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COMPARING AGRICULTURAL YIELD OF MEMBER AND NON-MEMBER FARMERS OF FARM SERVICES CENTERS IN DISTRICT SWAT

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ABSTRACT

Different extension approaches have been launched among different communities in order to promote agricultural production. Farm services centers are extension based programs initiated for farmers at districts level in Khyber Pakhtunkhwa province of Pakistan. The focus of the study is to identify the differences in the agricultural productivity of the member and non member farmers of these farm services centers. A sample size of 120 respondents was selected for analysis keeping the same number of 60 member farmers and 60 non member farmers of the farm services centers. The collected data were analyzed using SPSS. Results indicate that yield of member farmers are higher than non member respondents. Results of the study also show significant differences in the crops yield as well as livestock milk yield of these two types of respondents. In order to make these farm services centers more meaningful the provision of agricultural farm inputs, agricultural machineries and agricultural credits on proper time will further improve the productivity of the member farming community.

Keywords: farming community, farm services centers, agriculture extension, farm inputs and yield differences.

INTRODUCTION

For success of any progressive agricultural program, there is need to understand how local communities utilize natural resources in their environment. An indispensable element for the advancement of the smallholder agricultural sector is the establishment of solid farmer based organizations that are capable to effectively represent farmers' interests, sufficiently independent and motivated in nature (Mutimba, 2005). The critical aim of organizing farming communities is mainly aimed for enhancing farmers' access to extension services, which improve their linkages with agricultural experts, input suppliers, traders and policy makers. In addition, organizing farming communities provide opportunities for commercializing commodities improve their economy and add value to their production. It has been recognized that agricultural development reduces the prevalence of poverty (Department For International Development, 2004).

Food availability especially grain food has been a continuous concern for global policy makers after generation to generation, that can affect the economic security as well as the social and political stability (Su et al., 2012). In order to combat the challenges of food sufficiency and agricultural productivity in Pakistan like any other country, the role of formal and non-formal education is quite important. Both these types of education are important for sustainable agriculture and rural development. Generally the formal agricultural education is necessary for skilled manpower to serve agricultural sector through research, extension and commerce. While, non-formal agricultural education is particularly needed for training of farmers, agricultural farm householders and workers for their capacity building in vast ranges of community based organizations. Non-formal education is often provided by both public and private organizations.

Since 1947, agricultural sector has been the principal component of Pakistan's economy as majority of people living in rural areas are involve in agriculture. Per acre yields of many crops are low as compared to developed countries of the world. Beside other reasons the most important one is the unavailability of new information to the farmers. Sometime new innovations are complex, technical and hard to adopt by farmers in community (Anaeto et al., 2012). With the advancement in agriculture research there is need to develop agricultural extension services to effectively interact with the farming communities where they get information and adopt the new techniques in their existing farming system. Extension work is weak and less effective when its work solely, but becomes more powerful and effective when combines with any related cooperatives like price incentives, credit, seed multiplication, inputs suppliers and so on (Contado, 1997).

Government of Khyber Pakhtunkhwa (KP) initiated agricultural base platforms called Farm Services Centers (FSCs) in the province during 2000-01. The FSC is a public-private partnership and is the first attempt in KP province in Pakistan with the aim to increase agricultural productivity and profitability. FSCs were established at district level with sub-centers in some other points with the assumption to provide technical advice along with agriculture farm inputs like seeds, fertilizers and farm machineries to the farmers' at their doorsteps. The FSCs focus on green sector by bringing the related organizations at one platform to provide services to farming community and arrange local development strategies with the participation of local farmers (Government of NWFP, 2004). Some farmers register

their names in farm services centers and they are then considered the general bodies of these centers. Extension agents facilitate these member farmers in different occasion.

This study is conducted in district Swat, situated in the north west of KP province. It is a mountainous area with river, famous for its natural beauty. The main occupations of the people living in this area are agriculture, business and government Jobs. Small enterprises like village shops, fuel wood trading and fertilizer dealers also exist to facilitate the local dwellers. Most of the farmers have small land holding with tenancy status of owner and tenant in mix. Common crops of the area are wheat, rice, maize, potato, onion, tomato, okra and peas. Major livestock are cows, sheep and goats raised by the farmers in herd. The focus of study is to expose the general characteristics of the targeted farmers in the community and identify their cropping pattern in the areas. This study will also investigate the land availability, yield differences of some crops and livestock of respondents. In addition this study will also identify problems faced by farmers in model farm services centers.

