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### Documentation of indigenous edible items used by the tribal people of Kandhamal, Odisha

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#### Abstract

The study was documented the indigenous edible food items and their nutritional values which were available in tribal areas of Kandhamal district, Odisha. Data were collected from 2 tribal villages (Bregudaand Penala) belongs to Desia Kandha (Desia Khonds) tribe of Kandhamal district by using pretested questionnaire developed. Total 80 tribal women were selected by random sampling method from two different villages of Kandhamal. Forty women were selected from Breguda village and another 40 were selected from Penala village of Kandhamal district. There were 43 major indigenous foods of Kandhamal. Many of wild foods were still have not identified scientifically. The indigenous foods have high nutritional value. The cultivated foods (pigeon pea, horse gram, etc.) were consumed by the tribals of Kandhamal on regular basis. Some foods like taro, arrowroot, French bean etc. they were cultivated and sell it in the market to support their livelihood and consumed it rarely, as said by the villagers. The wild foods were also used for their livelihood support and only consumed during shortage of food which having high nutritional values and can be used as alternative option of main food items. Thus public awareness need to be encouraged to improve the nutritional knowledge of tribal communities of Kandhamal.

**Keywords:** Indigenous edible food items, nutritional values, consumption pattern, nutritional knowledge

#### Introduction

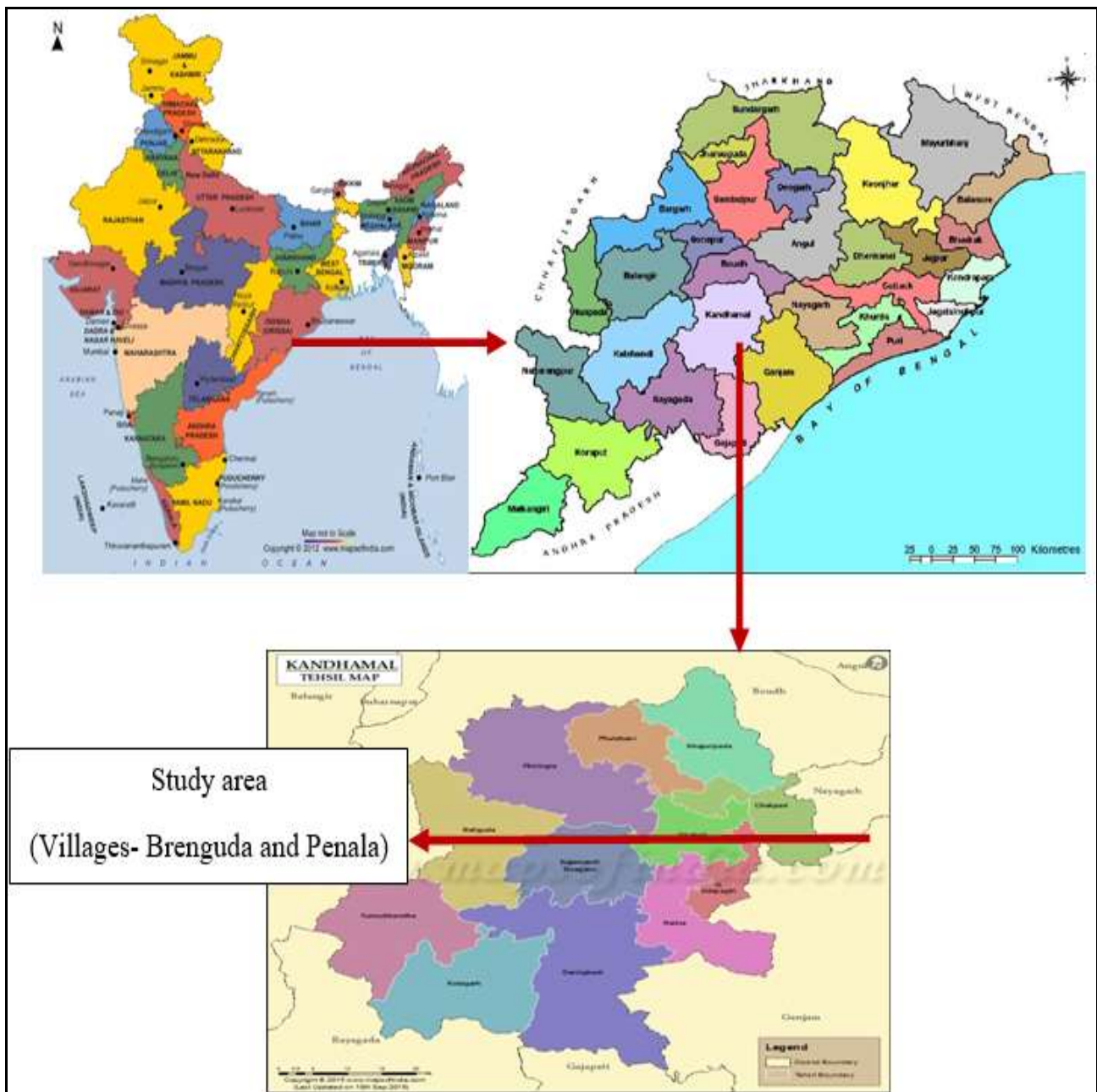
India has a variety of tribal population. Odisha has the largest number of tribal communities, 62 to be precise, in India, including 13 particularly vulnerable tribal groups (PVTGs). Kandhamal is one of the poorest districts in Odisha, ranking 29th out of 30 districts by the Human Development Index. More than 50% of the population constitutes tribal community. Most inhabitants belong to the Desia Kandha (Desia Khonds) tribe. Majority of tribal population of Kandhamal lives in forest ecosystem and has their own socio-cultural patterns, customs and distinctive food practices. Conventional agriculture does not give them adequate food due to indifferent land situation and as most of them are farmers belonging to poor category they depend on natural food resources. The wild foods were used for livelihood support and only consumed during shortage of food which having high nutritional values and can be used as alternative option of main food items. The objective of the study is to provide a baseline data on locally produced foods, indigenous and wild foods which have high nutritional value.

