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ASSESSMENT OF AGRICULTURE SERVICE PROVIDERS' TRAINING ON WATER CONSERVATION TECHNOLOGIES IN POTHWAR REGION

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ABSTRACT:- Water conservation technologies especially, High Efficiency Irrigation Systems (HEIS) remained unpopular due to absence of service sector for these technologies despite of the efforts being carried out since long. Therefore, a training component to prepare a cadre was included in the USDA funded 'Watershed Rehabilitation' project being implemented in collaboration with ICARDA and other NARS partners. The prime objective of these training programmes was to impart training based skills on water conservation technologies. To help in improving the effectiveness, the socioeconomic backup for assessment of these trainings was included as part of the activity. The information for paper is collected from opinions of the participants before and after the training. Descriptive analysis alongwith paired 't' test was used to measure the effectiveness of training. Results indicated higher satisfactory level as majority of the participants were strongly agreed (73%) and agreed (23%) that trainings were participatory and skill development oriented and as 96% agreed or strongly agreed that these were helpful in starting the business as assessment of agriculture service providers (ASPs). It can be concluded that the necessary condition has been fulfilled for water conservation. However, for assessing the impact of these skills towards water conservation technologies needs to be investigated in short and long term scenarios. Therefore, for fulfilling the sufficient condition realizing the real benefits from these trained ASPs further follow up by the concerned technical institutes is recommended.

Key Words: Agriculture Service Provider; Training Assessment; Paired T-test Analysis; Water Conservation Technology; Pakistan.

INTRODUCTION

The competition of industrial and domestic users for water as been increased with the higher population growth and concerns are being raised about the productivity of water used in agriculture. Increasing water scarcity is seen as a major contributor to stagnating productivity of major crops in the area. Since mid 1980s, researchers, farmers, extension specialists, machinery importers and local machinery manufacturers have been working to adopt resource conserving technologies. Evidence has emerged in recent years to suggest that these efforts are fruitful (Farooq et al., 2006). The innovations in water sector such as bed and furrow irrigation and zero tillage have gained popularity instead of HEIS such as sprinkler, drip & bubbler irrigation systems and other water conservation technologies are unpopular due to high initial cost of the system, non-availability of parts (under developed

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markets for these technologies) operational technicalities and system maintenance. Currently local farming community is involved in provision of agricultural services where they are dealing in input supplies like pesticides, seed, fertilizer, and providing technical services on tractors, threshers and ridgers etc. (Ali et al., 2011). In the new economic regime where market forces will play a major role; the private sector can increasingly provide agroservices. In this scenario, local service providers can play very important role as they are directly accountable to farmers and get their income from them (Sulaiman et al., 2005). According to Mengal et al. (2012), agricultural services provision system to transfer new technologies could be more strengthen by involving farmers at local level to get their feedback. There is need to improve the situation by providing the training and technical support to them for operation and management. Trend is rapidly emerging globally to include training and other modes of capacity building in technology transfer models (Darkenwald and Merriam, 1982). There is wide recognition that capacity building and trainings are prerequisites to economic and social development (World Bank, 2006). Capacity building and training have long been recognized as an important component of most research for development activities (Gordon and Chadwick, 2007). Hence there is need of training to build capacity of the service providers for water conservation technologies for precision agriculture as well as building of local manufacturers of these systems to reduce the cost (Alam et al., 2006). Hence such trainings are made part of almost all development projects according to emerging global scenarios. Since the absence of services sector for these technologies at grass root level is one of the major limiting issues, a training component for preparing a cadre of village level agricultural service providers was included in the USDA funded 'Watershed Rehabilitation' project being implemented in collaboration with ICARDA and other NARS partners. The prime objective of these training programmes was to impart skills based training on water conservation technologies to improve services for the early adopters and help in technology adoption with increasing employment opportunities as secondary objective. To make dissemination activities more effective, assessment and documentation of feedback on such undertakings was also made. Present study was aimed to make appraisal of ASPs' trainings conducted under ICARDA watershed project in Pothwar to ensure the effectiveness of training and to analyze the impact of these trainings on knowledge and skills of the participants.