METHODOLOGY

This study was conducted in Swat, an administrative district of the KP province. The whole district was universe of the study. A survey of member and non member respondents of the MFSC was conducted in the district. Primary data were collected through a structured questionnaire. From the whole district 120 respondents (60 member respondents of the MFSC and 60 non member respondents of the MFSC) were randomly selected for questionnaire. Questionnaires were filled during face to face meeting with respondents. Collected data were put in to computer using SPSS packages. During analysis descriptive statistics like frequencies, average and mean differences were determined. An additional independent sample T-test was used to compare mean differences in the member and non member respondents at 95% level of significance for equality of means. At last Dummy regression variable was also applied to determine the actual difference in the yield of both types of respondents with the given 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 = randomerror

RESULTS AND DISCUSSIONS

The diffusion of any innovation in existing society is complex and dynamic which mainly depends on several factors like need, performance and personality of individuals. A large number of preceding researches have pointed that persons with higher educational level has a propensity to adopt new technology as compared to those with no education (Krueger, 1993; Lleras-Muney and Lichtenberg, 2002; Wozniak, 1984). For example (Krueger, 1993) observed that highly educated people rapidly adopted the usage of computers for their jobs in the 1980s, in their workplace.(Wozniak, 1987) also reported that proper information and education reduce adaptation costs and uncertainty and enhance the probability of early adaptation. Table-1 presents the general information of the both respondents (Non member and member) along with mean difference and P-values. Values of table show that majority of member respondents are younger and have less farming experience than non member respondents. Educational level and family size of the member respondents is greater than non member respondents. The number of family members involving in the farming operation and duration of the member respondents is relatively higher than those of non member respondents. While the number of family member involving part time in the farming operations of the non member respondents is higher than the member respondents. The number of permanent and casual hired labour, monthly off farm income and yearly on farm income of the member respondents are greater than the non member respondents of the MFSC. Among all compared characteristics, the P-values of educational level in years of the respondents (0), farming experience of the respondents (0.01), the total number of family members (0.02) and the P-value of casual labour involvement in the farming practices (0.01) show significant differences between the non member and member respondents.

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Table-1. Information of general characteristics of the respondents.

Respondent status	Non Member	Member	Average	Mean diff.	P- value
Age of the Respondents (Years)	45.27	43.03	44.15	2.23	0.29
Education of Respondents (Years)	4.27	7.13	5.7	-2.87	0
Respondents' Farming Experience (Years)	24.13	18.87	21.5	5.27	0.01
Total Number of Family Members (No.)	12.23	15.83	14.03	-3.6	0.02
Family Members involved in Farming Operations (No.)	2.4	2.43	2.42	-0.03	0.88
Part Time Family Member involvement in Farming (No.)	1.93	1.63	1.77	0.31	0.15
Full Time Family Members Involvement (No.)	1.47	1.62	1.54	-0.15	0.28
Permanently Hired Labours involvement in Farming (No.)	1.5	2.83	2.5	-1.33	0.32
Casual Labour involvement in Farming (No.)	3.67	8.52	6.61	-4.86	0.01
Respondents' On Farm Income Per Year (Rs.)	63500	1509186	841946	-1445686	0.14
Respondents' Off Farm Income Per Month (Rs.)	23550	36600	27900	-13050	0.08

In agriculture, land management practices are very crucial for economic development. With population growth the demand for cultivated land also increases. The availability and utilization of secure land rights is critical for sustainability and poverty alleviation. (Nolte and Väth, 2013) also identified the same increasing demand for agricultural purposes asserting pressure on the land governance system in both Ghana and Kenya. Table 2 shows the detail information of the respondents regarding land holding size. The size of almost each type of land holding of member respondents is greater except rainfed land on rent and irrigated land shared. The P-values of some variables in given table indicate significance differences i.e., Own land irrigated (0), Own land rainfed (0.01), Operational land holding irrigated (0) and operational land holding rainfed (0.01) between the non member and member respondents.

Table-2. Information of the respondents regarding land utilization.

Respondents status	Non Member	Member	Average	Mean diff.	P-value
Owned land irrigated (acres)	1.70	7.07	4.62	-5.36	0.00
Owned Land Rainfed (acres)	1.67	3.81	2.53	-2.15	0.01
Rented irrigated land (acres)	2.47	5.01	3.88	-2.54	0.32
Rented rainfed land (acres)	0.63	-	0.63	-	-
Shared irrigated land (acres)	5.31	3.83	4.82	1.48	0.55
Shared rainfed land (acres)	-	1.25	1.25	-	-
Operational land holding irrigated (acres)	3.01	8.22	5.61	-5.20	0.00
Operational land holding Rainfed (acres)	1.95	3.81	2.63	-1.87	0.01

Wheat, maize and rice are major crops grown all over the world including Pakistan. The cultivated area and production of wheat, maize, rice and onion crops in the KP were 636.31(000 ha) and 1149.87(000 Tonnes), 440.60(000 ha) and 833.56(000 Tonnes), 3817(000ha) and 78.27(000 Tonnes), and 8.77(000 ha) and 154.21(000 Tonnes) respectively during 2012-13. Table-3 shows information of the respondents regarding cultivated areas and their production of mentioned crops. The yield of every compare crop of member respondents are high than of non member respondents. Among all compared crops the p-values of rice production (0) and onion production (0.01) show significance differences in yield of both types of respondents. This production difference may be the result of better extension services provided by FSC through extension agents about land management practices, seed availability, proper sowing and irrigation and usage of proper fertilizer in the fields. (Owens,

Hoddinott, and Kinsey, 2003) also pointed that through extension services the value of crop production increased (i.e., gross returns per hectare) about 15% in Zimbabwe.

