

Full Length Research Paper

Farmers training programme of Ethiopian Institute of Agricultural Research: An appraisal

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A large number of high yielding crop varieties, management practices, and other technologies have been generated by Holetta, Debre Zeit and Melkassa Research Centres. While the core functions of Ethiopian Institute of Agricultural Research (EIAR) are technology supply; popularization; national coordination and capacity building and policy development; the research and extension division of EIAR is responsible for catalyzing scaling up and scaling out technologies. Training of farmers, development agents, and other extension staff has been an important component of this task. This study was undertaken to appraise the status of EIAR's farmers training approach. One wereda was purposely selected in the localities where each one of the three research centres has operated over the last several years. Equal numbers of respondents were selected and qualitative and quantitative data were collected from each centre. Primary and secondary data were also gathered using structured and informal interviews and analyzed. The quantitative data were analyzed using descriptive statistical tools such as frequency, percentage and chi-square test. The result of study shows that the most important problems identified in the training process were absence of training need assessment, shortage of training time, and too much theory during training and limited use of indigenous knowledge. Therefore, it is recommended that, during training process all the three research centres should include training need assessment which is the first steps in designing a training and development program.

Key words: Onion, durum wheat, potato, extension package, training, farmers, research centre.

INTRODUCTION

Ethiopian Institute of Agricultural Research (EIAR) is engaged in agricultural research and extension activities. EIAR's role would include finding innovative and effective means of technology dissemination (Zelege, 2000; Abate, 2007). The focus of Research-Extension-Farmer Linkage, so far, has been technology transfer. Each improved technology has been demonstrated in one or two peasant associations, mostly in the vicinities of research centres. Several agricultural technologies and high yielding varieties were released from the research centres operating under the umbrella of EIAR such as Holetta, Debre Zeit and Melkassa Research Centres. The research and ex-

ension units are responsible for transfer of technologies that are being developed in the respective research centres to farmers and other functionalities through training. The units are charged with the responsibility to support technologies transfer through effective farmers' training. Thus quite significant amount of time and money has been spent on agricultural technologies dissemination through farmers' and development agents' training programs which have been organized by each Agricultural Research Centre of EIAR. To have a clear assessment of these efforts, the evaluation of training is also an important part in the training process cycle. In evaluating an extension training program, one needs to consider that most training activities exist in a larger context of projects, programs, and plans. Raab et al. (1987) define training evaluation as a systematic process of collecting information for and about a training activity which can then be used for guiding

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decision making and for assessing the relevance and effectiveness of various training components. The objective of this study is to analyze different dimensions of farmers' training process by EIAR centres.

RESEARCH METHODOLOGY

Selection of the study area and training program

A purposive sampling design was followed for the selection of the study research centres namely Holetta Research Centre (HRC), Debre Ziet Research Centre (DZRC) and Melkassa Research Centre (MRC). This judgmental sampling technique was followed by the investigators due to the reason that these three Research Centres were the most important ones currently involved on technology generation and dissemination under EIAR system. Around each research centre, the study was undertaken in one wereda, which was selected purposively from where the Research Centres had been executing training for the past three years to farmers. This judgmental sampling method was chosen based on the preliminary study undertaken by the investigator. Welmera Wereda, Ada'a Wereda and Adama Wereda were selected for this study from the Weredas where HRC, DZRC and MRC had been offering training for the last three years, respectively. This weredas were purposively selected based on some selection criteria. One of the criteria used during the selection procedure was the fact that the research centres had been offering trainings on agricultural technology (dissemination and extension) and these weredas had more number of participants than other weredas. The *weredas* which were sufficiently close to the research centres to enable a series of visits to selected farmers by the researchers over a limited period of time was another criterion.

HRC offered training for farmers from different weredas on agricultural technologies related to barley, wheat, tef, faba bean, field pea, chickpea, linseed and potato during the last three years from 2005 to 2007. The number of farmers who accessed improved agricultural technologies associated with different crops was found to be higher in Welmera wereda when compared with the other weredas. Therefore, training of potato package being the important one was chosen in the case of HRC to measure training effectiveness in this study. The reason for this was also attributed to the fact that HRC was coordinating national potato research and extension programs and actively involved on dissemination of potato packages nationwide.

