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## Impact of farm ponds on its beneficiaries in terms of technological and economical changes

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### Abstract

The present study was undertaken in a purposively selected Aurangabad District of Marathwada region as the number of farm ponds were increasing since last few years. Four talukas *viz.*, Paithan, Aurangabad, Gangapur and Vaijapur were selected purposively and from each taluka 5 villages and 4 respondents from each village were selected randomly thus sample size of 80 respondents were selected for the present study. The respondents were interviewed with the help of structured schedule prepared for the purpose. It is concluded that the respondents were in middle age group up to 30 to 48 years with higher secondary education, land holding up to 4 hectare and farming experience (6-17 years), mostly living in nuclear family of 4 to 6 members with medium social participation, use of information sources and medium utility perception with high extension contact. 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 changes among beneficiaries in terms of technical, economical and social aspects. These changes were 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:** Impact, farm pond, beneficiaries, technological changes, economical changes

### Introduction

The natural resources soil, water, air and sunlight has become a matter of serious concern now. Soil and water resources, are being exploited because of increased population, also careless and irresponsible attitude of human being. Farming population depends on agriculture land, posing an urgent need to conserve the soil and water.

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.

To overcome the drought prone situation in drought affected districts of Marathwada, number of dug out type ponds (water storage structures) are necessary for harvesting of excess rain water on farmers field. The harvested water in farm ponds is being used for providing life saving irrigation to rainfed crops by lifting and applying to the fields. More than 80.00 per cent cropped area in Marathwada region of Maharashtra state is under rainfed condition and remains dependant on the vagaries of monsoon. The rainfall amount and its distribution during monsoon period are mostly erratic and uncertain coupled with occurrence of frequent droughts of several days to weeks affecting rainfed productivity drastically.

Construction of farm ponds is one of the beneficial programmes for harvesting excess rain water during rainy season; which is implemented by the State Agricultural Department. The excess rain water harvested in farm ponds play a vital role in stabilizing crop production through recycling during dry spell in *kharif* season and for protective irrigation in *rabi* season. The state agriculture department has decided to construct over one lakh farm pond during 2010 under the Maharashtra Rural Employment Guarantee Scheme (MREGES). The government is going to construct 200 farm ponds in every taluka of the state.

Hence, the present study was carried out to assess the impact of farm pond on beneficiaries with the following specific objectives.

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## Objectives

1. To study the profile of farm pond beneficiaries.
2. To study the impact of farm ponds on its beneficiaries.

## Methodology

The present study was undertaken in the purposively selected Aurangabad District of Marathwada region as the number of farm ponds were increasing since last few years. Four talukas namely Paithan, Aurangabad, Gangapur and Vaijapur were selected purposively. From each taluka 5 villages and 4 respondents from each village were selected randomly thus sample sizes of 80 respondents were selected for the present study. 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.

## Findings

The findings of the study are given below

### Profile of farm pond beneficiaries

It is evident from the data in Table 1 that majority (63.75 per cent) of the respondents were in middle age group of 30 to 48 years, followed by 22.50 per cent of respondents were in young age up to 29 years and only 13.75 per cent were in the old age group i.e. above 49 years.

The data further indicates that 30.00 per cent of respondents were educated up to higher secondary level, followed by 23.75 per cent were educated up to secondary school. 13.75 per cent respondents educated up to college level and 20.00 per cent and 12.50 per cent of respondents were illiterate and were educated up to primary level of education, respectively.

It was observed from Table 1 that 42.50 per cent of the respondents possessed medium land holding (2.1 to 4 ha), followed by 32.50 per cent having semi medium (4.1 to 10 ha) size of land holding. 16.25 per cent and 6.25 per cent of respondents possessed small to marginal land holding respectively. Only 2.50 per cent of respondents possessed big land holding (above 10.1 ha).

