

Farm Ponds for Climate-Resilient Rain Fed Agriculture A-Study

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ABSTRACT

The value of farm pond knowledge by way of an alteration method towards speechless water scarceness owing to numerous details, counting weather change. This knowledge takes the possible to rise obtainability of water for other irrigation, upsurge in harvested area and output significant to upsurge in remaining profits after crops. Farm fishpond offers a clarification to intimidated the augmented incidences of drought, chiefly mid-season then irredeemable shortage under climate modification situation. The policy interference to endorse one pond for each farm holding having an area of 2.0 ha at separate farm level or on community-sharing basis. Restraints for large-scale application of farm pond knowledge are also conversed.

Key Words: Weather alteration, lack organization, farm ponds, rainfed agriculture, additional irrigation.

1. INTRODUCTION

RAINFED cultivation in India donates 40% toward the countrywide nutrition hamper. Supports 40% of the populace 80% of cultivation and 60% of beef. Fragile agro ecosystems with low farm output are shared topographies of rain fed agriculture largely practised now arid. Semiarid and dry sub-humid zones. Rising fever, lacks and floods, increasing variability in rainwater and increase in seawater level are evidences of induced dangers owed to weather alteration. During 1900-2012 droughts and floods were recurring normal disasters which affected lots of persons in the country. In India, the bodily impression of weather alteration is predicted to rise the normal superficial fever in 2-4 C, alteration the circulation and occurrence of rainfall, reduction the quantity of raining beings by more than 15, increase high-intensity rainfall, and frequency and intensity of cyclonic storms. Parts of western Rajasthan, Karnataka, northern Andhra Pradesh and southern Bihar are likely to be extra susceptible in terms of extreme events. Weather aberrations such as delay in the onset of the southwest monsoon, incidence of long, dry spells and early withdrawal of monsoon also affect yield growth and strongly influence output heights. The higher average annual fevers coupled with varying rainfall and water stress can have serious implications on crop production in the tropics. In India, important negative influences are predicted by medium-term weather alteration by a reduction in yield by 4.5-9% between 2010 and 2039. Cereal productivity is projected to decrease by 10-40% by 2100 and greater loss is expected in Rabi. Hence, concerted

efforts are required for extenuation and version to reduce the susceptibility of Indian cultivation to the contrary influences of weather modification, thus making it more resilient.

2. TYPE OF FARM POND

Reliant on the basis of stream and their place with respect to the land-living external, farm ponds are gathered into four types:

1. Dugout ponds or excavated ponds

Dugout ponds are excavated at the site and the soil obtained by excavation is formed as embankment around the pond. The pond could either be fed by surface runoff or groundwater wherever aquifers are available. In case of dugout ponds, if the irrigation, the water has to be pumped out. Surface water ponds are the most common type of farm ponds.

2. Surface ponds or watershed ponds

These are partly excavated and an embankment is constructed to retain the water. Generally a site which has a depression already is chosen for the pond construction. The pond is fed by surface runoff from its catchment area. The earthen embankment, mechanical spillway and an emergency spillway are parts of the pond. It is desirable to take the water out of the pond through gravity outlet for irrigation. Selection of suitable site for this purpose is, therefore, important.

3. Spring or creek fed ponds

Spring or creeks fed ponds are those where a spring or a creek is the source of water supply to the pond. Construction of these ponds, therefore, depends upon the availability of natural springs or creek. Off-stream storage ponds are streams which flow only seasonally. The idea is from the seasonal flow in the streams.

4. Off-stream storage ponds

Suitable arrangements need to be made for conveying the water from the stream to the storage ponds. Another type of ponds, referred to as leave ponds are formed by embankments and are usually of a regular shape and are of uniform depth. Levee ponds are filled by water from wells, storage reservoirs, streams, or estuaries.

3. COMPONENTS OF A FARM POND

The pond consists of the storage area, earthen dam, mechanical spillway and an emergency spillway. The mechanical spillway is used for letting out the excess water from the pond also as an outlet for taking out the water for irrigation. The emergency spillway is to safeguard the earthen dam from overtopping when there are inflows higher than the designed values.

