



**XV WORLD FORESTRY CONGRESS**  
Building a Green, Healthy and Resilient Future with Forests  
2–6 May 2022 | Coex, Seoul, Republic of Korea

## **Degradation of Tribal Forest-Ecosystem and Food insecurity among Kutia Kondh tribe of Odisha-A Major Concern in 21<sup>st</sup> Century**

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### **Abstract**

Tribal People look after their forest in such a way no one can't as they depend solely on forest for their livelihood, also they worship their forest as God. One such tribe called Kutia Kondha of Odisha (specially located in Kalahandi & Bolangir districts) protect the forest since ages and due to their indigenous agricultural practice(Podu cultivation) they are able to grow nutritious grains and other food. Their practice helps to conserve the agro ecosystem as well as forest ecosystem, but due to intervention of Government and other agencies they fear their forest will no longer sustain and their livelihood is in stake so also their food security because of massive Teak plantation programme . When the whole World is focusing on Food security measures, at this juncture the tribal forest ecosystem on which the tribal people depends for the NTFP for their sustenance is being destroyed in the name of "Development" which is the dark side of Sustainability campaign. Scientifically, due to such programme the nutritious grains like Millets which are majorly grown by tribal can't be grown henceforth which is the major concern as they are now start eating poisonous food i.e the underground portion of certain wild plants. This causes severe health hazards to these tribal people. In a survey it is found that about 78% of tribal population is suffering from hunger related complications and about 82% children are suffering from various food poison and other unknown diseases which sometimes lead to premature death. Also about 92% of tribal population (forest dwellers) has now changed their food habit due to non availability of land for their indigenous cultivation practices which is another factor for their food insecurity. In conclusion the coordination of 3 "E" is important as lack of proper education and less access to ecology will lead to a degraded economy.

*Keywords: Climate change, Food systems Deforestation and forest degradation, Human health and wellbeing, Sustainable forest management*

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### **Introduction, scope and main objectives**

The rapid expansion and breakthrough in the arena of science and technology have taken humankind to a new age. The developments have both pros and cons. On the one hand, while the technological developments have affected almost every aspect of human life, at the other, it has its devastating effect on nature itself. Thus mankind faces double challenges from modern machines and from saving the nature, the mother earth. The limited land, water and forest resources will come under increasing pressure to meet the diverse biomass needs of the growing population. India has to find a strategy to optimize the use of its natural resources in a way so that it can get high productivity as well as sustainability. This will pose a major scientific, social and political challenge for India. So it is high time to plan for a long term strategy for the development of the tribal forest ecosystem as the important life support systems such as wood land, forest land and waste land have been misused, overused or degraded over the time, so that the system is no longer able to function properly. The finely tuned tribal forest ecosystem can be easily split apart. If too many trees are cut

down for commercial or any other reasons or growing population pressures force the local people to expand their croplands and thus reduce the area of adjoining forest and grazing lands, as a result the overall biomass production will steadily go down, the system will be increasingly susceptible to the vagaries of the weather (in other words floods and drought) and will soon take a shape of a pseudo-desert which ultimately lead to food insecurity among the tribal population. So it is high time that the tribal forest ecosystem should not be disturbed and the indigenous agricultural practice should be maintained. For tribal people Forest is “God” as their daily needs starting from firewood to healthcare are fulfilled by forest. But they are in a insecurity zone as their forest land is decreasing day by day by intervention of Government/NGO schemes and unwanted activities. Hence a holistic approach for sustainable forest is needed.

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## **Methodology**

### **1-Selection of Tribal village**

A specific tribe among the 62 tribal categories i.e Kutia Kondh are found in the Kudasingha village of Bolangir district of Odisha state of India which forms an eco-complex with two other hamlets (20° 11'-21° 05' Northern latitude and 82° 41'-83° 40' East longitude). The eco-complex is situated at a distance of about 28 km from Bolangir town. Bolangir lies at an elevation of 115 mt (377 ft), flanked in north west by Gandhamardhan hills, a name of Ramayan fame, and the north east by the rock girdled Mahanadi. The area is situated under 'West Central Table Land Zone' characterized by hot and sub-humid monsoon climate with an average rainfall of 1224.6 mm and the soil P<sup>H</sup> ranged from 5.4 to 6.1.

