

Analyzing the Performance of Member and Non-member Farming Community of Model Farm Services Center in District Dera Ismail Khan, Pakistan

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ABSTRACT

Model farm services center (MFSC) is a capacity building approach launched in Khyber Pakhtunkhwa province, which provides opportunities to the farming community to enhance their knowledge and skills. It also helps in developing linkages with agricultural entities for increased yield and improved socio-economic status of the farmers. The current study investigates the influence of farm advisory services and agricultural facilities provided to the farmers through MFSC. In addition, a comparison between the performance of the member and non-member farmers of this extension program will be determined. The primary data were selected from 120 respondents (60 members and 60 non-members of the MFSC) using questionnaires to interview farmers from district Dera Ismail Khan (DIK), located in Khyber Pakhtunkhwa province of Pakistan. The results reveal that majority of the respondents are of middle age with the low educational background. Most of the member farmers are relatively more aware of various aspects of agricultural system prevailing in the DI Khan and rest of the country such as best crop varieties suiting their environment, extension activities and their yield is higher than that of non-member respondents. Some of the respondents were of the view that lack of agricultural inputs, shortage of farm machinery, unavailability of credit facilities and long distance of the MFSC are the main problems they are confronted with. The provision of quality farm inputs, agricultural training, credit facilities and extension sub MFSC in the area can boost up agriculture in this particular area.

KEYWORDS: Model farm services center, extension services, farmer knowledge, agriculture development and Dera Ismail Khan

INTRODUCTION

Agriculture is the main source of income generation for the majority of the poor households in most parts of the world. Mostly in developing countries, a large proportion of the population relies on this sector. Besides, both hunger and poverty are continuously on the rise particularly in remote areas. With the passage of time, various initiatives have been taken for sustainable agriculture with the aim of closing the technology gap faced by subsistence farmers. These initiatives use various approaches for providing new technologies to farmers such as improved varietal seeds, balanced fertilizer and new animal breeds, or farm advisory services [1] [2][3]. With the advancement in extension work during the last few decades, some new approaches like decentralization, farmer field school, and public-private partnership approaches have been attracting more attention of the farmers in most parts of the world. Decentralization always enhances mutual contacts and brings respect and trust among the staff, which obviously raises the level of flexibility to propose location-specific extension work in the farming communities. It promotes group work among the employees, which leads to increased consideration and efforts from farmers and other entrepreneurs through communication with them [4].

For today's global market demand as well future prosperity, the farming communities should have the latest information and skills regarding new techniques of farming, new methods of the farming practices, improved variety seeds, proper pesticides, balance fertilizer and advance agricultural machineries, water management techniques, access to market for their products as well export facilities for their crops and best agricultural policies which support farmers [5] [6]. For this purpose, the farmers should be encouraged to implement improved and locally suitable technology [7]. In such situation, the role of extension organization is important for dissemination of key

information about improved agricultural practices in the farmer and motivation for their adaptation. Extension methods change with the advancement in the field of agriculture. Particularly those approaches received more attention in the community which involves group-based activities focus on learning and empowerment [8].

Although agriculture sector contributes a large proportion of Pakistan's economy still crop production in the country is low as compared to the world's average [9], which can be improved by obtaining research-based knowledge, adopting improved agricultural methods and advanced machinery by farmers. Insufficient knowledge of the farmers towards sustainable agriculture is the main obstacle to agricultural development. There is a need to increase the farmer's knowledge about the safe environment and agriculture sustainability. In this regard, the extensionists can perform key role especially in farming application of best agricultural practices among the farmers [10]. It should be taken into consideration that concerned personnel in extension activities should be well trained in all disciplines needed in the planning, implementation, and management process [11], especially the supervisors should have the capability to guide and motivate their subordinates for sustainable agriculture [12].

Establishment of the Model Farm Services Centers (MFSCs)

Pakistan is an agricultural country. The majority of the population (67%) of the country is living in rural areas and is directly or indirectly connected to agriculture for their livelihood [13]. Almost 70% of the economy is based on this sector which employs 44 percent of its workforce and about contributes 20 percent of Pakistan national's income [14]. Although most parts of the land in this country is suitable for agriculture purpose yields of most crops are far behind from developed countries. The possible reasons for this low productivity among others are a lack of technical knowledge for proper agriculture within the farming community and unavailability of agricultural inputs and farm machinery. Since the independence of the country in 1947, the government launched different agricultural extension programs for agriculture development.

