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Analyzing the Usefulness of Demonstration Plots as Perceived by the Farmers in District Faisalabad, Pakistan

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ABSTRACT

Agricultural extension is the driver of motivation of farmers towards the adoption of agricultural innovations. Therefore, different extension methods are employed to enhance the effectiveness of extension services and bring change in farmers' behaviour. In this study, an attempt is made to explore the use of demonstration plots as perceived by the farmers in district Faisalabad. In this study, a total of 130 randomly selected farmers, five Agriculture Officers (AOs) and five Field Assistants (FAs) participated. From the farmers, data were collected through face-to-face interview techniques on a structured and validated interview schedule whereas from the extension field staff, the data were collected on an interview guide. Quantitative data were analysed using Statistical Package for Social Sciences (SPSS) and qualitative data were analysed using a content analysis approach. Qualitative results indicated that the demonstration plots helped farmers to change their behaviour from a traditional farming approach to a modern approach of farming for more production and profits. Group discussion, method and result demonstration methods were focused areas while demonstrating technologies at the demonstration plot. Farmers found demonstration plots useful for the reasons of being active, cooperation from the extension staff, equal treatment to the farmers, participation of farmers in group meetings, enhanced learning and motivating farmers to adopt the latest technologies. Considering the usefulness, there is a need to enhance the number of demonstration plots. More research studies are also recommended to be conducted in other districts of the Punjab s well to investigate the further room for improvement and strengthen the extension services for farmers.

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INTRODUCTION

Demonstration plots are plots of land where farmers can experiment with new agricultural technologies under the guidance of an extension agent. These plots are typically located in the same village where participating farmers reside, as the soil and climate conditions are likely to be similar to what the farmers are used to. In contrast, field days are often held further away from the farmers' communities, where the local conditions may be different and unfamiliar. As the benefits of agricultural technologies can vary depending on local conditions, farmers are more likely to gain valuable

knowledge about the profitability of new technology from demonstration plots located in their communities (Duflo *et al*., 2008; Marenya and Barrett, 2009; Suri 2011).

Demonstrations conducted directly on the farm or ranch are especially significant for introducing technologies that demand a significant change from the current methods being used in the farming operation (Miller and Cox, 2006). Demonstration plots are an effective method for disseminating technology to farmers and promoting agricultural development. The insights gained from constructing demonstration zones that prioritize innovation can provide practical guidance for other countries seeking to achieve Sustainable Development (Wang *et al*., 2020). These plots are typically set up in rural areas and showcase new technologies, techniques, and best practices that can improve yields, increase profits, and enhance sustainability (Sseguya *et al*., 2021). Farmers can visit these plots, observe the technology in action, and learn from experts and fellow farmers about how to implement the technology in their fields. In addition to gaining knowledge about profits, farmers also learn about improving their production processes, such as the most efficient use of resources. In a study by Conley and Udry (2010), farmers focused on one aspect of new technology: the optimal amount of fertilizer to use for pineapple, which was a new crop in the region. However, often technologies involve adjusting and learning about multiple production aspects, as demonstrated in studies by Beaman *et al*. (2013), Bulte *et al*. (2014), Emerick *et al*. (2016), Mponela *et al*. (2016), and Nourani (2019).

Farooq *et al*. (2007) suggest that demonstration plots can serve as effective extension tools if they: (i) address the issue of sustainability to the technical matter, (ii) provide alternatives and assist in decision-making, (iii) offer information on the financial and economic consequences of recommended technologies, (iv) encourage technology adaptation to local conditions, and (v) modify their structure and content to align with the interests and requirements of the intended audience. The government of Punjab, aimed at improving agriculture, thus, a demonstration was kept as a major pillar of technology dissemination. According to the report of the Government of Punjab (1987), one of the objectives of the agriculture department was to establish the demonstration plot. Each Field Assistant was bound to establish a demonstration plot in each union council in each cropping season to demonstrate the latest farming techniques. Whereas, the agriculture officer was bound to supervise the demonstration plots. According to the results of Davidson *et al*. (2001) the demonstration fields of the Department of Agriculture are a significant source of information, which is not unexpected considering their historical role in public extension services and agricultural universities in Pakistan and other parts of the world (as exemplified by Ruttan, 1997).

