

Indigenous Technical Knowledge of Tribal Farmers in Organic Farming in Alluri Seetharama Raju District of Andhra Pradesh, India

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ABSTRACT

An explorative research study was conducted in Alluri Seetharama Raju district of Andhra Pradesh during 2022-2023 to document the indigenous technical knowledge (ITKs) of tribal farmers as a part of organic farming in major crops like paddy, ragi, maize, cowpea and vegetables. The indigenous knowledge on agricultural practices represents both the ancestral knowledge and current experience. The information on these ITKs may form a platform to redesign and revalidate organic farming packages in various crops. The ITKs relating to soil health improvement, weed management, prevention from pest and disease attack *etc* were documented through focussed group discussions in selected villages of ASR district. These ITKs being practiced by tribal farmers over years in raising various crops and reasons behind their exercise are briefed in this article.

Key words: *Indigenous technical knowledge, Organic farming, Tribal farmers*

Introduction

Indigenous Technical Knowledge (ITK) is the elemental part of the culture, civilization and history of a local community (Borthakur and Singh, 2012) which provides identity to a particular customs or society (Warren *et al.*, 1989). ITK is the localised knowledge, transmitted from generations to generations and time experienced by local community to resolve the practical problems with the available local resources (Baver and Jun, 2002). It is the knowledge of the indigenous people residing in different geographical regions of the world with their own techniques, practices, skill and culture (Bruchac, 2014). ITKs are distinctive, traditional and local knowledge put into practice from centuries ago

(Ghosh, 2011). ITK-based practices are used by the majority of the subsistence and semi commercial farming community without the knowledge of its scientific rationality. Adoption of properly documented ITKs in cultivation practices with rationality will augment organic farming (Naharki and Jaishi 2020). Documenting ITKs will assist for their revival to support sustainable agriculture (Gyan *et al.*, 2016).

ITKs needs to be explored, verified, modified and scientifically validated for wider utilization and application of organic fruits production practices (Kranthi *et al.*, 2016). ITKs need to be identified, documented and tested for their scientific hidden logic to aid in the development process (Pongel, 2011). So far, many documented ITK from different local communities/ societies are evidence for their

significance in pest management. Prior to studies on ITKs, their proper documentation from the farming communities where they were developed and practicing (Dhoke *et al.*, 2021) is much needed as these indigenous communities usually transmit and practice through direct face to face contact (Zulfadrim *et al.*, 2019). ITK, if not conceded on by the present being from elders, or not protected and not practiced by the local people they will be vanished (Padma and Jagadeswaran, 2022).

Organic farming is a production system which avoids, or largely excludes, the use of synthetic fertilizers, pesticides, growth regulators *etc* in cultivation of crops (Stockdale *et. al.*, 2001). Tribal farmers in the high altitude and hilly areas have their unique and traditional way of cultivation of crops based on their local practices without using any harmful inputs. These local practices are nothing but ITKs being followed by tribal farmers for control of pest and diseases, storing the harvested produce, growth promotion, soil fertility enhancement, crop planning aspects *etc*.

Alluri Seetharama Raju (ASR) district of Andhra Pradesh is a complete agency district with high altitude hill agriculture by tribal farmers. Traditionally, tribal farmers cultivate variety of crops following their own traditional practices right from kind of traditional seeds usage to produce storage abstaining from use of agro-chemicals, fertilizers, growth regulators or any other external inputs. Tribal farmers employ their traditional knowledge gained from their ancestors to store the harvested produce, to provide nutrient supply to the crop, to enhance soil fertility and to mitigate pest and disease infestations to the crops.

Documenting such a privileged heritable traditional knowledge in cultivation of crops from our ancestors is most flagrant for present commercial crop cultivation. Hence, present study was carried out with an objective to document the ITKs being followed by the local tribal farmers of ASR district in their way of cultivating the crops through organic farming methods.

Materials and Methods

An explorative research study was conducted in Alluri Seetharama Raju (ASR) district of Andhra Pradesh during the year 2022-2023. Focus Group Discussions (FGD) was carried out to document various ITKs. FGD is a qualitative research method

and data collection technique in which a selected group of people discuss on a selected topic or issue in-depth, facilitated by a professional or an external moderator.

In ASR district FGDs were conducted in four Mandals and in each Mandal three villages were selected for the present study. The selected villages are Kothapalem, Tajangi and Kolapari villages of Chinthapalli mandal; Rompula, Assurad and Jerrala villages in G.K.Veedi Mandal; Badimetla, Barasingi and Donela villages in Paderu Mandal and Amuru, Kontapalli and Vakapalli villages in Hukumpeta Mandal. While conducting the FGDs in each village, elderly tribal farmer along with women farmers were also involved. The practice/method of ITKs followed by these tribal farmers in various crops was documented during FDG in a semi-structured open format.

