

**A REVIEW :**

Tribals in Agriculture

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SUMMARY : The progress of the country is related with tribal development as the tribal population in the country is not small. Tribal economy is mainly hunting, collecting and fishing or a combination of hunting, collecting with shifting cultivation. The tribal agriculture is primitive and backward resulting in low productivity. Tribal agriculture is characterized by small land holdings, improper land utilization, poor farming techniques, over grazing of pastures, low capital investment and low production inputs. Tribal areas are in the nature's lap and agriculture has unique potential to absorb these people and creating opportunities for employment. It was found that tribal farmers were aware of some improved farming practices but did not have detail knowledge and training on method of application of fertilizer, organic and chemical fertilizer doses and method of application, method of transplanting, plant protection measures, methods of harvesting and methods of inter-culturing. The indigenous knowledge of farmers is considered as important sources of information about the local farming systems, experiences, institutions, culture etc. Tribal women constitute half of the work force among tribals in India. Tribal women are discriminated, though they make enormous contribution to the agriculture and allied sectors. Due to absence of employment opportunities in agriculture sector; young people belonging to tribal communities are finding themselves at cross-road of life. There is strong need to sensitize and train the tribal folks through adequate extension, policy and financial support for holistic development of tribals in our country.

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BACKGROUND AND OBJECTIVES

A tribe is a social division in a traditional society consisting of families linked by social, economic, religious, or blood ties, with a common culture and dialect. The tribal peoples of India are also known as "Adivasis", which literally means 'Indigenous People' or 'Original inhabitants of a given region'. India has the social largest tribal population in the world next to Africa. According to Population

Census (2011), the number of scheduled tribes in India is 10,42,81,034. It is 8.6 per cent of the total population of India. A total of 9,38,19,162 people belonging to scheduled tribes reside in rural areas whereas 1,04,61,872 people in urban areas. The scheduled tribes are 11.3 per cent of the total population of rural areas and 2.8 per cent of urban areas. There are about 550 tribes in India. Major population of the tribes is found in Chhattisgarh, Orissa, Jharkhand, Madhya Pradesh, North

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Eastern States and the Andaman and Nicobar Islands (Kumbhkar, 2010). The representation of tribes in the Indian society is quite small and at the same time it is culturally effective and significant (Vyas and Mann, 1980). Tribal people has been seen to be strongly associated with the forests, hills and remote areas, practicing a unique life style, having a unique set of cultural and religious beliefs. For millennia, tribal communities have lived in forests and survived on hunting and gathering. However, with growing population and resource pressure, it is now witnessing that a rise in livelihoods based on settled farming (Anburaja and Nandagopalan, 2012). Tribal economy is mainly hunting, collecting and fishing or a combination of hunting, collecting with shifting cultivation (Purkayastha, 2016). Nevertheless, tribes are rich in indigenous agricultural practices because of autonomous social structure and lesser contact with people in plains. Their life style indicates that the tribes have intimate knowledge on environmental process. They employ unique management strategies in agriculture to utilize the environment.

Prospects of tribals in agriculture:

Tribal areas are in the nature's lap and agriculture has unique potential to absorb them and creating opportunities for employment. The factors like hard working, dignity of labour and affection for the land are genetically prevailing among them which are considered to be the fundamental assets of tribals. Sethi (1984) highlighted that majority of agricultural labourers in India are drawn from the scheduled castes and Tribes. They practice a different occupation depending on the nature of resource available especially type of land and human skill (Marchang, 2018). Several studies revealed that, provision of extension and training of modern agricultural practices, facilitated tribals in adoption of innovation with relative advantage and compatibility in their own field conditions. Mandavkar *et al.* (2011) reiterated that the tribal labourers were aware of agricultural operations but needed detail knowledge and training about them especially method of application of fertilizer, organic and chemical fertilizer doses and method of application, method of transplanting, plant protection measures, methods of harvesting and methods of inter-culturing. Tribal goat keeping farmers reported maximum training need with respect to veterinary care of goat and care of pregnant goat. Similarly, a study on awareness and