Jerath. S *et al.* (2015) <sup>[6]</sup> conducted a study on traditional knowledge and nutritional value of indigenous foods of the

Oraon tribal community in Jharkhand, India. The result showed that more than 130 varieties of indigenous foods were identified, many of which were rich sources of micronutrients like calcium, iron, vitamin A, and folic acid. Some were reported having medicinal properties.

#### Materials and Methods

The study was conducted in Kandhamal district of Odisha state during 2018-19 (Fig-1). Total 80 tribal women were selected by random sampling method from two different villages (Bregudaand Penala) belongs to Desia Kandha (Desia Khonds) tribe of Kandhamal. Forty women were selected from Breguda village and another 40 were selected from Penala village of Kandhamal district. Information on indigenous edible food items and wild foods were collected from eighty respondents of diversified age groups of Desia Kandha tribal community of Kandhamal District. The data on consumption of cereal, pulses, tubers, green leaves, fruits and flowers were collected through Pre-tested questionnaire by personal interviews. The plants were identified as per flora of Odisha. The identified plants were arranged with scientific name, English name, local name, source of the food item and their nutritional importance.



**Fig 1:** Map of selected villages of Kandhamal district for survey

**Results**

**General information of respondents**

A total 80 women were selected by random sampling method for the study. From two villages each 40 women were taken. In the study information were collected from background characteristics of respondents and data has been showed in table 1.

Age distribution of respondents revealed that 53.75% and 46.25% of women were belonged to 23-44 years and 44-73 years respectively. There were 57.5% illiterate, 10% were in between class 1 to 5<sup>th</sup> and 27.5% were in between 6<sup>th</sup> to 10<sup>th</sup>

and 5.10% were in between 11<sup>th</sup> – graduation. Most of them (92.5%) were in below poverty line and only 7.5% were in above poverty line category. It is customary to classify the families into two categories viz., nuclear and joint. The results indicated that 62.5% were lived in nuclear type family and 37.5% were lived in joint type family. As far as the family size is considered 52.5% families belonged to small family (i.e. 1 to 4 members in the family) and 47.5% families belonged to large family (i.e. 5 to 9 members in the family). Eighty percent women were agricultural worker whereas 20% were non-agricultural worker.

