000	29000	8.3	7.7	-0.7
Deogarh	278000	250022	38000	20000	13.7	8.0	-5.7
Dhenkanal	460000	444762	17000	57000	3.7	12.8	9.1
Gajapati	385000	507898	34000	45000	8.8	8.9	0.0
Ganjam	871000	852990	64000	39000	7.3	4.6	-2.8
Jagatsinghpur	197000	180292	17000	23000	8.6	12.8	4.1
Jajpur	289000	316527	25000	22000	8.7	7.0	-1.7
Jharsuguda	220000	171244	73000	29000	33.2	16.9	-16.2
Kalahandi	836000	742801	15000	44000	1.8	5.9	4.1
Kendrapara	255000	251805	24000	18000	9.4	7.1	2.3
Keonjhar	830000	795718	203000	76000	24.5	9.6	-14.9
Khurda	289000	311867	13000	61000	4.5	19.6	15.1
Koraput	790000	677953	170000	36000	21.5	5.3	-16.2
Malkangiri	619000	624588	160000	48000	25.8	7.7	-18.2
Mayurbhanj	1042000	1030213	56000	94000	5.4	9.1	3.8
Nawapara	341000	396969	26000	31000	7.6	7.8	0.2
Nawarangpur	529000	595273	63000	42000	11.9	7.1	4.9
Nayagarh	424000	421097	24000	35000	5.7	8.	2.7
Phulbani/Kandhamal	765000	863983	115000	34000	15.0	3.9	11.1
Puri	305000	280710	33000	32000	10.8	11.40.6	
Rayagada	758000	748233	41000	27000	5.4	3.6	1.8
Sambalpur	670000	656177	84000	48000	12.5	7.3	5.2
Sonepur	234000	213578	36000	16000	15.4	7.5	-7.9
Sundargarh	971000	1056732	157000	80000	16.2	7.6	-8.6
	15571000	15471547	1753000	1253000	11.3	8.1	-3.2

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Government of India http://lus.dacnet.nic.in/dt_lus.aspx



This category of land use presents a highly mixed picture across districts, with some of them losing land under this classification, while others have increased areas. While the most dramatic loss in this category of land has happened in Malkangiri (an 18% decrease in this land, from 160,000 hectares in 1998-99 to 48,000 hectares in 2010-11), Koraput also witnessed dramatic decrease of 1.34 lakh hectares under this category (16% decrease), with only 5.3% of the district's land classified as "Other uncultivated land" in 2010-11.

4.5 Land Use Shifts in Study Districts³⁵

Rayagada District

The following table gives a picture of land use shifts block-wise in Rayagada district, percentage decrease/increase by 2006-07, compared to 1998-99, block-wise (this is percentage land under a given category in the total land reported for that block).

Table 47: Land use shifts in Rayagada between 1998-99 to 2006-07

Rayagada District : Block Name	Forest Area	Misc. Tree	Permanent Pastures	Cultivable Waste	Non-Agricultural use	Barren Land	Current Fallow	Other Fallows	Net Sown Area
Bissam-cuttack	-3.7	0.1	0.3	0.5	0.6	-4.1	0.7	0.5	5.2
Chandrapur	-1.7	-0.1	-0.4	-2.4	-2.0	15.4	-1.3	-1.6	-5.9
Gudari	2.9	0.2	1.2	1.0	0.8	-14.3	3.9	-0.1	4.4
Gunupur	-19.2	0.8	-0.5	0.5	-0.2	16.8	-1.3	0.0	3.2
Kalyansinghpur	1.1	-0.1	-0.5	-1.7	0.1	2.3	1.1	-1.6	-0.7
Kashipur	8.9	-0.2	-0.5	2.0	-3.5	27.8	-13.9	-3.3	-17.2
Kolnara	-5.5	0.3	0.2	0.6	2.0	4.9	0.3	1.3	-4.1
Muniguda	7.7	-0.2	0.8	1.8	1.1	-7.3	3.9	-3.1	-4.6
Padmapur	-8.9	-0.9	-0.3	-3.3	-0.6	18.1	1.9	-2.2	-3.8
Ramanguda	-6.3	0.0	-2.0	-2.5	-0.5	4.8	4.8	-4.3	6.0
Rayagada	4.3	0.2	-0.3	-1.5	1.1	-8.2	3.0	-0.1	1.5
	-2.1	0.0	-0.1	0.0	0.0	4.5	0.4	-1.1	-1.6

The above table shows a significant decrease in forest area in Gunupur block and barren lands increasing.