adoption of modern agricultural practices among STs in KBK districts of Odisha exhibited that relatively higher awareness levels were expressed by the farmers in tribal area on seed replacement (9% households), summer ploughing (6%), balanced use of chemical fertilizer (12%), soil testing and seed sowing techniques (2%) and use of organic farming (7%). In general, non-STs were found to be marginally more aware than the STs on adoption of modern agricultural practices (Das and Sahoo, 2012). Moreover, recently, the indigenous knowledge of farmers is considered as important sources of information about the local farming systems, experiences, institutions, culture etc. (Sharland, 1991). Tribal communities, namely Irulas, Malayalis and Muthuvans living in the state of Tamil Nadu, have been cultivating traditional cultivars of paddy, millets, pulses and vegetables. The traditional cultivars sown by them, over generations, form the principal crops of their agricultural system (Ravishankar and Selvam, 1996). The livelihood of tribal communities in the Jharkhand state has traditionally been dominated by pig-based production systems poultry, goat rearing and artisan activities also played a vital role in the livelihood of tribal people (Kumar *et al.*, 2015). When the world advocates for sustainable and organic farming to achieve global food and nutritional security in the wake of climate change, the traditional agrarian practice by these indigenous farmers make it a case of success and help the state and policy makers overcome the agrarian crisis. Dwelling amidst hills, forests, coastal areas and deserts, tribals over the centuries have gained precious and vast experience in combating environmental hardships and leading sustainable livelihoods. Their wisdom is reflected in their water harvesting techniques, indigenously developed irrigation channels, construction of cane bridges in hills, adaptation to desert life, utilization of forest species like herbs, shrubs for medicinal purposes, meteorological assessment etc. (Dash, 2018). Forest based livelihoods by the tribals mainly revolve around collection, processing and utilization/selling of various Non-timber forest products (NTFPs) like fuel wood, lac, tooth brush, leaves for plate and cup making, fodder and browse, vegetables, fruits, seeds, flowers, bamboos, medicines, mushrooms, oilseeds, oilseed cake, spices, honey, oils, gums, resins, gum-resins, dyes, wax, brooms, fibres, floss, silk, charcoal, fencing, wildlife products, thatches, baskets, ropes, mats, handicrafts, pickles, beverages, abiotic products etc. (Patidar *et al.*, 2018).

Therefore, to give boost to the tribal livelihood, numerous development plans like Tribal sub-plan and Tribal block development have been in operation for tribal agricultural development.

Constraints faced by tribals:

STs are historically a disadvantaged and economically a backward people. They have been at the 'lower end in all indicators of living conditions and household assets' (Bhagat, 2013). Their characteristics include rural-oriented, illiteracy, economic backwardness such as lower income, higher incidence of indebtedness and fewer assets among others and social retardation such as low status (Hanumantha and Grover, 1979). The main constraints faced by the majority of tribals in the participation of different on-farm activities were lack of irrigation facility, unavailability of agricultural labour, high labour charges and lack of training facility for fish farming. While, with regard to off-farm activities major constraints faced by the respondents were lack of proper knowledge about different off-farm activities, lack of training facility in tribal area for skill development related to different off-farm activities, poor economic status of tribes and lack of transportation facility in tribal area (Shandilya *et al.*, 2016). Tribal agriculture is characterized by small land holdings, improper land utilization, poor farming techniques, over grazing of pastures, low capital investment and low production inputs. They have insufficient agricultural land, meagre capital and unmatched skills for practicing modern agriculture. The reasons behind the same are unawareness, illiteracy, insufficient capital and government aids, lack of land tenureship and lack of resources. As a result, they have low agricultural productivity. They are not interested in cultivating superior crops because of crop failure and loss. They mainly depend on production of millets crops like maize, *Jowar*, *Bajra*, kodo, kutki etc. for their livelihood and they avoid using modern hybrid seeds, fertilizers and chemicals (Dash, 2018). However, the rural agrarian economy of tribal India rests on the shoulders of the young farmers. Tribal youth are unable to produce sufficient resources to fulfill their livelihood requirements; and they migrate towards urban centres searching jobs in unorganized sectors. Young people from tribal areas are currently entering the labour force as the tribal agriculture is primitive and backward resulting in low productivity.

