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To measure the impact of farm ponds on beneficiary farmers in Jaipur district

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Abstract

Farm ponds are small tanks or reservoirs constructed for the purpose of storing water essential for surface runoff. Farm ponds are useful for irrigation of plants, water supply for the cattle, fish production etc. Water is an essential and precious resource upon which our ecosystem and agriculture production depend.

The present study was conducted in Jaipur district of Rajasthan. There are 23 AAO circles under the Assistant Director Agriculture, Jhotwara (Jaipur). Out of which 4 AAO circles viz. Hingonia, Jobner, Boraj and Bichun were selected purposively for the study purpose due as to these AAO circles are adjoining to SKNAU, Jobner and within 20 Km radius in which scientists of University are regularly engaged in transfer of technology in nearby villages and farmers are also visiting the University for solution of their agriculture problems. It was noted that all the crops including vegetables exhibited changes in positive direction for average productivity i.e. increases in productivity. Construction of farm pond created remarkable change in the form of cropping pattern, cultivating more crops per unit area, increased productivity of crops including vegetables, which increased their annual income as compared to before. This brought cent per cent area under micro irrigation, construction of houses and found changes in their consumption pattern as compared to before.

Keywords: farm pond, impact, cropping pattern, crop productivity and cropping intensity

Introduction

It is true that progress of India is dependent on the development of agriculture. Increased agriculture production depends upon the number of factors of which water plays an important role. Agriculture sector is one of the most important industries in the Indian economy, which means it is also a huge employer. Approximately, 60 per cent of the Indian population works in this sector, contributing about 18 per cent to India's GDP. This share decreases gradually with each year, with development in other areas of the country's economy (Jaganmohan, M., 2020) [4].

Farm ponds are small tanks or reservoirs constructed for the purpose of storing water essential for surface runoff. Farm ponds are essentially useful for irrigation of plants, water supply for the cattle, fish production etc. Water is an essential and precious resource which maintains our ecosystem and agriculture production depends. Water is a natural resource and 97.39 per cent of water is in the ocean i.e. pure salty in nature. Another 2.16 per cent is fresh water, out of this 77.23 per cent is in the polar ice and glaciers. Only small fraction of water resource present on the ground lakes, rivers and atmosphere and is useful for mankind. In India total cultivable land is 139.36 M ha out of this 37.67 M ha is under irrigation which comes to 27 per cent (Deshmukh *et al.*, 2017) [3].

The main aim of constructing farm pond is to make the availability of protective irrigation at critical growth stages of crop. The farm pond has a great impact on changing the crop productivity as well as cropping intensity. It also helps in changing the economic situation of farmers. The irrigated area also increases due to the construction of farm pond (Deshmukh, *et al.*, 2017) [3]. India has been predominantly an agricultural country. Hence, it is true that progress of India is very much dependent on the development of agriculture. The increased agricultural production depends upon the number of factor of which, water play an important role.

A farm pond is a large pit dug out in the earth, usually square or rectangular in shape, which harvests rainwater and stores it for future use. The pond is surrounded by a small bund, which prevents erosion on the banks of the pond. The size and depth depends on the amount of land

available, the type of soil, farmer’s water requirement and the cost of excavation and the possible uses of the excavated earth. Usually farm pond size has a range of 15×15×3 meter, 20×20×3 meter, 25×25×3 meter and 30×30×3 meter, respectively. (Jakkawad *et al.*, 2020) [5]

Research methodology

There are 23 AAO circles in the Assistant Director (Agriculture) Jhotwara, Jaipur. Out of which 4 AAO circles viz. Hingonia, Jobner, Boraj and Bichun were selected purposively. Among these four selected AAO circles out of 234 beneficiaries 120 sample respondents were selected randomly according to proportional method. The respondents were interviewed with the help of structured schedule prepared for the purpose at their home and farm and data was collected. The collected data was analyzed with the help of suitable statistical methods i.e. frequency, percentage mean, standard deviation and z test for interpretation of the findings.

