



Evaluating Constraints-Faced by Farmers in the Adoption of Paramparagat Krishi Vikas Yojana in Rajasthan State of India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Among all the states of India, Madhya Pradesh has covered largest area under organic certification, followed by Rajasthan and Maharashtra. Rajasthan state of India is well known for its rainfed areas in which agriculture is a gambler of Indian monsoon and it can act as a potential zone for PKVY. In

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Rajasthan, organic farming is also named as “*Baderaan ki kheti*” which locally means as the type of farming done by their ancestors, but actually it is a traditional approach of farming with modern and scientific way. Government of Rajasthan has also taken an initiative to bring much area under organic farming through Paramparagat Krishi Vikas Yojana (PKVY) in Bikaner District. Hence, in 2015-18 highest numbers of clusters were formed under PKVY. Thus, the study was conducted in Bikaner District of Rajasthan state to delineate the constraints being faced by farmers in adopting the Paramparagat Krishi Vikas Yojana in the state of Rajasthan. The Bikaner district comprises eight *tehsils*. Out of three *tehsils*, namely Nokha, Sridungarhgarh and Bikaner, were selected purposely for the present investigation based on the highest number of registered farmers under PKVY. One village from each selected *tehsil* constituted the sample of the study and PKVY beneficiary farmers were selected purposely using proportionate random sampling method and the non-beneficiary farmers were randomly selected from the same villages to constitute the other half of the sample size. Thus, 180 respondents, *i.e.*, 90 beneficiary and 90 non-beneficiary respondents were included in the present investigation. The data were gathered from 180 respondents through an interview schedule. It was found that the main constraints faced by the farmers in the adoption of PKVY were ‘time consuming process’, ‘lack of literacy among farmers’, ‘low yield during transition period’, ‘lack of knowledge about geo-tagging’ and ‘incentive is too low. This may be because farmers in the study area were not aware about the complete procedure involved in the adoption of PKVY and required more exposure through various extension activities like awareness programmes, trainings, workshops and interactive sessions. Progressive organic farmers who have adopted all the practices of organic farming and have advanced knowledge should be used as referent extension person for increasing the rate of adoption of PKVY.

Keywords: PKVY; organic farming; farmers; adoption; constraints.

1. INTRODUCTION

India is a second most populous country in the world in which agriculture and allied activities are the major source of livelihood. After independence, feeding this huge population was a difficult task and for solving this “Green Revolution” came into existence in which emphasis was given to high production with the help of high yielding varieties and chemicals. However, as time passed, excessive use of chemicals had negative impact on the ecosystem comprising soil, environment and human health. It is now discernible that with the injudicious use of chemicals, soil becomes less fertile, productivity decreases and the presence of chemical residues in the crop, which is eaten by the humans gets transferred to human body resulting in different diseases. After realizing these consequences organic farming came into existence. “Organic farming can be defined as the crop production, animal rearing and other products without using the synthetic chemical fertilizers, herbicide, insecticide-pesticides, transgenic species or antibiotics and growth-enhancing steroids, or other chemicals” [1]. “Hence, organic farming is in a nascent stage in India, about 2.78 million hectare of farmland was under organic cultivation as of March 2020, according to the Union Ministry of Agriculture and Farmers’ Welfare. This is two per cent of

the 140.1 million ha net sown area in the country. India’s top three states namely Madhya Pradesh, Rajasthan and Maharashtra account for almost half of the area under organic cultivation. Even the top three states with the largest area under organic cultivation are Madhya Pradesh, Rajasthan and Maharashtra, *i.e.* 4.9, 2.0 and 1.6 per cent of their net sown area under organic farming” [2].

Considering the existing potential and future demand of organically produced food products, which is now a sunrise sector, Government of India is also making immense efforts. Therefore, to promote organic farming, a centrally sponsored scheme was initiated by the government in the year 2015 all over the country. This scheme is called as Paramparagat Krishi Vikas Yojana (PKVY), it is a sub-component of Soil Health Management Scheme (SHM) under the National Mission of Sustainable Agriculture (NMSA), which aims at supporting and promoting organic farming, in turn resulting in improvement of soil health. Under PKVY, hilly areas and rainfed areas were selected as the remote sensing areas due to less uses of chemicals. The funding pattern under the scheme is in the ratio of 60:40 by the Central and State Governments, respectively. In the case of North Eastern and the Himalayan States, Central Assistance is provided in the

ratio of 90:10 (Centre: State). At the State level, the State Department of Agriculture and Cooperation has been implementing the scheme with the involvement of Regional Councils that are registered under the PGS-India Certification Programmes. Thus, realizing the importance of *Paramparagat Krishi* in the field of agriculture, the present study was conducted with the objective to delineate the constraints being faced by farmers in adopting the Paramparagat Krishi Vikas Yojana in the state of Rajasthan.