MATERIALS AND METHOD

Service providers play an important role in transferring technology and creating the awareness. ASPs were selected on the criteria set by USDA and other technical partners. They were selected randomly, from the project sites and interviewed for right selection and got training. Training was more on hand learning by doing the things. As quality and effectiveness of the training is a qualitative phenomenon and could not be measured directly through documentation based on participants' views, therefore, Likert scale was used to organize above data for analysis. The observations were recorded based on participation in the

trainings, focus group interaction with the target trainees and documentation of feedback from trainees along with the interest and requirements of their respective areas. Separate questionnaires were developed for pre and post training information. Pre-training data was collected to look for involvement of participant in type of services and some basic information about the participants like farming experience, education, status as ASP etc. Post training questionnaire was to collect data on variables like relevancy of training with participants, existing service provision, practicality and skill development of the training, discussion of field related issues, and compatibility of the technologies covered in the training in participants' respective areas. Interview method was employed to collect data through questionnaires. Structured interviews were conducted to collect the data from participants' own perspective and to give feedback on different technologies introduced during the training and field visit.

Information was collected and data was entered and analyzed on software programme of Statistical Package for Social Sciences (SPSS). Paired t-test examines the mean of individual differences of paired measurements and thus is appropriate for pre-post situations (Park, 2009). Paired t-test was applied to compare the knowledge and capabilities of the participants about management of water conservation technologies be-fore and after training scenario.

RESULTS AND DISCUSSION

Socioeconomic Characteristics

Data of four trainings conducted in sequence under watershed project were collected from participants. Fifty nine out of sixty participants were interviewed. They were mainly from Pothwar including Chakwal district (Kalar Kahar, Talagang, Choha Saidan Shah), Attock (Fatehjang), and Rawalpindi (Murree) and some from Faisalabad and Layya while five from Balochistan (Loralia, Musa Khel, Zob, Qila Saifullah). Sample comprised respondents from different age groups, farming experience and education (Table 1).

Majority of respondents (59%) representing farming community were fully engaged in farming, 32% were partially engaged while only 9% were not involved in any farming activity. Regarding services provision status, 20% of the respondents were providing services (like tractor, seed drill, MB plough, bed planter, and seed & fertilizer supply services) seasonally, 22% were engaged on whole year basis whereas, 58% were not involved in any kind of activity regarding agricultural services (Table 2). This conclude that emphasize should be on right selection of the participants to spread the impact of training on large scale. Since services sector for water conservation technologies especially HEIS is not much developed yet, none of the participants was involved in service provision for these technologies.

Table 1. Socioeconomic characteristics of respondents

Variables (years)	Minimum	Maximum	Mean	Standard Deviation
Age	16	65	34.59	12.90
Education	0	18	10.31	03.42
Farming experience	0	45	12.39	12.03

Source: Field Survey 2013-15

Key Indicators of Training Quality

The key indicators established to assess the quality of training and rating

Table 2. Involvement in farming and agricultural service provision

Involvement in farming	Frequency	Percent
Full time	35	59.3
Part time	19	32.2
Nil	5	8.5
Total	59	100.0
Status as ASP		
Seasonal	13	22.0
Whole year	12	20.3
Not ASP	34	57.7
Total	59	100.0

Source: Field Survey 2013-15

included i) relevancy of the training to the service provision activity of participants if they are already ASPs, ii) to which extent the training is helpful to extend service provision (if already ASP) or to start providing services in water sector (if not ASP already), iii) practicality and skill development in training, iv) compatibility of water conservation technologies in participants' respective areas. As many as 57.7% of the participants were not ASPs so training was irrelevant to their existing activities while majority of them apportioned positive standards and only few (6.9%) showed negative expressions in this regard (Table 3). However, the training was helpful to start business as ASPs in HEIS sector even if they are not already ASPs. When objective question was asked that to what extent training is helpful to start business as ASP, about 96% expressed positive valuations. Since the objective of the training was to equip the local serv-ice providers with skills to provide services on watershed technologies, response was positive. It was recommended after the first training that more time should be allocated for practical installation of the technologies by the participants. The strategy proved best as majority of the respondents (73%) were of the view that training was more on skill development through practical training and built confidence to them. Whereas some disagreed to this statement. This was important to know the respondent perception about target technologies for which the ASPs are being technically equipped (Table 3). Overall trainings were rated good in terms of training course and methodology of the training.