The use of demonstration plots for technology dissemination is an effective and valuable approach to promoting agricultural development. By providing farmers with practical, hands-on learning experiences, building social capital, and promoting sustainable agriculture practices, demonstration plots can help to improve yields, increase profits, and enhance the livelihoods of farmers. However, the literature on demonstration plots in Pakistan is scanty, leaving a research gap. This study was conducted to bridge this literature gap. The core objective of this study was to analyze the use of demonstration plots as viewed by the farmers and extension field staff as well.

METHODOLOGY

Pakistan is diverse in agriculture and farming is practiced in all provinces of the country. However, Punjab province is leading in terms of agriculture and the production of crops. Therefore, Punjab is a major contributor to the national economy and supports livelihoods. This study was conducted in the Faisalabad district of the Punjab province. Faisalabad is rich in agricultural resources and also famous for agro-based industries. The survey-based research design was used in this study to collect data from the farmers in Faisalabad. Faisalabad had a total of six tehsils, which are homogenous in condition due to agriculture being practiced in all tehsils. Considering the resources this study was conducted in tehsil Faisalabad which was chosen randomly. All the farmers residing in All the farmers living in the rural areas of Tehsil Faisalabad who were directly connected with farming were considered as the research population of the study. There are a total of five markaz (Faisalabad, Samundri, Thikriwala, Dhudiwala, and 2 JB) in tehsil Faisalabad. Demonstration plots were arranged by the extension field staff in these Markaz. The list of farmers belonging to this markaz who have directly or indirectly been the beneficiary of the

demonstration plots was obtained from the office of Assistant Director of Agriculture (Ext), tehsil Faisalabad. The list consisted of a total of 2319 farmers. The sample was drawn using an online sample size calculator www.surveysystem.org keeping a confidence level of 95% and confidence interval at 5. The sample size of the study was 130 farmers. Thus, 26 farmers were chosen at random from each markaz of the tehsil thereby making a sample size of 130 farmers for quantitative data. Whereas, total 5 agriculture officers and 5 Field Assistants (FAs) were consulted to explore the procedure of establishing the demonstration plots. They were interviewed qualitatively on an interview guide. To collect data from the farmers, an interview schedule was developed, which was validated, pre-tested on 20 farmers and reliable using the Cronbach alpha technique. Data were collected using face-to-face interview techniques and analysed with the help of Statistical Package for Social Sciences (SPSS). Qualitative data were analysed using the content analysis technique.

RESULTS AND DISCUSSION

In this section, qualitative and quantitative results are explained. In the first section, qualitative results are explained. In this section, the type of demonstration plots, objectives of installation of demonstration plots, selection of demonstration plots, use of demonstration plots as an extension method and change in behaviour of the farmers using demonstration plots as a source of technology and information dissemination. Whereas in the second section, the effectiveness of demonstration plots as perceived by the farmers is discussed.

Type of Demonstration Plots in the Study Area

Extension Field Staff (Agriculture Officers in particular) were the change agents in the study area, and Field Assistants were the supporting hands in organizing demonstration plots. They explained that demonstration plots were organized for different crops like Garlic, Tomato, Wheat etc taking the season into account. The Extension staff argued that; The cost and inputs for the established demonstration plot at the farmer's field were provided by the Agriculture Department. However, in the case of the demonstration plot for the wheat crop, the cost of wheat crop seed was afforded by the department. It was reported that there were certain guidelines followed by the department before establishing the demonstration plots. For instance, farmers' needs were assessed before the establishment of demonstration plots. Soil testing is also preferred, but occasionally. Because the extension staff had great acquaintance with the soil condition in the area of their jurisdiction. The agriculture officers reported that; Farmers were keen on learning through demonstration plots. Their participation remained very promising and the participation of young farmers aged between 25-35 years was a very positive gesture because young farmers were more receptive towards new technologies rather than old-age farmers.

