

Endogenous Development in Tribal Agriculture

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Abstract

The North-eastern Ghats of India, covering 3 states, is abode to a population of about 6.5 million tribals, representing 45 groups. The backbone of a tribal subsistence-based economy is agriculture. On the basis of their anthropological racial backgrounds and the topography and ecology of the area, tribals have adopted diverse agricultural practices in the Ghats. They practice mainly three types of agriculture, which are mostly mixed types except in the case of wetland crops such as rice. Tribal agriculture practices are mostly based on their world-view, beliefs and indigenous knowledges.

Tribal traditional village council functionaries – the custodians of indigenous knowledge and world-view practices – play a big role in agricultural development. They have evolved and adopted several mechanisms for land, soil and crop management including natural pest control, botanical pesticides and organic farming practices by using indigenous knowledge and also by performing and practicing related world-views. There are different categories of tribal healers. The healers responsible for crop health are called “Taas Guniyas”, and they help the community take care of crop health by using herbal medicines and mantras and by performing rituals.

Modernization and the introduction of mono crops and cash crops with hybrid seeds and other external inputs for crop management are adversely affecting tribal traditional agriculture, related knowledges and world-view practices.

Integrated Development through Environmental Awakening (IDEA) has been promoting the endogenous development concept in the tribal belts since 1995 and reviving and integrating indigenous knowledges with modern knowledges.

Introduction

The Eastern Ghats is one of the major natural resource bases of India and is the homeland of about 60 tribal communities with a population of over 11.5 million. The North-eastern Ghats, covering Andhra Pradesh, Western and Southern Orissa and Chattishgarh, is the homeland of about 6.5 million tribals, representing 45 ethnic communities from 3 racial and 4 linguistic groups. Most (80%) of these tribal groups live in inaccessible mountain valleys, hilltops and in plain forest areas with diverse lifestyles and eco-cultural practices based on their beliefs in nature, world-views and indigenous knowledge. The tribal economy is mostly agro-forest based, which is a subsistence type of economy. While agriculture and animal husbandry are the major economic bases for land-owning families, animal husbandry and the collection of minor forest products, herbs and non-timber forest products are the major income sources for marginalized and landless families.

Tribal agriculture

The backbone of a tribal subsistence-based economy is agriculture. On the basis of the topography, agro-ecology and their racial and cultural backgrounds, tribals have adopted diverse (sometimes area and community specific) agricultural practices with their time-tested indigenous knowledges and technologies and have integrated several related world-view (spiritual) practices.

The tribes of the North-eastern Ghats mainly practice three (specific to the Koraput–Visakhapatnam area of the Andhra–Orissa border) types of agriculture. These are

1. Shifting cultivation (Podu/Dongor Marbar/Lankapad senad)
2. Terrace cultivation (Tinn/Jolabedda)
3. Plain land agriculture (Digudu Podha/Pallam/Metta)

Shifting/slash and burn cultivation

Shifting cultivation is the major subsistence economic base of the tribals, especially the mountain and valley tribes. The fallow period of the shifting cultivation patches that in the last two decades used to last for about six to seven years has come down to a mere one to two years. However, the practice of shifting cultivation is not only an economic pursuit but is also a way of life for many mountain tribes. The practice of shifting cultivation accounts for their social structure, political organization, economy, culture and religious identities. Traditionally, shifting cultivation was considered a property of the community/clan. Traditional village institutions and clan heads regulated the use of forests for shifting cultivation by the individual farmers in the community. This tradition is lost owing to several socio-economic and political reasons.

Indigenous knowledge and regulations related to shifting cultivation

1. The selection of the shifting cultivation patches/areas on the mountain is the responsibility of the traditional village councils, clan heads and senior farmers. This is done on the basis of certain traditional selection criteria such as **ecological** assessment of the density of the vegetation (normally the patches with vegetation such as bushes and creepers and moist soil are considered best for shifting cultivation), **cultural assessment** (the forests or mountain should be inhabited by the mountain gods/goddesses such as *Dongor Devatha*, *Dharani Devatha* and the Seven Sister goddesses etc; the tribal priests perform a ritual and obtain the permission from these forest deities to commence mountain farming) and **economic** factors (the proposed patch should be large enough to be shared between the individual farmers). From among these three components, more consideration is given to ecological and cultural aspects. If ecological and economic components are favourable but cultural considerations are not, the tribals consider the other two components meaningless. This shows the value the tribals attach to their world-views and the spiritual world.
2. Once the selection is over, the decision on the general layout of the land management system is decided on the basis of the size and topography of the hill.