Similarly, DZRC had been offering training on improved agricultural technology packages on several crop and livestock related areas of development. The major technology dissemination areas were associated with durum wheat, chickpea, lentils, tef, and poultry and beef production. When one compares training activities and number of farmers in the area of crops and livestock packages dissemination it seems a lot of work had been done by the centre on durum wheat and chickpea improved packages by DZRC over the last five years. Further, durum wheat agricultural technology adoptions as well as disseminations were being coordinated nationally by DZRC. Thus, training of durum wheat package was purposively chosen to assess training effectiveness study in the case of DZRC. Among the Weredas, Ada'a Wereda was found to be highly associated with the dissemination of durum wheat package.

On the other hand, MRC was located in the Ethiopia rift valley and found in warmer weather agro-climatic conditions and thus, improved crop technology packages were mainly associated with fruit and vegetables, haricot bean, sorghum, millet, flower, tef and silk-worm production improved agricultural technology packages. Currently, MRC was highly engaged on adoption of onion production technology and involved on training the technology for farmers and SMEs. Also, MRC was nationally coordinating onion research and

adoption. Therefore, the onion training program was purposively selected for this centre in order to study the effectiveness of the trainings that were being offered to the farmers by the centre. Adama wereda was selected for the study due to the reason that the highest frequency of farmers had training from MRC on onion package.

Study area and site description

HRC is located at a distance of 45 km from the capital city of the country, Addis Ababa. The centre is located at 8°30'E latitude and 9°00'N longitude with 2400 m altitude. The mean annual rainfall was 1078 mm and mean maximum and minimum temperatures were 22.1 and 6.2°C, respectively. Major soil type of the area was nito-sols and vertisols. The Welmera wereda consists of 61 and 39% dega and weynadega, respectively. Research commodities include barley (nationally coordinated), bread wheat, tef, highland oil crops (nationally coordinated), highland pulses (nationally coordinated), potato (nationally coordinated), fruits, soil and water management, dairy (nationally coordinated).

The study related to Debre Zeit Centre was contacted at Ada'a wereda (around Debre Zeit town). Ada'a wereda contains 3, 3 and 94% dega, winadega and kola (hot climate), respectively. The wereda had 79781, 590, 1159.17, 477 and 250 ha of arable, grazing, forest, hills lands and water body, respectively. The total area of the wereda is 92751.33 hectare. The area is found 47 km from Addis Ababa with an average geographic coordinate of 8°44'N latitude and 039°01.5'E longitude and an average altitude of 1900 m above sea level with an average annual rain fall of 851 mm. The average maximum and minimum temperatures were 24.3 and 8.9°C, respectively. The study area consists of almost entirely of Alfisol/Mollisol and Vertisols with high clay content. The study area had a Tepid to cool moist mid to high altitude climate. Research commodities were: tef (nationally coordinated), durum wheat, lentil (nationally coordinated), fruits and vegetable, poultry, (nationally coordinated) dairy, beef, forestry, chickpea (nationally coordinated).

The MRC is found near Awash Melkassa (8°24'N latitude and 39° 12'E longitude) that is 17 km southeast of Nazareth town and 117 km away from Addis Ababa. The area is situated at an altitude of 15 50 m als. The average annual rainfall was 763 mm. The average monthly maximum and minimum temperatures were 28.6 and 13.8°C, respectively. The agro climatic conditions of the centre are classified as dry land and semiarid. The soil of MARC farm had a dominantly loam and clay loam texture. The responsibility of the research centre in terms of research commodities was vegetables (nationally coordinated), fruits (nationally coordinated), sorghum (nationally coordinated), beans (nationally coordinated), maize, tef and farm implements (nationally coordinated).

The study related to MRC was conducted at Adama Wereda. Adama Wereda was located in the central Rift valley of Ethiopia, Oromia Region East Shoa Zone, which was at the distance of 99 km eastern of Addis Ababa. The wereda consists of 31, 45 and 24% low land, mid-high land and high land, respectively. The elevation of the wereda ranges from 1400 m. asl at low land areas to 2700 m asl at the peak of high land. The temperatures of the wereda vary from 17 to 34°C with the rain fall ranging from 600 to 1200 mm.

The total population of the study areas from HRC, DZRC and MRC was 87942, 301029 and 106244, respectively. The total population of male in the study areas associated with HRC, DZRC and MRC was 43672, 156125 and 51814, respectively. While the total population of female in the study areas associated with HRC, DZRC and MRC was 44270, 144904 and 54430 respectively.

