IMPACT OF FARM PONDS ON CROPPING PATTERN – A CASE STUDY ON VEMBEDU VILLAGE IN TAMILNADU

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Abstract: ***Rainwater is an important target for water management. Water harvesting structures have the potential to increase the productivity of arable lands by enhancing crop yields and by reducing the risk of crop failure in arid and semi-arid regions, where water shortages are common because of scanty rainfall and its uneven distribution. The technology adoption decision could increase the farm household's agricultural yield by improving the availability of water during the dry spell periods. It has also the potential to increase the moisture of the soil, which in turn has an impact to increase the agricultural yield harvested. Farm ponds are water harvesting structures used for several purposes of farm need. Farm ponds is vital to increase ground water table, to increase storage of rain water, to improve recharge of bore wells, to provide water facility for crops during crucial period, to facilitate rising of ID crops, to provide drinking water for cattle, to provide wage employment to agricultural labor.The purpose of data collection is to collect the information about the socio-economic status of farmers before and after the construction of Farm ponds. CROPWAT is a DOS or Windows based decision support system designed as a tool to crop water use studies, particularly the design and management of irrigation schemes. WATMAN INFO CARD is the card which highlights the all the features for the watershed development mainly considering the panchayat level.***

Keywords: Rainwater Harvesting Structures, Farm Ponds, Cropping Pattern, CROPWAT, Socio-Economic Status, WATMAN INFO CARD.

INTRODUCTION

Water is the limiting factor for farming, forestry and animal husbandry. Conservation of the environment and sustainable utilization of natural resources are major issues of concern within the international community. Land degradation is a serious environmental problem worldwide and a major threat to the sustainability of agriculture and economic development. Well managed natural resources are the key to socio-economic development and water is very often a key factor to improved natural resources management and ecological restoration. The water resources, especially in arid, semi-arid regions are subject to great variability and uncertainty leading to constraints in food production and water availability for households and industries.The rainwater harvesting techniques are used to utilize rainwater more efficiently to benefit households' needs and farming and also to avoid problems of flooding. In urban areas, growing water scarcity and poor water quality is widespread.

In physical terms, water harvesting can be used to

- Meet household water needs
- Meet irrigation water needs, especially for supplemental irrigation.
- Reduce storm water runoff in urban areas.
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Construction of water harvesting structures led to sufficient availability of water for irrigation, for livestock drinking and household purposes and which contributed to an increase in crop production and ensured food security.

Farm ponds are water harvesting structures used for several purposes of farm need. Farm pond is used for storing the monsoon rainwater, which is used for irrigation. Farm ponds are expected to have an impact on cropping pattern, productivity, employment, and income of the farmers. (L.B.Kunnal, et al, 2007). Farm ponds, even though limited in terms of size and water capacity, perform very significant roles in various aspects according to their proper placement in the watershed context. The farm pond impacts indicate not only increasing crop yields in both the rainy and the dry seasons, but also reduction of downstream sediment load (LDD, 2004).

The improved crop management practices compared with change in cropping pattern have contributed for providing additional employment among farmers. In addition to this, during off-season, construction of farm-ponds, was also contributed to increasing employment among the farmer who have farm ponds. (Rajeshwari Desai, et al, 2007). The impact of Farm Pond on soil, water and plant relationship of an agricultural and also on the socio-economic status of the farmers are considered as the main theme of this study.

STUDY AREA DESCRIPTION

The area chosen for the study is Venbedu village located in Thiruporur block of Kancheepuram district as shown in Figure (a). The study area is located at latitude of 12º44´44.53˝N and longitude of 80º08´30.79˝E. It is located at the elevation of 72 ft. Two tanks located around the village are Thaiyur tank and Kattur Tank.

The main occupation of the people in this village is Agriculture and some of them have their own farms. Here, more than 6 farm ponds are constructed mainly for the purpose of irrigation. Because of the farm ponds, there is a change in the cropping pattern and cropping intensity. The agronomic practices followed in the village are the crops like paddy, groundnut, the cereals like red gram, black gram, the trees like coconut, mango, lime and the vegetables like brinjal, snake gourd are planted here.

METHODOLOGY

Soil-Water-Plant Analysis

The soil around the selected Farm Pond was tested to know about the type, infiltration rate and available soil moisture of the soil. The soil condition was examined to adopt the crop cultivation. CROPWAT model was used for calculating the Crop Water Requirement which also forms the irrigation scheduling and scheme supply for each crop. It allows the development of recommendations for improved irrigation practices, the planning of irrigation schedules under varying water supply conditions, and the assessment of production under rainfed conditions or deficit irrigation.

