



POSITIVE IMPACT OF FARM PONDS IN RURAL LIVELIHOOD OF INDIA

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Abstract

Rainfall is the basic source of agricultural activities but the mismanagement of rainwater harvesting results in a decline the agriculture production it severely affected rural livelihood. The farm ponds are one of the best alternative methods for collecting and storing rainwater for future use. Farm ponds are usually small dugouts like a square or rectangle shape. In rural areas, farm ponds are used by farmers for irrigation purposes, cultivate vegetables nearby houses, and used as drinking water for cattle, etc. The study mainly focuses on the positive impact of farm ponds on rural livelihood in India. The study is purely based on secondary data and used two economic principles applied in farm pond-based Agricultural production i) Principle of Combining Enterprises ii) Principle of Comparative Advantage to increase crop production in the rural areas. This paper discusses some case study of farm ponds helps to irrigation activities, increases crop production to gain profit, and also helps to recharge the groundwater level, control soil erosion, The farm ponds are supports to sustain agricultural activities and improve the standard of living of people, especially in the rural area.

Key words: Farm Ponds, Comparative Advantage, Ground Water, Livelihood.

1. Introduction

Agriculture is a main occupation of rural livelihood in India. Land, water, Agricultural laborers and capital are the four important factors of production in Agriculture. According to Times of India reported 17 percent Indian cities face water shortage problem and Tamil Nadu is top in the list. According to Jal Sakthi ministry report 255 districts and 1592 block are face water shortage problem and rural area people always search water for their basic needs. Water is a main source of Agriculture. But now a day's water scarcity in everywhere, it highly affected livelihood of rural people and less Agricultural production. Farm ponds irrigation-based agriculture help to rural farmer to cultivate less water intensive crops and gain good production.

2. History of Farm Ponds

In Arthasasthra Chanakya mention water harvesting system in small reservoir, store water used for Agriculture or used for drought period. In world level the first farm pond constructed in Bolivia 1980 and resulted Successful experience in Bolivia (South America). In Madhya Pradesh 1984 Patel is the first farmer build farm pond to improve the groundwater level.

3. Methodology

This research paper based on theoretical and descriptive in nature. The study was based on Secondary data. The data were collected from the Indian Council of Agricultural Research, Central Research Institute for Dry land Agriculture (CRIDA) and India Water Portal. This study was integration of economic principle in Agriculture to improve crop production and better standard of living of rural people therefore two Economic principles applied in farm pond based Agricultural production i) Principle of Combining Enterprises ii) Principle of Comparative Advantage This paper intends to describe the how farm pond irrigation increases crop production to gain profit and uplifted the rural livelihood through creation of employment opportunities.

4. Discussion

Farm ponds-based cultivation best suitable with less water intensive crops it helps to rural people to gain profit and uplift their standard of living.

Table 1. Approximate Water Needs for Seasonal Crop

Crop	Crop water need (mm/total growing period)
Alfalfa	800-1600
Banana	1200-2200
Barley/Oats/Wheat	450-650
Bean	300-500
Cabbage	350-500
Citrus	900-1200
Cotton	700-1300
Maize	500-800
Melon	400-600
Onion	350-550
Peanut	500-700
Pea	350-500
Pepper	600-900
Potato	500-700
Rice (paddy)	450-700
Sorghum/Millet	450-650
Soybean	450-700
Sugarbeet	550-750
Sugarcane	1500-2500
Sunflower	600-1000
Tomato	400-800

Source: Food and Agriculture Organization

<https://www.fao.org/3/s2022e/s2022e02.htm#2.4%20determination%20of%20crop%20water%20needs>

The table 1 indicates the Alfalfa, banana, citrus, cotton, sugarcane, sunflower these crops are required 1000 mm to above 2000 mm of water till the total growing period and remaining crops are required less than 100 mm of water.

Principle of Combining Enterprises describes the product and product relationship or else Combination or product mix involving product relationship. Complementary Productions and Supplementary Productions

- **Joint and Complementary Productions** relationship is directly proportionate. With the increase in one product there is also increase in other product. Ex: Cultivation of Brinjal followed by Chillies cultivated in same farm.
- **Supplementary Productions** means increase in one product does not affect for each other or they are independent in production. Ex: Crop production (paddy) and Dairy enterprise (paddy straw as a fodder for cattle's).

Both Joint & Complementary Productions and Supplementary productions applied in farm pond-based cultivation it resulted good profit especially in rural area. In supplementary farm pond-based production create another employment opportunities like cattle farming, dairy production, Aqua farming etc.

Principle of Comparative Advantage

David Ricardo developed the classical theory of comparative advantage in 1817. **Comparative advantage:** (Cost of production) refers to relative advantage of growing different crop in a region. When comparative advantage with farm pond cultivation and normal irrigation cultivation it shows farm pond cultivation have some advantage in production

Case study: Sri Venkatappa is a farmer in the Nagenahalli village of Tumkur district, Karnataka owns one acre of dry land with low soil fertility. One farm pond of dimension 20 m x 20 m x 2 m with water storage capacity of 800 cubic meter. it was small dugout to harvest runoff water. With help of farm pond, he took three crops in a year. He cultivated tomato in 0.25 hectare which gave a yield of 7 tonnes and income was Rs.28000. Additionally, he cultivated chilies in 0.25 hectare which gave a yield of 1500 kg of green chilies and an additional income of Rs.20000. He also cultivated coriander in 0.25 hectare which gave a yield of 800 kg and an additional income of Rs.16000. The observation of this case study indicates the farmer adopted Principle of Combining Enterprises (within one acre he cultivated tomato, chilies and coriander) and Principle of Comparative Advantage (get more net returns). These two principles application resulted, farmer gain good production and profit.