### **2-Vegetation data**

The eco-complex is surrounded by 39.82ha of tropical dry deciduous forest. The tribal people largely depend on the forest for food, fodder, fuel, minor forest products like Mahua, Kendu, broom grass and also for rare medicinal plants for their traditional healthcare system. The common plant species are; *Acacia torta*, *Albizzia procera*, *Albizzia lebbeck*, *Adina cordifolia*, *Careya arborea*, *Diospyros melanoxylon*, *Diospyros montanna*, *Mangifera indica*, *Mitragyana parviflora*, *Tamarindus indicus*, *Terminalia arjuna*, *Terminalia tomentosa* *Anogeissus latifolia*, *Buchanania lanzan*, *Haldina cordifolia*, *Madhuca indica*, *Cleistanthus collinus*, *Terminalia alata*, *Dendrocalamus strictus*. *Andisia salanacea*, *Cassia fistula*, *Embllica officinalis*, *Cipadessa baccifera* and *Holarrhena antidysenterica* etc.

### **3- Data collection about tribal People and their practices**

The tribal people of the study area display their cultural identity and distinctiveness in their social organization, language, rituals and festivals and also in their dress, ornament, art and craft. They have retained their own way of managing internal affairs of the village mainly through two institutions namely, the village council and the youth dormitory. Every facet of their life covering round-the-year activities is intimately connected with religious beliefs and ritual practices. It is these aspects of their culture that give meaning and depth to their lives, and solidarity to their social structure. The tribal people of the eco-complex worship 'Mahua' (*Madhuca indica* Gmel.) tree as God. The total number of population is 406(210 male & 196 female) with 9.2% literacy rate. In Kudasingha about 26.5% of the total households engaged in plucking and binding Kendu leaves