To disseminate technology, group discussion, method demonstration and result demonstration technique were used by the extension staff. Although, farmers had more interest in the demonstration of the results to further decide whether to adopt the recommended technology or not. Extension staff agreed to change the behaviour of farmers due to demonstration plots and most of the adoption of the technologies was due to the demonstration plots.

Objectives of Demo-Plots

The perceived objectives of the demonstration plots include technology transfer, fostering the adoption of certain technologies and bringing change to the farmers' behaviour. EFS while establishing demonstration plots had various objectives to meet.

- To enhance the production of crops in particular areas of interest
- To enhance the knowledge, attitude and skills of the farmers
- To make farmers aware of the new technology and the way to use this particular technology for multifold benefits
- To motivate farmers to shift from traditional farming to modern farming for more benefits and cost conservation.
- To increase the cost-benefits ratio of the farmers and motivate them towards profitable farming.
- To increase the share of agriculture in national GDP by improving the production of crops through technical support to the farmers.

Establishment of Demonstration Plots

Extension staff was asked to report on the process of establishing the demonstration plots. Following selection guiltiness was perceived by the respondents.

- Identifying the meeting with the progressive farmer to ask him to devote a piece of land to establish the demo

plot at his farm area

- The affordability of the farmers is taken into account, thus the progressive farmer who can afford the expenses for the time being is chosen.
- The location of the demonstration plot is very critical. Therefore, the plot preferably which is situated roadside is chosen.
- Distance of farmer's houses is kept in mind that the demo plot should be nearer to their houses so that the farmers can visit the plot easily.
- Sometimes all inputs are given by the government. Whereas, sometimes only seed and fertilizer are given to the farmers for demonstration plots.

Change in Farmer's Behaviour through Demonstration Method of Extension

Extension staff found demonstration one of the effective methods of technological dissemination and changing the farmer's behaviour. Different approaches are used for the technology transfer, however, the demonstration plot giving the opportunity of "seeing and believing" was by far the most effective. Therefore, the extension staff puts their best efforts to increase the number of participating farmers and visiting the demonstration plots. As suggested by Anderson *et al*. (2007), to increase the effectiveness agricultural extension should include the systems of trainings and visits to the farmers, establishment of demonstration plots, farmers field schools and farmer field day. This implies that demonstration plots are by far among the most effective methods of extension. Considering the significance, extension field staff had set up demonstration plots in the study area. To showcase the technology at demo-plot, the announcement is made through the mosque, group meetings and informal contacts. Once the farmers are gathered at the plot, the particular technology is disseminated followed by the opportunity of questions and answers. Agriculture officers who usually visit the demonstration plot fortnightly answer the questions of the participating farmers. Whereas, Field Assistant visits the plot daily and remains in contact with the farmers regularly. Visiting the demo plot, seeing the practical demonstration of technology and frequent interaction of the field staff with the farmers was the key factor in changing the behaviour of farmers towards the disseminated technology. Khan *et al*. (2009) reported that demonstration plots not only created awareness among farmers but also motivated them towards modern farming and applying inputs considering the needs of the crops. Consequently, the know-how about modern farming increased among farmers.

Perceived Effectiveness of Demonstration Plots

The demonstration plot is organized on the farmers' field, farmers also participate in different sessions on the demo plot and also receive support and feedback from the extension staff. Therefore, they were also asked how they perceive the effectiveness of those demo plots. Their response was taken on five point-Likert scale i.e. 1= Not at All, 2= Less Effective, 3= Moderately Effective, 4= Highly Effective, 5= Very Highly Effective. Means and standard deviations were calculated and the responses were ranked based on the mean value.

