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Indigenous Sustainable Organic Manuring Practices of Dryland Farmers in Tamil Nadu

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ABSTRACT

The study was undertaken to document various indigenous sustainable organic manuring practices by farmers of Tamil Nadu. The study was conducted in the selected villages of the dry tracts of Tamil Nadu *viz.*, Coimbatore, Salem, Erode, Krishnagiri, Dindigul, Villupuram, Ramnad and Virudhunagar districts. Documentation of indigenous sustainable organic manuring practices was done by direct interview and group discussion methods. Triangulation exercise was also done in the study village to gather reliable information about indigenous technical knowledge of dry land farmers of Tamil Nadu. In this paper, important sustainable organic manuring practices adopted by the dry land farmers *viz.*, basal manure application in coconut, yield improvement in watermelon using tender coconut milk and toddy, composting of dropped leaves in Guava orchard, cactus as organic manure in coconut, rice husk as manure, rice husk ash as manure and cotton boll residue as manure in the field were explored and described in detail.

Key words: Indigenous techniques, organic manuring practice, dryland farmers, documentation.

INTRODUCTION

Dryland farming is profitable production of useful crops without irrigation on lands that receive rainfall of less than 500 mm annually, and could be extended to include areas receiving up to 750 mm annual rainfall where its distribution was unfavourable. Indian agriculture is predominantly a rainfed agriculture under which both dry farming and dryland agriculture are included. Out of the 143 million ha of total cultivated area in the country, 101 million ha (*i.e.* nearly 70%) area are rainfed. In dryland areas, variation in amount and distribution of rainfall influence the crop production as well as socio-economic conditions of farmers (Karthikeyan *et al.*, 2006). Dryland cultivation in India produces about 44 per cent of the food grains and 75 per cent of oilseeds and pulses. There has been a tremendous increase in the use of modern technologies in boosting production in agriculture recently. However, Adoption of these technologies has been limited to irrigated areas, where these technologies have proved profitable. The farmers of the dry tracts however, face severe constraints in adoption of these technologies, due to multipule reasons. Poduction risk is one of the important features of rainfed agriculture from the farmers perspective, the risk could be observed not only due to drought but also due to wet weather, frost, pests, diseases, market rates *etc.* The factors associated with risk, however vary from year to year and also from location to location in an unpredictable manner. Traditionally, a number of practices have been evolved by farmers to address the problem of risk. These traditional practices are relevant under the changing scenario in rainfed agriculture and there is also need for blending the traditional practices of risk management with modern practices at high production. The knowledge in today's parlance is called local knowledge/traditional knowledge (or) indigenous knowledge (Balasubramaniam, 2009).

The term indigenous technical knowledge was defined by many authors in different manner (Warren, 1991; Brouwers, 1993; Flavier *et al.,* 1995; Gremier and Louise, 1998) but warren (1991) gives a holistic definition of indigenous knowledge. He defined indigenous knowledge as the local knowledge that is unique to a given culture or society. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities. Indigenous knowledge systems often are collaborating and adapted to local, cultural and environmental conditions (Natarajan and Santha Govind, 2006). Hence, this study was taken up to document indigenous sustainable organic manuring practices of dryland farmers in Tamil Nadu.

METHODOLOGY

The study was conducted in the selected districts of the dry tracts of Tamil Nadu *viz.*, Coimbatore, Salem, Erode, Krishnagiri, Dindigul, Villupuram, Ramnad and Virudhunagar districts. In these locale, the villages were selected by appraisal of several indicators namely rainfall, overall agricultural development, cropping

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intensity besides consultation with Assistant Director of Agriculture (ADA), Agricultural Officer (AO) and Assistant Agricultural Officer (AAO) of the respective village. Participatory Rural Appraisal techniques were adopted to identify and gather description about the indigenous sustainable organic manuring practices that are prevalent in the selected village. Key informants including progressive farmers belonging to small, marginal and big farmer categories, aged farmers, farmwomen and farm labourers were involved during the process of data collection. By contacting the respondents through one to one interaction and group discussion methods, the indigenous sustainable organic manuring practices used by dry land farmers were documented. Triangulation exercise was also done in the study to gather reliable information about indigenous Technical Knowledge of the dry land farmers in Tamil Nadu.