In the beginning of 21st Century, the government of Khyber Pakhtunkhwa province initiated new public-private partnership approach called farm services centers. After five years, these farm services centers were renamed as MFSCs at the district level. Later on, branches of these MFSCs were extended to sub-districts levels with the aim of attracting the farmers' confidence and increase their access to technical advice along with farm inputs. Generally these farm services centers were developed for empowering and organizing the small farmers and provide them opportunity to receive technical assistance, direct contact with other allied sectors of agriculture departments and a platform where they have access to facilities and major production inputs like seeds, pesticides, fertilizers and machinery [15]. These MFSCs are bottom-up approach by nature whereas every person more than 18 years of age, involved in agricultural businesses and have his own agricultural land, dairy farm, poultry farm, fish farm and involved in any other agricultural related activities shall be eligible for membership for the MFSCs. Farmers need to pay a nominal fee of Rs. 100/-for enrollment and Rs.500 for membership for MFSC. After membership, these MFSCs provide different inputs like certified seeds, farm machinery, balanced fertilizers, skills regarding the application of fertilizers, pesticides and knowledge to increase the skills of farm management, need assessment, planning, and modernization of agriculture [16].

REVIEW OF LITERATURE

The study conducted by [3] analyzed constraints and gap of the MFSC approach through questionnaire from a sample size of 306 respondents in the district Dera Ismail Khan in the KP province. He found that agricultural machinery was provided to almost half of the respondents. Similarly, seed and fertilizer were the second and third most provided inputs provided to respondents respectively. His findings show that the main agricultural information source in the area was input dealers followed by MFSC and respondents considerably learn more skills about agronomic practices as compared to horticultural practices. Furthermore, some of the constraints like less duration for machinery utilization, complicated booking procedure, and costly rental prices, out-dated machinery and unavailability of crop specific machinery on proper time were observed during the study.

[16] Conducted a study to evaluate the Model Farm Services Center's (MFSC) contribution in yield enhancement of major crops/vegetables in district Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan, during the year 15. A sample of 306 was selected using Sekaran sampling technique for interview purpose using a well and pre-tested interview schedule. He performed step by step analysis to investigate the yield improvement through MFSC. The outcomes of Wilcoxon Sign Rank Test indicate a significant improvement in yield of wheat, sugarcane, rice, maize and tomato by Model Farm Services Center. The result Pearson's correlation coefficient indicates the highly significant positive relation of wheat and sugarcane yield difference before and after registration with Model Farm Services Center. Thus, the vast scope of MFSC was due to the reason that MFSC registration duration had a significant endowment in the improvement of yield and filling the gap of potential yield of registered farmers. So the government should

focus such programs for the awareness of farmers to reregister themselves with MFSC in order to learn and adopt new farming techniques to cope with upfront agricultural challenges. Similar studies need to identify factors which motivate farmers and other related stockholder in the province.

[17] Studied agricultural extension services and its influencing factors associated with farmers' satisfaction with a sample size of 150 beneficiary farmers in North West Ethiopia. He found that about 55% of the respondents were satisfied whereas 45% of them were dissatisfied with the extension services. His finding based on ordered logit model reveals that supposed economic return, regular base extension contact, off-farm income and the family size were influential factors for the respondents' satisfaction. While on another side the limited technological choices, costly inputs, inappropriate credit system and vague responsibility between the extension work and the politician were the reasons stated by the unsatisfied respondents.

[18] Analyzed agricultural extension system in North West Frontier Province (NWFP) now known as Khyber Pakhtunkhwa (KP) province in Pakistan. The result of the study indicates that weak farmer-extension linkage system prevails in the region. Despite the pledge of the government to provide extension services to the farmers at doorsteps, most of the farmers complain about no visits of the extension field workers to their farms. His finding also shows that the weakness of the extension system was due to the lack of devotion, motivation and sense of responsibility among extension agents and weak monitoring system. The regular task of providing and adopting of proper agricultural technologies to farmers and good farm practices would not be sufficient for agricultural production which should be based on strong extension-farmers linkage.

MATERIAL AND METHODS

This portion discusses the mechanics of the research work. It explains the universe of the study, sampling technique, data source, and analytical techniques used.

