Traditional Agricultural Wisdom for Sustainability in Tribal Areas

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Agriculture is the most primitive occupation of the tribal people. Though the people had changed their cultivation pattern from traveller's cultivation to settled cultivation, but some of the practices have remained unchanged among many group of farmers. The unchanged practices may be due to fact that they find the practices more sustainable. It is painful when somebody says the tribals are backward or primitive. It not only affects the sentiments of the clientele group but also equally affect the organizations working in those areas for their development. Hence, the technology should be transferred to them without affecting their sentiment. A number of appropriate technologies are generated by them and have become sustainable under their farming system.

The paper focuses attention to the practices of the resource poor tribal farmers that makes use of low cost renewable inputs, family and community labour for solving the food crises through their traditional wisdom which need documentation to make the future agriculture a sustainable one. Besides, effort has been made to gather necessary explanation on some of the practices followed by them. A few regular researches have been done to see whether their practices are based on any scientific basis; much other research work is yet to be started.

The study on the farmer's traditional wisdom on agriculture was initiated through non-random selection of respondents from eight different tribals of eleven Blocks of the undivided Koraput district, (For administrative convenience, Koraput has been divided into four districts i.e. Koraput, Malkangiri, Nawarangapur and Rayagada). Erstwhile undivided Koraput covers an area of 27,369.40 sq. kilometers which is richly inhabited by tribal community.

The respondents were selected from among different age groups, different working class group (basically they are farmers). *Mukhias*, *Disharies*, *Beju* etc. They have given necessary explanations on the continuity of their traditional practices. About 70% of the people of 30-50 age groups were flexible and they disapproved many of the traditional practices and wanted to discontinue those practices based on blind belief.

A typical tribal village is situated a little away from the main road and mostly inside the forest. Generally, the houses are constructed on the both side of a wide village road. The cowsheds are constructed on the middle of the road earlier. Now, they are having a cowshed in their house in front side or in the end of house row. This system has changed due to reduced number of wild animals and effective forest.

Most of the houses have some backyard and they raise a kitchen garden. Gradually, this kitchen garden extends to the field which again merges with the forest. The village has been set up where there was plain land and a stream. This selection of their dwelling place shows their intelligence and foresight.

Agriculture and the Religious Functions :

The tribals are very much religious. They offer rituals for Goddess *Dharani* (Earth) to provide them the best crop. They also pray '*Indra'* – the god of rain to shower timely rain for the crop. They worship '*Dharanimata'* before sowing the seeds in the field during *Baisakh*. Similarly, after a month of transplanting of paddy, they have Puja for filling up the grain by the grace of God. After the harvest of paddy, they have a ritual when they pray Mata Laxmi to be kind to them and bless them with a good crop. Even before going to clear the forest for jhoom cultivation (Slash and Burn Method), they usually pray God Mountain to sustain them.

Traditional Wisdom :

The tribals are intelligent and have made agriculture sustainable through their agricultural practices. Knowingly or unknowingly, they have created a balance between the environment and requirement. They hardly over-harvest anything from the nature or forest. Eventhough they sometimes starve, they never over-utilize the forest resources which is abundant; because they think for the future.

Mixed Farming :

Each and every tribal household keeps a few animals according to their size of the family. To make mixed farming sustainable, they harvest main crops. After harvest, they allow the cattle to graze in the field. In return, the animals leave the excreta which serves as the manure. They seldom milk the cow and they believe that milk is for the calf.

They keep the birds (Fowls) because they need 7 to 10 of those in a year for the different rituals to offer in sacrifices. The functions are observed in the winter to onset of monsoon. During the rainy season, they do not observe many functions. It is interesting to refer that the birds may damage the kitchen garden crops before these crops stand. Therefore, it is seen that, all birds are killed and devoured by the family members, leaving only one or two. Moreover, the birds would be eaten away by the wild dogs, foxes as the kitchen garden would be full of crops during the early part of the rainy season. But in the early winter, the new batch of chicks is seen in the villages. Usually, the people take them to the field so that the birds would devour the insects harmful to the crops. This cycle is not seen in the coastal areas of Orissa.