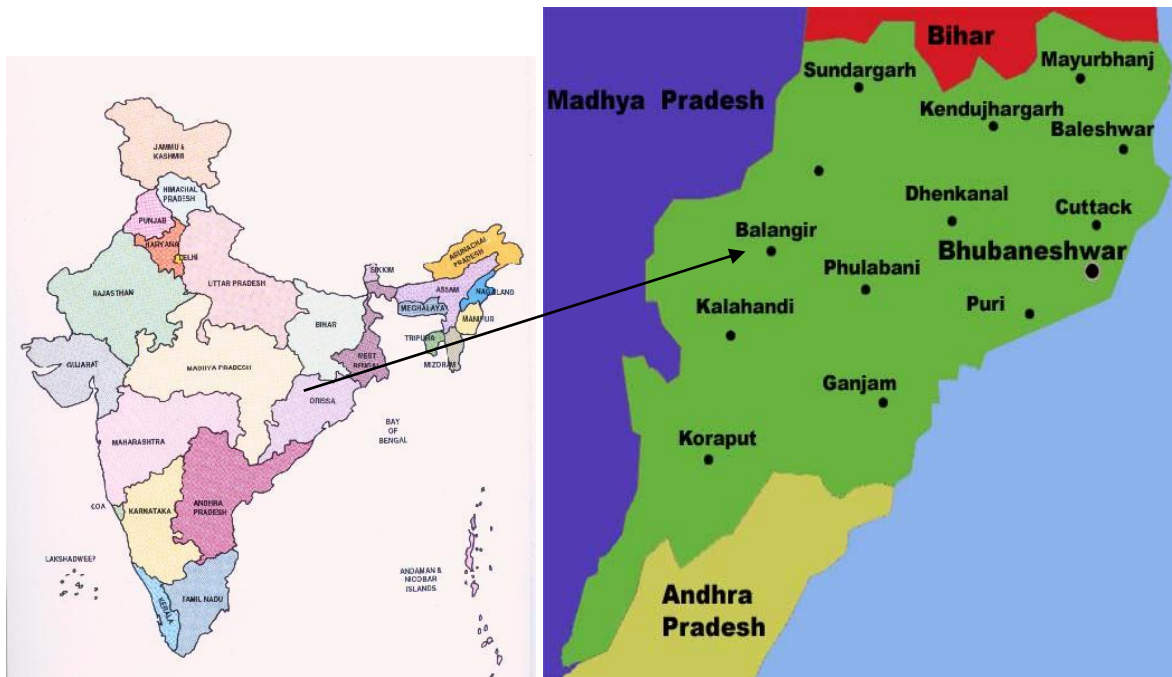


Fig. 1: [Map of Balangir, Odisha, India]



Fig. 2: [Kutia Kondh dancing and worshipping mother earth]

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## Results

Forests form an important part of livelihood security of the local tribes. Besides supplying food, fodder, fuel, house building materials, medicinal plants forests add a lot to the subsistence economy of these rural tribal populations through MFP (minor forest products) and herbal products.

### ***MFP***

The minor forest products on which the tribal people depend are Mahua flowers, Kendu leaves, Thorn broom etc. The flowers of Mahua plant are collected in the month of March to May. Local tribes use the flowers in making liquor called mahuli and the fruits are also collected for extracting the oil which is used for cooking. Thorn broom was also collected for local use. Mostly women and children are engaged in the collection of minor forest products.

### ***Herbal health care***

Medicinal plants occupy an integral position in the socio-cultural lives of the tribal people of the village complex. Their cultural life, religious practices have given birth to unique tools and technologies of their own that have nurtured and cultivated under the perennial plant association. The tribal communities of this remote part of Western Orissa are geographically and socially marginalized people who depend heavily on nature and natural resources such as forests, minerals etc., with their own primitive technologies based on much labor input and wastage to sustain life and growth. The medicaments used by the tribal to cure illness, though not documented properly, is not flexible as that of well documented allopathic system of medicine. These medicaments are mainly vegetable drugs derived from biomass of plant origin like root, leaf, bark, flower, fruit, seed, rhizome etc (Rao, Jena and Sahoo 2008).

The Ethno-medico-botanical study of the village complex revealed that, the native tribes (Kondh) use some of the folk medicinal plants for the treatment of different types of diseases (Table-1) (Mohapatra and Sahoo 2008). Women of all tribes of the village complex suffer from various kinds of gynecological diseases due to lack of proper education, sanitation, safe drinking water, intake of liquor in high quantities, excess labor during pregnancy etc. The medico-botanical survey revealed that 33 medicinal plants belonging to 24 families were used against various gynecological disorders (Mohapatra and Sahoo 2008a). One of the important gynecological diseases observed among the pregnant women of the village complex is threatened miscarriage. They depend more on herbal remedies for the treatment of this disease. Patients are administered with the decoction of leaves, bark and the whole plant to get relief from the disease. The plants and plant parts contain various phytochemicals like natural oil, tannins, flavonoids, steroids etc (Anchome Enterprises, Mumbai, CAMAG) which may have a role in arresting the threatened miscarriage. Natural oil act as a precursor of prostaglandins whose effects are like that of hormone (Garret and Grisham, 1995) and saponin has antibiotic properties (Oliver-Bever, 1986). Flavonoids helps in boosting immune system (Randine, 2003, Ifeoma, 2007) and plant steroids called as phytosterols act as precursor of sex hormone i.e. progesterone (Goodwin and Mercer 1983, Chiras, 1999).