³⁵Source:and <http://desorissa.nic.in/des-data/DATA%20BASE%20WORK.htm>



Sundargarh District

Table 48: Land use shifts in Sundergarh district between 1998/99 to 2006/07

Change in %age of a given category land in total land of Block, by 2006-07, compared to 1998-99

	Forest Area	Misc. Tree	Permanent Pastures	Cultivable Waste use	Non-Agricultural	Barren Land	Current Fallow	Other Fallows Area	Net Sown
Balisankara	-3.7	0.1	0.3	0.5	0.6	-4.1	0.7	0.5	5.2
Baragaon	-1.7	-0.1	-0.4	-2.4	-2.0	15.4	-1.3	-1.6	-5.9
Bisra	2.9	0.2	1.2	1.0	0.8	-14.3	3.9	-0.1	4.4
Bonaigarh	19.2	0.8	-0.5	0.5	-0.2	16.8	-1.3	0.0	3.2
Gurundia	1.1	-0.1	-0.5	-1.7	0.1	2.3	1.1	-1.6	-0.7
Hemagiri	8.9	-0.2	-0.5	2.0	-3.5	27.8	-13.9	-3.3	-17.2
Koida	-5.5	0.3	0.2	0.6	2.0	4.9	0.3	1.3	-4.1
Kuanarmunda	7.7	-0.2	0.8	1.8	1.1	-7.3	3.9	-3.1	-4.6
Kutra	-8.9	-0.9	-0.3	-3.3	-0.6	18.1	1.9	-2.2	-3.8
Lahunipara	-6.3	0.0	-2.0	-2.5	-0.5	4.8	4.8	-4.3	6.0
Lathikata	4.3	0.2	-0.3	-1.5	1.1	-8.2	3.0	-0.1	1.5
Lephripara	-2.1	0.0	-0.1	0.0	0.0	4.5	0.4	-1.1	-1.6
Nuagaon	0.2	0.2	-2.2	-0.5	5.2	-1.0	9.3	-2.4	-8.8
Rajgangapur	6.3	-0.1	1.7	-1.6	3.6	-1.1	-6.0	-0.3	-2.6
Subdega	1.8	-0.3	-0.6	7.0	1.7	2.7	-3.5	-5.6	-3.3
Sundargarh	4.0	-1.7	1.4	-1.2	-0.3	-0.7	0.1	2.2	-3.8
Tangarpalli	1.1	-1.1	-0.3	1.0	-0.8	-0.3	5.7	-3.8	-1.4

Significant decline in forest cover is seen in Bonaigarh and Baragon blocks in this district.

4.6 Food Security : Precepts and Practices

The Indian food security edifice has been built on a 3-sided framework: (1) Production efforts focused on a few resource rich pockets by investing various support systems (research and extension, infrastructure like roads and godowns, irrigation resources etc.) there; (2) Focus on Yield increases in two food grains to build the national level food security these are rice and wheat, given that they were amenable to higher yields with seed breeding efforts focused on chemical- and other external-input-responsiveness; (3) these two grains were then be procured from these intensive cultivation pockets and distributed to poor households all over the country, through an extensive network of warehouses, transportation, dealer outlets etc., all encapsulated in what is called the Public Distribution System (PDS).

In India, this PDS has come to be equated with the nation's understanding and actualization of "food security". While excluding other nutritious and more affordable food grains grown in rainfed conditions the PDS was mainly based on the assumption that producers and consumers of food grains are distinctly different from each other (that a vast majority of poor consumers are not producers of food), and that low food prices are essential for food security of everyone. The official policy started equating food security with the PDS programme³⁶; it is

³⁶ The 1974 World Food Summit defined Food Security as 'the availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices'.



only in the recent past that there is any acknowledgement that large tracts of rainfed farming in the country, with their highly-evolved, low risk diverse cropping systems, have been neglected with the adoption of this framework of food security for the entire nation.

