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FARMERS' EMPOWERMENT UNDER FSC APPROACH REGARDING SELECTED AGRICULTURAL INPUTS IN KHYBER PAKHTUNKHWA, PAKISTAN

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Abstract

With the emergence of new ideas and approaches in agricultural extension system modern phenomenon like privatization, decentralization and public-private partnership has received more success in the farming communities. Farm Services Center is also such type of approach initiated in Khyber Pakhtunkhwa province of Pakistan. In this study 400 member farmers from five different districts named Swat, Dir Lower, Swabi, Mansehra and Dera Ismail Khan of Khyber Pakhtunkhwa province were selected for data collection purpose as a sample size to determine the farmers' empowerment under FSC approach regarding selected agricultural inputs in Khyber Pakhtunkhwa, Pakistan. The findings revealed that majority of the respondents i.e. 63.25, 41.46, 44.94, 68.59 and 59.48% were benefited by FSCs regarding cultivator, rotavator, maize sheller, land leveler and mould board plough respectively. The inputs such as seed, fertilizer, and farm machinery are insignificantly related to the number of years being registered, when comparing those who are registered 6-10 years to those registered more than ten years. The study concludes that FSCs failed to provide all machinery to all of the respondents. Farmers were much facilitated regarding provision of seeds, fertilizers and pesticides. It is recommended that FSCs should be furnished with enough farm machinery to be rented out to the farming community and also should take initiative to compel private companies to sponsor schemes for low cost inputs.

Key words: Farm services center, Farming community, Farm input and Yield performance.

INTRODUCTION

Agriculture is the main source of income generation for a vast majority of population in Pakistan and contributes about 19.8% (GOP, 2016) to national Gross Domestic Product (GDP). Whereas, 60% of this GDP comes from crops while, the

remaining 40% is contributed combined by livestock and forestry. Agriculture improvement, poverty alleviation and rural development in the country have been supported by extension services through the public-private sector under the ministry of agriculture. During the last few decades significant improvement in extension services has been observed in Pakistan.

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Currently the government is focusing to modernize traditional farming practices by transferring improved agricultural technologies to develop rural life in general and enhance crop production in particular. Agricultural extension system in developing countries is faced with numerous problems and challenges such as lack of skills in administrative capabilities and supervisory services to produce more efficiently, lack of information regarding local markets, unavailability of sufficient budget, high cost of transportation and poor linkages among the related entities which have dwarfed significantly the production and productivity of the stakeholders. It is thus imperative to analyze and properly address these problems. During the last decades of the 20th century some of the agricultural developmental programs in region were criticized as being deficient, ineffective, utilizing top-down approach and less targeted to poorer farmers.

Most of these agriculture related problems are not only limited to this particular region as in most other parts of the world numerous such problems are faced by farming community. As world's population is growing with time at a rapid pace, cultivable land is decreasing by global industrialization. Global warming in the form of climatic changes is further aggravating the concerns as it has been reported to negatively affect the average yield of some main crops. There is a tremendous pressure on the growers to produce more and more from the same or smaller fields. In such scenario there is an immense need for a comprehensive agriculture supporting system where every grower combat and develop mutual contacts with researchers, extensionists and policy makers.

In order to improve the extension system, government of Khyber Pakhtunkhwa (KP) province adopted a new agricultural extension approach, called the Farm Services Centers (FSCs) in the year 2000. Available literature (World Bank, 2000; Feder *et al.*, 2001) indicates that local extension work will be more productive if it is strongly supported by the local government. Hence the basic perceptions of these centers are the awareness of local farmers about the improved farming system and to ultimately uplift their socio-economic status in the community. This approach was purely launched for extension services and is based on the public- private partnership to enhance agricultural yield and create linkages among

farming community and different other related departments. These services centers focus to enhance farmers' hidden capabilities and potential in the environment and to develop their linkages with government and non-government organizations. In fact it is the first of its type attempt made only in KP province of the country with the aim to provide physical and financial resources, technical support along with provision of farm machineries and inputs to the farmers.

Any local individual more than 18 years of age having agricultural land or livestock farms or related agribusiness activity is eligible for registration with a nominal charge of Rs. 100. While lifetime membership fee for these FSCs is Rs.500. After membership FSCs provide various farm inputs such as improved varietal seed, fertilizers and agricultural machinery, plus advisory services and guidance regarding different usage of inputs, enhance farmers' knowledge and skills in farm management related activities. The main focus of the study was to determine the farmers' empowerment under FSC approach regarding selected agricultural inputs in Khyber Pakhtunkhwa, Pakistan.