RESULTS AND DISCUSSION

Basal manure application in coconut *(Adi uram)*

This technology was followed traditionally for more than 35 years. Farmers in Pottuthati village indigenously followed a manuring pattern using the locally available materials like dried fish, *kolinji* and salt. Farmers applied dried fish (½ kg) of any type cheaply available in their locality, *kolinji* leaves (1 kg) and salt (2 kg) per tree as basal dose around the trees (ring application method) in 2 feet depth. Farmers made a ring like channel around the trees so that manure applied would reach the root zone area and watering become easier. The flowering and fruit set were found to increase in the subsequent years by this low cost practice. Even in un-irrigated areas farmers applied this manure once in a year after the onset of monsoon. The purpose of use is to increase the soil fertility and yield in coconut trees. This technology is cheap and effective and adopted with locally available materials like dried fish, kolingi leaves and salt. Yield of trees improved upto 30 per cent by adopting this technology. Approximate cost for adoption of this technology is only ₹ 25/tree.

Yield improvement in watermelon using tender coconut milk and toddy *(Elaneer kal thelithal)*

In dryland areas, watermelon was widely grown suited to any rainfall pattern and soil type. Farmers indigenously adopted certain practices to increase the yield and fruit size in watermelon. For this practice, about 900 ml of toddy was mixed with 100 ml of tender coconut milk. This solution was sprayed in 30-35 days old crop using knapsack/hand-sprayer. After 20 days, another spray was given during flowering stage. Farmers observed that this method of spraying in improved the yield (up to 20%) and also the fruit size of watermelon (upto 15kg/fruit). Farmers perceived that this technology was cheap and effective. Farmers used locally available materials like tender coconut and brandy to improve yield in watermelon crop. The purpose of use was to increase the yield and size of fruits. This practice improved yield, fruit size and also it is cheap and economical. Adoption of this technology incurred a cost of ₹ 150/acre.

Composting of dropped leaves in Guava Orchard *(Makka vaithal)*

'Guava' is an important fruit tree grown in dryland areas of Tamil Nadu. Farmers of Melathulukankulam village followed an age-old practice of composting the shredded / fallen leaves from the trees in guava orchard. Farmers believed that the leaves of most trees contain twice as many minerals as manure, since most trees were deep rooted, they absorb minerals from deep soil and a good portion of these minerals go into leaves. Hence, by using the fallen leaves from the trees, farmers made compost in a simple way. Filling the trenches with fallen leaves has to be done once in 6 months duration. Farmers made trenches (with the help of mummaty/ spade) of 1 feet depth, feet breadth - 2 and 10 m length in between the trees. They later filled the trenches once in a week with the fallen leaves. Then the surface of the trench was covered with a thin layer of soil. Fallen leaves inside the trench passed through several stages from surface litter to decompose humus partly mixed with mineral soil. The compost will be ready in about 40-60 days with little moisture available in the soil. Farmers believed that this technology would increase the yield of guava up to 20 per cent. Farmers perceived this method of in-situ composting in guava orchard to be moderately effective (65%) and very economical. The leaves in their natural state tend to blow away or mat down into a tight mass. If shredded and composted they form better manure. This age-old practice of in-situ composting improved the soil structure resulting in 20 per cent increased guava yield. Composting of leaves adds organic fibrous matter to the soil thereby increases soil fertility. Humus building qualities improved the structure of all soil types. Aerate heavy clay soil, prevent sundry soils from drying out too fast, soak up the rainwater and check evaporation. Good sanitation in the guava orchard can be maintained. Hiding of snakes and other dangerous insects in the orchard can be minimized. This practice reduced the input requirment for next crop. A cost of ₹ 500/acre as labour charge was involved.

Cactus as organic manure in Coconut *(Chapathikalli)*

This ITK was practiced for more than 20 years. Farmers indigenously buried cactus plant around the coconut trees. Cactus was locally available in nearby

areas of the villages. Farmers cut the plants as a whole and transported it to their field. With the help of mammaty, the cactus plant was chopped to pieces and buried in the soil under the coconut tree up to 2 feet depth by digging the soil. About 2-3 plant was buried per trees and closed with soil again. Farmers believed that cactus leaves being juicy on decompostion increased the soil moisture and organic matter content. Farmers repeated the practice twice in a year. About 2 labourers and a cart was required for this practice. The practice increased the soil fertility status, soil moisture conservation, yield of coconut trees. No cost was incurred for its adoption. therefore, if was suitable for poor farmers.