Results and Discussion

In absence of proper bench mark observations, the study attempted comparison between beneficiaries before and after use of farm pond respectively. For the reason that all the situational, administrative, climatic and other such forces should be common to both. It was assumed that the higher change would be observed in use of farm pond. Therefore, in order to isolate impact of farm pond the comparison between after and before use of farm pond was made.

Change in cropping pattern

It was revealed from Table -1 that cropping pattern (area) of all crops viz. wheat, barley, gram, mustard, bajra, green gram, cluster bean, chilli, tomato, okra, pea and brinjal etc. increased from 17.50 per cent to 26.66 per cent in high category of cropping pattern. Likewise in low category, per cent of the beneficiaries decreased from 31.67 per cent to 17.50 per cent after the farm ponds. Most of the beneficiaries came under medium category. It was found that after the farm pond per cent of the beneficiaries were 55.84 in comparison to 50.83 per cent before farm pond. Mean of change in cropping pattern of beneficiaries was 7.58 (after farm pond) and 6.45 (before farm pond). The standard deviation was 3.42 (before farm pond) and 4.32 (after farm pond). It was assumed that the scores in different categories were taken as rounded figure. Calculated 'Z' value showed that difference in change in cropping pattern of before and after of farm pond beneficiaries is positive and significant.

Table 1: Distribution of the respondents according to change in cropping pattern

Change in cropping pattern					
Categories	Before		Categories	After	
	No.	Per cent		No.	Per cent
Low (below 3 score)	38	31.67	Low (below 4 score)	21	17.50
Medium (from 3 to 9 score)	61	50.83	Medium (from 4 to 12 score)	67	55.84
High (above 9 score)	21	17.50	High (above 12 score)	32	26.66
Mean = 6.45, SD = 3.42		Mean = 7.58, SD = 4.32			
'Z' value = 4.72**					

** = Significant at 0.01 level of probability

Before construction of farm pond respondents followed

traditional cropping pattern *i.e.* they cultivated only one or two crops. After construction of farm pond cropping pattern changed to growing more than one or two crops particularly *Rabi* crops including increase in area of vegetable crops also. This result indicated that after construction of farm pond the cropping pattern changed due to availability of water for irrigation and putting additional land for cultivation of more crops. The findings were supported by Ahire (2000) [1], Mankar (2014) [8] and Desmukh *et al.* (2017).

1. Change in crop productivity

It is revealed from Table - 2 that all the crops showed change in average productivity in positive direction *i.e.* increase in productivity. Majority of *Kharif* and *Rabi* crops showed increase in average productivity. In *Kharif* crops bajra, green gram, groundnut, and cluster bean were increased in average productivity *i.e.* 11.72 %, 7.17%, 16.64 % and 17.52 % over base year, respectively.

With regards to *Rabi* crops, there were change in average productivity in wheat, barley, mustard, gram and pea with per cent change 21.27%, 7.54 %, 14.89 %, 16.71%, and 13.68%, respectively.

Whereas, in case of vegetables, there were change in average productivity in chilli, brinjal, okra and tomato with per cent change *i.e.* 8.25 %, 11.39 %, 17.23 % and 14.98 %, respectively. The findings are in line with Ahire (2000) [1], Nipanikar (2006) [6], Kulkarni (2009) [7], Thakur (2014) [9] and Chavai and Sinde (2017) [2].

Table 2: Distribution of the respondents according to change in crop productivity

S. No.	Crops	Productivity q / ha.		Per cent change
		Before farm pond	After farm pond	
n=120				
A	<i>Kharif</i>			
1.	Bajra	14.50	16.20	11.72
2.	Green gram	11.43	12.25	7.17
3.	Groundnut	27.82	32.45	16.64
4.	Cluster bean	9.36	11.00	17.52
B	<i>Rabi</i>			
5.	Wheat	40.98	49.70	21.27
6.	Barley	48.67	52.34	7.54
7.	Mustard	13.09	15.04	14.89
8.	Gram	14.60	17.04	16.71
9.	Pea	52.69	59.90	13.68
C	Vegetables			
10.	Chilli	167.10	180.89	8.25
11.	Brinjal	255.27	284.36	11.39
12.	Okra	74.28	87.08	17.23
13.	Tomato	200.68	230.76	14.98

From the above findings it could be concluded that there was definite impact of farm ponds on productivity of different *Kharif*, *Rabi* and vegetable crops mostly due to availability of protective irrigation facility from farm pond and also drip irrigation facility. All the crops showed change in average productivity in positive direction *i.e.* increase in productivity. Majority of *Kharif*, *Rabi* and vegetable crops showed increase in average productivity.