This approach to food security has essentially resulted in both the intensive agriculture pockets like Punjab as well as the neglected rainfed pockets in the rest of the country to suffer with various consequences from this inappropriate approach. The consequences are also in terms of environmental degradation and environmental health problems. The increasing number of cancer cases in Punjab are an example.

The attempt to ensure cheap food to consumers (as outlined in initial Five Year Plans too, as a means to allowing manufacturing sector to take off in the country), that too of only a couple of grains, meant that producers of food around the country were not supported adequately enough either for production end matters or at the output end. Risk coverage for a highly risky profession was missing, even though a crucial functioning of feeding the nation was being performed by these farmers. In several pockets of the country, a vicious cycle was set off with producers not getting enough returns to ensure that their land is developed and healthy; the returns would not even suffice for re-investing back on crop cultivation operations. This is apparent from the 59th Round of NSSO where for the first and only time in India, a Situational Assessment of Farmers was taken up.

In the semi-arid and dryland pockets of the country, smallholders started abandoning cultivating their own lands in favor of more assured wage income by working in other people's lands and were hopeful of falling back on the PDS rice scheme for at least partial subsistence. Fallowisation became a new development in several regions. The diversity of various food grains apart from rice and wheat (even here, the green resolution paradigm resulted in huge genetic diversity erosion of course) was affected. When production is reduced, there is a concomitant impact in terms of decline in consumption as well as disappearance of associated knowledge. In this entire discourse and application of food security, there was no focus on nutrition security in an integrated fashion.

While this is so at the ground level and policy level in India, the global discourse with regard to understanding food security had progressed. From the definition in the 1974 World Food Summit which still seems to be India's main approach, the current widely accepted definition has moved on to:

"Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".

It is well recognized now that food security or insecurity is a multi-dimensional phenomenon. It is not a supply-side issue alone. It is not just about quantity of food, but quality too (including diversity, nutrition and safety). In the jurisprudence arena related to food security, it has been recognized to be closely linked to livelihood security, since food security is also about purchasing power and access and control over productive resources etc. Social dimensions of food security are also well-acknowledged by now (gender, caste, ethnicity etc.). The fact that food security is impinged upon by various factors like natural disasters, climate variability, conflict, international trade, new forms of markets like commodities exchanges etc. needs to be acknowledged.

Food security is one area of entitlement where the macro picture can be very misleading, and unless the data systems are built to capture even the intra-household access and consumption issues, the entitlement cannot be actualized in any meaningful manner. The United Nation's Food and Agriculture Organisation (FAO) is currently in the process of developing a Food Insecurity Experience Scale (FIES) which can measure food insecurity due to limited access to food, and level of severity as an experience-based metric. This Scale seeks to attempt to identify the food insecure, to match other policy measures to address food insecurity.



While these developments in discourse and some amount of practice are unfolding, India's recently enacted National Food Security Act still continues with a narrow definition:

“to provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life of dignity” (the objective of the Act).

In the Definitions section, 'food security' means “the supply of the entitled quantity of food grains and meal specified”, and 'food grains' means rice, wheat or coarse grains or any combination thereof conforming to such quality norms as may be determined from time to time by the Government.

The narrow paradigm of food security continues now in a statutory framework, with inadequate attention paid to culturally appropriate food or safe and nutritious food, or about empowering producers. In a paradigm that believed in “produce more and prosper” with farm incomes supposed to become better with greater yields, the reality turned out to be different. Official data shows that the average monthly farm income even in an agriculturally-developed state like Punjab is just Rs. 4960/- which is comparable to the daily wage rates of farm labour in the country. Net returns for the farmers are actually shrinking in the country, across crops, regions and categories of farmers. Worse, many farmers are highly indebted. The NSSO 59th Round data shows that for an overwhelming majority of Indian farm households (landless to semi-medium landholding categories), the monthly income is less than their monthly expenditure. This income deficit is the highest for the landless at Rs. 917/-. This NSSO survey also shows that the average monthly income from cultivation, for all sizes of landholdings is a meager Rs. 969/-, which is just around Rs. 32/- per day. Meanwhile, India continues with the dubious distinction of having the largest number of hungry and malnourished in the world. Most of the hungry and malnourished are in rural India. This is not surprising or unexpected.