Generally, forest cover on the top of the hill is left untouched. Depending on the gradation of the hill, either vertical or horizontal plots will be divided. On the basis of the plot design, individual farmers can plan their cropping patterns and land soil management practices.

3. Once these technical considerations are taken care of, the tribals celebrate a festival known as *Pushya Parob* in the months of December–January and distribute the land to the clan heads for further distribution to their clan members. While distributing the land, the village council also suggests certain protocols related to extent of land, types of species of trees to be left in the shifting cultivation patches etc. Community members are also given advice on different types of land and soil and on cropping pattern management.
4. The traditional village council heads view seriously the violation of the protocols related to technical considerations such as socio-cultural regulations by the individual members and clans.
5. Mixed crops are the traditional crops grown in the shifting cultivation patches. However, depending on the type of design of the plot, a cropping pattern will be suggested. For example
 - In wider horizontal sloping plots, cereals, millet, beans and vegetables can be grown.
 - In vertical plots, different crops can be grown at different altitudes, for instance, sweet orange (*kamala*), lemon (*nimma*) and custard apple (*seethaphal*) can be grown on the upper part; ginger, sweet potato, turmeric and yam species can be grown in the lower part and cereals, pulses and millets can be grown in the middle part.

Traditional land classification

Depending on the soil type, the traditional shifting cultivation patches are classified into (tribes of Koraput and Andhra–Orissa border):

1. Arengbur : A land with large boulders and soil that is very hard
2. Jalengbur : A patch with rocky soil but that a hoe can penetrate
3. Jakupbur : A land with scattered stone slabs, which are not removable
4. Takup : A land dominated by stones and a depth of considerable soil in between two large stones
5. Ragudibur : A land characterized by fragile red chips mixed with soil

On the basis of the soil types, crop selection is made. Traditional village council heads such as *Disari* and *Pujari* and senior farmers will advice farmers on these technical aspects.

Terrace cultivation

Terrace cultivation is carried out in the valleys where there is perennial or seasonal water available. Unlike shifting cultivation, the selection process and the ownership of the terrace cultivation is retained with individuals or a clan.

The practice of terrace cultivation involves mostly terrace bunding using indigenous technologies, for example, land and soil management practices adopting indigenous knowledge such as application of farmyard and green manure, mulching and weed management practices. Crops grown in these lands are mostly mono crops

such as traditional rice varieties in the kharif season and vegetables and pulses in the rabi season.

Plain land cultivation

Plain land cultivation is of two types:

1. Dry plain or undulated land cultivation
2. Irrigated or rain-fed wetland cultivation

These lands normally belong to either joint or nuclear families. They grow varieties of mono or mixed crops and vegetables.

Table 1. Indigenous knowledge and world-views related to tribal agricultural practices

Activity	Indigenous knowledge	Socio-cultural and religious practices
Classification of agriculture	3 types (shifting cultivation, terrace cultivation, plain land cultivation)	
Types of shifting cultivation	5 types (Arengbur, Jalengbur, Jakupbur, Takup, Ragdibur)	Performing community ritual before selection of area for shifting cultivation
Soils suitable for specific crops	<p>Red soil : little millet, finger millet, tubers</p> <p>Black soil : little millet, finger millet, dry paddy</p> <p>Sandy soil : tubers, hill paddy, jowar, red gram, finger millet, niger</p> <p>Rocky soil : niger, black gram, cowpea, beans, red gram, minor millet</p> <p>Red and black : paddy and soil mixture vegetables</p>	<p>Important agriculture related festivals:</p> <p>Total no. of festivals</p> <p>Area and land selection for shifting cultivation</p> <p>Soil testing</p> <p>Seed testing</p> <p>Making agricultural implements</p> <p>Pest control and crop health</p> <p>Harvest conservation (for food security)</p> <p>Wild leafy vegetables conservation</p> <p>Rain making</p>
Soil testing	<p>Soil testing by observation of the health (colour, size) of germinated seedlings during <i>Bali Parob</i></p> <p>Texture of soil; weight; taste; colour</p>	Soil testing ceremony by name <i>Bali Parob</i>