Table 1: [List of some less known folk medicinal plants with Local & Botanical name]

Sl no	Local (ODIA)	Botanical Name	Family	Tribe	Disease
1	Indramarisha	<i>Acalypha indica</i> L.	Euphorbiaceae	Kondh	Bronchial asthma
2	Pokasungha	<i>Ageratum conyzoides</i> L.	Asteraceae	Kondh	Gastric pain
3	Semel	<i>Bombax ceiba</i> L.	Bombaceae	Kondh	Dysentery
4	Kumbi	<i>Careya arborea</i> Roxb.	Lecythidaceae	Gond	Leucoderma
5	Kharkhari	<i>Clerodendron serratum</i> L.	Verbenaceae	Kondh	Indigestion
6	Nirmuli	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Kondh	Snake bite
7	Badachandal	<i>Desmodium gangeticum</i> L.F	Fabaceae	Kondh	Dysentery
8	Kendu	<i>Diospyros melanoxylon</i> Roxb.	Ebenaceae	Kondh	Leucorrhoea
9	Kantapadma	<i>Eurayle ferox</i> Salisb.	Nymphaeaceae	Kondh	Arthritis
10	Gharpodia	<i>Hedyotis corymbosa</i> L.	Rubiaceae	Kondh	Dyspepsia
11	Champa	<i>Michaelia champaca</i> L.	Magnoliaceae	Kondh	Oral contraceptive
12	Acchu	<i>Morinda citrifolia</i> Roxb.	Rubiaceae	Kondh	Rheumatic pain
13	Anela	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Kondh	Abdominal pain
14.	Chitaparu	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Kondh	Piles
15	Muturi	<i>Smilax zeylanica</i> L.	Liliaceae	Kondh	Leucorrhoea
16	Chanapata	<i>Triumpheta rhomboidea</i> Jac.	Tiliaceae	Kondh	Piles
17	Dhatki	<i>Woodfordia fruticosa</i> L.	Lythraceae	Kondh	Leucoderma

### **Mahua (*Madhuca indica* Gmel.)**

locally called as 'Mahul', is a prominent multipurpose Indian forest tree, not because it possesses valuable timber, it is hardly ever cut for this purpose- but because of its delicious and nutritive flower. It is considered to be one of the most useful trees in the tribal belt for cultural and economic reasons. The agro-climatic conditions of this area are suitable for raising Mahua plantation. The above ground biomass of Mahua includes wood, leaf residues and flowers. Mahua has a special status among NTFPs as it is linked to the livelihood security of tribal people in different ways. Apart from meeting food and other requirements, it is also a source of seasonal income. Its flowers are used to brew the country liquor which is very much popular among the indigenous community. The tree has religious and aesthetic value in their culture too. It provides income to the poor households who collect it both for self consumption and for income generation by selling in order to meet daily household items. The flowers and seeds also have medicinal and nutritional properties (Fig-3)



Fig-3 (Mahua plant with Mahua flower)

In addition to these MFP, Kutia Kondh tribe also cultivates Millets (Highly nutritious) which is the main food of these people. Millets are grown well by their traditional Podu cultivation. Now a days the food habit of these indigenous people is changed to rice and other cereals as the land on which they grow millets are used for teak plantation by Government/NGO as a measure to engage these people to uplift their economic status but on the other hand the immune power of these people is in stake and due to unavailability of land, they are forced to eat some poisonous food which is found underground. In a survey about the health status of these tribal, it is found that more than 70% of total population are affected by various diseases due to hunger/by poisonous food consumption (District Medical data, Bolangir, 2019).

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## Discussion

The traditional tribal communities living in small hamlets of the village ecosystem represents a most remarkable feature of Indian caste-society. They can be more appropriately called as “ecosystem people” (Dasmann, 1988) as they depend on limited natural resources of their surrounding for their livelihood. Under the influence of the changing environment the mode of living of these tribal though modified still remains unique in their attitude towards plants and their conservation (FAO and FILAC, 2021). The ethnic tribes of the eco-complex primarily depend on the herbal plants for their healthcare need as they are far away from the modern healthcare system. The rare plants found in the nearby forest are collected and medicines are prepared in traditional system by the local ‘Vaidya’ or village medicine man and taken in the form of decoction of different parts of the medicinal plants. In this study it is established that the local forests have a rich source of rare medicinal plants on which the tribal people depend for the cure of different diseases.