Table-3. Information of the respondents regarding crops area and production.

Respondents status	Non Member	Member	Average	Mean diff.	P-value
Wheat rabi crop area (acres)	2.25	2.72	2.49	-0.47	0.26
Wheat crop production in monds per acre	21.98	25.06	23.58	-3.08	0.13
Maize kharif crop area (acres)	1.73	2.17	1.97	-0.44	0.22
Maize crop production in monds per acre	17.83	21.50	19.79	-3.67	0.11
Rice kharif crop area (acres)	1.54	1.21	1.43	0.33	0.29
Rice Production in monds per acre	26.87	44.76	32.84	-17.89	0.00
Onion area in acres (Rabi)	2.00	0.36	0.69	1.64	0.00
Onion yield in monds per acre	76.25	192.86	166.94	-116.61	0.01

(1 mond= 40Kg)

Livestock is not only a source of economic and income generation but also important from nutritional perspective. Cow, buffalo, goat, sheep and poultry are the most common animals; reared for the milk and meat production in the area. The contribution of KP to total production of livestock has declined from 19 percent of total production of Pakistanin1950s to 12percentin 2005. Table-4 shows the number of livestock of the respondents, information of the livestock position that either they are currently dry or milking and their daily milk yield in kilogram. P-values of the cow's milk (0.03) and goat's milk (0) show significant differences in the yield of member and non member respondents.

Table-4. Information of the respondents regarding livestock production**.**

Respondents status	Non member	member	Average	Mean diff.	P-value
Total number of cows	3.00	2.95	2.97	0.05	0.90
Cows currently dry	1.22	1.00	1.14	0.12	0.22
Cows currently milking	1.33	1.39	1.37	-0.06	0.71
Cows' milk yield (kgs/day)	5.00	6.59	5.93	-1.59	0.03
Total number of buffaloes	3.00	3.40	3.24	-0.40	0.52
Buffaloes currently dry	1.33	2.00	1.78	-0.67	0.16
Buffaloes currently milking	1.20	1.46	1.35	-0.26	0.07
Buffaloes' milk yield (kgs/day)	7.70	8.08	7.91	-0.38	0.70
Total number of goats	2.25	1.00	1.71	1.25	0.21
Goats currently dry	-	1.00	1.00	-	-
Goats currently milking	1.50	1.00	1.40	0.50	0.49
Goats' milk yield (kgs/day)	0.88	2.00	1.10	-1.13	0.00
Total number of poultry	4.00	6.67	6.00	-2.67	0.45

The following Table shows information of the respondents regarding the actual yield differences in some crops and livestock milk yield. Among all compared crops and livestock milk yield of the member respondents is higher than non member respondents. The reasons for this yield difference may be the knowledge of respondents regarding agricultural practices like varietal seed, land management practices, sowing time and methods, irrigation timing and techniques, application of fertilizer and pesticides, availability of new technologies and harvesting and storage methods. Beside these reasons, the availability of new technology and agricultural extension services to the farming community are also vital. The p-values of wheat yield (0.13), open pollinated maize yield (0.21) and buffalo's milk yield (0.70) show non-significant difference while the p-value of hybrid maize yield (0.01), rice yield (0), onion yield (0.01), cow s' milk yield (0) and

goats' milk yield (0) show significant differences in the both types of respondents.

Table-5. Information of the respondents regarding difference in crops and milk production.

Crops/Livestock	Constant	dummy	p-value
Wheat	21.98	3.08	0.00
	1.44	2.00	0.13
Hybrid maize	19.50	13.89	0.00
	3.90	4.50	0.01
Open pollinated maize	16.53	-2.16	0.00
	1.20	1.70	0.21
Rice	26.38	17.74	0.00
	2.76	4.36	0.00
Onion	76.25	116.61	0.05
	36.29	41.15	0.01
Cow's milk Kg/day	5.00	1.59	0.00
	0.54	0.70	0.03
Buffaloes milk Kg/day	7.70	0.38	0.00
	0.72	0.96	0.70
Goat milk Kg/day	0.88	1.13	0.00
	0.08	0.17	0.00

During this study both these types of the respondents were also asked about problems or the areas where they though improvement is needed regarding the services provided by FSC. Figure1 shows problems of the FSCs suggested by farmers. Most of these two types of respondents believed that lack of facilities or even agricultural inputs in FSCs are the major constraints which limit its goal of bringing revolutionary changes in agricultural community of the KP province. Majority of the respondents also were of the view that unavailability of agricultural farm inputs and agricultural machineries on proper time is the main problem in FSCs. Some of the respondents argued that high rates of inputs and biased agriculture services in the department are the main problems faced in their interaction with FSCs. Some of the respondents were not optimistic about the performance of FSC and expressed that this organization did not work properly and even does not inform them us about different agricultural activities scheduled in their areas. Some of the respondents deemed it necessary to strengthen the FSC by making sure the availability of credits and laser facilities to the targeted farming community.