MATERIALS AND METHODS

Universe of the study: The whole Khyber Pakhtunkhwa (KP) province was the universe for the current study. Khyber Pakhtunkhwa occupies the northwestern parts of Pakistan, adjoining Afghanistan in the west, Gilgit-Baltistan (Northern Areas) in the northeast, the semi autonomous Azad Kashmir in the east, and the provinces Punjab and Baluchistan in the southeast and southwest, respectively. The province of KP has an area of 74,521 km², while the Federally Administrated Tribal Areas (FATA) covers 27,220 km². Together they occupy an area of 101,741 km², which makes up 12.8% of Pakistan's total area GoKP (2013).

Sampling technique and sample size: Five districts namely Swat, Dir lower, Swabi, Mansehra and Dera Ismail Khan were purposively selected as these have a diversified type of cropping systems. From these five districts, an equal number of member farmers of FSCs i.e. 80 were randomly selected. In this way a

sample set of 400 respondents were selected for interview schedule with the assumption to represent the whole population.

Collection of data: A comprehensive interview schedule was prepared for data collection in the light of objectives of the study for respondents. Data were collected through face to face meetings with the respondents. During filling the interview schedules each and every question and its purpose was explained to respondents so that accurate and reliable information could be obtained.

Analysis of the data: Data collected was coded into the SPSS. After arranging data according to nature and objective of the study descriptive statistics techniques like frequencies, averages, their comparison and percentages were analyzed using SPSS package. In addition, Multinomial Logistic Regression was applied between inputs provided by FSCs and registration duration of respondents with FSCs.

RESULTS AND DISCUSSION

Agricultural Machinery: Among agricultural operation mechanization holds cynosure position because without proper seedbed preparation and proper mechanization the chances of better production reduced predominantly. It is one of the jobs of FSCs to provide machinery on rental basis to the registered farmers so that they can fulfill their mechanization demand for agriculture farming. The implements provided to the registered farmers includes; cultivator, laser leveler, maize sheller, tractor trolley, threshers etc. In this connection to know the performance of FSCs in facilitation of farmers regarding machinery provision they were probed. The responses of the respondents were recorded and presented in Table 1.

Cultivator: Data presented in Table 1 depicted that cultivator was utilized by all respondents. The performance of FSCs regarding provision of this implement was much better i.e. 63.25% of the respondents reported that they got cultivator from FSCs for field preparation. While 26.75% of the sample respondents hired the cultivator from private agricultural services providers. This might be attributed to the fact that FSCs were far away from

the villages and thus some of the respondents preferred to utilize private source for cultivators. Almost 6% of the respondents had their own cultivators whereas 4.5% of the respondents utilized the cultivator of fellow farmers on rented basis (Table 1).

Rotavator: Data in Table 1 reflected that rotavator was utilized by 164 respondents out of 400. The rotary cultivator is widely considered to be the most important tool as it provides fine degree of pulverization enabling the necessary rapid and intimate mixing of soil. Thus rotavator is the basic requirement of all the farmers therefore respondents were evaluated and it was observed that majority (41.46%) of the respondents utilized rotavator hired from FSCs source. The second major source for rotavator was private sources i.e. 39.63%. Similarly, 15.24% of the respondents had hired rotavator from fellow farmer whereas only small fraction of respondents (3.66%) had their own rotavators (Table 1). From the instant results it can be concluded that irrespective of sources the farmers were devoted to prepare best land for crops cultivation thus they hired rotavator from various sources. The reason might be that due to the lacks of rotavator implements in FSCs so the implements cannot reach to all member farmers timely so the FSCs members hired rotavator from other sources in the study area.

Thresher: Data presented in Table 1 reflected that threshers were utilized by all respondents of the study. Overwhelming majority (73.75%) respondents utilized threshers to thresh their harvested crops being hired from private sources. Second major source for thresher was fellow farmers as reported by 10.5%. Only 9.5% of the respondents reported that they hired thresher from FSCs which might be due to the fact that threshers usually got stuck on the own agricultural extension department farms. Minute numbers (6.25%) of the respondents had their own threshers (Table 1).