These shows the dependence on forest by these people for their food to healthcare, for which they are called as forest dwellers but gradually they are prone to hunger and food insecurity due to

degradation of forest land and also the natural resources. The landless and marginal farmers are most affected by the drought and 'non-absorption' capacity of the local agriculture sector forced large scale distress migration. They migrate to brick kilns of Andhra Pradesh, construction sites of Maharashtra, carpet industry in Uttar Pradesh and to Raipur of Chhatisgarh for rickshaw pulling. It has been found that bulk migration is push driven rather than pull of higher wages. The push factors are debt at higher rate of interest, inability to pay, money lender-dadan-agent nexus.

### ***Mapping Migration Flows***

Migration takes place within states as well as between them. The poorer states such as Orissa tend to send labor, while the industrialized, agriculturally rich ones such as Gujarat and Punjab tend to receive labor (Jha and Jhingram, 2005). Tribal areas are the hubs for employers seeking cheap labor. Employers often cross state boundaries and arrange to transport tens of thousands of laborers across long distances for work (Nayak, 2005; Venkataswarulu, 2005; Berman and Das, 2000; Ganguly, 1999; Katiyar, 2005; Hatekar, 2003).

### ***Out-migration from Western Odisha to Andhra Pradesh for Brick-kiln work***

Children are an essential part of the work units that contractors hire for brick work. A recent unpublished study of 300 brick kilns around Hyderabad revealed that as many as 35% of the total migrants were children, of which 22% were of elementary school age. While the bulk of this migration is to Andhra Pradesh, some migrants also go to Mumbai, Surat, Varanasi, Raipur and other cities to work in construction sites, in weaving units and hotels, and as rickshaw pullers. 85% migrate with their families. Significantly, migration is nearly equal among boys and girls up to the age of 10, but as age increases more girls migrate than boys (Desai, 2005).largely tribal populations often experience migration levels up to 80% or even 100 % ( Srivastava, 2003). These settlements will remain more or less empty for most of the year, except for those left behind, including elderly and ill. This can have a significant effect on the social life of the village, with no one present to celebrate festivals, to observe religious events, or to maintain village assets.

### ***Mahua flower Collection, Rural economy and Related Issues***

The tribal people of the study area depend on the Mahua flowers for their livelihood. Mostly women and children of the village ecosystem are involved in the process of gathering of Mahua flowers. Out of 89 households about 79 households depend mostly on the Mahua plant. However the Mahua flower gatherers of the village complex rarely get the true value of the produce, which they usually barter for daily grocery items. The average household income from the sale of dry Mahua flowers during one season is about \$ 16 which is very less in comparison to the state average (\$ 40). There are various issues which are responsible for the low income from the Mahua flower.

#### ***Collection***

Mahua flowers are handpicked from the forest floor, which is sometimes bushy and inaccessible. Therefore, for the convenience of collection, the forest floors are set on fire so that the floor becomes charred and the white flowers are clearly visible. But if the fire is not controlled it can become a forest fire which destroys much biodiversity.

#### ***Post harvest treatments***

A post harvest treatment of Mahua flowers involves cleaning, grading, drying and storing. However, due to lack of knowledge of proper techniques, the collectors resort to traditional methods and do not grade flowers based on quality parameters. Also drying is done under unhygienic conditions and

the flowers are often not thoroughly dried, which results in accumulation of moisture such that the quality of the whole collection deteriorates.

### ***Storage***

Almost 30% of the entire Mahua flower collected is spoiled due to lack of proper storage facilities. Mahua has a hygroscopic tendency and gather moisture, especially during the monsoon, when moisture percolates from earthen floors and the roof.

### ***Processing***

Almost all the Mahua collected is used for the production of the liquor, which is brewed following traditional methods. Existing processing practices is that those flowers which are unfit for human consumption are sold at a throwaway price for liquor production.