Farmers perceived demonstration plots as very effective in technology sharing, knowledge, attitude and skill development among farmers. The effectiveness was the cumulative outcome of various benefits. The demonstration plot was active (Mean: 4.45; Sd: 0.624), which gave farmers a consistent opportunity of learning and observe the demonstrated technology. The behaviour of the extension field was cooperative as they were supporting and facilitating the farmers paying visits to the demonstration plots (Mean: 4.42; Sd 0.582). This was a notion that farmers were being treated equally (Mean; 4.25; Sd: 0.614) irrespective of their land size. Previously it has been reported by many researchers like Ashraf *et al*. (2021), Ashraf *et al*. (2019) and Davidson *et al*. (2001) that extension services were biased towards the progressive farmers and small farmers were ignored. In the meantime, extension services were also perceived as ineffective. In the case of demonstration plots, not the farmers were only equally treated but also, but they had participated in the formal meetings for feedback (Mean: 4.20; Sd: 0.438), therefore, the demonstration plots were perceived as a source of learning by the farmers (Mean; 3.78; Sd: 1.04). It has been reported by Maertens *et al*. (2021) that farmers who had participated in the demonstration plots adopted the technologies more as compared to other farmers. Demonstration plots were a source of learning and motivation for the farmers to adopt the latest interventions. Moreover, farmers perceived that technology disseminated through the demonstration plot was beneficiary, and gave farmers persuasion to adopt it for improved productivity. Farmers were satisfied with the opportunity to visit the plot regularly, and easiness of technology to replicate. The knowledge

of the farmers was increased due to demonstration plots, and the technology disseminated through demo plots was news for many farmers. Sseguya *et al*. (2021) have reported that access of farmers to demonstrations was critical. The increased access of farmers to demo plots increased the probability of the adoption of a particular technology.

Table 1. Perceived effectiveness of demonstration plots.

Effectiveness	Mean± Sd	Rank Order
Demo-plot was active	4.45± 0.624	1
The behaviour of the extension field staff was cooperative	4.42±0.582	2
Farmers were treated equally	4.25±0.614	3
Formal meetings were organized with farmers	4.20±0.438	4
The plot was the source of my learning	3.78±1.04	5
Technology that is disseminated is beneficiary	3.73±0.856	6
Intention to adopt the disseminated technology	3.72±0.826	7
I had an opportunity to visit the plot regularly	3.56±0.704	8
Easy to adopt and replicate	3.43±0.746	9
Knowledge increased due to demo-plot	3.38±0.927	10
The technology implemented was new to me	2.15±1.02	11

CONCLUSION AND RECOMMENDATIONS

This study was conducted to analyze the demonstration plots established by the extension field staff for the dissemination of agricultural technologies among farmers. The responses from the extension field staff and farmers were obtained to analyze the establishment of demonstration plots and the effectiveness as perceived by the farmers. This was found that demonstration was one of the effective extension methods to disseminate agricultural technologies among farmers and give the opportunity of observing practices and outcomes in the field. Demonstration plots were organized on the farmers' fields, preferably progressive farmers and the plot on the roadside to ease the mobility of the farmers. Group discussion, method and result demonstration methods were focused areas while demonstrating technologies at demonstration forms. Extension field staff believed that demonstration plots helped farmers to change their behaviour from a traditional farming approach to a modern approach of farming for more production and profits. The same was complemented by the response from farmers as they found demonstration plots active, cooperation from the extension staff, equal treatment to the farmers, participation of farmers in group meetings, enhanced learning and motivating farmers to adopt the latest technologies. This is concluded that demonstration plots are an effective source of technology dissemination, however, there is a need to enhance the number of demonstration plots. Moreover, further investigations are required in other areas to channel the guidelines for the enhanced effectiveness of demonstration plots of major crops in particular.

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