Maize Sheller: Those respondents which had cultivated maize i.e. 267 respondents were further investigated about the source of maize sheller and their responses were presented in Table 1. It was found that majority (44.94%) of the respondents were facilitated by FSCs regarding maize shellers. Second major source of maize being reported by respondents was private sources (35.58). About 11% of the

respondents took maize sheller from fellow farmers whereas almost 9% of the respondents had their own maize shellers (Table 1).

Tractor Trolley: Tractor trolley is also important implement to transport the produce. Data presented in Table 1 showed that tractor trolley were utilized by all the respondents under study among which 77.25% of the respondents seek private source for this implement. Similarly 11.25% of the respondents hired tractor trolley from fellow farmer source whereas almost 6% of the respondents benefited from FSCs (Table 1). Only 6% of the respondents reported that they had their own tractor trollies.

Land Leveler: Data presented in Table 1 showed that 277 respondents utilized land leveler among which majority (68.59%) of the respondents were facilitated by FSCs. Also 24.55% of the respondents utilized fellow farmer source for land leveler whereas 4.33% of the respondents utilized private sources. Only 2.53% of the respondents reported that they had their own land levelers.

Hand Spray Machine: Hand spray machine is also an important implement mostly utilized by vegetables growers. The respondents were probed about hand spray machine and their responses were presented in Table 1. It was observed that 261 respondents utilized hand spray machine among which majority (37.16%) had their own hand spray machines. FSCs provided hand spray machines to 31.8% whereas 19.92% utilized fellow farmer source

and private sources for hand spray machine was utilized by 11.11% (Table 1).

Boom Spray machine: As boom spray machine is tractor driven and not affordable for all the farmers. Thus it was found that only progressive farmers utilized this implement. Boom Spray machine was utilized by 53 respondents only and they were from district Dera Ismail Khan (Table 1).

Laser leveler: Due to importance of laser leveler the farmers were also evaluated about the provision of this implement and their responses are presented in Table 1. It was observed that 38 respondents utilized this implement and it was available only in FSCs (Table 1) of district Dera Ismail Khan. It can be concluded that farmers were much devoted to their crop improvement and getting high yield that's why they were using modern implements on their farms.

Mould Board Plough: Mould board plough is one of the oldest of all agricultural implements and is generally considered to be the important tillage implement. During study it was observed that 116 respondents utilized mould board plough. FSCs were the major source for this implement as reported by 59.48% of the sample respondents. While 18.1% of the respondents hired mould board plough from private sources whereas 15.52% of the respondents had their own mould board plough. Almost 7% of the respondents hired from fellow farmers (Table 1).

Implements	Categories	Count	%
Source of Cultivator	Own	22	5.5
	FSC	253	63.25
	Fellow Farmer	18	4.5
	Private	107	26.75
	Total	400	100
Source of Rotavator	Own	6	3.66
	FSC	68	41.46
	Fellow Farmer	25	15.24
	Private	65	39.63
	Total	164	100

Continued table 1....

Source of Thresher	Own	25	6.25
	FSC	38	9.5
	Fellow Farmer	42	10.5
	Private	295	73.75
	Total	400	100
Source of Maize Sheller	Own	24	8.99
	FSC	120	44.94
	Fellow Farmer	28	10.49
	Private	95	35.58
	Total	267	100
Source of Tractor Trolley	Own	24	6
	FSC	22	5.5
	Fellow Farmer	45	11.25
	Private	309	77.25
	Total	400	100
Source of Land Leveler	Own	7	2.53
	FSC	190	68.59
	Fellow Farmer	68	24.55
	Private	12	4.33
	Total	277	100
Source of Hand Spray Machine	Own	97	37.16
	FSC	83	31.8
	Fellow Farmer	52	19.92
	Private	29	11.11
	Total	261	100
Boom Sprayer	Own	0	0
	FSC	53	100
	Fellow Farmer	0	0
	Private	0	0
	Total	53	100
Laser Leveler	Own	0	0
	FSC	38	100
	Fellow Farmer	0	0
	Private	0	0
	Total	38	100
Mold Board Plough	Own	18	15.52
	FSC	69	59.48
	Fellow Farmer	8	6.9
	Private	21	18.1
	Total	116	100