**Table 1:** General information of respondents

Particulars	Category	Frequency	Percentage
Age (Years)	23-44	43	53.75
	44-73	37	46.25
	Total	80	100
	Average (Mean $\pm$ SD)	43.7 $\pm$ 13.43	
Education	Illiterate	46	57.5
	1 <sup>st</sup> - 5 <sup>th</sup>	8	10
	6 <sup>th</sup> -10 <sup>th</sup>	22	27.5
	11 <sup>th</sup> -graduate	4	5
	Total	80	100
Economic status	BPL (Aay, Ration, Job)	74	92.5
	APL	6	7.5
	Total	80	100
Type of family	Nuclear	50	62.5
	Joint	30	37.5
	Total	80	100
Family size	1-5	42	52.5
	5-9	38	47.5
	Total	80	100
Occupation	Agricultural worker	64	80.0
	Non-agricultural worker	16	20.0
	Total	80	100

### List of indigenous foods available in the tribal areas of Kandhamal

The present study showed that the tribal people of Kandhamal district have very good nutritional knowledge on edible indigenous foods and their nutritional importance. There are a total of 43 major indigenous foods of Kandhamal. From which some are cultivated and others are collected from the forest. Consumption pattern of wild food plants depends mostly upon their availability in nature. Many of wild foods were still have not identified scientifically. The indigenous foods have high nutritional

value. The cultivated foods (pigeon pea, horsegram, etc.) were consumed by the tribals of Kandhamal on regular basis. Some foods like taro, arrowroot, French bean etc. they were cultivated and sell it in the market to support their livelihood and consumed it rarely, as said by the villagers. The wild foods were also used for their livelihood support and only consumed during shortage of food which having high nutritional values and can be used as alternative option of main food items. The indigenous food items which were used by the tribal people of Kandhamal are listed below.

**Table 2:** List of cereals and pulses used by tribals of Kandhamal

Scientific Name	English Name	Local Name	Source	Nutritional Importance
<b>Cereals</b>				
<i>Oryza sativa</i>	Rice	Chaula	Cultivated	Rich source of energy, CHO, phosphorus, protein
<b>Pulses</b>				
<i>Cajanus cajan</i>	Pigeon pea	Kandula	Cultivated	Rich source of protein, B vitamins (B3, B5, B6, B9) and amino acids (methionine, lysine, and tryptophan)
<i>Macrotyloma uniflorum</i>	Horsegram	Kolatha	Cultivated	Rich source of CHO, protein, dietary fiber, vitamins and minerals
<i>Vigna mungo</i>	Blackgram	Biri	Cultivated	Rich source of energy, protein, CHO, calcium, phosphorus, Vit. A, folic acid
<i>Vigna radiata</i>	Greengram	Muga	Cultivated	Rich in energy, protein, potassium, CHO, calcium, iron, vit. B6, magnesium

**Table 3:** List of green leaves used by tribals of Kandhamal

Scientific Name	English Name	Local Name	Source	Nutritional Importance
<b>Green leaves</b>				
<i>Amaranthus viridis</i>	Slender amaranth	Barada saga	Available in forest	Rich in CHO, iron and fiber
<i>Asparagus racemosus</i> Willd.	Shatamull/Shatawari	Satbari	Available in forest	Rich in vitamin A, iron and dietary fiber
<i>Bambusa vulgaris</i> Schrad.	Common bamboo	Kardi	Available in forest	Rich in CHO and fiber
<i>Basella alba</i> L.	Malabar spinach	Poi	Available in forest	Rich in vitamin A, vitamin C and Magnesium
<i>Marsilea MINUTAL.</i>	Dwarf water clover	Sunsunia saga	Available across paddy fields	Rich in CHO, vitamin C and potassium
<i>Ipomoea aquatic</i> Forsk.	Water spinach	Kolam saga	Available in forest	Rich in vitamin A, vitamin C and Magnesium
<i>Tamarindus indica</i> L.	Tamarind	Tentuli	Cultivated	Rich in vitamin A and minerals (calcium, iron)
<i>Trianthema portulacastrum</i> L.	Pigweed	Puruni saga	Available in forest	Rich in fiber, CHO, vitamin A and potassium
<i>Chenopodium album</i> L.	White goosefoot	Bathua saga	Available in forest	Rich in vitamin A, minerals, fiber, and essential fatty acids