Activity	Indigenous knowledge	Socio-cultural and religious practices
Seed testing for germination and seed health	Observation of germination of seed, colour of the germinated leaf, root, stem and even soaked seed coat during <i>Chaitra Parob</i>	Seed testing ceremony by name <i>Chaitra Parob</i>
Intercropping patterns/ systems in mixed agriculture	Cropping of heterogeneous varieties, e.g.: 1) Maize with beans 2) Jowar with red grams 3) Little millet with jowar/maize	Crop calendar (as per astrological calculations) – (Ploughing, land tilling, hoeing, seed broadcasting, harvesting and threshing) See Annex-1
Knowledge on duration of crops (area specific)		Agricultural knowledge through symbols: 9
a) Short duration crops	50-60 days: Little millet – Araku, Koraput Italian millet – Kondhs, Kondareddis of Orissa and Andhra Pradesh Maize – Koyas of Chattisgarh and Andhra Pradesh	Land management; soil treatment; seed treatment; transplantation; harvesting; pest control; rain making
b) Long duration crops	7-8 months: Black jowar (<i>Nalla/ kaki jonna</i>) – tribes of Andhra Pradesh–Orissa border 9-10 months: Hill red gram (<i>Kaliya kandi</i>) – tribes of Koraput–Visakhapatnam border	
Knowledge on weed management (women)	Weeds for crop health – green manure, mulching Weeds for cattle health – fodder Weeds for human health – medicinal plants Weeds for nutrition – leafy vegetables	

Activity	Indigenous knowledge	Socio-cultural and religious practices
Seed broadcasting, transplantation and spacing techniques	<ul style="list-style-type: none"> • Number of fistfuls and no. of fistfuls per acre (seed rate) • Number of throws for each grip (spacing) • Song narrates the spacing technique for transplantation of different plants Millets Beans Cereals Oil seeds 	
Knowledge of seed storage	Millets Pulses Cereals Tubers Oil seeds	
Knowledge on natural and botanical pest control	<p>Natural: Spiders (social spider), black ants, quails, reptiles</p> <p>Botanical: About 25 species of major plants (parts used: leaf, bark, stem, tuber, fruit)</p>	
Knowledge on harvesting techniques (women)	Sustainable harvesting techniques	
Songs	<p><i>Beddaroppa</i> – transplantation</p> <p><i>Oylee geeth</i> – land management</p> <p><i>Tode geeth</i> – weed management</p>	
Proverbs	<p>Soil related: <i>Puttamannu – gattimannu</i></p> <p>Weather forecasting related: <i>Uttara choosi – yettara gampa</i></p> <p>Seed broadcasting: <i>Vadlu okati – visurlu rende</i></p>	
Traditional knowledge and technology transmission practices	Dormitory education known as “Gothul” in different forms with different names (songs, dances, music, proverbs, practical demonstrations and participation)	

Relevance of tribal indigenous knowledge and world-views and their application for endogenous development

Indigenous tribal agricultural knowledge and related world-views are rapidly eroding because of modernization and acculturation. Tribal traditional institutional functionalities – the custodians of knowledge on agriculture and related world-view practices – play a big role in the agricultural development and farming practices. The healers responsible for crop health are called *Taas Guniy*, and they help the community take care of crop health by using herbal medicines and mantras and by performing rituals related to crops. The other functionalities help the community in land and soil management. Modernization and the influx of mono crops and other cash crops and new crop management practices are adversely affecting tribal traditional agricultural practices. The functions of the functionalities are also vanishing rapidly owing to modernization and socio-political reasons. The traditional knowledges are dying on the one side, and on the other, the hybridization process of tribal agriculture has begun, leading to a loss of diversity in the traditional agricultural knowledge in the tribal belts. This includes related significant world-view practices and the custodians of the knowledge – the tribal traditional institutional functionalities. Therefore, it is time to focus attention on some of the relevant indigenous knowledges and related practices and to revive them in agriculture through the endogenous development approach.

Table 2. Agricultural practices to be revived through the endogenous development approach

S. no	Activity	Relevance for endogenous development approach
1.	Area selection for shifting cultivation	The changing biodiversity and agro-ecological conditions means there is a need to integrate traditional cultural and ecological criteria to obtain sociologically acceptable, economically viable, environmentally sound and culturally ethical lines of sustainable endogenous development.
2.	Soil suitable for specific crops	This knowledge is to be revived to improve the land management practices of the mountain agricultural farmers.
3.	Soil testing	For many tribal communities (80%), especially in remote areas, this traditional soil testing is the only alternative. Because ecological conditions and soil health conditions are constantly changing, their vitalities need to be monitored before agricultural operations are started. Hence, this traditional soil testing knowledge and related rituals are to be further studied and enhanced with modern knowledge systems.