The 2012 FAO report on the world's food security (prepared by the UN Food and Agriculture Organisation, jointly with IFAD and WFP) reiterates that overall growth is necessary but not sufficient for sustained hunger reduction. “Agricultural growth is particularly effective in reducing hunger and malnutrition since most of the poor depend on agriculture and related activities for at least part of their livelihoods. Agricultural growth involving smallholders, especially women, will be most effective in reducing extreme poverty and hunger when it generates employment for women. Growth must not only benefit the poor but must also be nutrition-sensitive reducing hunger is about more than just increasing the quantity of food and is also about increasing the quality of food in terms of diversity, nutrient content and safety”. The report goes on to argue that linkage between economic growth and better nutrition has been weak and that an integrated agriculture-nutrition-health framework needs to be adopted.

It is in this context of continuing hunger and malnutrition, with the distress of the farming community expressing itself along several indicators, with the environmental resources degrading at a rapid pace, which in turn jeopardizes the very livelihoods that are dependent on these resources, that there is an imperative to re-look at our understanding of food security, and consequently, our ways of addressing the issue.

It is important to note that in all this debate, other than an occasional mention of uncultivated foods, there is no serious consideration of improving livelihood security to improve the situation of hunger and malnutrition, nor is there a serious reconsideration of forest resources in terms of providing nutrition and sustenance at critical periods of scarcity or stress.

The following is specific information related to Odisha as per official records.

According to the 64th round of NSS, the monthly per capita consumption of cereals in rural Odisha was 13.3 kg, out of which rice constituted 94% and wheat 4%, as against 11.7 kg at the all-India level, out of which rice



constituted 56% and wheat 34%. In urban areas, the monthly per capita consumption of cereals in Odisha stood at 11.8 kg (rice 82% and wheat 18%), as compared to per capita consumption of 9.6 kg at national level, constituting 50% rice and 46% wheat. (Economic Survey, Odisha 2012-13, pp. 27). However, the monthly per capita consumption of rice and wheat in kg has been declining in Odisha as shown in the table below³⁷.

Table 49: Per Capita Consumption of Rice and Wheat in Odisha

NSSO Round	Rural Odisha		Urban Odisha	
	Rice	Wheat	Rice	Wheat
55 th : 1999-2000	14.16	0.59	12.18	2.25
60 th : 2003-2004	13.78	0.61	11.59	1.93
61 st : 2004-005	13.29	0.53	11.05	2.03
62 nd : 2005-2006	13.03	0.58	10.06	2.26
63 rd : 2006-2007	12.57	0.48	09.6	2.17
64 th : 2007-2008	13.13	0.49	10.33	2.17

When it comes to different items of food consumption, the 64th round of NSSO shows that Odisha's average MPCE in rupees on cereals and vegetables is higher than the all-India average. However, it is significantly lower when it comes to pulses (rural Odisha), milk and milk products, edible oil etc. On fresh fruits also, Odisha expenditure per capita is lower than all-India averages for rural and urban³⁸.

Table 50: The average retail price (Rs. per Kg or Rs per Liter) of some essential commodities in Odisha is given in the table below³⁹:

	Rice	Mung	Arhar	Mustard oil	Potato	Onion	Sugar	Gur
2004	8.47	24.08	28.42	55.53	6.82	8.44	17.23	17.17
2011	17.02	68.67	67.36	77.97	8.82	16.36	33.35	35.75

Table 51: The 66th Round of NSSO (2009-10) shows that in Odisha, the per capita value in rupees, of consumption of food and non-food items for a period of 30 days is⁴⁰:

Rural, Food	Rural, non-food	Total	Urban, Food	Urban, non-food	Total
404.22	311.37	715.59	607.96	860.88	1468.84
56.49%	43.51%	100%	41.39%	58.61%	100%

All these values are lesser than the average at the all-India level (hover around 75% to 80% of national average).

Cost of Living, as estimated by consumer price index in Odisha is the second lowest in the country, higher only to that of Bihar, as of May 2012, for agricultural workers. CPI for agricultural labourers on food items is also below the national level in Odisha. The CPI for industrial workers however is higher than the national average.