Further it is observed that 71.25 per cent of respondents were in medium category (experience of 6 to 17 years), 15.00 per cent of the respondents were in low experience category (experience up to 5 year) and 13.75 per cent of the respondents were in high experience category (experience

above 18 years).

The data about family type reveals that majority 75.00 per cent of the beneficiaries in the sampled population had nuclear family and remaining 25.00 per cent were in joint families.

It could be observed from the Table 1 that 56.25 per cent of the beneficiaries were of medium size of 4 to 6 members followed by 22.50 per cent of small size of 3 members. Only 21.25 per cent of the beneficiaries found to be in big size i.e. more than seven members.

With regards to social participation majority of the respondents were under medium social participation (43.75 per cent), followed by 40.00 per cent of the respondents having high social participation and only 16.25 per cent of the respondents having low social participation.

With regards to information sources majority 75.00 per cent were under medium use of information sources followed by 12.50 per cent had used low and high information sources.

The data presented in Table 1 indicates that 47.50 per cent of the respondents were having high extension contact followed by medium level 27.50 per cent. Only 25.00 per cent of the respondents were having low extension contacts.

With regards to utility perception majority of the beneficiaries were under medium utility perception about farm pond technology (67.50 per cent). Followed by 18.75 per cent and 13.75 per cent of the beneficiaries having high and low utility perception. The results of the study are in consistency with (Supe *et al.* 2017) <sup>[2]</sup>

It is concluded that majority of the beneficiaries were in the middle age group of 30 to 48 years. The reason might be young people tend to be more receptive, enthusiastic, has more working efficiency, high risk bearing capacity and prone to adopt innovations on their farm. The level of education of the respondents was found good. The probable reason may be awareness about the importance of education and educational facilities available in villages. Nearly fifty per cent beneficiaries possessed land holding 2.1 to 4 ha. The probable reason may be due to fragmentation of land and majority of the respondents had experience of 6 to 17 years. The majority of the respondents had nuclear type of family and 4 to 6 members in each family. Majority of the respondents had medium to high social participation and majority of the respondents were using medium information sources had high extension contacts with the extension personnel with medium utility perception.

**Table 1:** Profile of farm pond beneficiaries

Sr. No	Characteristics	Farm pond beneficiaries (N = 80)	
		Frequency	Per cent
<b>1</b>	<b>Age</b>		
1	Young (Up to 29 years)	18	22.50
2	Middle (30 to 48 years)	51	63.75
3	Old (49 & above years)	11	13.75
<b>2</b>	<b>Education</b>		
1	Illiterate	16	20.00
2	Primary	10	12.50
3	Secondary	19	23.75
4	Higher secondary	24	30.00
5	College level	11	13.75
<b>3</b>	<b>Land holding</b>		
1	Marginal (up to 1ha)	05	6.25
2	Small (1.1 to 2 ha)	13	16.25
3	Medium (2.1 to 4 ha)	34	42.50
4	Semi medium (4.1 to 10 ha)	26	32.50
5	Big (above 10.1 ha)	02	2.5

4	Farming experience		
1	Low (up to 5 year)	12	15.00
2	Medium (6 to 17 years)	57	71.25
3	High (18 years & above)	11	13.75
5	Family type		
1	Nuclear	60	75.00
2	Joint	20	25.00
6	Family members		
1	Low (up to 3 members)	18	22.50
2	Medium (4 to 6 members)	45	56.25
3	High (7 members & above)	17	21.25
7	Social participation		
1	Low (up to 2)	13	16.25
2	Medium (3 to 7)	35	43.75
3	High (8 and above)	32	40.00
8	Sources of information		
1	Low (up to 4)	10	12.50
2	Medium (5 to 16)	65	81.25
3	High (17 and above)	15	18.75
9	Extension contact		
1	Low (up to 2)	20	25.00
2	Medium (3 to 7)	22	27.50
3	High (8 and above)	38	47.50
10	Utility Perception		
1	Low (up to 7)	11	13.75
2	Medium (8 to 18)	54	67.50
3	High (19 and above)	15	18.75

### Impact of farm pond on its beneficiaries

#### Technological changes

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 Cotton, Maize and Tur there were maximum increase in average productivity (37.70%), (18.17%) and (28.80%) over base year, respectively after than before.