**Table 4:** List of underground roots/tuber and other vegetables used by tribals of Kandhamal

Scientific Name	English Name	Local Name	Source	Nutritional Importance
<b>Underground roots/tubers</b>				
<i>Colocasia esculenta</i> (L.) Schott	Taro	Saru	Cultivated	Rich in fiber and starch
<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Elephant foot yam	Oluakanda	Available in forest	Rich in CHO, antioxidant, mineral and dietary fiber
<i>Ipomoea batatas</i>	Sweet potato	Mithaallu	Available in forest	Rich in vitamin A, vitamin B6 and dietary fiber
<i>Curcuma angustifolia</i> Roxb.	Arrowroot	Paluakanda	Cultivated	Rich in starch and have anti-inflammatory properties
<i>Momordica dioica</i> Roxb. Ex Willd.	Spiny gourd	BanaKankad	Available in forest	Good source of CHO, protein, fat and dietary fiber
<i>Kaempferia galanga</i> L.	Aromatic/Sand ginger	Adaphulakanda	Available in forest	Rich in vitamins (pyridoxine, riboflavin, vitamin-C, pantothenic acid) and minerals(iron, potassium, manganese, copper, selenium, and magnesium)
<b>Other vegetables</b>				
<i>Phaseolus vulgaris</i>	French bean	Rayikiya beans	Cultivated	Rich in CHO, fiber and good source of protein
<i>Brassica oleracea</i> var. <i>capitata</i>	Cabbage	Bandhakobi	Cultivated	Rich source of fiber, Vit. C, Vit. B6
<i>Brassica oleracea</i> var. <i>botrytis</i>	Cauliflower	Fulakobi	Cultivated	Rich in calcium, phosphorous, Vit. A, Vit. C
<i>Artocarpus heterophyllus</i>	Jackfruit (raw)	Panasha	Cultivated	Rich source of energy, calcium, phosphorous, Vit. C
<i>Solanum melongena</i>	Brinjal	Bayigana	Cultivated	Rich in phosphorous, Vit. A, folic acid, vit. C
<i>Solanum lycopersicum</i>	Tomato	Tamatar	Cultivated	Rich source of calcium, phosphorous, Vit. A, Vit. C

**Table 5:** List of fruits used by tribals of Kandhamal

Scientific Name	English Name	Local Name	Source	Nutritional Importance
<b>Fruits</b>				
<i>Artocarpus heterophyllus</i>	Jackfruit (ripe)	Panasha	Cultivated	Rich source of energy, calcium, phosphorous, Vit. A
<i>Citrus limon</i> Osbeck	Lemon	Lembu	Cultivated	Rich in calcium, phosphorous, Vit. C
<i>Psidium guajava</i>	Guava	Pijuli	Cultivated	Rich in calcium, phosphorous, Vit. C, antioxidant
<i>Spondia spinnata</i> (L.F.) Kurz.	Wild mango	Ambada	Available in forest	Rich in energy, calcium, vitamin A, vitamin C and phosphorous
<i>Terminalia bellirica</i> (Gaertn.)	Bibhitaki	Bahada	Available in forest	Good source of CHO
<i>Phyllanthus emblica</i> L.	Gooseberry	Anal	Available in forest	Rich in CHO, energy, vitamin C, calcium and phosphorous
<i>Psidium guajava</i> L. <i>Pomiferum</i> L.	Yellow/Lemon guava	Jamba	Available in forest	Rich in energy, calcium, phosphorous, vitamin C and antioxidant
<i>Schleichera oleosa</i> (Lour.)	Kusum/Ceylon oak	Kusum	Available in forest	Rich in energy, protein, calcium and phosphorous
<i>Ziziphus oenoplia</i> Mill.	Jujube	Kathuakoli	Available in forest	Rich in amino acids, vitamins and minerals
<i>Ziziphus mauritiana</i> Lam.	Chinese date/Ber	Barkoli	Available in forest	Rich in fiber, calcium, potassium, manganese and zinc
<i>Semecarpus anacardium</i> L.	Nut tree	Banabhalia	Available in forest	Rich in amino acids, vitamins and minerals
<i>Solanum torvum</i> L.	Turkey berry	Banabaigana	Available in forest	Rich in vitamin C and minerals
<i>Terminalia chebula</i>	Chebolicmyrobalan	Harda	Available in forest	Rich in vitamin C, energy, protein and minerals

