INDIGENOUS TECHNICAL KNOWLEDGE OF FARMERS IN DRY FARMING

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Dry land agriculture in India is always a challenge, since crop production in dry land depends on the vagaries of monsoon. Dry land areas receive less than 750 mm rainfall. Out of the net sown area of 136.18m ha, the dry land accounts for 93.13 m ha (68.4%) and contributes 40 per cent of total human population, 60 per cent of cattle heads and 44 per cent to total food production in India (Kannaiyan et al., 2001). In Tamil Nadu, area under dry farming constitutes 52 per cent of the total cultivable area and contributes to 40 per cent of total food production. The productivity of crops grown in dry land is not only low but also remains stagnant over years. Most of the areas of Tamil Nadu come under semi arid tropical climate, except the hilly regions and East coast. Out of 5.50 m ha of net sown area, nearly 3.20 m ha are rain fed (Kannaiyan et al., 2001).

The term Indigenous knowledge is used synonymously with 'traditional' and 'local knowledge' to differentiate the knowledge developed by a given community from the international knowledge system, some times also called the 'western system' generated through universities, government research centers and private industries (Somasundaram 1995). The decrease in cultivable land was due to increased population and their requirements for living space. The achievement was because of high yielding varieties, which were highly input responsive. Farmers used chemical and synthetic pesticides, fertilizers and growth promoters in high quantities with a motive to get high yields. In this process, the soil and environment got polluted due to injudicious land utilization with high intensity cropping and dumping of chemical and synthetic pesticides, fertilizers and growth promoters.

At this juncture, there was an additional responsibility on the agricultural research system to minimize soil and environment pollution along with keeping intact the primary objective of achieving the targeted food grain production. To satisfy these two requirements, the agricultural system aimed at eco-friendly low cost farming methods in integration with modern technologies (Lakshmana, 2000).

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Traditional practices are relevant under the changing scenario in rain fed agriculture and also to impress upon the need for blending the traditional practices of risk management with modern practices of high production. This knowledge in today's parlance is called local knowledge/traditional knowledge or indigenous knowledge (Balasubramanian, 1992). The interest in traditional knowledge is growing with considerable momentum. So, also in the case of dry land agriculture where modern knowledge alone is being considered inadequate to overcome the problems. There is undoubtedly a need to initiate systematic efforts for collection of traditional practices from different areas, so that these could be catalogued for wider use. Indigenous Technical Knowledge (ITK) would be helpful to develop ecologically compatible and socially accepted technologies in different areas of crop and animal culture. Keeping these facts in view, an attempt was made to document the indigenous dry farming technologies that have been adopted traditionally over years by dry land farmers.

Methodology

The study was conducted in Dindigul district of Tamil Nadu. Reddiarchatram block was purposively selected for the study, since the main occupation of most of the people was agriculture, which depended on poor and erratic rainfall. Majority of the farmers in the sampled block had been practicing dry farming. From this block three revenue villages were selected randomly. The sample size was fixed as 90 farmers consisting of 45 maize growers and 45 sorghum growers. The selection of 30 farmers was done at random in each of the selected revenue villages. Thus, 10 farmers were selected from each of the nine villages, covering three revenue villages using simple random sampling technique. Participatory Rural Appraisal (PRA) technique was used to document the indigenous practices adopted by dry land farmers in these selected villages. Key informants, farm women, youth, labour formed the sample for data collection in each of these selected villages.

Results and Discussion

Indigenous practices followed by dry land farmers

The dry land farmers practiced many low cost but effective technologies, which were adopted over many years in their locality. They perceived that these indigenous practices are effective and influenced the cost of cultivation as well as crop productivity. The following are the indigenous practices followed by the sorghum / maize farmers in the study locale. Most of these ITKs are practiced by small/marginal farmers who mostly depended on local resources for raising crops. However these ITKs were not commonly adopted by big farmers who mostly depended on scientific modern practices only. The Indigenous practices documented were classified under 6 major heads as given below.

A. Preparatory cultivation practices

1. Summer ploughing

Majority of the maize and sorghum growers had adopted summer ploughing 2-4 times over years, ploughing the land soon after the receipt of down pour. The advantages of these practices are,

i. Storing of rain water i.e. moisture retention in ploughed field for a longer period,
ii. Destroying the eggs, larvae and pupae of pests in soil,
iii. Eradication of weeds,
iv. Control of soil erosion
v. Reduction in the number of tillage operations during the time of sowing.

B. Seeds and sowing

2. Maize seeds soaked in cool water

Before sowing, the maize seeds are soaked in cool water for 2-3 hours. This could initiate early germination and higher germination percentage.

3. Soaking sorghum seeds in boiled cool water

Sorghum seeds are soaked in luke warm water for 8 hrs (or) over night before sowing. The purpose is to improve germination efficiency.

4. Soaking sorghum in cow urine

The sorghum seeds are soaked in cow urine overnight before sowing. The purpose of this practice is to induce drought tolerance in seeds.

5. Cow dung coating for cotton seeds

Cotton seeds are coated with cow dung before dibbling. This helps in intacting the fuzz in the seeds and set ease to dibble the seeds.

6. Cotton seed coated with red soil

Cotton seeds are coated with red soil and then sun dried before sowing. Advantage of this practice is to improve the germination percentage and it becomes easy in dibbling the seeds.

