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ENHANCING LAND PRODUCTIVITY OF TRIBAL FARMERS THROUGH SOIL AND WATER CONSERVATION INTERVENTIONS: A SUCCESS STORY OF COMMUNITY PARTICIPATION

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ABSTRACT

Tribal farmers of Boothanatham village in the Nilgiris face persistent challenges of low agricultural productivity due to rainfed farming, limited access to technologies, weak institutional linkages, and inefficient water use. Under the Tribal Sub-Plan, ICAR–Indian Institute of Soil and Water Conservation implemented participatory soil and water conservation interventions integrating lift irrigation, solar and diesel pumps, micro-irrigation, farm ponds, crop diversification, and capacity building. These interventions enabled assured irrigation, adoption of improved technologies, cultivation of high-value crops, and strengthened institutional linkages, resulting in enhanced land productivity, increased farm income, and improved livelihood security through strong community participation.

KEYWORDS: Community participation, land productivity, lift irrigation, soil and water conservation tribal sub-plan

INTRODUCTION

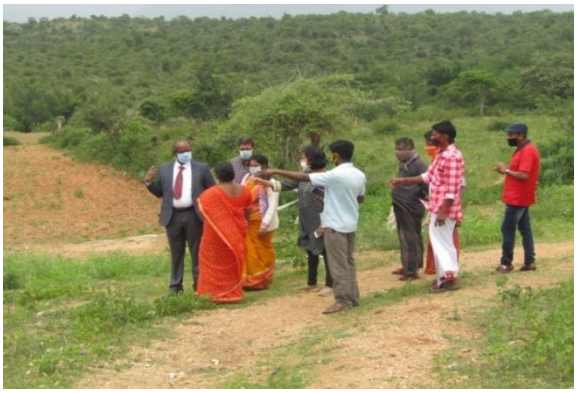
Tribal communities serve as authentic representations of a nation's cultural heritage and are considered the indigenous population. In India, they constitute an integral part of our human resource base, possessing rich indigenous knowledge and skills across all sectors, including agriculture. The Nilgiris, a biodiversity-rich part of the Western Ghats is exceptional for its diverse ecosystem features like various types of forests, grasslands, agricultural lands, and wetlands. It has five of the ancient tribal communities namely Todas, Kotas, Irulas, Kurumbas, and Paniyas. The tribes of this region depended on the forest for their livelihood. During the 19th century, the forest land use was converted into tea, coffee plantations and other commercial crop cultivation by the Britishers. The trend of forest land use conversion has continued, depriving tribal people of access to forest resources, such as medicinal plants, honey, and fuelwood. As a result, many tribal families were forced to migrate from their native lands, work as

underpaid labourers and endure a decline in their socio-economic condition. To address these challenges, the Government of India launched the Tribal Sub-Plan (TSP) with the aim of improving the socio-economic status of tribal communities through various developmental initiatives.

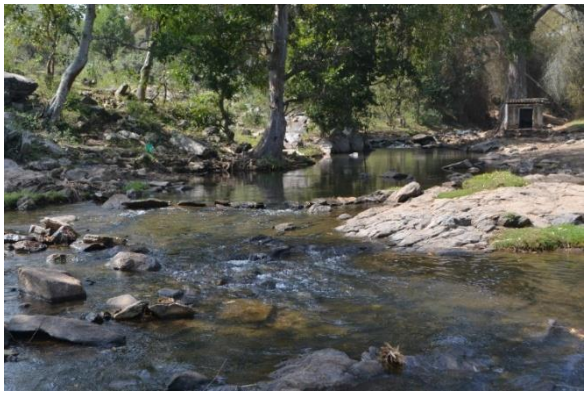
ICAR-Indian Institute of Soil and Water Conservation, Research Centre, Udhagamandalam, also shoulders the responsibility of uplifting the tribal community through supporting agricultural and other livelihood activities through TSP. The tribal village of Boothanatham, Udhagamandalam Taluk, The Nilgiris has been selected for the implementation of TSP, located in the middle of a dense forest (Nilgiri Biosphere Reserve) on the border between Tamil Nadu and Karnataka. This village is predominantly inhabited by Irula tribes. The major area of the region is covered by dense forest, and a meagre portion of land is utilized for agriculture. The Irulas tribes are indigenously lives inside the forest reserve and their livelihood security is depends on forest resources. But the constitution of National Park and wild life protection acts made illegal the traditional occupation of the Irulas tribes and their livelihood security is in question. However, Recently, Irulas families have been granted sizable land for cultivation under forest rights act 2006. Even though the area receives normal rainfall of 1000 mm and a tributary perennial river is aside of the land allotted, the tribal farmers could not get desired yield.