Universe of the study

The whole DI Khan district was the universe for this study pointed in figure 1. It is the southernmost part of 26 administrative districts in KP province (31°.15' and 32°.32' N and 70°.1' and 71°.20' E) with an elevation of 571ft from the sea level. The total area of the district is 7326 Km² with a population 1,939,000 in 2014. The land is very suitable for different kind of vegetables, variety of fruits and major crops [19].

Sampling technique and sample size

District D.I Khan is subdivided into five Tehsils that contain 47 union councils. From these five Tehsils three Tehsils named Paharpur, Parova and D.I Khan were selected randomly. From these three Tehsils a total sample size of 120 respondents was randomly selected, keeping the same ratio i.e., 60 member farmers of MFSC and 60 non-member farmers for interview schedules with supposition to represent the whole population.

Analysis of data

We used a structured questionnaire in the light of objectives of the study, including questions socio-economic characteristics of the respondents, as well as details about cropping pattern, input use and output from some crops and livestock. Data were collected through a face-to-face meeting with the respondents. During filling, the interview schedules every question and their purpose was explained to respondents so that accurate and reliable information could be gathered. The collected data were put in the computer through SPSS package. At the first step of the analysis, descriptive statistics like frequencies and cross tabulation were used to express the data results. Secondly, independent sample t-test was applied to determine the differences in their general characteristic as well as the farming methods of members and non-member farmers of the MFSC. Thirdly, a dummy variable regression was used to identify the actual difference in the yield of both types of respondents using the following equation.

$$y_i = \alpha_0 + \alpha_1 D + \varepsilon$$

Where

y_i = Yield of crops/livestock

α_0 = Constant

α_1 = Coefficient

D = Dummy variable equals to 1 if the respondents are members of MFSC and 0 if non-member

ε = random error

RESULTS AND DISCUSSION

This portion deals with the findings of the research and the related discussion of the results in the light of previous literature.

Information of the general characteristics and yields of the respondents

The triumph of any extension program mainly depends on the involvement of competent and motivated staff. But unfortunately, the lack of such kind of personnel is the basic problem in agricultural extension, especially for field staff to fulfill the requirement of sustainable agriculture [20]. Education is an important feature affecting the information and communication process along with others factors like roads, electricity etc in agriculture [21]. The data presented in table 1 show that member farmers are younger in age and have higher literacy level (number of years obtaining a formal education at any institution) than non-member farmers. Similarly, the land holding size and the hired number of both kinds of labor (casual and permanent) of the member farmers is more than non-member farmers are. Member farmers are also gaining greater crop yield than the non-member farmers but only the yields of rice and sugarcane show the significant difference between the two types of respondents. The yield is measured in local unit monds, whereas one mond is equal to 50 Kilogram. An analysis of the historical data reveals that the contribution of KPK province to the total production of livestock has declined from 19 percent of total production of Pakistan in 1950s to 12 percent in 2005 [22]. The milk yield per day from the livestock of the member respondents are also higher than of non-member respondents. Data in the table also indicate that monthly off-farm income of the member respondents is greater than that of the non-member income and there is a significant difference in farm income per year of both respondents.

In the existing farming system, the extension services do not reach the mass of farmers due to reasons like poorly motivated workers, unavailability of operational funds, the lack of appropriate technology and weak management system [23]. In addition to this one of the main problem is the less number of agricultural extension personnel involved in extension work compared to a large number of farming communities [24]. Data in the figure 2 show that majority of the nonmember respondents are unaware of the existence of MFSCs working for agricultural purposes in their areas. The majority of the non-member respondents while some of the member respondents could not recognize the extension agent working in their areas by name or face.

In order to be more useful, scientific information must be relevant, legitimate and realistic and its invention should be related to processing as well as product [25]. Figure 3 comprises of the respondents information regarding the crops and varieties they cultivate. The majority of the respondents from both types is aware and knows the name of recommended wheat, rice and sugarcane varieties. Surprisingly, many respondents from both groups did not know the name of maize variety they were cultivating.