It is in this context of rising food prices, a non-universal coverage of even the narrow approach of PDS-led-food-security (which our field study also shows as an issue for many nuclear families in the villages which were covered in the study), declining consumption of even staples in terms of quantity, reducing diversity and continuing concerns with regard to nutritional status that there is an urgent imperative to re-look at uncultivated foods and the potential that they hold.

37 Economic Survey, Odisha: 2012-13. Pp: 74

38 ibid

39 ibid, pp. 77

40 As cited in Economic Survey, Odisha : 2012-13



5. Recommendations for Policy Consideration

5.1 Recommendations to the Government of Odisha and Forest Department

1. The importance of uncultivated foods to the food basket of adivasi communities is clear from the study. It is recommended that the Government provide funds to research institutions to document the availability of uncultivated foods and their nutritional components so that conservation measures are taken up to ensure sustainable availability and collection processes in forest regions.

Most uncultivated foods are highly nutritious, but some are not. It is recommended that the nutritional properties of these foods be fully documented and shared with the communities to help them, make better choices.

2. The study highlights diversity of uncultivated foods with a wide range. The lowest in one village being 21 varieties to 69 in another, both in Sundargarh District. The Forest Department must take up a programme to understand the habitats producing uncultivated foods and make efforts to increase availability of nutritious foods.
3. The forest department in the past has prioritized commercial plantations to benefit the department. This has destroyed/jeopardized access to uncultivated foods to the local communities. This trend needs to be reversed. Any future plantations must be taken up only in consultations with the community. The existing knowledge within the community of availability of uncultivated foods and their habitats must be taken into consideration while developing the forests.
4. The Forest Rights Act 2006 provides for earmarking Community Rights. Odisha prides itself for implementation of the law with 730 community claims recognized. However there has been little discussion on how the commons are being developed to further strengthen food security by conserving and developing habitats to increase availability of uncultivated foods. The forest department must be tasked to support communities to conserve and develop food habitats. The department needs to work closely with the community to develop the forests for their needs. Implementation of the FRA gives communities and the forest department a new opportunity to develop the commons in the service of community and to meet an important development goal of ensuring nutritional security to the most marginalized.
5. Though this study did not examine issues related to cashew plantations, communities reported that cashew nut plantations in some areas have displaced cultivators growing millets and other food crops making people food insecure. In other areas, communities have reported increase in cash incomes from cashew. In some other areas it is seen that the productivity of the cashew plantations is very poor. Satellite mapping may show increased tree cover while the adivasi community is negatively impacted and lose crop diversity. It is necessary for the state government and forest department to take immediate steps to review the productivity status of cashew plantations and bio diversity to rectify the situation to increase cash incomes as well as food.
6. The study also shows that communities collect foods from nearby areas, but are unable to walk too far for collecting. This is again an area for research and action. When the forest department insists on undertaking cashew or other plantations close to the village how does this affect food/nutritional security of the whole



village community? Are the cash incomes generated used for buying nutritious food? While individual farmers may benefit, how does it affect the community?

The forest cover/canopy may show an improvement due to commercial plantations, but does this affect food gathering? How do different species of plantations impact availability of different UCF. These are all questions to be further researched and need to be addressed by the Government as well as CSOs including research bodies and the Universities.

7. In spite of the existence of the PDS system for several decades the study highlighted that a section of Adivasi people did not have their cards to access food grains. The most vulnerable families were buying food grains from the open market and at this time of growing food prices were increasingly vulnerable to hunger and malnutrition. The respective district administrative machinery needs to focus on Adivasi Communities in interior areas to improve its procedures to ensure all eligible families are given their rights to subsidized grains.
8. There are major shifts in the land use in the state, taking land away from true forests and agriculture. The state must set up a mechanism to study this process and how it impacts food security of local communities. The government needs to setting up livelihood programmes in blocks and districts where major shifts have occurred by denying them work and access to food grain.
9. It is recommended that the government address issues related to food security in a wholistic way. The appropriate department of Forests, Tribal Welfare Panchayat Raj and Agriculture must be mandated to work together to create a food security net for the most marginalized adivasis. The primitive tribal groups are known to be most vulnerable and their needs must be met.

