Exploring the Socioeconomic Dynamics and Technological Adaptation Among Farmers: Implications for Sustainable Agricultural Development and RuralLivelihoods in Jaipur, India

Abstract

The research was conducted in Jaipur district of Rajasthan. There are 23 AAO departments under the jurisdiction of Deputy Commissioner of Agriculture, Jothwara (Jaipur). Among these, 4 AAO departments viz. Hingonia, Jobner, Boraj and Bichun were deliberately chosen for this study because the AAO circle is next to SKNAU, Jobner is within a radius of 20 km, researchers from the school respectively many people are making technological improvements in nearby villages and farmers are also active. A total of 120 participants were selected from these four AAO circles. Judging from the entire health history of farmers benefiting from Nongtang, the majority of farmers benefiting from Nongtang are middle-aged (35 to 51 years old) (58.33%). Primary school graduate (20.00%), farmers are union members (37.50%), their share of average annual income (77.50%) is Rs. 1,26,781 to Rs. 4,72,303 and farmers share small land. category (38.33%). Moreover, most of the beneficiary farmers (44.17%) have moderate farming experience ranging from 15 to 31 years, (23.19%) farmers use PM Kisan application, (70.00%) farmers use information technology, (68%) 34) considers agriculture as the main business. job. The relationship between income and technological change shows that there is a positive relationship between education level, social participation, annual income, insured land, agriculture, agricultural practice and knowledge. The beneficiary's social profile indicates education, community involvement, annual income, land ownership, farm practice use, and data effective and relevant job creation and annual income. The correlation between the profile of the beneficiaries and their social variables shows a positive relationship between the level of education, social participation, and annual income. There is a significant relationship between the use of agricultural practices and the change in personal property and the education level of family members. Agricultural knowledge and information are important and positively related to changes in household members' education levels and ownership of agricultural equipment.

Key words: Farm pond, Relationship of Beneficiaries, Socio-economic impact, significantly,

Introduction

Agricultural ponds are small tanks or reservoirs designed to store water needed for rivers. Farm ponds can be used to water plants, provide water for cattle, raise fish and more. Water is an important and valuable resource on which our ecosystems and agriculture depend.

Agricultural reservoirs play an important role in the management and protection of soil and water used for many purposes to meet the needs of agriculture. Mainly used in agriculture, flood control, recreation, drinking water, fishing, animal drinking, fire prevention, etc. used for other purposes. Agricultural pools contribute to agriculture, employment, high income, etc. It has a positive effect. The soil it provides can be used in agriculture and the embankments in the fields can be strengthened. Farm ponds help increase soil moisture. These drainage structures also help store excess rainfall, thus preventing floods. Farm ponds dilute soil contaminants. Pond farming is a type of agriculture where two or more crops are grown together on the ground, which is more profitable and suitable for all large farmers (Jakkawad et al., 2020). An agricultural pond is a large pond, usually square or rectangular, dug into the ground that collects rainwater and stores it for future use. It has an inlet that controls the flow and an outlet that drains excess water. There is a small dam around the lake, which prevents erosion of the lake shore. Size and depth depend on the availability of land, type of soil, water needs of farmers, cost of digging and availability of land to be excavated. Water from farm ponds is sent to the fields manually or by both methods. Depending on the size of the land used by farmers, farm ponds vary between 15×15×3 m3, 20×20×3 m3, 25×25×3 m3 and 30×30×3 m3 (Mane et al., 2013). 2015). the effects of agricultural ponds on agricultural land, water and plant relations and farmer health are discussed as the subject of this study.

Sample

Statement of the Problem:

The agricultural sector plays a vital role in the socio-economic fabric of rural communities, particularly in regions like Jaipur. However, despite its significance, there exists a need to

comprehensively understand the socio-economic profile of beneficiary farmers and the factors influencing their livelihoods. The following key issues warrant investigation:

- Demographic Characteristics and Socioeconomic Status
- Income Disparities and Agricultural Practices
- Education, Social Participation, and Income
- Technological Adaptation and Farm Ownership
- Implications for Employment and Household Education
- Relationship of profile of beneficiaries with Technological change

Methodology

Deputy Commissioner (Agriculture), Jothwara, Jaipur has 23 AAO circles. Among them, 4 AAO offices viz. Hingonia, Jobner, Boraj and Bichun were chosen deliberately. From these four AAO selection cycles, a sample of 120 participants was selected proportionally from 234 beneficiaries. Interviews were conducted with the interviewees and data were collected from their families and farms with the help of a systematic approach prepared for this purpose. The collected data were analysed with the help of statistical methods such as frequency and percentage.

