

Native ecological techniques for economizing water usage in dry farming in Tamil Nadu

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Received 4 July 2006; revised 15 May 2007

Indigenous practices play a vital role in sustainable agriculture development and it is unique to a given culture of society. This knowledge is the information base for a society and facilitates communication and decision making for their development. The study was focused on the technologies being practiced by farmers for water conservation in dry tracts of South India. The study was conducted at Ramnad, Tuticorin and Virudhunagar districts with an objective of documenting the native ecological techniques for economizing water usage among the dry land farmers. Documentation of indigenous techniques for water conservation was done using Participatory Rural Appraisal techniques and direct interview method. Triangulation exercise was also done in the study villages to gather reliable information. Indigenous water saving techniques adopted by the dry land farmers of Tamil Nadu has been described.

Keywords: Indigenous techniques, Water conservation, Dry farming, Water harvesting

IPC Int. Cl.⁸: A01G25/00, E02B13/00

Conservation and efficient utilization of natural resources are the two key components to achieve sustainability in rain fed agriculture. Land degradation and over exploitation of ground water have prompted researchers and policy makers to evolve sustainable technological interventions to conserve natural resources in a cost effective manner¹. Accordingly, large number of location specific practices for water saving have been evolved and tested across the country. Water saving is a vital component of dry land crop management practices. Understanding of farmers practices for water saving and their traditional wisdom in the form of Indigenous Technical Knowledge (ITK) is very important. Indigenous Knowledge is the knowledge acquired by the local people through their past experience, evolved over the time under the influence of traditional knowledge, external factors and agents, and individual innovations². Over the millennium, indigenous people have developed a close and unique connection with the lands and environment in which they have lived. They have established distinct system of knowledge, innovation and practices relating to the uses and management of biodiversity on the land and

environment³. A proper and optimal blend of indigenous and modern wisdom would be the right answer for good impact and better utilization of the native knowledge by the rural artisans⁴.

Water harvesting is an age old practice in India. It is a process of collection of water from treated or untreated land surface/ catchments of roof tops and storing it in an open farm pond or closed water tanks/ reservoirs or in the soil itself (*in situ* moisture storage) for irrigation or drinking purposes. *In situ* moisture conservation is a vital component of dry land crop management practices. Earlier efforts were concentrated on construction of various types of bunds across the slope. This helped in controlling erosion and reducing soil loss rather than achieving uniform moisture distribution. Present emphasis is on biological water saving techniques. Biological water saving aims to increase crop water use efficiency and drought tolerance by genetic improvement and physiological regulation⁵. Moisture conservation begins right from seed bed preparation. There is a need to improve the system of conservation of rain water so as to attain a good uniform crop stand, better crop growth and consequently higher productivity. Hence, the study has been designed to document the

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indigenous water saving techniques adopted by the dry land farmers of Tamil Nadu.

Methodology

The study was conducted to find out the indigenous water conservation techniques adopted by the dry land farmers of Tamil Nadu. Ramnad, Tuticorin and Virudhunagar districts were selected for documenting the indigenous water conservation techniques based on the criteria of maximum area under dry land condition. In these locale, the villages were selected by appraisal of several indicators namely rainfall, overall agricultural development, cropping intensity. Participatory Rural Appraisal methodology was adopted to identify and gather description about the indigenous technologies practices by the farmers for water saving. Key informants including progressive farmers belonging to small, marginal and big farmer categories, aged farmers, farm women 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 technologies used by dry land farmers for water conservation were documented. Triangulation exercise was also done in the study villages to gather reliable information about Indigenous Technical Knowledge. The problems related to dry land or rain fed agriculture is complex as it is being practiced on extensive area under varied social climatic conditions. Location specific soil and water conservation interventions play a crucial role in the management of rain water. Indigenous water saving practices followed by the dry land farmers of Tamil Nadu are documented and explained.

Farmers of Kumaragiri village of Tuticorin district in Tamil Nadu traditionally practiced the method of planting grasses on their field bunds in order to arrest the runoff and soil loss. For this practice, they had selected grasses like marvel grass (*Dichanthium annulatum* Stapf), elephant grass (*Pennisetum purpureum* Schum.), etc. and propagated them by planting suckers/seed materials during rainy season. These grasses served both as an effective check against soil erosion and runoff water. Apart from this, grasses were harvested and used as fodder for grazing animals. These vegetative barriers were also created at every monsoon depending on the slope of the field for management of inter bunds. This practice could be adopted in any area irrespective of rainfall pattern.

Based on discussion with key informants and direct observation, it could be found that most of the farmers in this village had adopted this technology. Adoption of this technology incurred no cost. This indigenous technical knowledge is followed by medium and big farmers on individual basis. This method is practiced for more than 20 yrs. Majority of farmers belonging to Velichery village of Tuticorin district in Tamil Nadu adopted this indigenous technology for water saving. Cuttings of kiluvai are planted manually at field boundaries to a depth of 15-20 cm at a spacing of 30 cm during the month of April-May. This method of fencing was practiced to reduce runoff and its velocity and work as a live fence for moisture conservation

Farmers of Aruppukkotai village of Virudhunagar district in Tamil Nadu practiced intercropping cotton (*Gossypium* sp.) with black gram (*Vigna mungo* (Linn.) Hepper) for efficient moisture utilization. Small and medium farmers follow this practice on individual basis. This age old practice is for supplementing food requirement and for efficient moisture utilization. In this practice, seeds of cotton and black gram in 1:1 ratio are sown manually through seed hoppers attached with the cultivator and drop seeds. Row spacing of 30 cm and plant to plant spacing of 15-20 cm is maintained. Farmers had planted agave suckers in a month of October-November manually at a spacing of 60 cm on field boundaries and in fields adjacent to gullies to reduce the velocity of runoff. Gap filling is done in the subsequent years. This practice can be adopted for strengthening of field bunds as well as tank bunds also. The vegetative fencing also served as protection against grazing animals. The ITK practiced in Paramakudi village of Ramnad district in Tamil Nadu is also adopted by medium and big farmers on individual basis. The ITK is practiced by all types of farmers in Tuticorin districts in Tamil Nadu on individual basis. It is an age old practice evolved by experience gained over years. The method takes care of the food requirements in addition to soil and water conservation in the farm. The practice consists of sowing of Coriander (*Coriandrum sativum*) and Bengal gram (*Cicer arietinum*) in 7:1 ratio is done during November. Initially, coriander is sown behind the country plough and after 7 rows of coriander, one row of Bengal gram is sown. The interspaces between rows is 30 cm and between plants is 10-20 cm. Seed rate of Bengal gram is 6-8 kg/ha. The average yield of

Bengal gram is about 200 kg/ha. The intercropping method was practiced to make use of late monsoon rains received during November.

Conclusion

Proper documentation of the existing indigenous knowledge and subsequent field evaluation will be of paramount importance for making use of the valuable local wisdom in improving farming. And also it is essential to blend the culture, traditions and beliefs of the rural people in dissemination of technology. Conservation of land and water not only controls land degradation but also can lead to sustained productivity. Rains fed areas are mostly characterized with high intensity, short duration and erratic rainfall causing unpredictable droughts and floods. Conservation of this scarce resource through improved *in situ* moisture conservation and runoff management therefore hardly needs emphasis. The traditional water saving techniques will tremendously boost production of dry land crops. Before considering the improved systems of rainwater management, there is a need to document the indigenous methods of water saving. The identified indigenous techniques for water saving can be refined

further to reduce runoff and increase soil moisture conservation for enhancing the productivity of different production system.

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