4.	Seed testing	Similar to soil testing, this knowledge on seed testing and the related festival <i>Chaitra Parob</i> are the only alternatives to 80% of farmers. This can be further studied and enhanced with modern knowledges.
5.	Knowledge on duration of crops	The changing ecological, climatic and agronomical conditions in the tribal belts means there is a need to adapt/revive the knowledge on duration of crops to ensure sustainable agricultural crop returns to farmers.
6.	Knowledge on weed management	Traditional knowledge on weed management for the successful control of weeds through knowledge application is essential in the tribal belts. About 35–40% of the tribal crop loss is due to weeds. This can be minimized by reviving this indigenous knowledge on weed management.
7.	Seed broadcasting, transplantation and spacing techniques	The changing agro-diversity and agro-ecological conditions and crop management practices means that proper broadcasting, transplantation and spacing techniques are required. This indigenous knowledge can be revived and integrated with modern knowledge for better results.
8.	Knowledge on natural and botanical pest control	The use of natural and botanical pest control methods by the tribals has been in practice for generations and they are time-tested. For revival, their standard operating procedures (SOP) can be further standardized with more experimentation and validation. The transmission of this knowledge is associated with the festival called <i>Ashada Jatara</i> . Hence, this can be revived.
9.	Indigenous knowledge and technology transmission process through songs, proverbs and dormitory education	Traditional village councils and their traditional institutional functionaries and senior farmers possess vast knowledge on agriculture in the form of songs and proverbs. These can be revived and promoted through different programmes.

IDEA's efforts to promote endogenous development in tribal agriculture

1. A detailed documentation of indigenous knowledge and world-views related to tribal agriculture has been carried out.
2. On-farm validation of the knowledge systems and related world-views and their rationalities have been conducted.
3. Soil and seed testing knowledges and related ceremonies such as *Bali parob* and *Chaitra parob* have been revived.
4. Harvest conservation programmes have been promoted by reviving first eating ceremonies – *Nuakiya*, which is food security related.

5. Indigenous weed management practices have been revived through training programmes, dormitory education and experiments.
6. Indigenous knowledge on biological and natural pest control have been revived and enhanced through participatory action research and experiments and the evaluation of SOPs in collaboration with farmers.
7. On-farm conservation of traditional seeds has been promoted
8. Dormitory training programmes have been conducted on sustainable agriculture, agro-forestry, weed management and natural and botanical pest control etc.
9. Farmers' research units have been set up to help farmers conduct on-farm participatory action research experiments, demonstrations and training programmes.
10. Forums for crop health healers, known as *Taas Guniyas*, have been promoted with tribal healers.
11. Village crop health herbal gardens known as *Gram Taas Vaso* to be managed by the *Taas Guniyas* for the community have been promoted.
12. Documentation and experiments on the use of animal products for crop health have been conducted.

Annex-1

“Tribal Agricultural Almanacs Based on Star Science”

Cosmic influence during specific days and times of constellating sun and stars on agricultural operations and crop health

S. No.	Nature of agricultural operation	<i>Auspicious day</i>	Expected results
1.	Ploughing		
2.	Land tilling		
3.	Hoing	Sunday - <i>Asvani</i> Monday - <i>Sravana</i> Tuesday - <i>Magha</i> Wednesday - <i>Kruthika,</i> - <i>Anuradha</i> Thursday - <i>Punarvasu,</i> - <i>Pushyami</i> Friday - <i>Robini</i> Saturday - <i>Swathi</i>	Plants grow healthy with vitality
4.	Seed broadcasting		
	a) Crop – paddy	<i>Uttarashada, Sravana, Dhanistha, Sathabisha and Purvabadra.</i>	Good crop yield
	b) Finger millet	<i>Uttarabadra, Revathi, Asvani</i>	Good foliage and yield and healthy crop
	c) Minor millet	<i>Swathi and Anuradha</i>	Good crop yield

	d) Italian millet	<i>Revathi and Chitha</i>	Good crop yield
	e) Bitter gourd (vegetable)	<i>Mula and Uttarabadra</i>	Good crop yield
	f) Mustard	<i>Swathi, Anuradha</i>	Good crop yield
	g) Green gram	<i>Bharani in Sraban Mas</i>	Good crop yield
	h) Pumpkin	<i>Kruthika and Magha</i>	Good crop yeild

Reference: Kora Bhimanna, G Kangu, Cheddda Bhimanna etc.- tribal astrologers

Suggested reading

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