5.2 Recommendations to Department of Agriculture

1. Considering the extensive diversity and availability of uncultivated foods which can act as a buffer against hunger and malnutrition, it is recommended that the Department of Agriculture in Odisha as well as other states ensure that organic agriculture is promoted in and around forest regions. Particularly, pesticide use must be banned to prevent negative impact on forest environment and pollution of water bodies or collapse of bee colonies or other harm to the flora and fauna.
2. When agri-forestry is promoted, the agriculture/forest department need to pay attention to grow millets and ensure diversity of cropping to meet nutritional needs.

5.3 Recommendations to Government of India

1. The current debates around food security are focused on stocking mainly rice and wheat and distributing them at subsidized price. In spite of the existence of the PDS system over decades, 47% of the country's population mainly women and children are noted to be malnourished. A lack of proteins and micro-nutrients (including iron deficiency) is clearly seen. Uncultivated foods such as greens, fish, crabs, snails etc have the potential to improve nutritional status. It is recommended that the Government of India make efforts to enhance availability of UCF.

The Government of India may hold consultations and advise state governments/Forest Departments to make efforts to record availability of uncultivated foods and make efforts to conserve and develop them.

The government has for too long viewed forests only as contributing mineral wealth and as a source of income from sale of timber. While the FRA has recognized the rights of communities to access land rights it has not adequately implemented community rights. In particular the rich source of vital foods etc available to more than 530 indigenous communities living in the country has been ignored. It is strongly

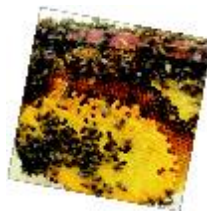


recommended that the government develop appropriate policy and practice to conserve forest foods and increase their availability.

2. The study also highlights that loss of habitat and displacement should not be viewed narrowly as only economic loss. Any displacement should take into account the loss of access to uncultivated food resources. Government should take steps to address this at new rehabilitation sites.
3. Food composition analysis should be taken up for all UCF particularly green vegetables which are rich source of iron. People's knowledge and scientific knowledge must be combined to spread awareness of healthy foods.
4. The study highlights major land use shifts in the state affecting agriculture production and possibly reducing employment. The Government of India needs to study the issue in depth and take steps to ensure food security for affected families and regions.
5. Government of India may like to direct concerned departments to work in convergence to ensure food security/nutritional security for Adivasi people.

5.4 Recommendations to Civil Society

1. Civil Society Organizations and People's movements have recognized the importance of uncultivated foods, but this has usually been in broad terms. Adequate efforts have not been made to understand in depth, the contribution forest foods make to nutrition and health of Adivasi people and to protect them from starvation in times of drought. It is recommended that NGOs and People's organizations make special efforts to understand the current situation through detailed studies and strategize to conserve and develop available foods.
2. Civil Society groups promoting Forest Rights for Adivasi people have concentrated on NTFP access and marketing. It is recommended that voluntary organizations working in the forestry sector pay special attention to promoting conservation and use of UCFs. Civil society has to meet the challenge to create sustainable access and use of UCF to improve people's diets.
3. Civil Society groups working with adivasi communities can play an important role in improving nutritional deficiencies. One way of doing this would be to study the nutritional value of UCF available to the community and create awareness to increase their usage. This will also entail conserving and developing the commons.
4. Groups across Odisha who have promoted Community Forest Management have also neglected the importance of UCF to Adivasi Community. It is recommended that groups working towards the welfare of Adivasi Communities start researching this area in their local areas to take up conservation works.
5. Civil Society should act like a watch dog to study land use shifts which jeopardize food security. They need to organize to bring the issue to the government.