2. METHODOLOGY

The present study was conducted in Bikaner district of Rajasthan state which was purposely selected for the present investigation on the basis of largest number of clusters formed under PKVY during 2015-18. Three *tehsils* namely Nokha, Sridungarhgarh and Bikaner were purposely selected for the present investigation on the basis of highest number of registered farmers under PKVY. Selection of respondents was based on proportionate random sampling from a comprehensive village list of farmers registered as PKVY beneficiaries from the *Panchayat Samiti*, Bikaner, Rajasthan. To constitute the other half of sample size same number of farmers were also selected randomly from the same villages who have not registered in PKVY to act as control sample. Thus, a total of 180 respondents *i.e.* 90 beneficiary and 90 non-beneficiary respondents were included in the present investigation. A close ended interview schedule was used for data collection. The pre-testing of the interview schedule was carried out with 25 non-sampled respondents who were not included in the study. The personal interview technique was adopted for the collection of data. Analysis of the data was done with the help of different statistical tools like mean percent score, rank correlation and t-test [3].

3. RESULTS AND DISCUSSION

The merriam-webster dictionary meanings of constraints are 'confinement', the exercise to determine or 'confine action', 'bound' and 'faltered condition', restriction of liberty or of free action. To measure the constraints responsible for hindering the adoption of PKVY by the respondents, a schedule was developed. For the present study, all the possible constraints being faced by the beneficiary and non-beneficiary farmers were grouped into five

major categories *viz.* general, socio-personal & psychological, production, marketing and financial constraints. In order to study various types of constraints, the respondents were asked to give their response on three point continuum. Based on scores in each category of constraint mean percent score was calculated for each dimension.

General constraints: The data in Table 1 reveals that general constraints *viz.* 'time consuming process' (82.59 MPS) was ranked first by the beneficiary respondents, followed by 'less affordability' (71.85), 'previously used chemicals affect soil very badly' (70.37 MPS), 'lack of institutional support' and 'non-availability of agriculture supervisor, AAO, AO' (62.22 MPS) ranked second, third, fourth and fifth, respectively. Whereas, in case of non-beneficiary farmers the first rank was assigned for 'time consuming process' (87.40 MPS), followed by 'previously used chemicals affect the soil badly' (80.74 MPS), 'lack of institutional support' (65.18 MPS), 'less affordability' (64.44 MPS) and 'non-availability of agriculture supervisor, AAO, AO' (37.77 MPS) were ranked second, third, fourth, and fifth, respectively. For overall respondents 'time consuming process' got first rank with 84.99 MPS, followed by 'previously used chemicals affect the soil badly' (75.55 MPS), 'less affordability' (68.14 MPS), 'lack of institutional support' (63.70 MPS), 'non-availability of agriculture supervisor, AAO, AO' (36.29 MPS) were ranked second, third, fourth and fifth, respectively.

The value of calculated rank correlation (r_s) was 0.70 which was non-significant, leading to conclusion that there was a similarity in rank assignment pattern of general constraints of beneficiary and non-beneficiary farmers in adopting PKVY, though there was a difference in the magnitude of MPS of beneficiary and non-beneficiary farmers. Thus, from the above findings it may be concluded that majority of the respondents reported that 'time consuming process' and 'previously used chemicals affect the soil very badly' were the major constraints faced by the respondents. This probably happened because farmers in the study area lacked knowledge on PGS certification process. The findings are in line with the findings of Sihare [4] and Sahani *et al.* [5] who concluded that major constraints faced by the farmers were organic farming is time consuming process and infrastructural constraint.

Table 1. Ranking of Items under General Constraints

S. No.	General Constraints	Respondents					
		Beneficiary Respondents(n=90)		Non-beneficiary Respondents (n=90)		Overall Respondents (N =180)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Time consuming process	82.59	I	87.40	I	84.99	I
2.	Previously used chemicals affect soil very badly	70.37	III	80.74	II	75.55	II
3.	Lack of institutional support	62.22	IV	65.18	III	63.70	IV
4.	Less affordability	71.85	II	64.44	IV	68.14	III
5.	Non-availability of Agricultural supervisor, AAO, AO	34.81	V	37.77	V	36.29	V
	Pooled	64.36	$r_s = 0.70$	67.10	$t = 1.73^{NS}$	65.73	

