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Constraints Perceived in Adoption of Landraces by the Beneficiaries of Global Environment Facilities Project

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ABSTRACT

This study was undertaken in Rajasthan state to delineate the constraints perceived in adoption of landraces by the selected 113 beneficiaries of project funded by Global Environment Facilities (GEF). Results revealed that high labour charges, natural calamities, unavailability of latest technology at village level and unavailability of proper storage place were perceived as most severe constraints. Correlation analysis of socio-economic antecedents with constraints revealed that strong and positive correlation was found between technological constraints and occupation. Financial constraints had significant and negative correlation with occupation, while significant and positive correlation with social participation. Storage constraints were strongly and positively associated with caste whereas strongly and negatively associated with income. General constraints had significant positive correlation with occupation, land-holding and income.

Keywords: Constraints, Landraces, Adoption, Socio-economic, GEF

INTRODUCTION

Agriculture is the primary source of livelihood for majority of country's population. This sector contributes 18.3 percent of GDP (Anonymous, 2023). During crop year 2019-20, food grain production was estimated to reach a record figure of 295.67 million tons (MT) (Anonymous, 2020). If we see in the context of production to productivity, we can see the clear-cut difference that the land has potential to grow more but somehow our farmers are not able to harness that potential due to lack of adoption of innovative technology and recommended package of practices. Government of India and ICAR is taking many initiatives to enhance the rate of adoption and trying to bridge the gap between what is and what ought to be. Technology dissemination and facilitation in adoption is a key activity, institutions which are playing major role in dissemination of technologies in India are ICAR, State Agriculture Universities (SAUs), State Agricultural Departments, KVKs, NGOs etc. Among these agencies, State agricultural universities (SAUs) are the main functionaries, responsible for the dissemination of new techniques by providing area specific recommendations, on and off farm research and by suggesting various package of practices (POPs).

Agriculture University Jodhpur is also implementing many research projects which are helping in the dissemination of recommended package of practices and developing area specific interventions for well-being of farming community. Out of them one project entitled "Mainstreaming agricultural biodiversity conservation and utilization in agricultural sector to ensure ecosystem services and reduce vulnerability" funded by UN Environment-Global Environment Facilities (GEF) is being implementing by Agriculture University, Jodhpur with the collaboration of CAZRI (Central Arid Zone Research Institute) and GRAVIS (Gramin Vikas Vigyan Samiti) under the guidance of

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ICAR, New Delhi. The main focus of the project is to mainstream the conservation and use of agricultural biodiversity for the resilience in agriculture, sustainable production to improve livelihood and to access the advantage sharing capacity of the farmer communities. The GEF project is being implemented in three districts of Rajasthan namely; Barmer, Jodhpur and Jaisalmer. Three types of villages were selected as per the letter of agreement (LOA) i.e. Core, Buffer and Control. The farmers of the core villages are considered as ultimate beneficiaries for the implementation of the project. Those farmers who voluntarily came forward to conduct performance trials of the selected landraces on their farms were named as Champion farmers. Three types of demonstrations were conducted namely Mother trails (MT), Baby trails (BT) and Seed multiplication trails (SMT) on the farms of selected farmers. The seeds of the landraces were collected from across the state and distributed to champion farmers of each selected village. The champion farmers cultivated the seeds of landraces on their farms under technical guidance of Agriculture University, Jodhpur to evaluate the performance in the selected area. Performance of the landraces is evaluated based on the different preferences of the farmers and their productivity. Hence, under this project a study had been conducted to delineate constraints faced by the beneficiary farmers of the project in adoption of recommended cultivation practices from field preparation to storage in all Kharif crops i.e. Moongbean, Mothbean, Sesame and Pearlmillet. The purpose of the study was to know the areas where farmers are facing problems so that with the help of extension activity, technical backup and some govt. policies we can ameliorate the problems which are hindering the rate of adoption and ultimately leading to the low productivity.

MATERIALS AND METHODS

The present study was conducted in Rajasthan state of India. Rajasthan was purposively selected because this research was carried out under the project entitled "Mainstreaming agricultural biodiversity conservation and utilization in agricultural sector to ensure ecosystem services and reduce vulnerability" funded by Global Environment Facilities (GEF), which is being implemented in the state. This project is implemented in three districts of western Rajasthan namely Jodhpur, Barmer and Jaisalmer. Out of these three districts two districts namely Jodhpur and Barmer were purposively selected for the study due to the fact that majority of project's beneficiaries belong to these districts. The project was implemented in only two tehsils of selected districts namely Osian - Jodhpur and Chohtan – Barmer. Hence, these tehsils were purposively selected for this study. The project implemented in the four core villages of selected tehsils, namely; Mansagar and Govindpura - Osian, Jodhpur and Dhok and Dhirasar - Chohtan, Barmer for implementation of selected project interventions. Therefore, these villages were selected purposively for the present study. A complete list of the project beneficiaries among the selected villages was collected from the project office and all beneficiaries who were selected in the initiation year of the project and were benefitted by kharif crops (Moongbean, Mothbean, Sesame and Pearl millet), were selected as respondents for the data collection. Hence, a total number of 113 farmers from selected villages were sort listed based on preset criteria which constituted the sample for the study.