Results and Discussion

The ITKs were being practiced by the tribal farmers since extended years as a privileged knowledge gained from their intimates or ancestors. The various ITKs as followed by the tribal farmers in various crops in order to protect their crops right from sowing to harvest were documented through FDG method and briefed hereunder.

ITKs in paddy crop

1. Soaking of Maddi tree leaves (*Terminalia elliptica*) in water for two days and then application of that spray fluid to the paddy transplanted field results in improved growth with enhanced tillerings.
2. Soaking of paddy seeds in milk before planting provides protection against viral diseases as milk provides resistance to the germinated crop.
3. Raising Mucidi (*Strychnos nux vomica*) as a green manure crop prior to paddy direct sown offers tremendous protection against termites.
4. Prior to last puddling operations in paddy insitu incorporation with leaves of Tentemu (*Cassia tora*) and twigs of Jeelugu (*Caryota urens*) as green manure improves soil fertility
5. Leaves of Vadisa plant (*Cleistanthus* sp) mixed with cow dung are simply broadcasted around paddy field bunds after appearance of leaf folder suppress their pest load.
6. To minimize the infestation of leaf folders and swarming caterpillars in rice at grain filling

stage, boiled rice mixed with sheep blood is broadcasted as granular application. The rice balls attract the birds to approach the paddy fields and they in turn will act as predators for pest larvae.

7. To manage the leaf folder damage, sand is applied with force on the paddy leaves during early morning where the leaves are wet with fog and mist so that sand can stick to the leaves. The sand cause aberrations on the larval skin leading to death due to desiccation.
8. Before raising nurseries the paddy seeds are soaked in sap of Pudina (*Mentha spicata*) leaves to prevent the blast disease incidence.
9. Erection of Jiluga (*Diancha* spp) twigs in paddy fields during tillering stage minimise the leaf folder incidence as these twigs act as trap crop.
10. In order to prevent the spread of weeds on paddy field bunds, with the help of a spade a thin layer of soil along with weeds on the bunds were sliced off and stamped on the same place in inverted direction so that weed grow in reverse direction with poor expansion and setting of seeds for propagation is lowered.
11. Grading of healthy and sick seeds before raising nurseries is practiced with Vakka (*Acorus calamus*). Vasa powder along with cow urine was boiled for few hours left overnight. When the paddy seeds are soaked in this water sick seeds will be floating and healthy seeds will be sunken. The sunken healthy seeds are used for sowing.

ITKs in Ragi crop

1. Tribal farmers allow their cattle to graze in ragi crop 3-4 times during the tillering stage. The long duration and tall varieties of ragi after consumed by cattle maintains uniform height, less lodging and sustains synchronous maturity of panicles. This will help them to save time and also labour at the time of harvest.
2. Incorporation of ashes in soil before sowing in ragi crop is practiced to prevent soil born pest and diseases as the ashes will act as repellents

ITKs in Maize crop

1. Before sowing, maize seeds were soaked in warm water for 3-6 hours. This practice will enhance the per cent germination and also offers protection against stem borers.
2. As a part of secondary source of income, lima

bean seeds are sown in widely spaced maize crop. After cobs harvest, the maize plant will act as stake for lima bean crop to twine and grow.

ITKs in Cowpea crop

1. Cowpea seeds are stored in earthen pots mixed with kitchen ash which provides protection from pest attack
2. In an earthen pot cowpea seeds were filled up to 3/4th of the pot and remaining part was filled with ash which offers protection from storage pest maladies.

ITKs in Vegetables

1. To prevent the sucking pest's damage especially aphids the kitchen waste is mixed with turmeric powder and applied to vegetables.
2. To preserve pumpkin seeds for next season sowing after 4-6 months, the selected pumpkin used to be place at top of the roof in open place.
3. Root rot in brinjal can be suppressed by spraying alovera leaves pulp.
4. To protect the nursery beds from ants, finely grounded ash powder is used as a band around nursery bed. This act will safeguards the sown seeds from ants attack with its repellent action.
5. In order to preserve the brinjal and tomato seeds without infestation from pests till next season sowings, the collected seeds were rolled along with ash bed and stored.

ITK for Improving Soil fertility

Tribal farmers believe as realistic that cattle dung and urine has some properties that enhances the soil fertility and improves the soil nutritional status to raise the crops. Before raising the nursery beds in a suitable place cattle farming was done where in these cattle were stalked. The floor of that place was covered with dry paddy husk or groundnut husk or bajra straw which imbibes the cattle dung or urine and enriched with organic matter. Now that place/area is well prepared for raising nursery beds. After few days these cattle will be moved to another place.

Conclusion

From the present study it is clearly elucidated that, tribal farmers of ASR district, Andhra Pradesh are mostly dependent on their conventional methods of cultivation using various ITKs. Through focussed group discussions many ITKs in various crops were

documented and all those customs set up scientific base for organic farming. Technical based research trials on the documented ITKs are to be designed to formulate revised pest management modules or nutrient management concepts or soil enhancement skills.

Conflict of Interest

The authors declare that no conflict of interest exists.

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