r_s= Rank Correlation; MPS= Mean Percent Score; NS = Non Significant

Table 2. Ranking of Items under Socio-personal and Psychological Constraints

S. No.	Socio-personal and Psychological Constraints	Respondents					
		Beneficiary Respondents (n= 90)		Non-beneficiary Respondents (n= 90)		Overall Respondents (N= 180)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Lack of awareness about PKVY	80.75	I	86.29	III	83.51	II
2.	Lack of encouragement	64.81	IV	66.66	IV	65.73	IV
3.	Lack of literacy among farmers	78.15	II	91.11	I	84.63	I
4.	Lack of interest in organic farming	68.15	III	88.89	II	78.52	III
5.	Lack of support from family members	50.00	V	39.25	V	44.62	V
	Pooled	68.37	$r_s = 0.70$	74.44	$t = 1.73^{NS}$	71.40	

r_s= rank correlation; MPS= Mean Percent Score; NS= Non Significant

Socio-personal and psychological constraints: The data in Table 2 depicts that major constraints faced by beneficiary farmers were 'lack of awareness about PKVY' (80.75 MPS) which was ranked first, followed by 'lack of literacy among farmers' (78.15 MPS), 'lack of interest in organic farming (68.15 MPS) was ranked second and third, respectively, 'lack of encouragement' (64.81 MPS) was ranked fourth and 'lack of support from family members' (50.00 MPS) was at last position.

Further, examination of the Table 2 reveals that the major constraints perceived by the non-beneficiary respondents were 'lack of literacy among farmers' (91.11 MPS) which was ranked first, followed by 'lack of interest in organic farming (88.89 MPS) was ranked second, 'lack of awareness about PKVY' (86.29 MPS) ranked third, 'lack of encouragement' (66.66 MPS) ranked fourth and 'lack of support from family members' (39.25 MPS) was ranked fifth, respectively.

If we look at the data in Table 2 irrespective of beneficiary and non-beneficiary respondents, data reveals that major constraints perceived by the overall respondents were 'lack of literacy among farmers' (84.63 MPS), followed by 'lack of awareness about PKVY' (83.51 MPS) ranked first and second, respectively. While, 'lack of interest in organic farming' (78.52 MPS) was ranked third and lack of encouragement' (65.73 MPS) was ranked fourth, respectively. The constraint viz. 'lack of support of family members' (44.62 MPS) was perceived least important by the overall respondents in the study area as they had assigned last rank to this constraint. Here, the value of calculated rank correlation (r_s) was 0.70 which was non-significant, leading to conclusion that there was a similarity in rank assignment pattern of socio-personal and psychological constraints faced by beneficiary and non-beneficiary respondents in adopting PKVY, though there was a difference in the magnitude of MPS of beneficiary and non-beneficiary farmers. The findings are in accordance with the findings of Naik [6], Barik [7], Modak [8] and Kumar & Keerthana [9] who reported major constraints faced by the organic farmers were lack of support from family members, lack of knowledge regarding organic farming practices, no knowledge about organic scheme and lack of information regarding organic farming.

Production Constraints: The data in Table 3 illustrates that major constraints faced by

beneficiary farmers were 'low yield during transition period (85.18 MPS) which was ranked first, followed by 'weed problem because no chemical is used' (80.74 MPS), 'non-availability of labour' (50.00 MPS), 'non-availability of raw material for organic farming' (47.77 MPS) ranked second, third and fourth, respectively and non-availability of organic seeds (33.70 MPS) was ranked fifth at last position. Further, Table 3 reveals that the major constraints perceived by the non-beneficiary respondents were 'low yield during transition period' (89.62 MPS) which was ranked first, followed by 'weed problem because no chemical is used' (82.22 MPS), 'non-availability of raw material for organic farming' (50.75 MPS), 'non-availability of labour' (49.62 MPS) ranked second, third and fourth, respectively and non-availability of organic seeds (37.03 MPS) was ranked fifth at last position.