SURVEY AND PROBLEM IDENTIFICATION

The developmental initiatives aimed at improving the socio-economic status of the tribal community will be successful only if they are implemented in accordance with local needs. Hence, a preliminary survey on participatory mode was conducted by the scientists of ICAR-IISWC, RC, Udhagamandalam, for the need analysis through interaction with the local people. Together with the village head and the landless and land holders, we traversed the entire village and documented the available resources.



Survey and interaction with village people



The perennial river running near the agricultural fields

PROBLEMS IDENTIFIED

Based on the survey and interactions with the local communities, we identified some problems contributing to the prevailing socio-economic conditions of the people. The issues are classified into 5 major categories.

1. LOW PRODUCTIVITY IN RAINFED AGRICULTURE

The farmers cultivate crops such as small millets, groundnut and pulses under rainfed conditions. The crop productivity was very low in the rainfed condition compared to the nearby farmers cultivating the same crops under irrigated conditions. Due to rainfed farming, farmers cultivate only one crop during the south west monsoon, remaining period the field is left as fallow. Lack of irrigation facilities restricted the choice of crops that can be cultivated in this region. As the farmers predominantly grow the local crop varieties, attention given for the nutrient management is rare. The farmers are habitual to apply Farm Yard Manure (FYM) before the cropping season and incorporate in the soil, which is the primary source of nutrients. The application of nutrients from inorganic sources is rarely practiced by the farmers. Due to the above facts, the productivity was very less in the region.

2. LACK OF CROP DIVERSIFICATION

Farmers mostly rely on rainfed crops and cultivated the same in every season. This practice affects the soil fertility and also market opportunities. Crop diversification with commercial crops will improve the income of the farmers.

3. LIMITED ACCESS TO IMPROVED TECHNOLOGIES

The village is located in a remote and isolated area. Hence, the awareness and accessibility of new and improved technologies and varieties have not effectively reached the farmers.

4. WEAK SOCIAL AND INSTITUTIONAL LINKAGES

The village farmers have very limited contact with the government departments and banking institutions. The farmers does not have any formal association for initiating or taking part in collective agricultural activities.

5. INEFFICIENT UTILIZATION OF WATER RESOURCES

The Moyar, a perennial river, is one of the tributaries of the Bhavani River that flows through the village's agricultural lands. Despite the year-round availability of ground water, the lack of electricity in the village poses a significant constraint on farmers' to effectively utilize this water for crop cultivation. Farmers those who have financial capacity to rent diesel pumps irrigate their fields during critical crop growth stages. Others left the land fallow except the rainy season. Furthermore, the sloppy agricultural lands are poorly maintained without proper soil and water conservation measures.