Impact of Training on Knowledge and Capabilities

A paired samples t-test was used to compare two related means i.e., before and after training to know the change in technical knowledge and skills of trainees about the solar, drip, bubbler and sprinkler irrigation system. The null hypothesis shows that difference in means was zero showing no change in knowledge against the alternate H_1 showing that

Table 3. Percent response to key indicators for assessing training quality

Response	Training relevancy with business	Helpful to start as business	Participatory and skill development	Compatibility in area
Strongly agree	18.6	50.8	72.9	47
Agree	16.9	45.8	23.7	39
Disagree	6.9	3.4	3.4	14
Not applicable	57.6			
Total	100	100	100	100

Source: Field Survey 2013-15

Table 3. Paired sample t-test

Indicator	Paired differences					df	Sig. (2-tailed)
	Mean		Std. deviation	95% confidence interval			
	Before	After		Lower	Upper		
Solar system	1.4068	3.0000	0.619	1.432	1.755	58	0.000
Drip irrigation system	1.8475	3.6441	0.664	1.624	1.970	58	0.000
Bubbler irrigation system	1.7966	3.5932	0.637	1.631	1.963	58	0.000
Sprinkler irrigation system	1.4746	3.2542	0.671	1.605	1.955	58	0.000

Source: Field Survey 2013-15

difference is not zero.

H_0 difference in mean=0
H_1 difference in mean≠0

Results are analyzed at 0.05 critical level and showed the statistically significant result (P< 0.05) so results are statistically significant and there is difference in mean before and after the training (Table 4).

Trainings are important instrument for dissemination of technologies and to build up and improve human skills and abilities regarding developmental process (Prasad, 1994). Analysis revealed that training has equipped the participants with skills and capabilities for installation and functioning of the mentioned technologies and improved the technical knowledge of the participants. These results get support from the literature that trainings impact the people very positively in building capacity and accelerating development process (Ahmed et al., 2007; Siddiqui et al., 2012; Hoque and Usami, 2008).

CONCLUSION AND RECOMMENDATIONS

Trainings were successful in improving knowledge and skills of the participants. Strategy to focus more on delivering practical knowledge to develop skills proved the best and hence recommended to employ this methodology in trainings/capacity building activities in development projects. However, it is essential to ensure integration among all stake-holders involved in dissemination of these technologies including research professionals, extension agents and manufacturers/input suppliers. Since the high efficiency irrigation systems are capital intensive and need above average returns on investment to pay back the investment, so training should also include knowledge to create awareness regarding shift from subsistence agriculture to high value crops under HEIS systems. Moreover, for assessing the impact in terms of utilization of these skills and knowledge towards larger objectives for up scaling of water conservation technologies, it needs to be investigated in short and long term scenarios. Therefore, for fulfilling of the sufficient condition to realize the benefits from these trained ASPs, further follow up by the concerned technical institutes is recommended.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

S. No	Author Name	Contribution to the paper
1.	Ms. Sumia Bint Zaman	Writen and organized this paper, Surveys and data collection, Data entry & SPSS analysis, Introduction, Methodology, Results & discussion and References.
2.	Mr. Waqas Farooq	Wrote abstract, Data collection Methodology and SSPS analysis
3.	Ms. Sidra Majeed	Data collection (surveys) and analysis
4.	Mr. Hasnain Shah	Technical input at every step in analysis
5.	Mr. Abdul Majid	Technical support for conducting this research activity

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