Results and Discussion

Demographic Characteristics and Socioeconomic Status

The data given in Table 1 showed that majority of respondent's 58.33 per cent farm pond beneficiary farmers belonged to middle age group, 24.17 per cent farm pond beneficiary farmers belonged to old age group and only 17.50 per cent farm pond beneficiary farmers belonged to young age group. The findings of this study are supported the findings of Kumawat (2015) and Todkar*et al.* (2020).

More discussion here

The data further indicates that majority of farm pond beneficiary farmers were educated up to high school and primary. They were educated up to 19.17 per cent for high school and 20.00

per cent for primary education. Likewise, 10.83 per cent respondents could read and write and as 10 per cent could read only and 10 per cent for graduate level. According to data in Table 2 also explain that 20 respondents 16.66% were educated at middle class level and only 7 respondents were educated as above graduate 5.80% and also 9 respondents 7.50% were illiterate. The findings of this study support the findings of Ingle (2002) Badhala*et al.* (2014).

Further it is observed that majority of respondents *i.e.* 37.50 per cent belonged to the category of members of one organization under social participation, 23.33 per cent respondents were members of more than one organization category, 5.84 per cent of the farm pond beneficiary farmers were office holder in such an organization, only 2.50 per cent respondents were wide public holder and 30.83 per cent farmers were not member of organizations category. The findings of this study support the findings ofMeena (2010), Ahir and Kapse (2017) and Jakkawad*et al*. (2020).

With regards to annual income majority of respondents *i.e.* 77.50 per cent had medium level of annual income. Whereas, 8.34 per cent of respondents had low level of annual income followed by 14.16 per cent with high level of annual income. Thus, it was concluded that majority of the respondents were having medium annual income. The findings of this study supported the findings of Verma (2010).

The data in Table 1 indicated that38.33 per cent farm pond beneficiary farmer were found in small farmer land holding category. Likewise, 30.83 per cent were found in semi-medium land holding category, 13.34 per cent were found in marginal category, whereas 15.00 per cent farm pond beneficiary farmers were found in medium land holding category. Only 2.50 per cent farm pond beneficiary farmers were found in large land holding category. The findings of this study supported by the findings of Rathod (2014), Kumawat (2015) and Todkar*et al.* (2020).

It was observed that majority 44.17 per cent of the beneficiaries had medium farming experience whereas, 27.50 per cent of the beneficiaries had high and 28.33 per cent had low farming experience.The findings of this study were supported by the findings of Kumar *et al.* (2014), Jakkawad*et al*. (2019) and Todkar*et al.* (2020).

It was noted that majority of respondents 23.19 per cent were using PM Kisan App. Whereas, 19.07 per cent of the beneficiary farmers were using Agri App and Kisan Suvidha App

followed by 13.85 per cent beneficiary farmers were using M-Kisan Portal App followed by 12.89 per cent farm pond beneficiary farmers were using of Agri Media Video App and only 11.85 beneficiary farmes were using of IFFCO Kisan App. These results are in line with the result obtained by Meirmanova (2019).

The data given in Table 1 explain that majority of respondents 68.34 per cent had cultivation as the main occupation. Likewise, 10.00 per cent respondents had services + cultivation, 8.33 per cent respondents had business + cultivation, 5.83 per cent respondents had cast occupation + cultivation and only 4.17 per cent respondents had labourer occupation + cultivation, 3.33 per cent had independent profession + cultivation; respectively. The findings of this study supported the findings of Miah *et al.* (2015).