Jhoom Cultivation :

Now-a-days, the tribals are pushed up and up the hills. All the good fertile land owned by them in the valleys is near the streams now belonging to the non-tribal due to urbanization. The towns are coming up and industries are constructed resulting in the migration of the peace loving tribals farmers to interior parts of the forest. Ultimately, they have to depend on the uplands of the hill slope which can hardly give them a cropping during the rainy season. The land and produce both are not sufficient for them. Hence, they search for an alternate source for their sustenance. They grow upland paddy and other grain crops such as cereals and millets in the upland areas and grow pulses in the *bagada* (land cleared by them in the forest). They are conscious

that if the land will be left as such there might be soil erosion. They do not cultivate or plough the land, but dibble the seed with the help of a '*Gadi'* or of special hoe having one point, made up of wood. This minimizes soil erosion. Moreover, these crops cover the denuded forest area. It is customary with them to grow one or two crops in the hilly slopes in every 3-4 years. During this interval, the natural vegetation also covered the ground and the nutrient lost during the last crop is also regained by the deposition of silt.

It is seen that in late summer, just after one shower of rain, the tribal farmers usually go to the forest in search of the tuber crops; they harvest it by digging. But they refill the pit with the twig or piece of it which provide them the tubers in the next year. This is seen with arrowroot, yam, *bhata kanda, masiha kanda*, amorphophallus etc. Through these practices, the tuber crops continues to grow for years together in the same areas.

It can not be told that the tribals are destroying the forest. The felling of a fruit tree is an offence to the tribal communities. They treat the mango, mahua, jackfruit, salap and other fruit bearing trees as one of their own family members. But jhoom cultivation is a way of life. They cannot leave it unless they are engaged in other income generating works during the spring and the summer seasons.

Selection of Crop and Cropping pattern :

They practice crop rotation from time immemorial. Turmeric (*Curcuma longa*) is a cash crop mostly grown as annual crop, but sometimes it is also grown as a biennial crop, but after a turmeric crop they either leave that land fallow or grow a legume crop such as bold arhar (*Cajanus cajan*), blackgram (*Phaseolus mungo*) and after 2 to 3 years, they again grow turmeric in the same field.

They are very specific in the selection of crops. In the up-land, they grow Kuiri (*Panicum milliare*), a minor millet that gives only one quintal / acre. This yield is stable in any hazardous climatic condition and not affected by diseases and pests but the crop is ready within 60 days and it provides them food when they do not have anything during October-November. They say that Kuiri is like their eldest son who takes care of the old parents. Soon after Kuiri, they take another oilseed crop niger (*Guizotia abyssinica*) with the available moisture.

They can predict whether the paddy crop will give them better yield. If there will be rain at night and bright sunshine in the day, the crop will be wonderful; but if the opposite condition prevail the crop will fail. By seeing the intensity of the fruiting of mango, they can predict whether the paddy crop will be good. If there will be good mango crop next year, there will be good paddy crops too.

Besides paddy, they grow a number of beans which solves their protein requirement. They get paddy from the field and cowpea (*Vigna sinensis*), blackgram (*Phaseolus mungo*), Kandula (*Cajanus cajan*) from the *bagada* (forest areas).

Mixed Cropping :

It is a common feature in the tribal paddy field that one can find other crops like maize, blackgram, sorghum, ragi, kandula etc. in certain proportions. Due to erratic rainfed, most of the time the paddy crop fails. Therefore, one crop serves as the insurance for the other and they are sure to get a crop. In this mixed cropping, they include a legume which adds nitrogen to the soil

and provide the farmers with pulses. On the bunds of the land, they plant pulses such as arhar, blackgram, greengram etc.

Crop Production Practices :

a. Seed treatment

The tribal farmers are very careful about the seeds. They store the seeds with care and before sowing, they sometimes treat them with locally available materials. They dip the vegetable seeds in a aqueous solution of asafetida or hingu for about half an hour. They dry it in shade before sowing. They believe that this keeps the plants healthy.

b. Sowing of seeds

Broadcasting method is the common practice in the upland situation for paddy. They explain that this practice restricts the growth of weeds. They generally take a higher seed rate and follow one to two weeding. But, they say that in line sowing, the weeding is easier but need more than two weedings.

c. Use of manures

Farmers usually mix *Dhanicha* seeds with paddy and sow at a time together. At the time of *beusaning*, they incorporate this green manure in the soil. Use of cowdung and compost is the general practices. They also put wood ash in the soil for raising vegetables and fruit trees.

d. Weeding

They use a special type of implement, *Gadi* for weeding. Hand weeding is the general practice. They sometimes grow black coloured paddy to rouge out the volunteered seedlings of the last years variety grown in the same plot.