The fact is that most part of the research work done by agricultural research experts cannot reach to the targeted farmers due to poor coordination between the researchers and extension staff as well the weak extension services to the target farming communities. For this purpose, an effective transfer technology system should be organized, where all entities can easily contact each other for technology diffusion in the communities. Extension worker should be fully trained to use a variety of extension methods and crop production technologies for the existing system. Figure 4 shows data regarding the frequency of respondents contacts with agricultural and livestock departments. The majority of the member respondents (48) regularly contact the agricultural office for improved technology while conversely; most of the non-member respondents (34) are not in contact with the agricultural office for improvements. The main purposes behind the contact of the respondents with the agriculture department include improvement of the farming method, to take advice about crops diseases, and obtain good variety seed. To facilitate the farming community types of field days, workshops or agricultural training are regularly arranged. The data reveal that majority of the member respondents (42) regularly participate in agricultural programs arranged for them while the majority of the non-member respondents (56) do not attend any agricultural activity in their areas. The results further indicate that (36) of the member respondents contact the livestock departments for livestock diseases and management practices while 30 of the non-member respondents did not contact the livestock departments for any assistance. It is found that majority of the both respondents contact the private livestock doctors for diseases and consultants. The majority of both (46) member respondents and (48) non-member respondents did not attend any livestock program in their areas for their livestock production.

Figure 5 shows information of the respondents regarding agricultural facilities for improvement. Almost three-fourth of the member respondents (44) were visited by extension agents for sharing knowledge about improved technology while many non-member respondents (38) were never reached by them for any improvement. This figure also

indicates that half of the member respondents (30) received agricultural training and a half (30) did not receive any agricultural training while almost (58) non-member respondents did not receive any agricultural training. Some of the respondents pointed that they have obtained just one-day training from agricultural extension department. The rest of the trained respondents mentioned different durations of the training. A vast majority of the respondents appeared quite satisfied with the effectiveness of the training some termed these training programs as just average. Mostly in the agriculture sector, all types of farmers need credits for their desired production; especially the small farmers are usually in dire need of such credits as timely availability enables the farmers to fulfill their needs for various agricultural inputs. In Pakistan, most of the farming population consists of small-scale farmers with multiple occupations. The proper use of credit can improve the average yield. [26] Found a positive impact of credit on the wheat productivity with 5% increase in the yield during his study. According to [27] the average per acre yield of wheat crop increased from 950 kg to 1075 kg with credit while, rice crop yield was increased from 1450 kg to 1680 kg during his study. This figure also depicts that only (6) of the non-member respondents and (22) members respondents received agricultural credit during the last few years while the majority of both respondents did not receive any credit for agricultural purposes. The main sources of credit for them are Agricultural banks that provide the credit facilities to farmers. Few respondents also mentioned that they receive the credits from their friends, relatives, and other commercial banks. The majority of the respondents also indicated that they utilized the credit for agricultural purposes. Only two member respondents did not utilize the credit because they used that credit in the construction of their houses.

Improvement is an endless process and essence for farming communities. The proper application of chemical fertilizers along other related inputs has contributed to enhancing especially grain productivity in the last few decades [28][29]. The main theme of MFSC is to facilitate the farmers to determine their potential productivity, particularly in terms of agricultural yield through developing linkages with agricultural entrepreneurs and Government Line Agencies (GLA). Another theme is skill development and motivation for utilizing various inputs beforehand to be saved from any shortage and conflicts. Table 2 shows the actual yield differences of crops and livestock milk yield of the respondents which were determined by dummy variable regression. Although the yield of every crop and livestock milk of the member respondents is more than non-member respondents but significance differences were only observed in rice and sugarcane crops yields.

The focus of the study is to determine the impact of MFSC on the existing farming communities and identify the strengths and weaknesses of this new public-private partnership program. Some of the farmers reported several problems in these farm services centers. The majority of the both groups especially member farmer are of the view that there is a severe shortage of facilities, especially the unavailability of farm inputs as improved variety seed, balance fertilizer etc in these farm services centers. Some of the respondents also highlighted that the prices of some inputs are high as compared to prices in open markets. Some of the respondents pointed out that these farms services centers are far away from their residence. Lack of staff in these MFSCs was also termed as a serious constraint by some of the respondents along with their absence from offices. Quite a few respondents questioned the working procedure and activities adapted by these MFSCs and responded that the staff was also not cooperative. Some of the respondents stated that the staff members of MFSC are biased and distribute agricultural inputs on favoritism. Some of the respondents argued that these MFSCs are not as effective as the quality of inputs provided to the farmers through them is not up to the mark and these cannot provide credits facilities to the poor farmers. It was also mentioned by some farmers that there is no modern facility available with the staff of MFSC such as laser leveler etc.