The frequency of use of various sources of information about farm pond technology by respondents in Table 1 revealed that amongst the informal group sources of information, most of the respondents used regular contact to family (42.50 %) followed by neighbours (25.84%). The respondents used sometimes contact with friends and relatives (55.83%) followed by (52.50%) contacted to progressive farmers (52.50%) and never contacted to progressive farmers (36.66%). In case of formal sources, majority of the respondents *i.e.* 48.34 per cent had always contacted with agriculture supervisor. Among them, 56.66 per cent had sometimes contact with private agencies and NGO's. Large majority 42.50 per cent of the respondents had no contact with Village Extension Workers. In case of mass media sources of information 20.84 per cent respondents always watched TV, 58.33 per cent respondents sometimes used TV and 54.16 per cent of them had never used radio, The findings of this study supported by the findings of Todkar*et al*. (2020) and Jakkawad *et al*. (2020).

Table 1: Profile of farm pond beneficiaries

1. Age			
S. No.	**Categories**	**Frequency**	**Per cent**
1	Young age (below 35 years)	21	17.50
2	Middle age (from 35 to 51 years)	70	58.33

3	Old age (above 51 years)	29	24.17
	Total	120	100

2. Education

S.No.	Categories	Frequency	Per cent
1.	Illiterate	09	7.50
2.	Can read only	12	10.00
3.	Can read and write	13	10.87
4.	Primary school	24	20.00
5.	Middle school	20	16.66
6.	High school	23	19.17
7.	Graduate	12	10.00
8.	Above graduate	07	5.80
	Total	120	100

3. **Social participation**

S.No.	Categories	Frequency	Per cent
1	None	37	30.83
2	Member of one organization	45	37.50
3	Member of more than one organization	28	23.33
4	Office holder in such an organization	7	5.84
5	Wide public holder	3	2.50
	Total	120	100

4. Annual income

S. No.	Categories	Frequency	Per cent
1	Low (below ` 126781)	10	8.34
2	Medium(from ` 126781 to ` 472303)	93	77.50
3	High (above ` 472303)	17	14.16
	Total	120	100

5. Land holding

S.No.	Categories	Size of land holding	Frequency	Per cent
1	Landless	0 ha.	00	00.00
2	Marginal farmers	Up to 1.00 ha.	16	13.34
3	Small farmers	1.0 to 2.00 ha.	46	38.33
4	Semi-medium farmers	2.0 to 4.00 ha.	37	30.83
5	Medium farmers	4.0 to 10.00 ha.	18	15.00
6	Large farmers	More than 10.00 ha	03	2.50

	Total		120	100
6. Farming experience				
S.No.	**Categories**	**Frequency**	**Per cent**	
1	Low (below 15 years)	34	28.33	
2	Medium (from 15 to 31 years)	53	44.17	
3	High (above 31 years)	33	27.50	
	Total	120	100	
7. Use of farming App				
S.No.	**Farming Apps**	**Frequency**	**Per cent**	
1.	Agri App	37	19.07	
2.	Agri Media Video App	25	12.89	
3.	IFFCO Kisan App	23	11.85	
4.	M-Kisan Portal	27	13.85	
5.	Kisan Suvidha App	37	19.07	
6.	PM Kisan App	45	23.19	
8. Occupation				
S.No.	**Categories**	**Frequency**	**Per cent**	
1.	Labourer + cultivation	5	4.17	
2.	Caste occupation + cul	7	5.83	
3.	Business + cultivation	10	8.33	
4.	Independent professior	4	3.33	
5.	Cultivation	82	68.34	
6.	Service + cultivation	12	10.00	
	Total	120	100	

9. sources of information

S. No.	***Sources of information**	**Regular**		**Sometime**		**Never**	
1	**Informal sources**	**F**	**%**	**F**	**%**	**F**	**%**
I	Family	51	42.50	54	45.00	15	12.50
II	Neighbours	31	25.84	58	48.33	31	25.83
III	Friends / relatives	14	11.67	67	55.83	39	32.50
IV	Progressive farmers */	13	10.84	63	52.50	44	36.66
2	**Formal sources**						
I	Village Extension Workers	14	11.67	55	45.83	51	42.50
II	Krishimitra	4	3.34	63	56.66	53	40.00
III	Agriculture supervisor	58	48.34	62	51.67	0	00.00