With regards to *rabi* crops there was change in average productivity in Wheat, Jowar and Gram with per cent change 23.28 per cent, 26.88 per cent and 24.42 per cent, respectively. Whereas, in case of vegetables it was observed as (13.77%) per cent. The results of the study are in consistency with (Deshmukh *et al* 2017) [1]

It could be concluded that there was definite impact of farm ponds on productivity of different *kharif* and *rabi* crops mostly due to availability of protective irrigation facility from farm pond. Regarding z value of crop production, all calculated 'z' value showed that there was positive and significant difference before and after production.

It was revealed from Table 3 that cropping pattern (area) of all crops increased from 12.50 per cent to 41.25 per cent in high category of cropping pattern and in low category per cent of the beneficiaries decreased from 21.25 per cent to 8.75 per cent after the farm pond. Most of the beneficiaries came under medium category. Calculated 'z' value showed that difference

in change in cropping pattern before and after of beneficiaries is positive and highly significant. The results of the study are in consistency with (Deshmukh *et al* 2017) [1].

It was revealed from Table 4 that cropping intensity increased from 13.75 per cent to 36.25 per cent in high category of cropping intensity and in low category per cent of the beneficiaries decreased from 13.75 per cent to 7.50 per cent after the farm pond. Most of the beneficiaries came under medium category. Calculated 'z' value showed that difference in change in cropping pattern before and after of beneficiaries is positive and highly significant. The results of the study are in consistency with (Deshmukh *et al* 2017) [1].

**Table 2:** Change in crop productivity

Sr. No	Crop	Before arm Pond	After farm Pond	Percentage Change	'z' test
		Quintals/ha	Quintals/ha	Per cent	
<b>A</b>					
<b>Kharif</b>					
1	Cotton	10.98	15.13	37.70	3.08
2	Maize	51.66	61.05	18.17	1.6
3	Tur	9.79	12.61	28.80	2.29
<b>B</b>					
<b>Rabi</b>					
1	Wheat	22.19	27.38	23.38	3.25
2	R Sorghum	17.89	22.70	26.88	4.06
3	Gram	12.98	16.15	24.42	3.44
4	Vegetables	184.72	210.17	13.77	3.58

**Table 3:** Change in cropping pattern

Sr. No	Beneficiaries	Extent of change				'z' test
		Low (Up to 13%)	Medium (13.1 to 31)	High (31.1 & Above)	Mean	
1	Before farm Pond	17 (21.25)	53 (66.25)	10 (12.50)	22.38	
		<b>Low (Up to 30%)</b>	<b>Medium (30.1 to 59%)</b>	<b>High (59.1 &amp; Above)</b>		<b>12.29</b>
2	After farm Pond	7 (8.75)	40 (50.00)	33 (41.25)	45.00	

**Table 4:** Change in cropping intensity

Sr. No	Beneficiaries	Extent of change				'z' test
		Low (Up to 57%)	Medium (57.1 to 126%)	High (above 126.1)	Mean	
1	Before farm Pond	11 (13.75)	58 (72.50)	11 (13.75)	92.44	<b>13.83</b>
		Low (Up to 132%)	Medium (132.1 to 217%)	High (above 217.1)		
2	After farm Pond	10 (12.50)	56 (70.00)	14 (17.50)	175.23	

### Economic changes

With regards to annual income in both the categories i.e. before and after construction of farm pond (Table 5), it was found that annual income increased from 15.00 per cent to 20.00 per cent in high annual income group. Most of the beneficiaries come under medium income group category. The calculated z value showed that there was difference in income after than before. As regard to income from cultivation it was 2.38 lakhs after adoption of farm pond and 1.19 lakhs before farm pond. The calculated 'z' value was significant indicating that there was significant difference in income after than before.