e. Mulching

Generally mulch is used by them in upland condition. They say that it helps in better germination of the seed material and restrict soil erosion and it provides certain amount of nutrients. They use sal mulch for raising turmeric. They say that no other species can compete with sal. The sal can withstand browsing to a great extent. In summer, when other trees shed their leaves, the sal put forths new big leaves. It is easy to carry sal stumps without any problem. If sal mulch is not available, they may reduce the land under turmeric. They say that in turmeric growing, sal mulch is given because it lasts longer.

f. Irrigation

They level the land properly so that water can flow without any hindrance from one plot to the other. Water is not allowed to spill over the plots. The main water channel is checked at different intervals. They divert the flow of water towards the field and from one field to other. They use earthen pipes or bamboo poles so that water can flow to the neighbouring fields without making any breach in the ridges. They may place a flat wooden plank or a flat stone piece on the ground where the water will drop with a speed. It helps in conserving the soil as it will flow only after facing a direct impact with the stone piece or wooden plank. This practice is followed where there is a perennial stream in the sloppy areas.

g. Crop Protection

When they plant fruit trees, they generally spray the whole plant with cowdung so that cattle will not eat the plant. They also spray the dilute solution of cowdung to the roadside plants so that from that side cattle will not enter the field. The tribals uses the dry fruits of *Lagenaria spp.* for storage of seeds. They dry the leaves of Begonia

(*Vitex negundo*), Neem (*Azadiracta indica*) leaves and mix it with pulses and keep the seeds in gunny bags or bags made out of the straw. This practice to some extent, saves the grains from attack of pulse beetles. It is recorded that this practice saves 45 - 85% of grains from the beetles. The turmeric and *bael* leaves are also used for this purpose.

They put a little amount of opium in the internode of cucurbits like pumpkin, ash gourd, bottle gourd. The number of fruit increases per plant (as Morphin increases fruiting). In papaya, if it does not bear fruiting, the farmers used to put a peg horizontally on the stem and the plant starts bearing fruits (It may due to change in C/N ratio that would initiate flowering). They have no answer to the practice which seem to have good effect. This certainly shows their wisdom and intelligence to develop practices those are suitable to their situation.

Post-harvest Technology :

They dry the tendu fruits, mango, jackfruit and consume it during the rainy season without addition of preservatives. They can keep these fruits and pulps for a long period. They consume the powdered mango kennel after removing the bitter principle by washing it with running water. They use many seeds for getting starch or protein. There are many examples – a few of which are given here.

Community Resources Management :

The farmers in tribal areas mostly depend on the forest all the year round; but they believe that the forest belongs to all. Before using the community resources such as forest, water, pasture; they always discuss among themselves. Before going for jhoom cultivation, the villagers (Elder persons) sit and plan out of the future programme. They go together to the forest, cut down the trees or small shrubs from the earmarked areas only.

The tribal farmers generally keep a particular area for getting the mulch for growing turmeric, as mulching for turmeric is a must. Everybody has equal right on this input. They do not indiscriminately cut the forest. They keep the area under the turmeric almost fixed. They unnecessarily disturb the eco-system. Even, they do not decide who would grow turmeric which year. There may be some exceptions, but they follow a certain rule in maintaining the eco-system.

They use their excellence in developing the terraces or developing plots in the uplands for growing paddy. In many areas, where the farmers have the cross bund by themselves and run the channel up to 2.5 km with such a precision that the flow is never interrupted. They do it very nicely using the bamboo poles as a levelling instruments.

In the streams, they dig shallow wells which retain the flow water for the summer season. They use this water for irrigating the field in the bank of the streams. In some areas, it is seen that a tank stream during the rainy season. On the bank of the water harvesting structures, they fix the families who would use the water in the first year and who would use in the next year.

These practices that exist today, are certainly developed by the intelligent minds to make themselves self sufficient. Necessity has made them to think how best they can harvest the nature. Only the traditional wisdom of the farmers has to be given due importance while developing technology for them. Then the appropriate technology for them are to be found out through the research and to be tried in their

setting for its efficacy. Through the testing, if it proves better and the farmers accepted it, then automatically that become sustainable. On the other hand, as they do not want to part with their environment and they take agriculture as their occupation, they will make agriculture a sustainable one through their traditional wisdom with the blend of modernization.

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