The cross-sectional research design was applied in the present study. It was used for fact-finding with adequate interpretation. For the study, a face-to-face interview method by using an interview schedule was adopted. The schedule was first prepared in English and then translated to Hindi (native language) and then back to English to verify the consistency and content. Initially, information about perceived constraints was obtained to prepare the interview schedule through conducting focused group discussions, farmer scientist interactions, and first-hand information from the field visits during project activities. The constraints were conscripted in the consultation with subject matter specialists of Agriculture University, Jodhpur and the project staff. The listed constraints were categorized under four categories *viz.* technical, financial, storage and general constraints. In interview schedule responses were collected on three continuums viz. Most severe, severe and least severe and the scores of 3, 2 and 1 were awarded to them, respectively. To analyse the collected data, the total number of a constraint were summed up and they divided by total number of respondents to obtain the mean per cent score. The constraints were than ranked in descending order on the basis of mean per cent score. For getting the

constraint score of an individual respondent, the scores of all the constraints that the individual faced were summed up.

Further, correlation analysis was done to investigate the relationship between various socio-economic attributes of farmers and different types of constraints. The purpose of this analysis was to determine the extent to which these attributes are associated with the mentioned constraints. Positive and negative correlations were assessed, and the implications of these findings were discussed within the context of their research objectives.

RESULTS AND DISCUSSION

The results presented in the Table 1, reveals that among the technical constraints; unavailability of latest technology at village level was found to be most severe, followed by lack of knowledge about plant protection measures, inadequate knowledge of agriculture functionaries and lack of technical guidance, respectively. Lack of knowledge about spacing was observed least severe constraint based on their MPS. These findings are in accordance with the findings of Patodiya and Sharma (2014) and Das (2012).

Table 1: Distribution of respondents according to technical constraints (n=113)

S.No.	Technical constraints	MPS	Rank
1	Lack of technical guidance	58.33	IV
2	Inadequate knowledge of agriculture functionaries	70.00	III
3	Unavailability of latest technology at village level	74.67	I
4	Lack of knowledge about plant protection measures	71.67	II
5	Lack of knowledge about spacing	51.00	V

The data in Table 2 shows the financial constraints of the respondents, among which; high labour charges were found most severe followed by high cost of equipment, high cost of insecticides and pesticides and high cost of fertilizers, respectively. Moreover, lack of credit facility in the area was observed least affecting constraint. These findings are similar with the findings of Sharma *et al.* (2020) and Bheemudada and Natikar (2016).

Table 2: Distribution of respondents according to financial constraints (n=113)

S.No.	Financial constraints	MPS	Rank
1	High labour charges	80.33	I
2	Lack of credit facility in the area	69.00	V
3	High cost of equipment's	76.67	II
4	High cost of insecticides & pesticides	74.00	III
5	High cost of fertilizers	71.33	IV

This part includes several aspects which are related to the storage of the produce. Each aspect is assigned with a particular rank and data in this regard are presented in Table 3. The Table 3 revealed that most affecting constraint was unavailability of proper storage place which was followed by inaccessibility to fumigants for storage. Constraint related to unavailability of storage bags and high losses during storage were ranked 3rd and 4th, respectively. Lack of technical knowledge about storage was found to be least severe constraint. Findings of the study are in conformity with the findings of Jakkawad *et al.* (2017).

Table 3: Distribution of respondents according to Storage constraints (n=113)

S.No.	Storage constraints	MPS	Rank
1	Lack of technical knowledge about storage	57.67	V
2	Inaccessibility to fumigants for storage	66.67	II
3	Unavailability of proper storage place	68.33	I
4	Losses during storage	62.00	IV
5	Unavailability of storage bags	64.33	III

The results in Table 4 revealed general constraints of the respondents, constraints about natural calamities were found most severe; which is followed by resource poor farmers, lack of transportation facilities due to lack of pucca road and fragmented and undulated land, respectively. Lack of motivating agencies in the area is the least affecting constraint. These findings are in accordance with the findings of Iyagbe *et al.* (2017) and Parsa *et al.* (2014).

The data in Figure 1 reveals that among four categories of constraints the financial constraints were perceived with the highest intensity by the respondents; followed by general and storage constraints. Technical constraints were perceived with the least intensity and found to be least severe.