Rice husk as manure (*Nel makku uram*)

After the post-harvest practices and processing in paddy, husk and ill filled chaffs remain in bulk among the farmers. Farmers used these materials in composting. The farmers digged manure pits of size 5x3x3 feet length, width and hight respectively in their backyards. Along with soil, farmers applied these materials (Husk, ill filled grains, and chaffs) inside the pits in layers. After 3-4 months, the composting process would be completed and ready for the application in any cropped field. During these three months period, farmers owning cattle had applied cow's urine and cowdung inside the pit for easy and earlier decomposition. Rice husk was applied as manure to all crops including cereals, pulses and oilseeds. This method is used to recycle organic waste into good manure. Farmers perceived that this indigenous way of preparing manure with the paddy chaffs, ill filled grains and husk to be very economic and effective in increasing the soil fertility status. Also the yield of crops grown with manure application produced quality farm produces. No cost was involved in its adoption. This techniques improved soil fertility and crop productivity.

Rice husk ash as manure *(Nelumi)*

Farmers from time immemorial had utilized ash as manure and as pest control agent against leaf sucking pests. In Aayakudi village paddy growing farmers used rice husk ash as manure to the crops in the vegetative stage. Farmers after processing the paddy collected rice husk and burnt it to ash. Then these burnt ash (25 kg/acre) was applied in the field as basal manure for wide range of crops like cereals, pulses and millets. Ash of rice husk when applied in the field was found to increase the soil fertility and yield of the crop. This practice could be adopted in any geographical area and feasible for all crops. Farmers perceived that this indigenous way of utilizing rice husk, as manure was very cheap. They found this practice to be moderately effective (30%) in increasing soil fertility. Adoption of this technology incurred no cost. This technique improved soil fertility, yield and seed quality improved to some extent (10-20%).

Cotton boll residue as manure in the field (*Songukal*)

This was an age-old practice being practiced from time immemorial. This ITK was individually followed by all the categories of farmers. In pampoor village, rainfed cotton had been widely grown. In cotton, picking operation was carried out after boll bursting during sunny days to ensure moisture free kapas of good quality. Here farmers carried out harvesting operation in cotton manually by standing in the field itself. Farmers believed that though manual picking was slow it would better preserve the fibre characteristics of cotton. After 2-3 pickings, the plants were later uprooted leaving the dried bracts and leaves sticking with cotton bolls in the field itself. Then the field was well ploughed after the receipt of monsoon. These residues when added in the field would increase the soil fertility by acting as manure. Also these residues improved the soil structure and infiltration rate. The bracts left in the field cause pricking in hands and legs of the workers during subsequent cotton picking. Hence some farmers collected the bolls from the cotton crops and picking operation was done in the house or in shady places to escape the hot sun. Here the picking was not done in the field itself. After separating the kapas, farmers carried the boll residues like dried leaves, bracts and spread them evenly in their fields. This alternate practice somewhat reduced the drudgery of workers in consequent cotton pickings and eased the cultural operations. This practice could be adopted in all areas and applicable to any crop field. Farmers perceived that this indigenous technology gradually increased the soil fertility. They were also satisfied with the crop yield (20 % of cotton yield) from this residue-applied field. This technique increased infiltration rate and improved crop yield and soil structure. No cost was involved to adopt this technology.

CONCLUSION

The present study presented the organic manuring practices which can act as supplements to inorganic fertilizers. Organic manures improves soil fertility, structure, texture, moisture and crop productivity besides reducing dependency on other sources as these manures are available either in farmer's field or obtained locally. Also, organic manures drastically reduces environmental degradation and pollution created by applying fertilizers over a long period of time. Thus, indigenous knowledge on organic manures should be collected, documented and validated in timely manner. These, innovative technologies can be invented by blending indigenous knowledge and scientific knowledge.

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