Sampling, types and methods of data collection

Sampling

A multistage sampling procedure was selected for the purpose of

this study. From the 14 zones in Oromya region, East Shewa and West Shewa were chosen purposively. The research centres under EIAR namely HRC, DZRC and MRC belonging to these zones were also chosen purposively. As described earlier, one wereda was purposively selected from areas where each one of the three research centres is offering training to the farmers. Equal numbers of trained and untrained respondents were used for this study. Therefore, from each one of the three weredas (Welmera, Ada'a and Adama) 40 trained and 40 untrained farmers were chosen for comparison purpose. The untrained farmers were selected from quite a significant distance away from where the trainings had been offered in order to avoid the cases of knowledge transfer from trained farmers to the untrained ones.

Welmera wereda was in the mandate area of HRC and the farmers trained by the centre were included in the sample from this area. Ada'a wereda was under the area of DZRC and hence the farmers included from this wereda were those who were trained by DZRC and MRC was located in Adama wereda, and the farmers trained by the centre were selected from this wereda. The sample included 40 trained and 40 untrained farmers that were selected randomly from the three weredas of the list of farmers under each centre. Untrained farmers were selected randomly, from the sampling frame creating using the list of farmers growing the selected crop, with the help of development agents and PA leaders. Since the topics selected for the study for the centres were 'potato package' (for HRC), 'durum wheat package' (for DZRC) and 'onion package' (for MRC), the farmers who had participated in the respective trainings were only included in the preliminary lists that were prepared as well as in the sample. Under each research centre one wereda was selected and under each wereda two PA were selected (one for trained and the other for untrained sample farmers) purposively. The PAs which consisted of the highest numbers of trained farmers in the wereda were selected for the purpose of this study.

Types of data

This training effectiveness study was intended to be carried out in two stages through qualitative and quantitative data collection methodologies. Qualitative and quantitative data were collected from the respondents. Primary and secondary data were gathered and analyzed for the purpose of the study.

The sources of primary data were the trained and un-trained farmers in the three weredas where HRC, DZRC, and MRC had been operating. In addition, supplementary qualitative information was collected from some of the extension functionaries who attended trainings in these centres, trainers and training organizations, as well as from farmers.

Methods of data collection

Quantitative data were generated from the farmer respondents using a pre-tested structured interview schedule. From the three weredas, total sample of 240 farmers (40 trained and 40 untrained from each wereda) were chosen to undertake survey for quantitative data collection. For the collection of quantitative data a structured interview schedule was prepared. Fifteen development agents, five for each of the three Research Centres, employed for data collection, were trained on the methodology of data collection for two days. Pre-testing of the structured interview schedule was performed before data collection as a preliminary study in order to check its validity and consistency, and to make refinements. Qualitative data, in line with the objectives of the study, were gathered from both categories of respondents through focus group discussions, in-formal interviews and key informant ratings. Professionals in the research and extension department of EIAR, subject matter specialists who were involved on training in their area of specialization in

EIAR centres, development agents from the study locations as well as from the office of weredas' capacity building and rural development and trained farmers were considered for individual or focused group discussion during qualitative data collection.

Methods of data analysis

All the data were processed and analyzed using appropriate statistical tools to fulfill the objectives of the study. The quantitative data was analyzed using descriptive statistics like frequency, percentages and chi-square were used to test the magnitude of the relationship and influence among dependent and independent variables. The qualitative data were coded, described and interpreted to supplement the quantitative data.

RESULTS AND DISCUSSION

Training need assessment

The basic information of the data on training need assessments are presented below in Table 1. The study showed that, from 40 sample farmers who were trained by the DZRC, significant ($P < 0.05$) number of trained farmers responded that there was no attempt made to ask their need before the training. In this case, the need assessment was focused only on whether the farmers need training on specific topics related to durum wheat production technology which is available from the research centre. This could clearly indicate that the research centre did not make training need assessment in a broader sense in selection of topics, curriculum design and development based on the farmers' interest. However, the frequency of respondents that perceived there was training need assessment was slightly higher under MRC, although not significant. However, during the farmers' group discussion the respondents pointed out that the consultation for need for training have been narrow that the research centre mainly focuses on a specific agro technology that were developed by the centre. Although not significant based on chi-square ($X = 0.400$), the frequency of respondents who perceived that there was need assessments before the training was 22 (55.0%). Whereas the frequency of respondent who perceived that there was no training need assessment was 18 (45.0%) in the case of MRC. However, during discussion with the subject matter specialists it was noted that the centre mostly organized training based on the availability of new or improved technologies. Obviously, technologies related to onion production and marketing have been developed based on the existing farmers' problem in the study area. The other reason for higher frequency of respondents who perceived that there was training need assessment could be attributed to the fact that most farmers were selected, and were positively biased towards the centre.