It is observed from Table 6, cent per cent of land of beneficiaries were brought under drip irrigation system after construction of farm pond and only 31.25 per cent of land was under drip irrigation system before farm pond. The 'z' value was found significant; it means that due to construction of farm pond the beneficiaries were more aware about utilization of water as compared to before.

Table 6 also depicted that 32.50 per cent beneficiaries had converted their kachcha house in to pacca house, whereas, only 13.75 per cent beneficiaries were having pacca house before. The 'z' value was found significant indicating that beneficiaries constructed their kacha house to pacca house more than before.

With regards to social impact, 75.00 per cent respondents were able to provide education to their family member's better way after wards, whereas only 43.75 per cent respondents were providing education to their family before. The 'z' value was significant indicating that beneficiaries were able to provide education to their family better way than before. The results of the study are in contradictory with (Deshmukh *et al* 2017) <sup>[1]</sup>.

As per as consumption pattern is concerned 56.25 per cent of beneficiaries were consuming better way after construction of farm pond as against 47.50 per cent respondents were consuming. The 'z' test was significant indicating that after construction of farm pond beneficiaries consuming in a better way than before.

As per as possession of vehicles/automobile was concerned 97.50 per cent of beneficiaries were having motorcycles after construction of farm pond as against 56.25 per cent respondents were having their own motorcycles, whereas 17.50 per cent of beneficiaries were having their own tractors after construction of farm pond and only 7.50 per cent of respondents were having their own tractors before. The 'z' test was significant indicating that after adoption of farm pond beneficiaries possessed more number of vehicles as compared to before. The results of the study are in consistency with (Deshmukh *et al* 2017) <sup>[1]</sup>.

**Table 5:** Change in income level

Sr. No	Beneficiaries	Extent of change			Mean	'z' test
		Low Up to 49	Medium 49.1 to 190	High above 190.1		
1	Before farm Pond	4 (5.00)	64 (80.00)	12 (15.00)	119.94	<b>3.24</b>
		Low Up to 71	Medium 71.1 to 404	High above 404.1		
2	After farm Pond	6 (7.50)	58 (72.50)	16(20.00)	238.19	

**Table 6:** Overall Changes due to farm pond

Sr. No	Particulars	Before farm Pond	After farm Pond	'z' test
1	Income	1.19	2.38	3.24
2	Area under drip%	25 (31.25)	80 (100.00)	17.50
3	Construction of house%	11 (13.75)	26 (32.50)	4.00
4	Change in education of family members	35 (43.75)	60 (75.00)	4.28
5	Change in consumption pattern	38 (47.50)	45 (56.25)	1.42
6	Vehicles%			
I	Motorcycle	45 (56.25)	78 (97.50)	8.00
ii	Tractors/ Cars	6 (7.50)	14 (17.50)	3.33

**Table 7:** Diversion of respondents towards horticultural crops after construction of farm pond

Sr. No	Crop	No	Per cent
1	Sweet orange	14	17.50
2	Pomegranate	18	22.50
3	Ginger	16	20.00
4	Vegetables	38	47.50
5	Onion	11	13.75

### Conclusions

1. It is concluded that the respondents were having middle age with higher secondary education status, medium land holding and medium farming (6-17 years) experience, mostly living in nuclear family of four to six members with medium social participation, use of information sources and utility perception with high extension contact.
2. Results revealed that all the crops including vegetables exhibited changes in positive direction for average productivity i.e. increases in productivity.
3. Construction of farm pond created remarkable change among beneficiaries in terms of technical, economical and social aspects. These changes were in the form of cropping pattern, cultivating more crops per unit area, increased productivity of crops including vegetables, which helped to increase their annual income as compared to before. This brought cent per cent area under micro irrigation, construction of houses and changes in consumption pattern.

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