Shifting cultivation by the tribes:

Traditionally, the indigenous hill people, mostly scheduled tribes, living in the North East greatly depend on land and forest for their livelihood through agriculture particularly shifting cultivation, food gathering and hunting. Shifting cultivation has been practiced as a way of life within the tribal communities and hill people from time immemorial (Gupta, 2000; Peale, 1874 and Seavoy, 1973). However, it is not practiced by all the tribes (Corbridge, 1988). It occupies a distinct place in the tribal economy and constitutes a vital part of the livelihood means, life-style and socio-economic set-up of hill and tribal regions. It is deeply rooted and linked with indigenous ethnic culture (Mef and Gbpihed, 2009 and Roy *et al.*, 2012) in the hills such as the Khasis, Nagas, Kukis, Mizos, Zhomis etc. It is the primary means of livelihood for the Garos of Meghalaya (Reddy, 1991). According to Thangchungnunga (1987), in Mizoram the agriculturists confined practicing shifting cultivation due to the hilly terrain of the state; nevertheless, permanent cultivation is also practiced in the small patches of flat land. Shimray (2004) has remarked that some Nagas such as Tangkhul, Mao, Zeliangrong and Maring practice both shifting cultivation as well as sedentary terraced cultivation. Terraced cultivation is confined to the lower gradient of the mountain ranges and to narrow river banks and valleys. Among some tribal communities like the Angami and Tangkhul Nagas of Nagaland, Apatanis of NEFA, sections of Saoras of Orissa, terrace cultivation is traditionally practiced. Wet cultivation is a more recent development among the tribal people, particularly in Central and Western India.

Tribal women in agriculture:

Tribal women constitute half of the work force among tribals in India. Tribal women are discriminated, though they make enormous contribution to the agriculture and allied sectors. They have very little access to the knowledge and skills of modern farm technologies and related resources. Women participate in all agricultural operations excepting ploughing and sowing of rice seed, contributing between 70 to 80 per cent of the total labour. The tribal women work for about 1 to 15 hours per day involving in agriculture and allied activities. Tribal women do manure application, sowing, weeding, thinning, irrigation and harvesting up till storage. Due to increasingly shifting of the male members of the tribal

household towards non-farm employment on a seasonal or semi-permanent basis, the women become de-facto house hold heads with the increasing responsibilities as farm managers and workers (Sharma and Kaur, 2015). The tribal women living in the Kalrayan Hills of Tamil Nadu state have rich knowledge about the indigenous practices, especially in post harvest and cultivation aspects on paddy (*Oryza sativa* Linn.) and tapioca (*Manihot esculenta* Crantz.) (Natarajan and Govind, 2006). The tribal women collect minor forest produce like Amla, Soapnuts, Shikakai, Adda leaves, Hill brooms, Firewood, Bamboo, Gumkaraya (Kovela gum) and sell these products in the nearby haats (market) and exchange

the produce for their daily requirements through barter system. Results reveal that the work participation rate and role performance of tribal women in agriculture and allied sectors is high as compared to their male counterparts and contribute lion's share to the family income (Kalyani *et al.*, 2011).

Indigenous technical knowledge (ITK) of tribals:

Indigenous technical knowledge has strong roots in rural culture. The term traditional tribal agricultural practices denote a type of knowledge that has evolved within the tribal community and has been passed on from one generation to another (Brouwers, 1993). It is also

Table 1: Major Scheduled Tribes in India (State-wise)