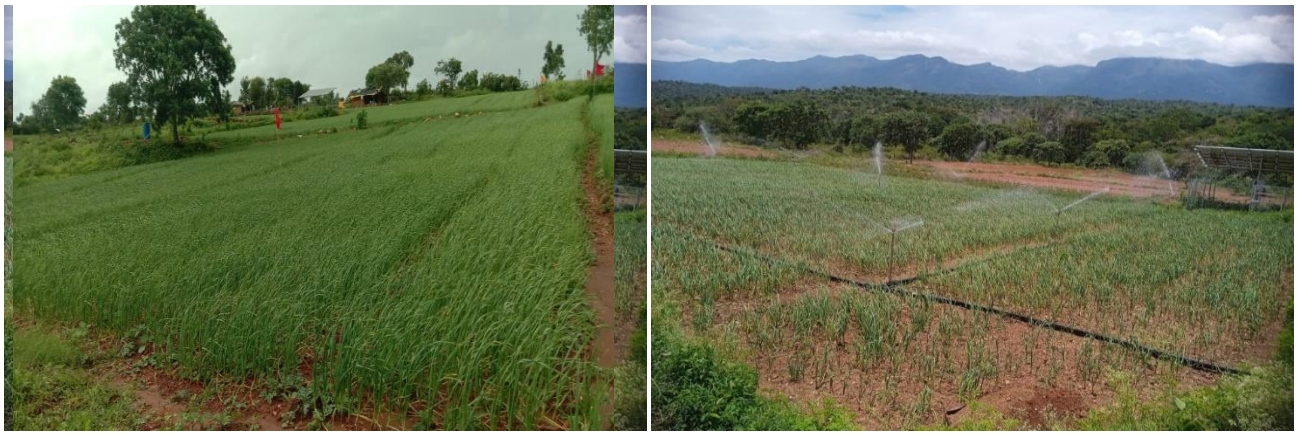
IDENTIFIED PROBLEM VS. INTERVENTION IMPLEMENTED

Independent technologies on renewable energy utilization, soil and water conservation, crop production and value addition are available and in operations elsewhere. However, we integrated these energy and water technologies in vicinity of Irulas tribal Geo-entity for agricultural and social upliftment. Lift irrigation was introduced along with water saving micro irrigation techniques, like sprinklers, to improve water availability for both domestic and agricultural purpose. Initially, a 8 HP diesel pump was installed to lift water from the river, and sprinklers systems were provided to ensure irrigation for the crops. However, adopting solar energy for lift irrigation presents a sustainable, eco-friendly, and economically viable solution for enhancing agricultural productivity. Therefore, in addition to diesel pump a 5 HP solar pump was installed to lift water for irrigation purpose.

Diesel pump provided for lift irrigation

Solar pump setup for lift irrigation

This initiative encouraged the farmers to cultivate vegetable crops under assured irrigation. In addition to millets, crops like garlic, onion, pulses and beans are now grown using micro irrigation leading to enhanced productivity of the agricultural land. A farm pond was also constructed to harvest rainwater, which helps conserve water resources and ensures a reliable supply of irrigation during dry spells, particularly benefiting farmers cultivating crops through micro-irrigation. New varieties and cultivation technologies were introduced through government and non-governmental organizations enabling the farmers to adopt them.



Garlic crop with sprinkler irrigation

Since the farmers are not continuously engaged in agricultural activities, they do not possess their own sprayers and rent battery-operated sprayers at a rate of ₹30 per hour. Therefore, battery-operated sprayers were also provided to the farmers to facilitate timely and efficient pest and disease management operations. In addition to that small farm implements also distributed to the farmers for carrying out agricultural operations.

Several capacity building programmes were conducted focusing on soil and water conservation, integrated nutrient management, water harvesting technologies, and efficient utilization of water. During these training, experts and officials from various departments provided detailed guidance of government schemes and subsidies available to tribal farmers. This facilitated the collaboration between farmers and Horticultural department, Agricultural engineering department, and Forestry department resulting in increased adoption of technologies and improved livelihood opportunities.

The user groups and self-help groups have been formed and linked with Banks in near by town and necessary linkages have been created with line departments and research institutions for technological updates.

CONCLUSIONS

The tribal farmers of Boothanatham village have been able to increase their agricultural income by cultivation an additional crop with the help of lift irrigation systems that draw water from the tributary of river. This initiative has also helped them save on the rental costs previously spent on diesel pumps. With the help of pumps and the micro irrigation system, farmers are able to cultivate high value vegetable crops like beans, garlic etc. Moreover, the farmers also effectively use the sprayers for timely plant

protection activities. Their knowledge and skills in adopting new improved technologies have been enhanced through various capacity building programmes. Additionally, the linkage between the village and other government departments has been strengthened, further supporting the enhanced agricultural production. The scheme launched by Government of India for Tribal farmers is highly beneficial in improving land productivity and livelihood security of tribal communities in Bothanatham village of the Nilgiris hill.

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