If we look at the data in Table 3 irrespective of beneficiary and non-beneficiary respondents, data presents that major constraints perceived by the overall respondents were 'low yield during transition period' (87.40 MPS) which was ranked first, followed by 'weed problem because no chemical is used' (81.48 MPS), 'non-availability of labour' (49.81 MPS), 'non-availability of raw material for organic farming' (48.51 MPS) was ranked second, third and fourth, respectively and non-availability of organic seeds (35.36 MPS) was ranked fifth at last position. The value of calculated rank correlation (r_s) was 0.90 which was positive and significant at one per cent level of significance, leading to conclusion that there was a similarity in rank assignment pattern of production constraints of beneficiary and non-beneficiary farmers in adopting PKVY, although there was a difference in the values of MPS of beneficiary and non-beneficiary respondents. Thus, from the above findings it may be concluded that majority of the respondents reported that 'low yield during transition period' and 'weed problems because no chemical is used' were the major constraints. The findings are in line with the findings of Sasidharan [10], Chandawat *et al.* [11] and Gurung & Choubey [12] who found that less yield in initial years was the major constraint perceived by organic farmers. The findings are contradictory with the findings of Priyanka *et al.* [13] who revealed that the major constraint faced by the cent per cent of the organic growers was labour problem. Oluwatosin and Ogunkanam [14] also depicted that very few respondents reported low yield after using organic manure.

Table 3. Ranking of Items under production constraints

S. No.	Production Constraints	Respondents					
		Beneficiary Respondents (n= 90)		Non- beneficiary Respondents (n= 90)		Overall Respondents (N= 180)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Non-availability of organicseeds	33.70	V	37.03	V	35.36	V
2.	Weed problems becauseno chemical is used	80.74	II	82.22	II	81.48	II
3.	Non-availability of labour	50.00	III	49.62	IV	49.81	III
4.	Non-availability of raw material for organic farming	47.77	IV	50.75	III	48.51	IV
5.	Low yield during transitionperiod	85.18	I	89.62	I	87.40	I
	Pooled	59.47	$r_s = 0.90$	61.84	$t = 3.55^{**}$	60.51	

r_s= rank correlation; MPS= Mean Percent Score; ****Significant at 0.01 level of probability

Table 4. Ranking of Items under Marketing Constraints

S. No.	Marketing Constraints	Respondents					
		Beneficiary Respondents (n= 90)		Non-beneficiary Respondents (n=90)		Overall Respondents (N =180)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Non-availability ofnearby market	69.26	III	75.55	III	72.40	III
2.	Lack of transportationfacility	63.70	IV	62.96	V	63.33	IV
3.	Lack of storage facility	49.25	VI	58.51	VI	53.88	VI
4.	Lack of consumeravailability	54.07	V	65.56	IV	59.81	V
5.	Lack of knowledge about geo-tagging	84.07	I	90.37	II	87.22	I
6.	Lack of awarenessabout PGS certification	80.74	II	91.48	I	86.11	II
	Pooled	66.85	$r_s = 0.89$	74.07	$t = 4.04^{**}$	70.46	

r_s= rank correlation; MPS= Mean Percent Score; ****Significant at 0.01 level of probability

Marketing constraints: The data in Table 4 depicts that major constraints perceived by the beneficiary respondents under marketing constraints category were 'lack of knowledge about geo-tagging' (84.07 MPS) ranked first, followed by 'lack of awareness about PGS certification (80.74 MPS) second, 'non-availability of nearby market' (69.26 MPS) ranked third and 'lack of transportation facility' (63.70) ranked fourth, 'lack of consumer availability' (54.07 MPS) ranked fifth and 'lack of storage facility' (49.25 MPS) ranked sixth, respectively. The data in Table 4 also presents that major constraints perceived by the non-beneficiary respondents were 'lack of awareness about PGS certification' (91.48 MPS) ranked first, followed by 'lack of knowledge about geo-tagging' (90.37 MPS) ranked second, 'non-availability of nearby market' (75.55 MPS) ranked third, 'lack of consumer availability' (65.56 MPS) ranked fourth, 'lack of transportation facility' (62.96 MPS) ranked fifth and 'lack of storage facility' (58.51 MPS) ranked sixth, respectively.

Further, Table 4 also depicts that major constraints faced by the overall respondents were 'lack of knowledge about geo-tagging' (87.22 MPS) ranked first, followed by 'lack of awareness about PGS certification (86.11 MPS) second, 'non-availability of nearby market' (72.40 MPS) ranked third and 'lack of transportation facility' (63.33 MPS) ranked fourth, 'lack of consumer availability' (59.81 MPS) ranked fifth, respectively. The constraint which was perceived least important by the overall respondents was 'lack of storage facility' (53.88 MPS) as they had assigned last rank to this constraint. Here, the value of calculated rank correlation (r_s) was 0.89 which was positive and significant at one per cent level of significance, leading to conclusion that there was a similarity in rank assignment pattern of marketing constraints of beneficiary and non-beneficiary farmers in adopting PKVY, though there was a difference in the magnitude of MPS of beneficiary and non-beneficiary farmers. The findings are supported by the findings of Sasidharan [10], Chandawat *et al.* [11] and Saran & Sharma [15] who concluded that certification facility and lack of transportation facility were the major constraints faced by the organic farmers but the findings are contradictory with the findings of Sihare [4] who reported that lack of awareness about PGS certification was the major constraint experienced by the organic

farmers in the adoption of organic farming.