7. Cotton seeds mixed with rice porridge and cow dung

Cotton seeds are mixed with required quantity of rice porridge with cow dung

before sowing. An hour of shade drying is done for the purpose of separating the seeds during sowing period.

8. Gourd seeds mixed with cow dung

Pumpkin and bitter gourd seeds are mixed with cow dung before sowing of the seeds. Purpose of this is to improve the seed germination and induce drought tolerance.

9. Removal of fuzz from cotton seeds

Cotton seeds weighing five kgs are mixed with 1/4 litre butter milk and cow dung (1/2 kg). The purpose is to remove the fuzz from cotton seeds and also to improve germination.

C. Manure and Manuring

10. Sheep penning

This is the practice of keeping the sheep penned overnight on the cultivated land so that the dung and urine excreted could be directly absorbed by the soil. It is followed in summer when the land is free from crops. Payment of 50 paise / goat / day has to be made by the beneficiary to the goat rearer. One acre of land can be covered for penning by 100 goats for a period of 40 days.

D. Mixed cropping

11. Sorghum and maize raised as a mixed crop with *lablab*

The *lablab* is mixed with broadcasted sorghum and maize crops. The purpose is to get additional yield and improve soil fertility through nitrogen fixation.

12. Raising *Agathi* crop as a border crop in sorghum field

Agathi (Sesbania grandiflord) has been used as a fodder crop. So it is raised as a border crop in a sorghum field.

E. Plant protection measures

13. Beating empty drums to ward away birds

This is the practice of blaring empty drums in sorghum and maize fields by engaging a man for this purpose. This practice scares away the birds from the field which would otherwise damage the crops.

14. Bird watch

A polythene sheet is tied to a long pole and placed in the center of the maize field. Due to heavy wind windy, polythene sheets flutter in the wind and produce sound to ward off birds. Noise from a tape recorder and cassette strips are also used for scaring of birds in maize and sorghum fields in dry land areas.

15. Throwing stones with the help of a leather rope

Stones are kept in a leather pouch tied with strings. Catching on to one end of the string swirls this around. On release of the string the stones will be thrown away at a great distance (20 m), which would chase the birds away from the field.

16. **Palmyra leaf is also used to produce a blaring sound** to alarm birds from the sorghum and maize fields.

17. **Raising castor crop as a border crop in rain fed cotton field.** The castor is grown as a bund crop in cotton field. It also acts as a trap crop, because, the castor crop readily traps pests like Spodoptera litura.

18. Cotton inter cropped with red gram

Red gram is intercropped with rain fed cotton i.e. red gram is sown in the bund. The purpose is to reduce the pests like bollworms, hoppers etc.

19. Neem seed kernel is soaked in water over night. Next morning the suspension is filtered and sprayed by adding sufficient quantity of water. It controls pests like Hopper, Jassids etc in cotton crop.

F. Indigenous Post harvest practices

20. Coating pulses with red soil: Before storing for later use, pulses such as mochai, red gram, blackgram and green gram seeds are coated with red soil and the main purpose of this practice is to prevent pest attack and easy separation of kernels and also to increase the storability of seed for a longer period.

21. Mixing sorghum seeds with sand helps store the seeds for a longer period by protecting it from storage pest.

22. To protect maize, sorghum seeds from attack by strorage pests, maize, sorghum are harvested separately, ear heads are threshed and stored in gunny bags along with the husk.

23. Cow dung ash is mixed with the maize seeds during storage. Purpose is to control storage pests and to increase storabiiity, without damage.

24. Storing the grains in Mud *kudhir*: This is the practice of storing the grains (sorghum, maize) in mud *kudhir*, a container made of mud. The purpose is to store the grains for a longer period preventing storage pest attack.

25. Pulses (Bengal gram, green gram, black gram) seeds are soaked in water over night and sun dried. Purpose is to break the seed for consumption purpose and also increase the storage life.

26. Black gram seeds mixed with castor oil helps in removal of seed coat from the seed.

27. Seeds of sorghum, maize, mochai, cowpea, blackgram, red gram, green gram, etc. are mixed with 10% BHC powder before storing, to prevent it from storage pest.

28. Cereals like sorghum, maize are dried and stored in storage bin. With an interval of 30 days, sun drying is done. Purpose is to remove the moisture from the seeds and prevent attack from storage pests.

29. Sorghum maize stalks after harvest, are cut and then tied at the top portion and sun dried for more than 15 days in the field itself. Dried stalks are stacked and arranged layer-by-layer. The top portion is covered with paddy straw and is used as feed for animals (dairy, bullock, buffaloes). In this way bye-products are stored for a longer period without damage.

Perceived benefits due to adoption of ITKs by Farmers

The farmers were asked about the perceived benefits felt by them as a result of the adoption of Indigenous dry land practices. The results are presented in the Table 1.

Table 1. Perceived advantages of ITK by farmers

S.No	Advantages	%
i.	Eco friendly in nature	60
2.	Low cost technology/Economic advantage	60
3.	Easy and well known to adopt the practices	55
4.	Effective utilization of locally available natural resources	50
5.	Labour and time saving technologies	52
6.	More compatible to local situation	43

Conclusion

Indigenous practices that are adopted by farmers in dry land farming can also be used in future by other dry land farmers elsewhere after proper and scientific validation. Even though there are lots of bottlenecks in the use of traditional practices, they can be solved by proper validation. Thus dry land farming can be sustained by combining modern scientific practices along with the traditional indigenous practices.

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