Table 1. General information of the member and non-member farmers of MFSCs

Respondents Status	Non-Member	Member	Mean diff	P-value
Age of the respondents (years)	44.80	40.77	4.03	0.05
Education of respondents (years)	4.97	8.20	3.23	0.00
Total land holdings (acres)	34.99	58.82	23.83	0.11
Casual labors hire for farming	5.00	6.00	1.00	0.34
Permanent labors hire for farming	1.44	2.75	1.31	0.03
Wheat production monds per acre	25.50	26.01	0.51	0.75
Gram production monds per acre	11.80	18.45	6.65	0.29
Rice production monds per acre	24.04	40.84	16.80	0.00
Sugarcane production monds per acre	530.92	649.63	118.71	0.03
Cow's milk yield (kgs/day)	6.71	7.88	1.18	0.14
Buffaloes milk yield (kgs/day)	8.08	8.85	0.77	0.20
goat milk yield (kgs/day)	1.17	0.67	0.50	0.12
Respondent off farm income per month (Rs.)	13285.71	16433.30	3147.59	0.33
Respondent on farm income per year (Rs.)	295263.16	418666.65	123403.49	0.02

Table 2. Dummy variable regression of yield difference of the respondents

Crops/Livestock	Constant	Dummy	P-value
Wheat	25.50	0.51	0.00
	1.13	1.62	0.75
Gram	11.80	6.65	0.01
	4.27	6.03	0.28
Rice	24.04	16.80	0.00
	4.06	5.37	0.00
Sugarcane	530.92	118.71	0.00
	39.42	54.05	0.03
Cows	6.71	1.18	0.00
	0.56	0.80	0.14
Buffaloes	8.08	0.77	0.00
	0.46	0.59	0.20
Goat	1.17	-0.50	0.00
	0.21	0.30	0.12