IV	Private agencies / NGO's	4	3.34	68	56.66	48	40.00
V	Scientists	9	7.50	67	55.84	44	36.66
VI	AAO	40	33.34	60	50.00	20	16.66
3	**Mass media**						
I	Newspaper	22	18.34	63	52.50	35	29.16
II	Radio	4	3.34	51	42.50	65	54.16
III	Television	23	19.17	68	56.66	29	24.17
IV	Internet	30	25.00	58	48.34	32	26.66
V	Mobile phone	25	20.84	70	58.33	25	20.83
VI	Farm literature	3	2.50	54	45.00	63	52.50

2.1 Relationship of profile of beneficiaries with Technological change

The values of coefficient of correlation furnished in Table 2 clearly showed that cropping pattern practices was positively and significantly related at 1% level of significance with social participation, annual income, land holding, farming experience and use of farming App. Cropping pattern was positively and significantly related at 5% level of significance with education and sources of information. There was positive and non-significant relationship found between age and occupation with the change in cropping pattern. As the beneficiaries were change prone, more educated which resulted in more social participation, more use of farming App and sources of information due to which adoption of improved cropping pattern also increased. This result indicated that after construction of farm pond the cropping pattern was changed due to availability of water for irrigation. Above findings are in line with Ahire (2000) and Nipanikar (2006).

The values of coefficient of correlation furnished in Table 2 clearly showed that crop productivity was positively and significantly related at 1% level of significance with education, social participation, annual income and use of farming App. Crop productivity was also positively and significantly relatedat 5% level of significance with farming experience, land holding and sources of information. There was positive and non-significant relationship found between occupation with the change in crop productivity. There was negative and non-significant relationship found between age with the change in crop productivity. Above relationship indicated that after construction and using of farm pond most of the crops yield increased due to the increased area under irrigation. It also increased annual income of farmers and they provided more education to their children, also increased social participation with extension workers to get more information about agriculture. The production of most of the crops was found to be increased as compared to the before farm pond. Above findings are in line with Ahire (2000), Nipanikar (2006) and Kulkarni (2009).

The values of coefficient of correlation furnished in Table 2 clearly showed that cropping intensity was positively and significantly related at 1% level of significance with education, social participation, annual income, farming experience and use of farming App. Cropping intensity was positively and significantly related at 5% level of significance with land holding and sources of information. There was positive and non-significant relationship found between age and occupation with the change in cropping intensity. Above findings are supported by the result of Chavai*et al*. (2015).

Table 2. Distribution of relationship of profile of beneficiaries with technology change (cropping pattern, crop productivity and cropping intensity)

S.No.	Independent variables	Cropping pattern 'r' value	Crop productivity 'r' value	Cropping intensity 'r' value
1.	Age	0.133 NS	-0.057 NS	0.107 NS
2.	Education	0.192*	0.251**	0.290**
3.	Social participation	0.431**	0.249**	0.346**
4.	Annual income	0.312**	0.266**	0.309**
5.	Land holding	0.303**	0.196*	0.186*
6.	Farming experience	0.322**	0.224*	0.360**
7.	Use of farming App	0.241**	0.383**	0.248**
8.	Sources of information	0.184*	0.217*	0.196*
9.	Occupation	0.142 NS	0.155 NS	0.163 NS

* = Significant at 0.05 level of probability

** = Significant at the 0.01 level of probability,

2.2 Relationship of profile of beneficiaries with economic change

It was noticed from Table3 clearly showed that employment generation was positively and significantly related at 1% level of significance with education, social participation, annual income, land holding and use of farming App. Employment generation was positively and significantly related at 5% level of significance with farming experience and occupation. There was positive and non-significant relationship found between age with the change in employment generation. Before construction of farm pond respondents cultivated crop only in kharif season but after construction of farm pond they took crop in Rabi and summer season. Hence intensive crop cultivation increased the more number of labourer and

additional employment is generated in the field of agricultureabove findings are in line with Nakhate (2006).

The values of coefficient of correlation furnished in Table 3 clearly showed that annual income was positive and significantly related at 1% level of significance with education, social participation, annual income, land holding and use of farming App. Annual income was positive and significantly related at 5% level of significance with occupation and sources of information. There was positively and non-significant relationship found between farming experience with the change in annual income. There was negative and non-significant relationship found between age and the change in annual income.Above findings are supported by Chavai*et al.* (2015).