Table 4: Distribution of respondents according to general constraints (n=113)

S.No.	General constraints	MPS	Rank
1	Natural calamities	75.67	I
2	Fragmented and undulated land	64.33	IV
3	Resource poor farmers	70.67	II
4	Lack of motivating agencies in the area	58.33	V
5	Lack of transportation facilities due to lack of pucca road	67.00	III

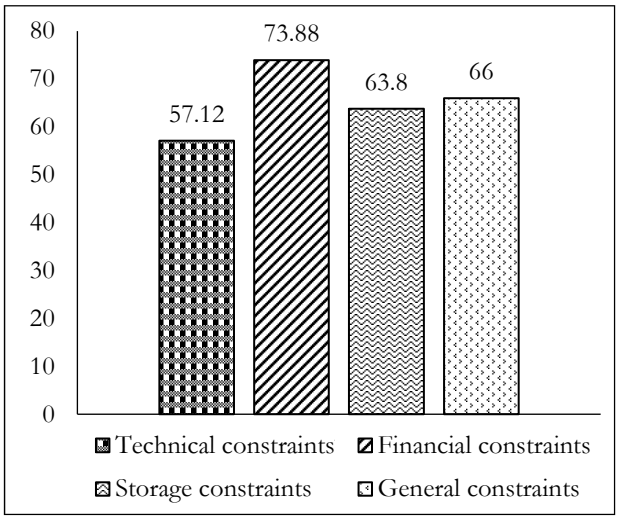

Figure 1: Relative position of different categories of constraints (n=113)

The Table 5 represents the results of a correlation analysis that explores the relationship between various socio-economic attributes of farmers and their constraints in adopting landraces. The interpretation of Table 5 shows that negative correlation coefficients for Age (-.068), Family type (-.059), Education (-.082) and Social participation (.057) indicate a weak negative association with constraints in adopting landraces. This means that as these attributes increase, the constraints decrease, and vice versa.

The positive correlation coefficients for Caste (.0202*), Occupation (.194*), Land holding (.106) suggest a weak positive association with constraints in adopting landraces. This means that as these attributes increase, the constraints also increase, and vice versa.

The highest correlation coefficient is seen between Storage Constraints and Caste (.202*), which is significant at the 0.05 level. This suggests a moderate positive association between Caste and Storage constraints, which means that farmers belonging to certain castes face more storage constraints in adopting landraces.

Similarly, the highest correlation coefficient is observed between General constraints and Income (.237**), which is significant at the 0.01 level. This indicates a moderate positive association between Income and General constraints, which means that farmers with higher income face more general constraints in adopting landraces.

Overall, this analysis highlights the importance of socio-economic attributes in understanding the constraints faced by farmers in adopting landraces. The findings can be used to design interventions and policies that address the specific constraints faced by farmers belonging to different socio-economic groups.

Table 5: Correlation analysis of socio-economic attributes with constraints (n=113)

Antecedents	Technological constraints	Financial constraints	Storage constraints	General constraints
Age	-.068	-.141	-.040	-.153
Caste	.011	.021	.202*	.107
Family type	-.059	.049	.078	-.073
Occupation	.194*	-.172*	.043	.158*
Education	-.082	.049	.111	.062
Land holding	.106	.103	-.098	.218*
Income	-.073	.025	-.230**	.237**
Social participation	.014	.162*	.081	-.057

*. Correlation is significant at the 0.05 level (1-tailed); **. Correlation is significant at the 0.01 level (1-tailed).

CONCLUSION

We can conclude by saying that financial constraints were the major hindrance in the adoption of landraces as perceived by the farmers. General and storage constraints were also acting as roadblocks in the adoption. High labour charges, natural calamities, unavailability of latest technology at village level and unavailability of proper storage place were found to be most severe constraints in the adoption. The new agricultural technologies are considered to be the prime mover to the process of agricultural development in India. Understanding farmers' perceptions of a given technology is crucial in overcoming the challenges and increasing rate of adoption of any technology. The present study highlights the need of extension organizations boosting their different programs to improve farmer adoption rates. Researchers, state agricultural department personnel, extension agencies, and commercial firms should consider the constraints expressed for non-adoption of recommended package of practices in order to better align their infrastructure for higher adoption of recommended technology for maximum production. Farmers should be given proper direction and awareness through practical skill-oriented training, field visits, field demonstrations, and other extension literatures. To avoid technological failures, farmers must be included as much as possible in the technology development process as well as in productivity enhancement strategies. Likewise, to get rid of financial constraints, it is suggested that rural regional banks and cooperative societies should come forward and help the poor farmers by providing loans and other financial assistance.

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