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Case study of Water Saving Through Temporary Water Storage Ponds in Village Vadavathur in Namakkal District

B Mohan, R Sangeetha, S Alagudurai, C Sharmila Bharathi, K Senthilkumar, S Aanand, M Daisy, K Pannerselvam and G Gohila

Krishi Vigyan Kendra
Namakkal - 637 002 (Tamil Nadu)

ABSTRACT

Vadavathur in Namakkal District is a drought prone village. The annual rainfalls is 400 mm. Farmers pump water from open and bore wells and store it in unlined temporary water storage pond and then irrigate the grown crops. Under the NICRA scheme fourteen temporary storage ponds were lined with HDPE 200 GSM UV irradiated plastic sheets. Most of the farm ponds were of the size of 65 ft length, 45 ft breadth and 6 ft depth with water holding capacity of 17,550 cu.ft. When water was stored in plastic sheet lined ponds, the seepage loss was minimized to ½ ft only in 15 d compared to ½ ft of water loss within 3 days in unlined storage ponds. Ground nut pod yield (22 q/ha) increased by 18 per cent as compared to 18q/ha obtained from fields irrigated from unlined ponds. The increase in yield was due to increased frequency of irrigation once in 10 d in lined pond compared to once in 15 d in unlined ponds. Similarly the weight of onion bulb was 23-25 g in field irrigated with the lined ponds compared to 9-11 g from fields of unlined ponds. This intervention helped in saving water as well as increasing the yield of crops.

Key Words: Water saving, Temporary water storage, Ponds,

INTRODUCTION

Water is essential component in agriculture and animal husbandry for year round productivity. The importance of water has percolated deeply in the minds of farmers especially in drought prone areas, where it is pumped from open and bore wells, stored in surface temporary water storage ponds for irrigation to the field crops. But many constraints like quick drying of open and bore wells, interrupted electricity supply, hinders adequate pumping and storage of water and assured productivity. Hence, for effective storage of water in temporary water storage ponds many methods like, clay lining, plastic lining, stone pitching, concrete flooring, are practiced on a project base. Among these, one low cost technology is plastic lining of temporary water storage ponds.

MATERIALS AND METHODS

The study area of Vadavathur village, Erumapatti block, Namakkal District, Tamil Nadu is a drought prone village. The annual rainfall is 400 mm; hence this village was selected to implement the National Initiative on Climate Resilient Agriculture (NICRA) Project during the year 2010. The site for temporary storage of water was the highest elevated area in the farmers' field. The ponds were dug using excavator and later manually the stones and weeds were removed. The inner surface of the pond was made smooth as possible, so as to avoid tear to the plastic lining sheets.

The standard size of the pond was 65 ft length, 45 ft breadth and six ft depth. Fifteen hours of JCB excavator was used for deepening the pond and strengthening the bunds @ Rs.650/hr and the

Corresponding Author's Email: namakkalkvk@gmail.com

total cost was Rs.9750/-. The cost of the HDPE 200 GSM UV irradiated polythene lining sheet was Rs.6/sq.ft and for lining a pond of 65 ft x 45 ft it amounted to

Rs.17,550/-. The plastic lining sheets were layed inside the pond first and then brought outward to the bunds and fixed with stay rods with the rings on the edges of the sheet. After laying the plastic sheets, water was pumped into the pond using 3 to 5 HP motors. During summer months (February to May) it takes 8 -10 d to fill the pond with a water holding capacity17,550 cubic feet, whereas during July to September it takes 5 – 8 d and during October to January it takes 3 -5 d to fill the pond, depending on the water table in the bore wells.

RESULTS AND DISCUSSION

The depth of open wells ranged from 60 to 120 ft and bore wells are as deep of 300 to 650 ft. The low discharge from these bore wells and open wells during summer months is inadequate for direct surface irrigation and hence, the common practice is to pump waterfrom bore wells and open wells mostly fitted with 5 HP air compressor pumps. The pumped water is stored in small surface storage ponds lined with clay from where it is pumped through centrifugal pump or taken under gravity flow to irrigate the fields entailing very low overall irrigation efficiency.

The soil of Vadavathur village is mostly red and sandy loam. Seepage rate from these soils is quite high and therefore water stored in the surface storage ponds was quickly lost. Similar observation was also reported by Selvi *et al* (2013). To avoid this problem of excessive seepage from the storage ponds, lining of these temporary storage ponds with HDPE 200 GSM UV irradiated polythene lining sheet was demonstrated in 14 farmer's field in Vadavathur village during 2011 to 2013. The pond was dug as per the size requested by farmers. Pond bed and sides were made weed and stone free to prevent any damage to the plastic sheet. The total cost of the intervention was approximately Rs. 30,000 /- since it varied from site to site, which included cost of polythene sheet and pond formation. The water from the open and bore wells were first pumped into this pond and then taken by gravity to irrigate the fields. Evaporation and percolation of water losses were minimized to ½ ft only in 15 d. compared to a loss of ½ ft of water in 3 d in unlined storage pond. Nega and Kimeu (2002) reported that the water exposed to direct sunshine, winds are lost by evaporation and the loose soil leads to seepage. It can be minimized by providing the storage tank with a lined covers. Similar observation was made by Subudhi and Senapati (2013) who reported that the water loss was 326 l/ d in lined pond and 24,000 l/d in un-lined pond.

In the study village, eight farmers cultivated ground nut variety TMV 7 during kharif season. Farmers irrigated the ground nut crop once in fifteen days during the year of 2011-2012 using water stored in temporary unlined storage ponds and the yield of pod was 18q/ha and haulms 37.5q/ha, whereas when water was stored in plastic lined ponds they could irrigate once in 10 d as a result of which the pod yield (22q/ha) and haulms yield (45q/ha) increased by 18 and 16 per cent, respectively. All the fourteen farmers cultivated onion using the water stored in temporary plastic lining ponds. Through this intervention moisture stress was avoided due to increased frequency of irrigation once in 14 d, it resulted in production of larger size onion bulb clusters from 9-11g to 23-25 g and shrinkage loss was minimized. Similar observation was reported by Subudhi *et al* (2013) where utilization of line pond water produced highest tomato yield of 48 q/ha.

During the year 2011-2012 with the water stored in unlined temporary water storage ponds farmers were able to cultivate only onion and sorghum, since only 30 per cent area was irrigated per day. In the same field where temporary water storage ponds were lined with plastic sheets, seepage loss was minimized and 40 per cent area was irrigated per day and farmers cultivated in addition to onion and sorghum, crops like ground nut and short duration vegetables like snake gourd and ridge gourd.

CONCLUSION

Temporary water storage ponds lined with plastic sheets were effective storage models in the open fields. The water seepage was minimized to ½ ft only in 15 days. The irrigation interval was

Measuring the size of the ponds

Lining the pond with polythene

Storing the water in lined ponds

Storing the water in unlined ponds

reduced from 15 d to 10 d. Through this intervention moisture stress was avoided in onion and ground nut crops and resulted in round the year cultivation of crops.

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