2. Change in cropping intensity

It is concluded from the Table - 3 that after construction of farm ponds the area in hectares in most of the crops has been increased.

A critical observation of change in cropping intensity Table - 3 revealed that the gross cropped area increased from 649.90 ha. to 754.60 ha. after construction of farm ponds over before construction of farm ponds. Before construction of farm pond the cropping intensity was 141.86 per cent whereas after construction of farm ponds it was 165.48 per cent. After construction of farm pond the per cent change in cropping intensity was observed as 16.71 per cent. As far as *Kharif* crops concerned there were no much change in area. However, the per cent change in total *Rabi* crops and vegetable crops area was relatively more after construction of farm ponds.

Table 3: Distribution of the respondents according to change in cropping intensity

n=120				
Crops	Area before farm pond (ha.)	Per cent	Area after farm pond (ha.)	Per cent
<i>Kharif</i>				
Bajra	125.20	34.02	130.9	34.00
Green gram	88.80	24.13	91.60	23.79
Groundnut	62.00	16.84	70.70	18.36
Cluster bean	92.00	25.00	93.40	24.25
Total <i>kharif</i>	368.0	100	385.60	100
<i>Rabi</i>				
Wheat	55.60	27.44	75.30	30.12
Barley	49.30	24.33	60.00	24.00
Mustard	25.30	12.48	28.30	11.32
Gram	30.50	15.05	38.80	15.52
Pea	41.90	20.68	47.60	19.04
Total <i>Rabi</i>	202.60	100	250	100
Chilli	30.70	40.39	49.60	41.68
Tomato	23.40	30.78	37.00	31.09
Brinjal	13.20	17.36	20.20	16.97
Okra	09.00	11.84	12.20	10.25
Total vegetables	76.00	100	119	100
Gross cropped area	649.90		754.6	
Net cultivated area	456		456	
Cropping intensity	141.86		165.48	
Per cent change	16.71 %			

The area under wheat, barley, pea, gram, mustard was found 30.12, 24.00, 19.04, 15.52 and 11.32 per cent increase over before farm pond, respectively. In case of vegetable crops like chilli, tomato, brinjal and okra; the per cent change in area after farm pond were increased to 41.68, 31.09, 16.97 and 10.25 per cent, respectively over before farm pond construction. The gross cropped area was increased from 649.90 ha. to 754.60 ha. which may help farmers to bring more area under *Rabi* crops and vegetable crops. Similar types of findings were observed by Chavai and Sinde (2017) [2].

Conclusion

The findings of the study indicated that cropping pattern (area) of all crops *viz.* wheat, barley, gram, mustard, bajra, green gram, cluster bean, chilli, tomato, okra pea and brinjal etc. increased from 50.83 per cent to 55.84 per cent in medium category of cropping pattern and also increased from 17.50 per cent to 26.66 per cent in high category of cropping

pattern. And in low category decreased from 31.67 per cent to 17.50 per cent after the farm ponds.

In *Kharif* crops bajra, green gram, groundnut, and cluster bean, there were maximum increase in average productivity 11.72 %, 7.17 %, 16.64 % and 17.52% over base year respectively. With regards to *Rabi* crops there were change in average productivity in wheat, barley, mustard, gram and pea with per cent change 21.27 %, 7.54 %, 14.89 %, 16.71%, and 13.68% respectively. Whereas, in case of vegetables there were change in average productivity in chilli, brinjal, okra and tomato with per cent change 8.25 %, 11.39 %, 17.23 % and 14.98 %, respectively.

The study clearly showed that before construction of farm ponds the cropping intensity was 141.86 per cent whereas after construction of farm ponds it was 165.48 per cent. After construction of farm pond the per cent change in cropping intensity was observed as 16.71 per cent.

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