Source of Seed: FSCs are also responsible for provision of seeds to their registered farmers thus the farmers was investigated about the provision of seeds and their responses were presented in Table 2. It was found that 385 respondents cultivated wheat among which majority (56.62%) of the respondents received

wheat seed from FSCs followed by home seed 27.79%, village market 10.13%, agriculture research station 2.86% and fellow farmers 2.6% (Table 2). Almost 50% of sample respondents had their own sugarcane seed. While FSCs provided sugarcane seed to 28.57% of the respondents whereas the rest of the

respondents utilized other sources for sugarcane seed i.e. Fellow Farmers (11.11%), Agriculture research station (7.94%) and village market i.e. 3.17% (Table 2). More than fifty percent of the sample respondents obtained rice seed from FSCs followed by home seed 18.18%, while rest of the sample farmers received rice seed from other sources (Table 2). Similarly, majority (35.58%) of the sample farmers received maize seed from FSC followed by home seed 34.46% whereas the rest of the sample respondents utilized other sources i.e. Village Market (27.72%), Agriculture Research (1.5%) and Fellow Farmers (0.75%). Onion was cultivated by 76 respondents

among which majority (39.47%) of the respondents obtained onion seed from village market, while 26.32% of the respondents received onion seed from fellow farmers. Only 11.84% of the respondents got onion seed from FSCs. Home seed was cultivated by 19.74% of the respondents in the study area. More than fifty percent of the sample farmers purchased tomato seed from FSCs, while the seed of minor crops did not provided by the FSCs to their member farmers in the study area (Table 2). From the present findings it can be concluded that most of the farmers were empowered by FSCs regarding provision of seeds of various crops/vegetables in the area.

Crops/Vegetables	Categories	Counts	%
Source of Wheat Seed	Home seed	107	27.79
	Fellow Farmers	10	2.6
	FSC	218	56.62
	Agriculture Research	11	2.86
	Village Market	39	10.13
	Total	385	100
Source of sugarcane seed	Home Seed	31	49.21
	Fellow Farmers	7	11.11
	FSC	18	28.57
	Agriculture Research	5	7.94
	Village Market	2	3.17
	Total	63	100
Source of Rice seed	Home Seed	8	18.18
	Fellow Farmers	1	2.27
	FSC	23	52.27
	Agriculture Research	1	2.27
	Village Market	11	25
	Total	44	100
Source of Maize seed	Home Seed	92	34.46
	Fellow Farmers	2	0.75
	FSC	95	35.58
	Agriculture Research	4	1.5
	Village Market	74	27.72
	Total	267	100
Source of Onion Seed	Home Seed	15	19.74
	Fellow Farmers	20	26.32
	FSC	9	11.84
	Agriculture Research	2	2.63
	Village Market	30	39.47
	Total	76	100

Continued table 2...

Source of Gram	Home Seed	22	53.66
	Fellow Farmers	11	26.83
	FSC	5	12.2
	Agriculture Research	1	2.44
	Village Market	2	4.88
	Total	41	100
Source of Mung	Home Seed	8	21.05
	Fellow Farmers	6	15.79
	FSC	0	0
	Agriculture Research	0	0
	Village Market	24	63.16
	Total	38	100
Source of Tomato	Home Seed	13	16.67
	Fellow Farmers	8	10.26
	FSC	41	52.56
	Agriculture Research	0	0
	Village Market	16	20.51
	Total	78	100
Source of pea	Home Seed	3	9.38
	Fellow Farmers	1	3.13
	FSC	0	0
	Agriculture Research	6	18.75
	Village Market	22	68.75
	Total	32	100
Source of Tobacco	Home Seed	36	64.29
	Fellow Farmers	20	35.71
	FSC	0	0
	Agriculture Research	0	0
	Village Market	0	0
	Total	56	100
Source of Shaftal	Home Seed	0	0
	Fellow Farmers	0	0
	FSC	8	14.29
	Agriculture Research	0	0
	Village Market	48	85.71
	Total	56	100

Fertilizers: Table 3 shows the responses of the respondents regarding the sources of fertilizers. The results shows that majority of the respondents (82%) have purchased urea from FSC while 18% of the respondents purchased it from the input dealer. Majority of the respondents (68%) purchased DAP from FSC whereas 32% of the respondents purchased DAP from the input dealers. The results also showed that Nitrophos was provided to 58%, Gypsum 57.5%,

Super silica 81%, super micron 83% and SSP to 56% of the respondents while 42%, 42.5%, 19%, 17% and 44% of the respondents had purchased Nitrophos, Gypsum, Super silica, super micron and SSP from the input dealers respectively. During the informal discussion with the respondents, it was found that the respondents face the problem of timely non-availability of fertilizers from FSC.