Table 3. Distribution of relationship of profile of beneficiaries with employment generation and annual income

S.No.	Independent variables	Employment generation 'r' value	Annual income 'r' value
1.	Age	0.050 NS	-0.143 NS
2.	Education	0.271**	0.317 **
3.	Social participation	0.310**	0.332**
4.	Annual income	0.324**	0.317**
5.	Land holding	0.248**	0.328**
6.	Farming experience	0.180*	0.130 NS
7.	Use of farming App	0.242**	0.297**
8.	Source of information	0.285**	0.181*
9.	Occupation	0.214*	0.191*

* = Significant at 0.05 level of probability

** = Significant at the 0.01 level of probability,

NS = Non-significant

2.3 Relationship of profile of beneficiaries with social change

The values of coefficient of correlation furnished in Table 4 clearly showed that material possession was positively and significantly related at 1% level of significance with education, social participation, annual income and use of farming App. Material possession was positively and significantly related at 5% level of significance with occupation and land holding. There was positively and non-significant relationship found between farming experience and sources of information with the change in material possession. There was

negative and non-significant relationship was found between age and the change in material possession. The findings are supported by Ahire (2000) and Nakhate (2006).

The values of coefficient of correlation furnished in Table 4 clearly showed that education change was positively and significantly related at 1% level of significance with education, social participation, annual income, farming experience and use of farming App. Education change was positively and significantly related at 5% level of significance with land holding, sources of information and occupation. There was negative and non-significant relationship found between age with the change in education. Due to this more yields were obtained from field and sold in the market. Income was available to educate the children with relation to construction of farm pond. Education is inversely propotional to the farm pond for improvement.The findings are supported by Ahire (2000) and Nakhate (2006) and Deshmukh *et al*. (2017).

The values of coefficient of correlation furnished in Table 4 clearly showed that implement possession was positively and significantly related at 1% level of significance with annual income and land holding.Implement possession was positively and significantly related at 5% level of significance with education, social participation, farming experience, sources of information and occupation. There was positive and non-significant relationship found between age and use of farming App with the change in implement possession. After construction of farm pond increased irrigated area result in increased area under cultivation of crops which result increased farm income also they require more implement for farm operation. Hence construction of farm pond results in increase in implement possession of respondents. The findings are supported by Ahire (2000).

Table 4. Distribution of Relationship of profile of beneficiaries with material possession, change in to education of family member and implement possession

S. No.	Independent variables	Material possession 'r' value	Change in education of family member 'r' value	Implement possession 'r' value
1.	Age	-0.100 NS	-0.076 NS	0.040 NS
2.	Education	0.287 **	0.289**	0.232*
3.	Social participation	0.301**	0.262**	0.184*

4.	Annual income	0.237**	0.252**	0.307**
5.	Land holding	0.180*	0.198*	0.274**
6.	Farming experience	0.084 NS	0.294**	0.206*
7.	Use of farming App	0.272**	0.264**	0.157 NS
8.	Sources of information	0.172 NS	0.214*	0.212*
9.	Occupation	0.215*	0.226*	0.226*

* = Significant at 0.05 level of probability
** = Significant at the 0.01 level of probability,
NS = Non- significant

Conclusion

Judging from the entire health history of farmers benefiting from Jaipur, the majority of farmers benefiting from Jaipur are middle-aged (35 to 51 years old) (58.33%). They have primary education (20.00%), farmers are members of a union (37.50%), they have an average annual income of 126781 to 472303 (77.50%), and farmers belong to the smallholder group (38.33%). Moreover, most of the beneficiary farmers (44.17%) have moderate farming experience ranging from 15 to 31 years, (23.19%) farmers use PM Kisan application, (70.00%) farmers use information technology, (68%) 34) considers agriculture as the main business. job. . The relationship between income and technological change shows that there is a positive relationship between education level, social participation, annual income, insured land, agriculture, agricultural practice and knowledge.

Relationship between education, community involvement, annual income, land insurance, use of agricultural farming practices, and beneficiary data showing useful information for job creation and annual income. Agriculture is positively associated with employment creation. The correlation between the profile of the beneficiaries and their social changes shows a positive relationship between the level of education, social participation, annual income, Land and business insurance. There is a significant relationship between the use of agricultural practices and the change in personal property and the education level of family members. Agricultural knowledge and information are important and positively related to changes in household members' education levels and farm ownership.