### ***Improper weighing***

One of the ways of exploitation by the middleman is that they use faulty measuring balance to weigh Mahua flowers, which allows them to gain approximately 200g each time it is weighed and at the end they gain 2-4 kg of extra material for which no prices are paid to the collectors. So a comprehensive strategy is to be framed to protect the forest resources.



**Fig-4**(Author with the tribal people of Kudasingha village giving suggestions for conservation of Biodiversity)

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## **Conclusions**

The tribal economy is partly agriculture and partly forest (NTFP) based. The ethnic people depend mainly on agriculture but the changing environment and scarcity of agricultural land limits the



primary productivity. This results in the food insecurity among these tribes. Due to the degradation of forest land, the villagers could not get sufficient non timber forest products like Mahua flowers, Kendu leaves, etc., as a result they are compelled to migrate to the other nearby states to earn their livelihood which is the major challenge of 21<sup>st</sup> Century.. The following suggestions can be taken as an action plan to conserve the rich diversity.

### ***Protection of forest and biodiversity***

The rural tribal population depends on forests for catering their daily and perpetual need of food, fodder, firewood, small wood and even timber. Rapid industrialization clubbed with semi-urbanization has increased the demand for forest materials, particularly the timber in past few decades. As this demand could not be met with legal sources, this has given scope for large scale illicit felling of forests leading to loss of biodiversity. In the recent past due to progressive increase in population the overall demand for timber and other forest produces has increased manifold. As a result, the natural mechanisms of demand supply balance from forests have failed. A high increase in the price of timber has made illegal trade in timber a lucrative business. Thus all forest areas in the state are under pressure for illicit felling. In order to conserve the degraded forests trees should not be cut frequently and scientific management must be practiced. Tree felling is only thus permitted in forest areas diverted for non-forestry purposes. This should be enforced strictly. There is however no prohibition on cutting of bamboo and collection of non-timber forest produce.

The immediate goal is to protect the existing dense forests with their rich bio-diversity and wildlife from degradation and to restore their vigor through appropriate treatment for natural regeneration. The forests, which have lost the indigenous rootstock, have to be afforested through plantations. Generating employment and income opportunities for the local poor, particularly tribals of Bolangir district and thus contributing to their food scarcity. Motivating the people towards active participation in forest protection and management through a Samrakhyan Samiti and creating awareness for the value of forests in local people. Afforestation with many species of trees, especially economic species should be practiced and afforestation must start at the time of sanction of developmental projects.

### ***Active Participation of Tribal People in ecological development and also in decision making***

The involvement and participation of local communities in planning and decision-making processes concerning environmental issues of the village ecosystem should be encouraged (Wengert, 1976; Wilkinson, 1976). Special institutional mechanisms would have to be created to ensure participation of rural tribal people by making them partners in development process, as they would be the main beneficiaries (Khoshoo, 1986). Conservation of biological diversity and sustainable use of biological resources are better possible under the control of local communities who not only regulate the harvesting practice of their own members but also exclude others from access to resources controlled by them (Gadgil, 1987; Dharampal, 1993, Naidu, 2005).

### ***Need for concerted effort to fulfill SDG 2030***

Poverty, regular natural calamities and lack of infrastructure have been a general issue of concern for the tribal forest ecosystem. In contradiction, tribal ecosystem has the advantages of rich mineral reserves, great tourism potential (Medicinal) and low cost skilled and un skilled work force. Therefore a clear vision of what can be achieved and how best to achieve it, is required. Importance should be given to the local communities in all developmental activities (Vision 2030, proposed by Satapathy, 2005 gives importance to two E's i.e. Education and Ecology as poverty is caused by lack

of proper education and less access to ecology. So supports from all sector required to fulfill the SDG by 2030.

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## Acknowledgements

The author specially thanks the tribal people of Kudasingha village of Bolangir district of Odisha for their tremendous support in survey process and expressing their real difficulties and suggestions for the conservation of Biodiversity.

*The views expressed in this information product are those of the author and do not necessarily reflect the views of policies of FAO*

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