Fertilizers	FSC	Input Dealer	Total
Urea	327 (82)	73 (18)	400
DAP	252 (68)	120 (32)	372
Nitrophos	114 (58)	83 (42)	197
Gypsum	157 (57.5)	116 (42.5)	273
Super silica	192 (81)	44 (19)	236
Super micron	139 (83)	29 (17)	168
SSP	165 (56)	130 (44)	295

Multinomial Logistic Regression Model: Data in Table 4 showed the results of multinomial logistic regression of inputs provided by FSCs i.e. seed, fertilizers, pesticides and farm machinery with registration duration of respondents with FSCs. The figures along with inputs represents the scale i.e. 1=very low, 2=low, 3= medium, 4= high and 5= very high. The reference category for this multinomial logistic regression was 10+ years of registration with FSCs. Multinomial logistic regression for farm machinery shows that medium category is significantly related to the response, to the number of years since registered with p-value=0.020, which means that provision of farm machinery by FSC as inputs, the medium to the high responses are low for the respondents who are registered less than 5 years as that of respondents who have been registered more than 10+ years. The inputs as seed, fertilizer, and farm machinery are insignificantly related to the number of years being registered, when comparing those who are registered 6-10 years to those registered more than ten years. The medium input of seeds is 2.8 times higher for those who are registered from 6-10 years as compared to those registered for more than 10+ years. The analysis reveals that the

odds ratio for very high category inputs about seeds as compared to other categories is higher for those 6-10 years than more than those having 10+ years of registration with FSCs. The odds are high in low to high category of fertilizer input by FSCs for farmers having 6-10 years of registration as that of more than 10+ years which shows that recently registered farmers took more fertilizer inputs from low to high category as compared to old registered farmers. For odds of medium input category of pesticides is highly significantly (p-value=0.004) related with duration of registration. The odds are very low 0.096 that a farmer of 6-10 years registration time take medium input of pesticide as compared to 10+ years of registration with FSCs. As the other odds ratios are less than 1 which shows that the farmer having 6-10 years of registration take very high input of pesticides as compared to more than 10+ years of registration with FSCs. Categories of farm machinery are insignificantly related to duration of registration and odds ratio are more than 1 in low and moderate category which shows that farmer having 6-10 years registration take high input of farm machinery in low to moderate category as compare to more than 10 year of registration.

Table (4): Multinomial Logistic Regression of Registration duration with FSCs and Inputs Provided

Since how many years you are registered ^a		B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
<= 5	Intercept	1.722	.345	24.953	1	.000			
	Seeds=1	-1.000	.640	2.438	1	.118	.368	.105	1.291
	Seeds=2	-.520	1.009	.265	1	.607	.595	.082	4.297
	Seeds=3	1.759	.930	3.582	1	.058	5.808	.939	35.914
	Seeds=4	-.442	.766	.333	1	.564	.643	.143	2.882
	Seeds=5	0 ^b	.	.	0	.	.	.	.
	Fertilizer=1	1.838	.772	5.670	1	.017	6.281	1.384	28.504
	Fertilizer=2	1.420	1.125	1.594	1	.207	4.137	.456	37.499
	Fertilizer=3	.489	.770	.403	1	.526	1.630	.360	7.375
	Fertilizer=4	.123	.694	.031	1	.859	1.131	.290	4.408
	Fertilizer=5	0 ^b	.	.	0	.	.	.	.
	Pesticide=1	-.375	.407	.848	1	.357	.687	.309	1.527
	Pesticide=2	.138	.738	.035	1	.852	1.148	.270	4.879
	Pesticide=3	-1.245	.726	2.939	1	.086	.288	.069	1.195
	Pesticide=4	-1.100	1.035	1.131	1	.288	.333	.044	2.528
	Pesticide=5	0 ^b	.	.	0	.	.	.	.
	Farm Machinery=1	-.270	.432	.391	1	.532	.763	.328	1.779
	Farm Machinery=2	.920	1.216	.572	1	.449	2.508	.231	27.191
	Farm Machinery=3	-1.029	.442	5.433	1	.020	.357	.150	.849
	Farm Machinery=4	-.769	.642	1.433	1	.231	.464	.132	1.632
Farm Machinery=5	0 ^b	.	.	0	.	.	.	.
6 - 10	Intercept	.872	.378	5.310	1	.021			
	Seeds=1	-.851	.759	1.254	1	.263	.427	.096	1.893
	Seeds=2	-1.362	1.239	1.210	1	.271	.256	.023	2.902
	Seeds=3	1.042	.988	1.112	1	.292	2.835	.409	19.658
	Seeds=4	-1.216	.852	2.037	1	.154	.296	.056	1.574
	Seeds=5	0 ^b	.	.	0	.	.	.	.
	Fertilizer=1	1.104	.891	1.535	1	.215	3.017	.526	17.312
	Fertilizer=2	1.803	1.331	1.834	1	.176	6.066	.446	82.422
	Fertilizer=3	1.611	.852	3.579	1	.059	5.010	.944	26.596
	Fertilizer=4	.947	.751	1.593	1	.207	2.579	.592	11.229
	Fertilizer=5	0 ^b	.	.	0	.	.	.	.
	Pesticide=1	-.733	.450	2.656	1	.103	.481	.199	1.160
	Pesticide=2	-.261	.785	.110	1	.740	.771	.165	3.589
	Pesticide=3	-2.342	.818	8.195	1	.004	.096	.019	.478
	Pesticide=4	.102	1.039	.010	1	.922	1.107	.144	8.492
Pesticide=5	0 ^b	.	.	0	.	.	.	.