References

Ahire, R. D. 2000. A study on the consequences of watershed development programme, unpublished Ph.D. Thesis, MAU., Parbhani.

Ahire, R. D. and Kapse, P. S. 2017. Socio-Economic impact of National Initiative on climate Resilient Agriculture (NICRA) Project on its beneficiaries Agresco 2016-2017.

Badhala, B. S., Prakash, P., Yogesh, K. and Joshi, L. K. 2014. Knowledge level of beneficiary and non-beneficiary farmers of gram production technology. *Agriculture Update*, 9(1): 64-66.

Chavai, A.M., Rakshe, U.V. and Shinde, S.B. 2015. Impact of Farm Pond on the beneficiary farmer of Maharashtra. *Indian Journal of Tropical Agriculture,* 33(4): 3525-3528.

Deshmukh, J.M., Hyalij, V.D., Suradkar, D.D. and Badgire, B.B. 2017. Impact assessment of farm pond on Beneficiaries. *International Journal Current Microbiology Applied Science,* 6(9):1712-1717.

Ingle, G. S. 2002. Impact of lift irrigation project on beneficiaries. M.Sc. (Agri.) Thesis submitted to Dr. PDKV, Akola.

Jakkawad, S.R., Sawant, R.C. and Manvar, V.S. 2020. Study on profile and constraints faced by beneficiaries in use of farm pond in Aurangabad district of Maharashtra state. *Journal of Pharmacognosy and Phytochemistry*, 9(4):175-178.

Kulkarni, 2009. Impact of watershed development programme, M.Sc. (Ag.) Thesis (Unpublished) MAU. Parbani.

Kumar, D., Sharma, K.D., Jadoun, Y.S. and Bhadauria. P. 2014. A study on the extension of adoption of sprinkler irrigation system by the farmers in Jhunjhunu district of Rajasthan. *Agriculture Science Digest*, 32(1): 33-37.

Kumawat, R. 2015. Knowledge and attitude of farmers towards recommended production technology of rapeseed and mustard crop in District Tonk (Rajasthan). M.Sc. (Ag.) Thesis, SKNAU,Jobner.

Mane, N.P., Ulemale, D.H. and Thakare, S.S. 2015. A comparative analysis on impact of farm pond's on farmer's economy in Amravati district. *International Research Journal of Agricultural Economic and Statistics*, 6(2): 287-292.

Meena, N.R. 2010. Knowledge and adoption of improved cluster bean production technology by the farmers in Jaipur district of Rajasthan M.Sc. (Ag) Thesis, MPUA&T, Udaipur.

Meirmanova, A. 2019. Mobile application and youth involvement in farming. *Oradea Journal of Business and Economics*, University of Oradea, Faculty of Economics 4(1): 56-64.

Miah, M.M., Afroz, S., Rashid, M.A. and Shiblee, S.A.M., 2015. Factors affecting adoption of improved sesame technologies in some selected areas in Bangladesh: An empirical study. *The Agriculturists*, 13(1): 140-151

Nakhate, S.S. 2006. Impact of SHG on Socio-Economic Development of its Member. M.Sc. (Agri.) Thesis, Marathwada Agriculture University, Parbhani.

Nipanikar, S. S. 2006. Impact of watershed development programme on beneficiaries of Osmanabad district. Unpub. M.Sc. (Agri.) Thesis, MAU, Parbhani.

Rathod, M.K. and Pawar, A.S. 2014. Study of Socio-Economic Condition of Decreased Farmers and Post Suicidal Consequences over their Families. *International Journal Extension Education*, 10**:** 93-98.

Todkar, A.M., Jakkawad, S.R. and Khodake, S.B. 2020. Profile of Bt cotton growers for control of pink bollworm. *Journal of Pharmacognosy and Phytochemistry*, 9 (5): 668-670.

Verma, R.C.2010. Adoption behavior of farmers towards Rice Production Technology in Banswara District of Rajasthan. M.Sc. (Ag.) thesis submitted to MPUAT, Udaipur.