Positive impact of individual farm pond in climatic vulnerable districts in India**Table 2. Number of farmers covered by farm ponds & Protective irrigation possible creation in Hectare (ha)**

Village	District/ Krishi Vigyan Kendras	Storage capacity (cu. m)	No. of farmers covered	Protective irrigation potential created (ha)	Increase In cropping intensity (%)
Kukurha	Buxar	1800	06	1.75	100
Affaure	Saran	11500	42	10	25
Chopanadih	Koderma	16560	50	20	40
Takli	Amravati	8400	25	10	20
Nacharam	Khammam	1460	4	9.6	40
Sanora	Datia	9500	10	19	100
Nagenhalli	Tumkur	68100	77	65	100

Sources: The Indian Council of Agricultural Research, National Initiative on Climate Resilient Agriculture 2014

The table 2 reveals that National Initiative on Climate Resilient Agriculture implemented the Krishi Vigyan Kendras in 100 climatic vulnerable districts in India. And adopted appropriate technologies practices. Its outcome was good indicated by above table. Farm pond was the key intervention in these districts. Farm ponds help to collected rainfall it increases groundwater level. In Nagenhalli village of Tumkur district farm ponds had highest storage capacity 68100 cubic meter, followed by Koderma district farms pond had 16560 cubic meters, Saran had 11500 cubic meter, Datia 9500, Amravati 8400 cubic meter and remain district farm ponds storage capacity was 1500 cubic meter to below 2000 cubic meter. And number of famers covered also more in Tumkur district was 77 famers used farm ponds and Koderma district covered 50 farmers. Protective irrigation hectares are increased in Tumkur district had 65 hectares Koderma district was 20 hectares and 19 hectares Datia district. Finally, it leads to increase the crop intensity.

Table 3. Farm ponds with modern irrigation techniques benefited villages

Village	District/ Krishi Vigyan Kendras	Techniques Demonstrated	Crop	Area (ha)	Net Return (Rs)
Lagga	Chamba	Sprinkler	Cauliflower	2	3,80,165
Kukurha	Buxar	LEWA	Rice	4	27,285
Affaure	Saran	Micro irrigation	Long gourd	2	65,988
Takli	Amravati	Sprinkler	Cotton	10	36,300
Nacharam	Khammam	Drip	Chilli	2	9,000
Nidhan	Morena	Sprinkler	Wheat	8	52,200
Vadavathur	Namakkal	Sprinkler	Onion	35	2,15,565
Nagenahalli	Tumkur	Drip	Brinjal	2	1,02,500
Nagenahalli	Tumkur	Sprinkler	Groundnut	1	59,500

Sources: The Indian Council of Agricultural Research, National Initiative on Climate Resilient Agriculture 2014

The Table 3 shows that farm ponds with modern irrigation techniques adopted villages, farmers gained more net returns. In Chamba district, cauliflower in 2 hectares used sprinkler irrigation method and gain Rs. 3,80,165 net return. In Tumkur district farmers cultivated brinjal with drip irrigation in 2 hectares, got Rs.1,02,500 and also cultivated Groundnut adopted sprinkler irrigation gain Rs. 59,500. The Saran district farmers used micro irrigation and cultivated long gourd in 2 hectares, net return was Rs. 65,988. Morena district cultivated wheat in 8 hectares with help of sprinkler irrigation and gain Rs. 52,200. In Amravathi district, cultivated high water intensity crop cotton in 10 hectares and get Rs.36,300 net returns. Therefore, farm pond helps to agriculture activities and farmers also gained good net return farm pond-based farming.

Farm ponds cultivation uplift the rural livelihood

- Farm ponds are one of the best alternative methods to collect rain water and used for future needs
- It reduces the risk of monsoon failure
- In rural areas farm ponds are constructed nearby house women are cultivate small plants, crops and gain some profits. It was mainly supports to small farmers
- Farm ponds are recharging the ground water and increase the groundwater level, water available for agricultural activities
- It helps to moisture soil and store drinking water for cattle.
- Some farmers are interested do aqua farming in same ponds.
- In addition, it creates employment opportunities like fish farming, cattle farming.

5. Conclusion

Farm ponds irrigation saves the life of Agriculture. Because recent days India receive heavy rainfall with short span, but in summer days its turn to opposite very drought condition people always need water for basic domestic purpose and for their livestock population. People suffered lot due to climate resilience. Farm ponds are one of the best solutions for this situation, when heavy rainfall government steps to create way to run off water to reach the ponds and it helps to control floods. In rural areas farmers constructed farm pond near by their houses, women are interested to cultivate the small crops and plants for their use and took water from farm pond, in addition they gain some income through cattle farming, dairy production, aqua farming.

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