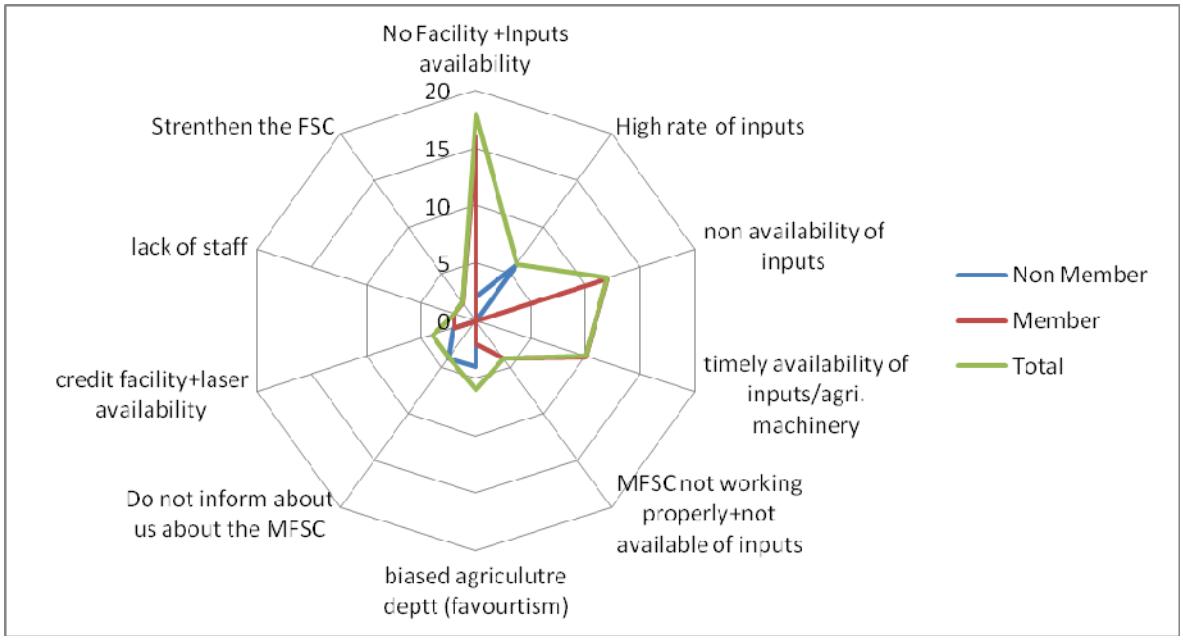

Figure-1. Distribution of respondents regarding problems face in farm services centers**.**

The prime responsibility of the FSCs is to focus on promoting linkages not only within their fellow farmers but also encourage their interaction with different other relevant governments departments, private traders and different organizations to enhance the overall agricultural productivity. As is obvious from the results of this study these FSCs have successfully changed the member farmer's yield considerably still, there is a wide gap to bring the desirable change in the yield of farming communities. In order to make the FSCs more efficient and profitable some suggestions should be taken into consideration. The most important is the availability of agricultural farm inputs on proper time and reasonable price to farming communities. It is also necessary that FSCs expand their services to non member respondents as they are part of farming communities and equally important for achieving targeted objectives of modernizing agricultural technologies adapted by the farming. As agricultural credits facilitate the application of new technology (Houseini, Khaledi, Ghorbani, and Brewin, 2011), and is thus a key to promote business skills and help in poverty reduction (Poliquit, 2006), therefore the availability of agricultural credits through these FSCs can change farmers' lives generally and agricultural production specifically.

CONCLUSIONS

It can be concluded from the results that majority of the farmers are middle aged with low educational background. They have ample experience of farming; still their production is lower from the potential yield. The member farmers of the FSC are enjoying significantly increased productivity in some crops, livestock and milk. Although the overall impact of these FSCs is positive still there is enough room for further improvement. The availability of improved varieties seed, fertilizer and pesticides on proper time along with modern agricultural machineries in these FSCs can achieve the desirable change. In order to motivate the farmers for greater yield, the availability of agricultural credits to the farming communities through these farm services centers is also necessary.

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