Table (a) INPUT AND OUTPUT DATA FOR IRRIGATION

Key Input	Climatic and crop data for calculations of crop water requirements and irrigation requirements. development of irrigation schedules and the valuation of rainfed and irrigation practices are based on a daily soil-water balance using various options for water supply and irrigation management conditions.
Key Output	Reference evapotranspiration, crop water requirements, and crop irrigation requirements.

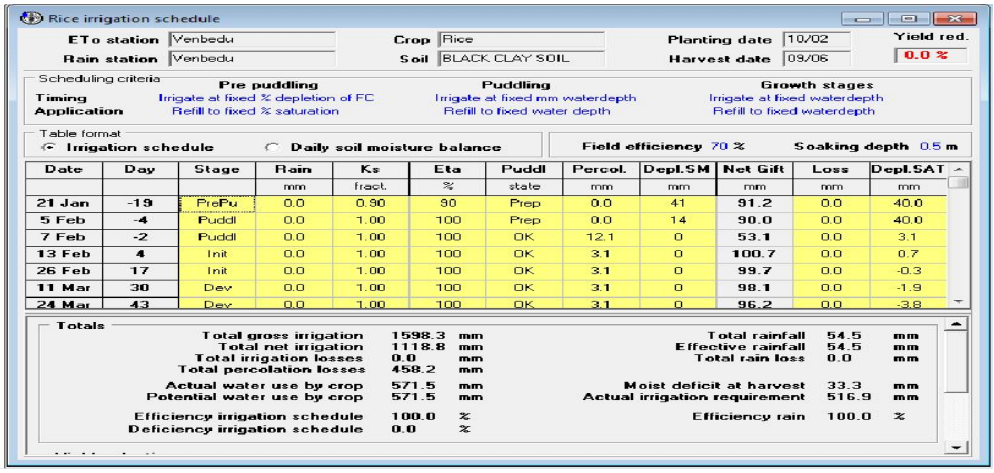
WATMAN INFO CARD

WATMAN INFO CARD is the watershed management information card which highlights all the information about the features of the watershed for its development mainly considering the Panchayat Level.
WATMAN INFO CARD has four different parts by dividing the information collected in four different approaches.

- General information of the village.
- Cropping pattern practiced in the village.
- Water resources in the village.
- Watershed management done in the village.

Results and Discussions

The soil types around the Farm Pond were Black Clay Soil, Red soil and Mixed Black and Red soil The irrigation required for Groundnut 353.1mm, for Paddy 842.5mm, for Red Gram 284.5mm, for Black gram 280.2mm using CROPWAT Model.



The irrigation schedule for Rice is
The scheme supply for the whole cropping pattern is

Scheme Supply

ETo station: Venbedu
Rain station: Venbedu
Cropping pattern: Single

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation deficit												
1. Rice	93.6	28.6	0.0	0.0	0.0	0.0	0.0	0.0	91.6	229.9	0.0	4.1
2. Groundnut	0.0	0.0	35.3	115.6	115.8	66.7	0.0	0.0	0.0	0.0	0.0	0.0
3. Red Gram	0.0	0.0	35.2	106.3	97.0	25.7	0.0	0.0	0.0	0.0	0.0	0.0
4. Black Gram	0.0	0.0	31.1	103.7	98.2	29.2	0.0	0.0	0.0	0.0	0.0	0.0
Net scheme irr.req.												
in mm/day	2.4	0.8	1.1	3.9	3.6	1.8	0.0	0.0	2.4	5.9	0.0	0.1
in mm/month	74.9	22.9	34.9	115.7	110.3	54.8	0.0	0.0	73.3	183.9	0.0	3.3
in l/s/h	0.28	0.09	0.13	0.45	0.41	0.21	0.00	0.00	0.28	0.69	0.00	0.01
Irrigated area	80.0	80.0	100.0	100.0	100.0	100.0	0.0	0.0	80.0	80.0	0.0	80.0
(% of total area)												
Irr.req. for actual area	0.35	0.12	0.13	0.45	0.41	0.21	0.00	0.00	0.35	0.86	0.00	0.02
(l/s/h)												

CONCLUSIONS:

The cropping Pattern was changed before and after the Farm Ponds. Before Farm ponds only Vegetables like Brinjal, Tomato, and .etc were planted. After Farm Ponds, the crops like Paddy, Red gram, Black Gram were planted. The irrigated area was increased from 24.58% of Whole area before Farm Ponds to 40.28% after Farm Ponds. There is also a change in Average Net Income of the Households when comparing before and after Farm Ponds.

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