Financial constraints: The data in Table 5 reveals that major constraints perceived by the beneficiary respondents were 'incentive is too low' (82.96 MPS) which was ranked first, followed by 'high labour charges' (66.29 MPS) second, 'no subsidy on organic fertilizer or pesticides' (65.18 MPS) ranked third and 'slow payment under contract' (62.96 MPS) ranked fourth, 'no special provision for PKVY under crop loan' (56.29 MPS) ranked fifth and 'lack of credit facility' (35.56 MPS) ranked sixth, respectively. The data in Table 5 also indicates that major constraints faced by the non-beneficiary respondents were 'incentive is too low' (87.40 MPS) ranked first, followed by 'no subsidy on organic fertilizer or pesticides' (81.48 MPS) ranked second, 'no special provision for PKVY under crop loan' (80.00 MPS) ranked third, 'high labour charges' (68.14 MPS) ranked fourth, 'slow payment under contract' (66.67) ranked fifth and 'lack of credit facility' (38.51 MPS) ranked sixth, respectively.

Further, Table 5 also depicts that major financial constraints faced by the overall respondents were 'incentive is too low' (85.18 MPS) which was ranked first, followed by 'no subsidy on organic fertilizer or pesticides' (73.33 MPS) ranked second, 'no special provision for PKVY under crop loan' (68.14 MPS) ranked third, 'high labour charges' (67.21 MPS) ranked fourth, 'slow payment under contract' (64.81 MPS) ranked fifth and 'lack of credit facility' (37.03 MPS) was perceived least important by the overall respondents in the study area as they had assigned last rank to this constraint. Here, the value of calculated rank correlation (r_s) was 0.71 which was positive and significant at five per cent level of significance, leading to conclusion that there was a similarity in rank assignment pattern of financial constraints of beneficiary and non-beneficiary farmers in adopting PKVY, though there was a difference in the magnitude of MPS of beneficiary and non-beneficiary farmers. The findings are in line with the findings of Sahani *et al.* [5] and Kumar & Keerthana [9] who concluded that organic farming is more labor intensive than conventional farming. The findings are contradictory with the findings of Barik [7] and Kaaliranjan & Supriya [16] who found that lack of credit facilities was the major constraint faced by the farmers in the adoption of organic farming technologies.

Table 5. Ranking of Items under Financial Constraints

S. No.	Financial Constraints	Respondents					
		Beneficiary Respondents (n= 90)		Non-beneficiary Respondents (n=90)		Overall Respondents (N =180)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Incentive is too low	82.96	I	87.40	I	85.18	I
2.	High labour charges	66.29	II	68.14	IV	67.21	IV
3.	Slow payment under contract	62.96	IV	66.67	V	64.81	V
4.	No subsidy on organic fertilizers or pesticides	65.18	III	81.48	II	73.33	II
5.	No special provision for PKVY under crop loan	56.29	V	80.00	III	68.14	III
6.	Lack of credit facilities	35.56	VI	38.51	VI	37.03	VI
	Pooled	61.54	$r_s = 0.71$	70.37	$t = 2.02^*$	65.95	

r_s= rank correlation; MPS= Mean Percent Score; * = Significant at 0.05 level of probability

4. CONCLUSION

The study, concluded that the most important constraints faced by the respondents in the adoption of PKVY were 'time consuming process', 'lack of literacy among farmers', 'low yield during transition period', 'lack of knowledge about geo-tagging' and 'incentive is too low'. For mitigating these constraints, some distance education programmes on organic farming under PKVY and farmer's field schools for the young & middle aged farmers can be organized by the State Agriculture Department so that they can realize the advantages of organic farming for future reference also. Initial three years duration is necessary for initiating certified organic farming under PKVY as excessive use of chemicals reduces the organic matter in soil, but if the farmers start growing organic produce on barren land and can somehow increase the organic matter in less time so there should be some provision under PKVY by which farmers can apply for organic certification of their land at early stage. There is a need to felicitate progressive organic farmers at farmer's fairs/events by which other farmers who are unaware about PKVY can become aware and feel motivated for adopting organic farming. Incentives under PKVY may also be increased by the central or state government to increase the rate of adoption of PKVY.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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