DESIGN OF FARM PONDS

1. Selection of site
2. Determination of the capacity of the pond
3. Design of the embankment

4. Design of the mechanical spillway
5. Providing for seepage control from the bottom.

CONSTRUCTION OF FARM PONDS

The construction of the embankment the first step is to clear the site and remove all vegetation and roots. The proposed base area of the embankment is thoroughly stirred by ploughing so that a good bond is obtained with the material.

PROTECTION AND MAINTENANCE OF FARM PONDS

The farm pond needs to be protected from cattle trespass. This is especially important if linking materials have been used which are likely to be damaged by cattle. Vegetative plantings around the periphery of the pond area prevent rapid in flow of sediment into the pond. The watershed area of the pond should also be protected from soil erosion with appropriate soil conservation measures. Regular maintenance of the pond and ancillary structures is essential.

POTENTIAL OF RAINWATER HARVESTING USING FARM PONDS BASED ON SURPLUS RUN-OFF AVAILABLE IN INDIA

The rainwater harvesting potential or surplus run-off available across the rain fed districts of India. It was reported that about 27.5 m ha of rained area in the eastern and central states has the maximum potential to generate run-off of 114 BCM of water. Out of this, 28 BCM can be used to provide one supplemental irrigation to about 25 m ha of rainfed area during a normal year and 31 BCM for one irrigation to about 20.6 m ha area in a drought year using 50 million farm ponds. This strategy would not only control erosion, but also contribute to climate change adaptation by rainwater harvesting and supplemental irrigation. Rainfed production could be increased by 50% by a single supplementary irrigation along with improved agricultural practices. In addition, these ponds can retain soil amounting 5-10 t/ha/year and 10-20 t/ha/year in red and black soil regions respectively. The collected sediment, rich in nutrients can be recycled within the catchment area to enhance productivity.

BENEFITS OF FARM POND AND RESERVOIR LINKING WITH PLASTIC FILM

1. Reduction in seepage losses to the maximum extent (95%)
2. Harvesting and storing of rain water from early monsoons.
3. Utilisation of harvested rain-water for short during crops as well as during off season.
4. Lining of ponds and reservoirs improve water availability over a longer period of time
5. It is highly useful in porous soils where water retention in ponds and water harvesting tanks is minimal.
6. Economical and effective method of storing water.

7. Prevents soil erosion.

WATER LOSSES IN PONDS AND RESERVOIRS

The need of water during the rainy season is minimal, and therefore, the water available from precipitation or from rivers/ streams is stored in ponds and reservoirs for various domestic, agricultural and industrial purpose over a period of time. In the areas of acute shortage of water, ponds and reservoirs sometimes form the only source of water. However, a good portion of water stored in these reservoirs or pond is lost by evaporation, seepage and temperature. The seepage and temperature losses are shown in table below. Evaporation being surface phenomenon is directly related to the surface area of a storage and temperature. The present estimate of evaporation losses are 6 M ha m. Taking into consideration the large and small storage of the country, the total water loss due to evaporation would be enough to meet the drinking water requirements of India in 2000AD. Water loss in a storage is sum total of seepage losses through dam/ bund and bed of reservoirs/tank and evaporation from open surface.

4. CONCLUSION

Farm pond is an option for rainfall gathering and to provide life- saving irrigation to standing yields when they are exposed to mid-term terminal drought and also for pre-sowing irrigation in post-rainy crops in rainfed areas. Ponds may be lined in light textured soils. While unlined farm ponds in soils having higher seepage can be utilized to recharge. In a watershed, a series of ponds may be constructed in farm fields and crosswise the river courses/ first-and second-order drainage channels to intercept run-off, reduce peak flow, control erosion and store water for supplemental irrigation and to recharge groundwater. Selection of crops and cropping systems based on profitability and irrigation requirement is needed to efficiently utilize the harvested water. Modern methods of irrigation like drip and sprinklers may be adopted for increasing water-use efficiency. Insufficient awareness among farmers. Small farm holdings, relatively high initial investments. Evaporation and seepage loss, and moderate benefits during 'normal' years are some of the constraints that impede adoption of farm ponds on a large scale in rainfed ecosystems of India

5. REFERENCE

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