Figure 1. Study area of the province

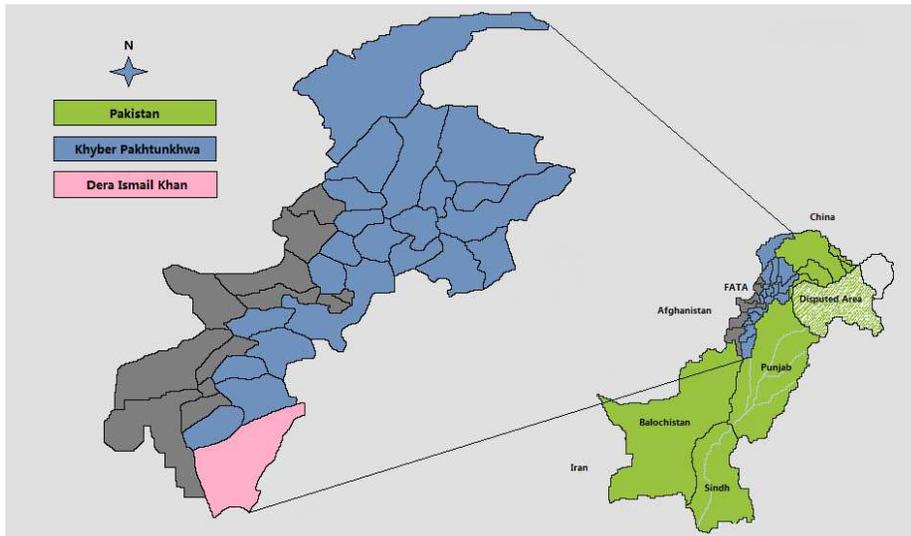


Figure 2. Distribution of the respondents regarding extension

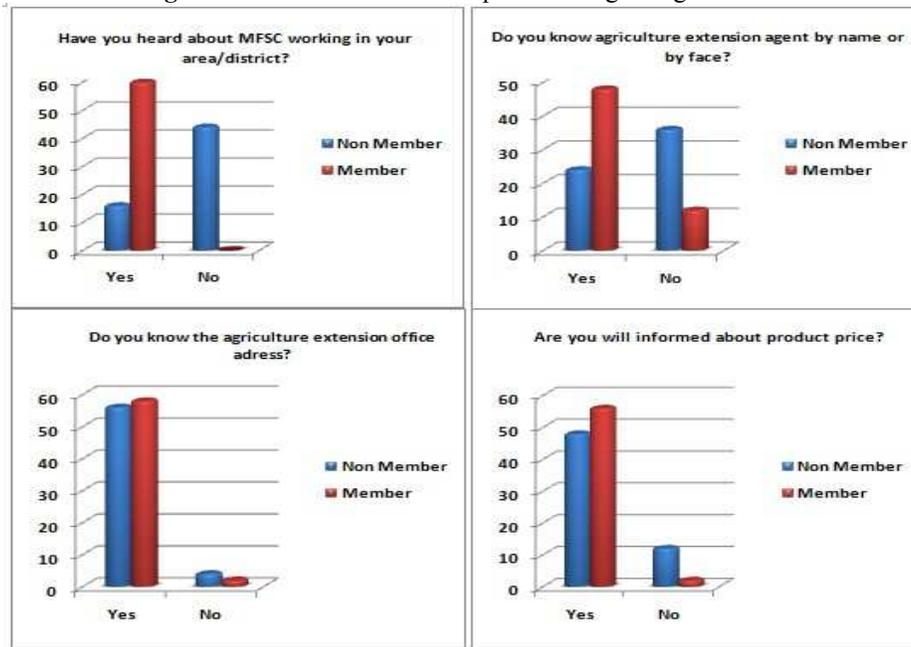


Figure 3. Distribution of the respondents regarding crop varieties

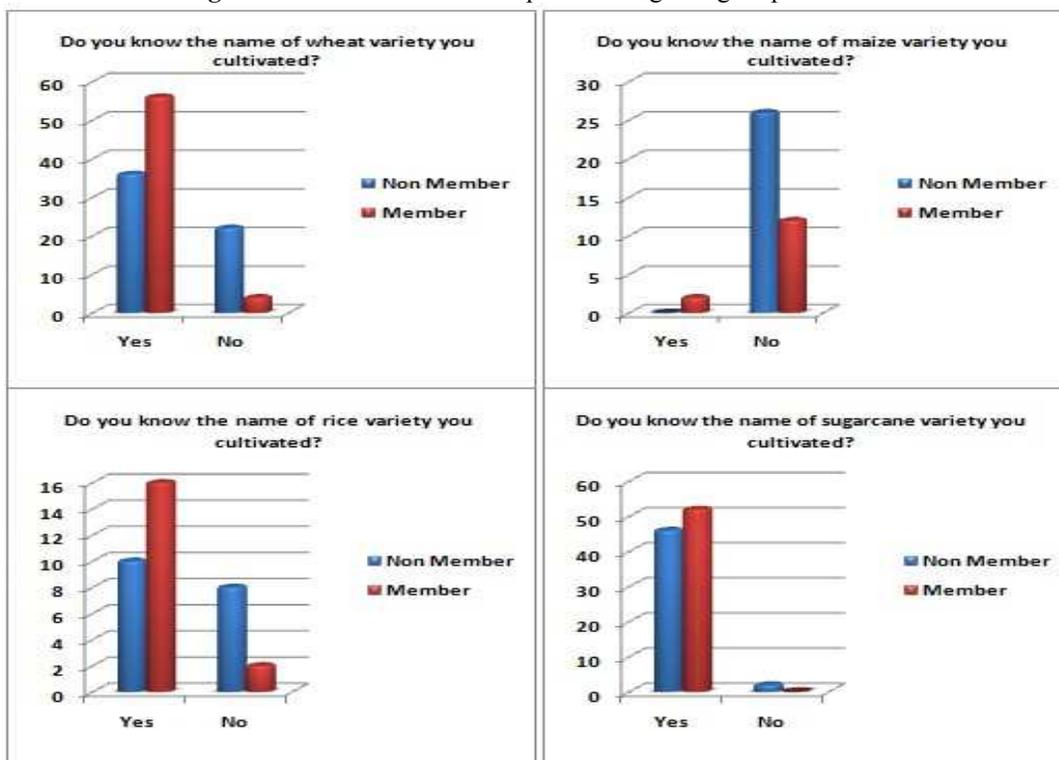


Figure 4. Distribution of the respondents regarding contacts/linkages with agriculture and livestock departments