<i>Continued table 4.....</i>									
Farm Machinery=1	-.312	.494	.399	1	.528	.732	.278	1.928	
Farm Machinery=2	.920	1.303	.499	1	.480	2.509	.195	32.239	
Farm Machinery=3	.629	.453	1.933	1	.164	1.877	.773	4.557	
Farm Machinery=4	-1.363	.797	2.923	1	.087	.256	.054	1.221	
Farm Machinery=5	0 ^b	.	.	0	.	.	.	.	.

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that FSCs failed to provide all machinery to all respondents. Some of the machinery was provided to half of the respondents whereas some of the implements were not provided even to the half of the respondents. This was due to fewer implements available in FSCs that's why they were unable to facilitate all the respondents. Farmers were much facilitated regarding provision of seeds, fertilizers and pesticides which is a good sign towards the adoption of latest/improved varieties also towards the food sustainability. It is recommended that FSCs should be furnished with enough farm machinery to be rented out to the farming community. The FSCs must build their own linkages as well with input providing companies i.e. seed, fertilizers and pesticides to buy inputs on subsidized rates from them and to be sold out to farmers. FSCs should take initiative to compel private companies to sponsor schemes for low cost inputs.

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REFERENCES

- Chaudary, K. M. 2006. Analysis of Alternative Extension Approaches to Technology Dissemination and its Utilization for Sustainable Agricultural Development in the Punjab, Pakistan. Ph.D. Thesis, Department of Agricultural Extension, Univ. of Agri, Faisalabad., Pp. 55-56.
- Feder, G., A. Willett and W. Zipp. 2001. Agricultural Extension: Generic Challenges and the Ingredients for Solutions. In S. Wolf, & Zilberman, D. (Ed.), Knowledge Generation and Technical Change: Institutional Innovation in Agriculture, pp: 313-356.
- GoP. 2016. Ministry of finance, Pakistan economics survey 2015-16 Islamabad. http://www.finance.gov.pk/survey/chapters_16/02_Agriculture.pdf.
- GoKP. 2013. Crops statistics of Khyber Pakhtunkhwa, crops reporting services, Agriculture, Livestock cooperative department, Peshawar.
- IFAD. 2002. Assessment of Rural Poverty in Asia and the Pacific. International Fund for Agricultural Development, Rome. [Online] http://www.ifad.org/poverty/region/pi/PI_part1.pdf. Accessed on: April 12, 2015.
- Khooharo, A. A. 2008. A Study of Public and Private Sector Pesticide Extension and Marketing Services for Cotton Crop. Ph.D. Dissertation, Department of Agricultural Education, Extension & Short Courses, Sindh Agriculture University, Tandojam, Pakistan. Pp. 42.
- Mesic, Ž., D. Žutinicand and J. Wibberley. 2007. Rural Technology Transfer in Transition Economies in Croatia. Under Project Agro Economic Policy Analysis of the New Member States, the Candidate States and the Countries of the Western Balkan. CEEC Agri Policy.
- Verma, N. K., D. K. Pandey and A. D. Upadhayay. 2013. Performance Evaluation of Fishery Based Self Help Groups in West Tripura. Indian Res. J. Ext. Edu., 13 (3): 15-18.
- World Bank. 2000. Decentralising Agricultural Extension: Lessons and Good Practice.