**Table 6:** List of flowers used by tribals of Kandhamal

Scientific Name	English Name	Local Name	Source	Nutritional Importance
<b>Flowers</b>				
<i>Madhuca indica</i> Gmel.	<i>Mahua longifolia</i> /Mahuwa	Mahula	Available in forest	Rich in sugar, vitamin, protein, alkaloids, phenolic compounds
<i>Tamarindus indica</i> L.	Tamarind	Tentuli	Cultivated	Rich in phytochemicals
<i>Sesbania grandiflora</i>	Agati	Agasthiphula	Available in forest	Rich in vitamin C, niacin, folate, potassium, phosphorous and calcium

**Table 7:** List of nuts, oil seeds and spices used by tribals of Kandhamal

Scientific Name	English Name	Local Name	Source	Nutritional Importance
<b>Nuts and oil seeds</b>				
<i>Arachis hypogaea</i>	Ground nut	Badam	Cultivated	Rich source of energy, protein, fat, CHO, phosphorous, calcium, Vit. A
<i>Sesamum indicum</i>	Sesame	Rasi	Cultivated	Rich in energy, fat, protein, calcium, iron, magnesium, Vit. B6
<b>Spices</b>				
<i>Curcuma longa L.</i>	Turmeric	Haladi	Cultivated	Rich in vitamin A, vitamin C, calcium, fiber, iron, niacin, potassium, zinc and antioxidant

**Nutritional Importance of indigenous foods**

The study revealed that the indigenous foods are having high nutritional values. Foods like pigeon pea, blackgram, turmeric, groundnut are rich sources of energy and

carbohydrates. Blackgram, turmeric, groundnut, bathua leaves, tamarind leaves are rich in calcium whereas pigeon pea, turmeric are rich sources of iron.

**Table 8:** Nutrient contain of some indigenous foods per 100 gms

Name of the food	Energy (Kcal)	Protein (g)	Fat (g)	Carbohydrates (g)	Calcium (mg)	Iron (mg)
Pigeon pea	343	22	1.5	63	13	28
Blackgram	347	24.0	1.4	59.6	154	3.8
Taro	97	3.0	0.1	21.1	40	0.42
Sweet potato	120	1.2	0.3	28.2	46	0.21
French bean	26	1.7	0.1	4.5	50	0.61
Turmeric	349	6.3	5.1	69.4	150	67.8
Groundnut	567	25.3	40.1	26.1	90	2.5
Susni sag	46	3.7	1.4	4.6	53	-
Bathua leaves	30	3.7	0.4	2.9	150	4.2
Tamarind leaves	115	5.8	2.1	18.2	101	0.30

**Most preferred indigenous foods and awareness about the nutritional factors of foods**

From the study it was found that the tribal people of Kandhamal district mainly preferred the foods which they are cultivating and which are easily available for them like rice, pigeon pea, slender amaranth, common bamboo,

malbar spinach, dwarf water clover, taro, sweet potato, arrowroot, French beans, cabbage, cauliflower, jackfruit, lemon, guava, ground nut. The tribal people have great nutritional awareness on edible indigenous foods especially which were cultivated by them.

**Table 9:** List of most preferred foods and nutritional awareness about foods

Most preferred foods	Nutritional awareness about foods
Cereal	Rice
Rice	Pigeon pea
Pulse	Dwarf water clover
Pigeon pea	Malabar spinach
Green leafy vegetables	Taro
Slender amaranth	Sweet potato
Common bamboo	French bean
Malabar spinach	Cabbage
Dwarf water clover	Cauliflower
Roots/tubers	Lemon
Taro	Guava
Sweet potato	groundnut
Arrowroot	
Other vegetables	
French beans	
Cabbage	
Cauliflower	
Jackfruit	
Fruits	
Lemon	
Guava	
Jackfruit	
Nuts and Oil seeds	
Ground nut	



## Conclusion

The results of this study have revealed that indigenous edible wild foods were only consumed during shortage of food by the tribals of Kandhamal which having high nutritional values. There is a need of public awareness on nutritive values of indigenous edible food items and wild foods which can enhance the food security of tribal communities of Kandhamal.

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