States/ Union territories	Name of common tribes
Andhra Pradesh	Andh, Sadhu Andh, Bhagata, Bhil, Chenchus (Chenchawar), Gadabas, Gond, Goundu, Jatapus, Kammara, Kattunayakan, Kolawar, Kolam, Konda, Manna Dhora, Pardhan, Rona, Savaras, Dabba Yerukula, Nakkala, Dhulia, Thoti, Sugalis.
Arunachal Pradesh	Apatanis, Abor, Dafla, Galong, Momba, Sherdukpen, Singpho.
Assam	Chakma, Chutiya, Dimasa, Hajong, Garos, Khasis, Gange.
Bihar	Asur, Baiga, Birhor, Birjia, Chero, Gond, Parhaiya, Santhals, Savar.
Chhattisgarh	Agariya, Bhaina, Bhattra, Biar, Khond, Mawasi, Nagasia.
Goa	Dhodia, Dubia, Naikda, Siddi, Varli.
Gujarat	Barda, Bamcha, Bhil, Charan, Dhodia, Gamta, Paradhi, Patelia.
Himachal Pradesh	Gaddis, Gujjars, Khas, Lamba, Lahaulas, Pangwala, Swangla.
Jammu and Kashmir	Bakarwal, Balti, Beda, Gaddi, Garra, Mon, Purigpa, Sippi.
Jharkhand	Birhors, Bhumij, Gonds, Kharia, Mundas, Santhals, Savar.
Karnataka	Adiyan, Barda, Gond, Bhil, Iruliga, Koraga, Patelia, Yerava.
Kerala	Adiyan, Arandan, Eravallan, Kurumbas, Malai arayan, Moplals, Uralis.
Madhya Pradesh	Baigas, Bhils, Bharia, Birhors, Gonds, Katkari, kharia, Khond, Kol, Murias.
Maharashtra	Bhaina, Bhunjia, Dhodia, Katkari, Khond, Rathawa, Warlis.
Manipur	Naga, Kuki, Meitei, Aimol, Angami, Chiru, Maram, Monsang, Paite, Purum, Thadou.
Meghalaya	Chakma, Garos, Hajong, Jaintias Khasis, Lakher, Pawai, Raba.
Mizoram	Chakma, Dimasa, Khasi, Kuki, Lakher, Pawai, Synteng.
Nagaland	Angami, Garo, Kachari, Kuki, Mikir, Nagas, Sema.
Odisha	Gadaba, Ghara, Kharia, Khond, Matya, Oraons, Rajuar, Santhals.
Rajasthan	Bhils, Damaria, Dhanka, Meenas(Minas), Patelia, Sahariya.
Sikkim	Bhutia, Khas, Lepchas.
Tamil Nadu	Adiyan, Aranadan, Eravallan, Irular, Kadar, Kanikar, Kotas, Todas.
Telangana	Chenchus.
Tripura	Bhil, Bhutia, Chaimal, Chakma, Halam, Khasia, Lushai, Mizel, Namte.
Uttarakhand	Bhotias, Buksa, Jannsari, Khas, Raji, Tharu.
Uttar Pradesh	Bhotia, Buksa, Jaunsari, Kol, Raji, Tharu.
West Bengal	Asur, Khond, Hajong, Ho, Parhaiya, Rabha, Santhals, Savar.
Andaman and Nicobar	Oraons, Onges, Sentinelese, Shompens, Jarawa

reported that traditional agricultural practices is farmers friendly, economic and environmental friendly, socially accepted and suited to specific local and environmental conditions (Sharma, 2015). Kumari, 2008 revealed that there were more than 130 indigenous technical knowledge items available related to paddy, maize, groundnut, wheat, pulses, horticultural crops and weather forecasting in agriculture, which may serve as alternatives to modern technologies. Behera *et al.*, 2006 delineated 49 plant species belonging to 30 families, mostly used by the tribal people of Kendujhar and Mayurbhanj district of Orissa for curing diarrhea. Similarly, Thakur *et al.*, 2014 reported that several tribal communities like Bhil, Bhilala and Barela in Madhya Pradesh used 15 medicinal plant species as ethno-medicine and pharmaceuticals to cure various ailments among human beings. The tribals practice indigenously inherited pest control techniques to produce pest-free crops. In all the measures of pest control varieties of pesticidal plant species including *Neem*, *Vitex*

negundo Linn., *Adhatoda vasica* Nees. and *Calotropis gigantean* R.Br. are used (Narayanasamy, 2006). The tribal folks have been utilizing varieties of plant based products, crop residues like ash, husk, etc. animal products like cow dung, red earth, etc. for protecting their crop plants in field and in storage of food grains. Tribals depend upon the organic manures like cattle refuse, green manure and domestic wastes and also the cattle are gathered in a land for certain period so as to enrich the soil with nutrients. Leaves of *Neem*, *Pongam*, *Calotropis gigantean* R. Br. and *Cassia javanica* Linn. are regularly used as green manure. *Digitaria cruciata var. esculenta* is largely cultivated for manure by composting the biomass, although the grains are also consumed. The role of a lesser-known legume, *F. vestita*, was evaluated for its ability to improve soil nitrogen status. Mixed cropping with *F. vestita* was found to give better economic returns, apart from improved soil fertility with a net gain in nitrogen of upto 250 kg per ha per year in North East