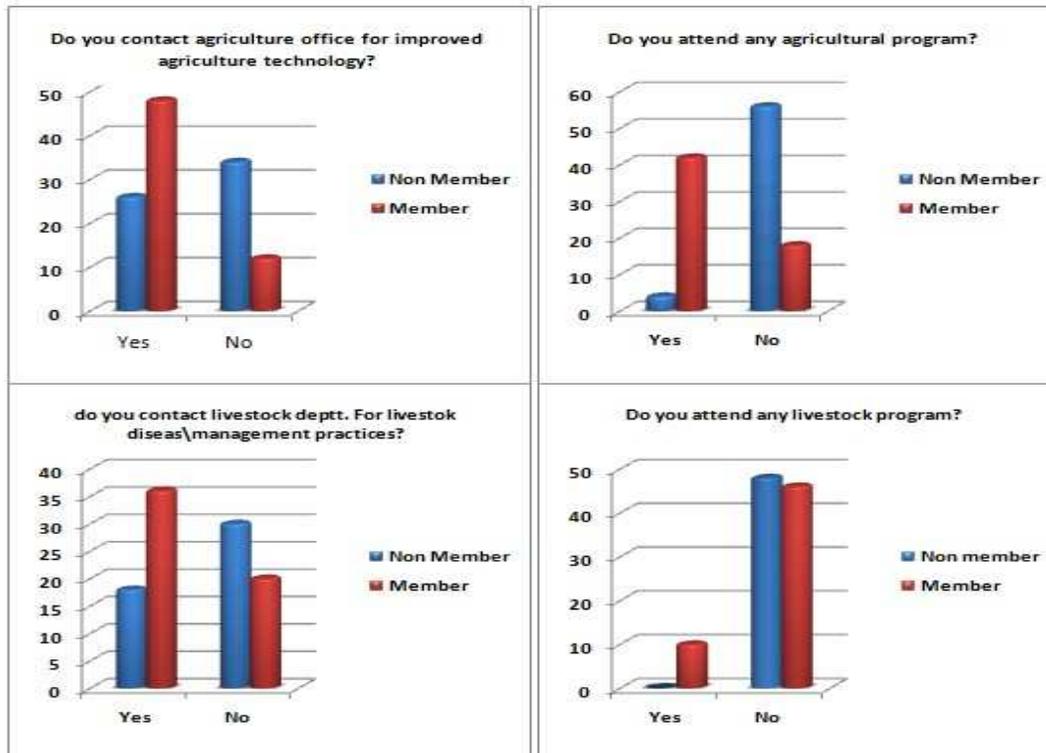


Figure 5. Distribution of the respondents regarding agricultural facilities

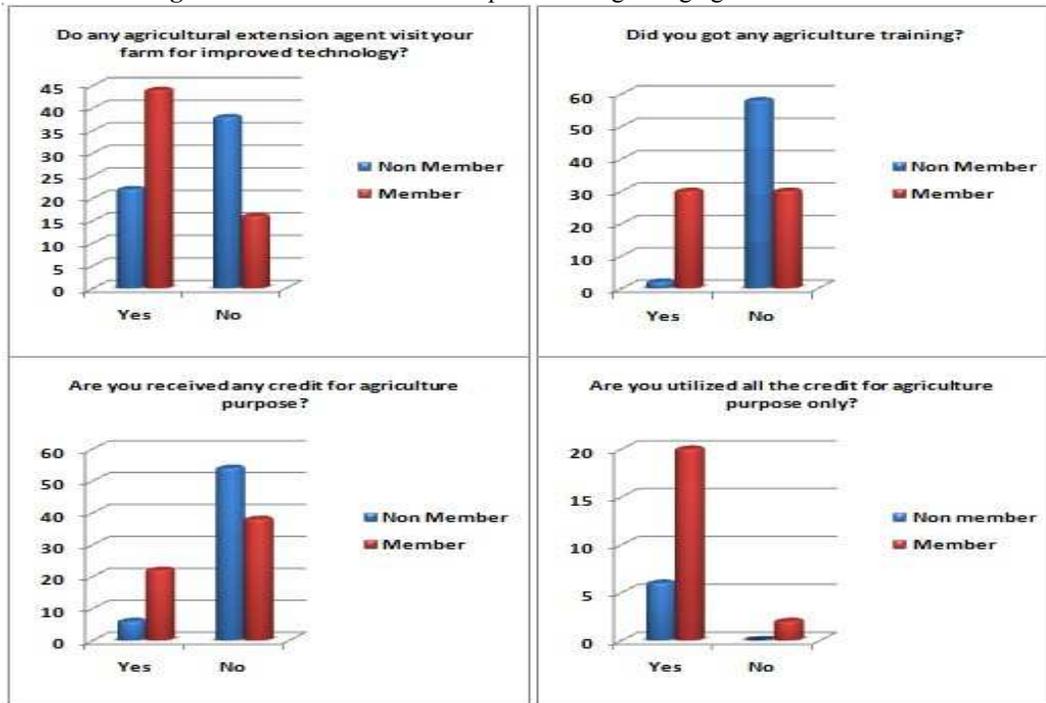
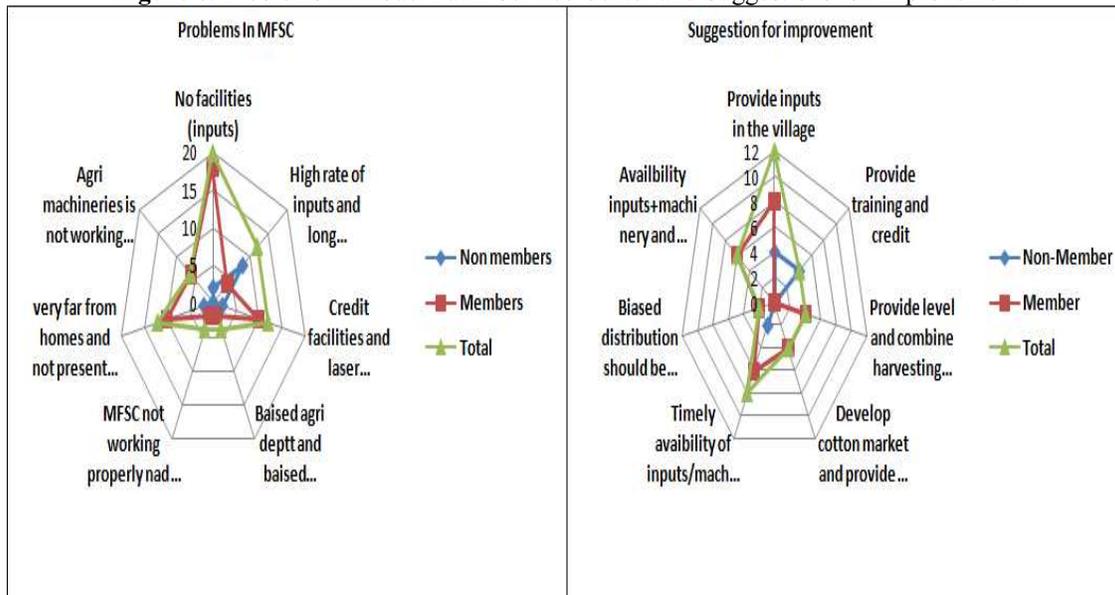


Figure 6. Problems in Model Farm Service Center and Suggestions for Improvement



Conclusion & recommendations

The findings of this study reveal that most of the farmers belonging to the area are of middle age with a poor educational background. Their land holding size is relatively more as compared to other parts of the province still there is enough gap in the actual and potential yield. Although it is evident from the findings of the study that member farmers of MFSC were enjoying greater yields of various crops; still there is big a room for further yield improvement of various crops. Lack of awareness of the farmers about the potential yield, unavailability of good quality seed on time, less use of agricultural machinery, the absence of credit facilities to the poor farmers and feeble linkages of the various agricultural entities are the common problems in the farming communities. To achieve a

potential yield in a more practical way, the following specific recommendations should also be implemented in the area.

- The awareness level of the farmers should be enhanced through these MFSCs.
- The availability of credit facilities to the poor farmers through these centers should be ensured.
- Farm inputs like good quality seeds, proper fertilizers, effective insecticides and pesticides should be provided at reasonable prices through these MFSCs.
- A comprehensive system needs to be developed which strengthens linkages among farmers, extension officers and researchers.
- Non-member farmers should be motivated for membership of the MFSC, as they constitute an integral part of the existing community.
- Training and demonstration programs should be provided more frequently for a better understanding of the farmers.

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Conflicts of Interest: The authors declare no conflict of interest.

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