Annexure 1: Diversity of Uncultivated Food Available

MUSHROOMS		TUBERS		GREENS		FRUITS		FAUNA	
1	Bada Chhatu	1	Bhata Kanda	1	Bali sag	1	Bana turuda	1	Baga (Crane)
2	Bali Chhatu	2.	Bhutig kanda	2	Barada sag	2	Baunsa Karada	2	Bana Kukuda (Wild chicken)
3	Balisara chhatu	3	Cherenga Kanda	3	Bhaji saga	3	Burudi	3	Bat
4	Basa Chhatu	4	Bakli Kanda	4	Bhata saga	4	Chhiadi	4	Bhuda sapa mansa (Snake)
5	Bati Chhatu	5	Bata Kanda	5	Biradi saga	5	Custard Apple	5	Bhunki machhi (Insects)
6	Baunsa Chhatu	6	Gada Gai	6	Chakunda saga	6	Demta	6	Chingudi (Prawn)
7	Bhoranda Chhatu	7	Ganu Gai	7	Drumstick leaves	7	Kalara	7	Chuna machha (Small Fish)
8	Bila Chhatu	8	Gethi Kanda	8	Gandri sag	8	Kankada	8	Crab
9	Chirko Chhatu	9	Hiru Kanda	9	Garki Saga	9	Maya Phula	9	Deer
10	Dasahara Chhatu	10	Katei Kanda	10	Ghurudi Saga	10	Papaya	10	Dove
11	Gambha Chhatu (Mushroom)	11	Katha Kanda	11	Hatua Saga	11	Sura Matha	11	Fish
12	Gende Chhatu	12	Khajuri Kanda	12	Kaloma Saga	12	Tamarind	12	Genda (Snail)
13	Gene Chhatu	13	Leko Kanda	13	Kanta sag	13	Wild Amla	13	Godhi mansa (Monitor Lizard)
14	Jamba Chhatu	14	Mundi Kanda	14	Katai saga	14	Zizyphus	14	Gundri Mansa (Quails)
15	Java Chhatu	15	Murgudi Kanda	15	Koinar saga			15	Jai Fish
16	Karama Chhatu	16	Paridi Kanda	16	Kuchha saga			16	Jhinka (Porcupine)
17	Khunta Chhatu	17	Pita Kanda	17	Leutia Saga			17	Kutura mansa (Small deer)
18	Khursual Chhatu	18	Pitala Kanda	18	Machuru saga			18	Lakti machhi (Insects)
19	Lahara Chhatu	19	Pitalu Kanda	19	Matha Sag			19	Pigeon Meat
20	Mendha Chhatu	20	Raadi Kanda (Tuber)	20	Murugudi Sag			20	Monkey
21	Muchu Chhatu	21	Rauda Gai	21	Patni Saga			21	Rabbit Meat
22	Pala Chhatu	22	Serenga Kanda	22	Rasi Sag			22	Red Ant
23	Patiari Chhatu	23	Serenga Kanda	23	Siti Daga			23	Snail oyster
24	Patra Chhatu			24	Sunsunia Sag			24	Tenkra Poka (Insects)
25	Ruguda Chhatu			25	Tumbi Saga			25	Tortoise
26	Sara Chhatu			26	Usal ding saga			26	Water duck
27	Srabana Chhatu							27	Wild Pig (Boar)
28	Suga Chhatu							28	Wild Rat
29	Tultula Chhatu								
30	Ui Chhatu								



Glossary

ATREE	Ashoka Trust for Research in Ecology and the Environment
CIFOR	Center for International Forestry Research
FAO	Food and Agricultural Organization of the United Nations
FRA	Forest Rights Act
GP	Gram Panchayat
HH	Households
ICDS	Integrated Child Development Scheme
IFAD	International Fund for Agricultural Development
MFP	Minor Forest Produce
MNREGS	Mahatma Gandhi National Rural Employment Guarantee Act
MPCE	Monthly per Capita Expenditure
NGO	Non Government Organization
NKCCDS	Nabakrushna Choudhury Centre for Development Studies
NTFP	Non-timber forest products
Palli Sabha	Village Community
PDS	Public Distribution System
PESA	Panchayats (Extension to Scheduled Areas) Act, 1996
PRA	Participatory Rural Appraisal
RLTAP	Revised Long Term Action Plan
RPRC	Regional Plant Resource Centre
SANFEC	South Asia Network on Food Ecology and Culture
SC	Scheduled Caste
ST	Scheduled Tribe
UCF	Uncultivated Foods
VSS	Vana Samrakshana Samithi
WEP	Women's Empowerment Program
WFP	World Food Programme





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