Table 2: List of tribal pesticidal plant species

Sr. No.	Common name	Botanical name	Pest(s) controlled	Parts used	Mechanism of action on insects
1.	Chilli	<i>Capsicum annum</i> L.	Pulse beetle	Fruit powder	Insecticide
2.	<i>Neem</i>	<i>Azadirachta indica</i> (Juss)	Stored grain pests	Leaf, twig, bark and seeds	Contact, stomach poison and repellent
3.	Indian Privet	<i>Vitex negundo</i> L.	Stored grain pests	Leaf and twigs	Contact poison and growth inhibitor
4.	Smooth Volkamera	<i>Clerodendron phlomoides</i> L.	Stored grain pests	leaf	Anti feedent and repellent
5.	Acorus	<i>Acorus calamus</i> L.	Stored grain pests	rhizome	Anti feedent and repellent
6.	Tobacco	<i>Nicotiana tabacum</i> L.	Earhead bug and leaf feeders	Leaf and stem	Stomach poison and repellent
7.	Fox Tail Palm	<i>Coryta urens</i>	Leaf folder and case worm	leaf	Anti feedent and repellent
8.	Kerala Plant	<i>Sterculia urens</i> Roxb.	Leaf folder and case worm	leaf	Anti feedent and repellent
9.	Panivaragu/ Kodomillet	<i>Paspalum scrobiculatum</i>	Leaf hoppers in rice	plant	Deterrent
10.	Babool	<i>Acacia nilotica</i> L.	Stem borer and leaf feeders	Crushed powder from leaves, seeds and bark	Anti feedent
11.	Cleistanthus	<i>Cleistanthus collinus</i> Roxb.	Beetle pest of rice	Leaf and bark	Anti feedent
12.	Pongam	<i>Pongamia pinnata</i> L.	Leaf and sap feeders	leaf	Anti feedent and repellent
13.	Castor	<i>Ricinus communis</i> L.	Rhinoceros beetle	Seeds and cake	Attractant
14.	Calotropis	<i>Calotropis gigantean</i> L.	Pests of cucurbits	Leaf and twig	Stomach poison and growth inhibitor
15.	Cycas	<i>Cycas circinalis</i>	Ear head bug of rice	flowers	Repellent and antifeedant

Region of India (Gangwar and Ramakrishnan, 1989). Therefore, it is important for the government to have a better recognition of the inherent strength of tribal agriculture. The effort should be to build further on these strengths instead of thoughtlessly uprooting traditional wisdom. Further careful observation reveals this to be a risk minimizing system which can provide at least some food even in adverse weather conditions. Hence, the relevance of this eco-friendly, zero fossil-fuel system has increased further in times of climate change and erratic weather. So eventually, traditional agricultural practices are fruitful for sustainable development of the tribal community and country as a whole.

Policy implications:

The major tribal groups in India are dependent on agriculture for their livelihood. Low agricultural productivity and production have resulted into their economic deprivation. New agricultural technology can improve the production and productivity of agricultural sector in tribal region and can cause the improvement in economic condition of the people.

The following policy implications are recommended:

– Agricultural extension officials should concentrate the information needs of the tribal farmers in the areas of pesticide, fertilizer and improved farm activities.

– Adult literacy education programme is required to help tribal farmers acquire basic skills and abilities to seek needed agricultural information through modern communication channels.

– Government should encourage tribal farmers by giving them special attention in terms of access to needed farm inputs.

– Needful infrastructural facilities are made available to ensure effective mass media support for information dissemination.

– ICT-based agricultural information system should be developed to encourage modern production technology in the tribal areas.

– Soil fertility in dry lands can be sustained only through maintenance of organic matter and achieving better fertilizer use efficiency through integration of moisture-conservation practices along with soil-fertility management. Strategies for on farm generation of organic matter need to be evolved.

– Agricultural universities and research organizations have to lay more emphasis on developing seeds, which require less water, so that farmers are able to increase

productivity even in critical environment conditions.

– Agriculture is still dependent on timely arrival and intensity of the monsoon. It is high time that an overall water management plan for conservation of water, preparation of watershed schemes, rainwater harvesting and recharging of ground water.

Conclusion:

The tribes lead a living more close to nature and depend on it for their survival. There is abundance knowledge and practice of the tribals in crop production and protection which need to be tapped for the present and future agriculture. The development departments should be fully involved in creating necessary awareness and information dissemination about agro-biodiversity conservation among the tribes; especially the tribal women. Till some better alternatives in occupation are made available to tribals, it is necessary to improve their knowledge, skill and efficiency to perform their present activities. This could be done by organizing the programmes such as training, demonstration, exhibitions and by providing modern tools and equipments to the tribals. The employment in service and industrial sector in tribal areas need to be strengthened to give them remunerative occupation.

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