According to the discussion made with the experts in the MRC concerning the need assessment they also briefly described that, there is no as such organized need assessment, but training can be organized based on information from DA and experts. The integrated TNA was not being planned and purposively conducted where as the main concern of the training centre is agricultural technology generation not

transfer, transfer comes because of the gap between agricultural offices and the activity to transfer the generated technology by the agricultural research centre to fill the gap. Most of the time training was organized when disease or any other problem happened. According to the SMS suggestion, the agricultural offices were not well coordinated with Melkassa Research Centre. Most of the time the research centre experts were invited by NGO's and not by agricultural offices.

According to the data gathered, from 40 sample farmers trained by the HRC, 30 (75%), responded that there was no attempt made to ask their need before the training. Only 10 of them (25%) indicated that they were consulted about their need before the training. Regarding the farmers response to consultation for need on interest, out of ten trained farmers 8 (20%) respondents were replied that they were consulted for need on interest.

The results presented in Table 1 showed that the frequency of respondents who said that there was no consultation on the level of their knowledge and practice before training was found to be highly significant ($P < 0.01$) when compared to the frequency of respondents who responded that they were consulted on knowledge and practice before training under the three agricultural research centres.

As can be clearly seen from the Table 1, the trained farmers who participated in trainings that were offered by the three research centres showed that they were consulted on their interest before training. Hence, the frequency of respondents who perceived that they were consulted on their interest before training was found to be significant at 0.01 level of significance.

The results indicate that, the farmers need before training was not evaluated before offering specific training on durum wheat agro-technology. Training need assessment is one of the crucial steps towards identifying the area of farmers' interest, design and develop curriculum that can best suit to the existing real conditions of farmers. Pholonngoe and Richard (1995) underscored the necessity of need assessment stating that: If non-formal education trainers hope to foster meaningful development, they should bear in mind that the needs of adults constantly change. As such it is important for trainers to possess skills to respond positively to these ever-changing needs. This can be done on by a constant identification of participants' needs. This was in line with the findings of Kefyalew, (2006). Generally, there was no attempt made by the training organizations to practice training needs assessment on a regular and continuous basis, aimed at extending the beneficiaries active participation. Rather, it could be possible to say that knowingly or unknowingly, the need of the trainers or assumption of the training organizations were imposed on the farmers (Kefyalew, 2006).

The group discussion made with the selected farmers in the Ada'a weredas includes the response of trained farmers. According to farmers' suggestions, it is good if farmers participation in the need assessment is considered carefully

before reaching at a decision concerning the duration of training, content of training and the type of crop to be included in a specific training. Because farmers have direct interaction with farm problem and the existing gap and they can give recommendation about the priority for their problem. The results presented in Table 2 are also supported by the view forwarded by the farmers during the discussion with the selected farmers. When needs are being determined, it is essential that distinctions are made between needs, wants, and interests.

According to farmers' suggestions mostly during the training sessions, they were allowed to establish common agreement with the organization offering training and usually promise to implement the content of the training into practice. However, during the process of implementation the follow-up and support of the training organization was very weak as a result of which the farmers may end up with shortage and problems associated with post harvest handling, marketing, lack of input and technical knowledge.

The farmers also pointed out that durum wheat is different from other wheat especially in the local market. Durum wheat is mainly used for processing industrial purpose, and bread wheat is preferred for consumption. Hence local retail market demand is less for durum wheat. Some of the major suggestion that were identified during the discussions is given as follows:

- (i) Training on business plan development including market survey.
- (ii) Repeated selection of specific farmers for training should be avoided.
- (iii) Training should be organized well before land preparation and sowing.
- (iv) Keeping up of promises given by the trainer for smooth implementation of ideas.
- (v) Appropriate information on the local available market needed.

The discussion with key informants at HRC indicated that there was no adequate need assessment. However, the training was organized based on the availability of new or improved potato extension package. The Research Centre is based on the transfer of new or improved available technology packages. In principle training should be arranged based on need assessment in order to make the training effective. During group discussion, the farmers indicated that there is no purposive need assessment, although the farmers usually informally communicate with the subject matter specialists and the training offered by the centre was found to be relevant to the interest of the participants.

Content of the training

Table 2 shows farmer's response to the content of the training that was offered by the DZARC, MARC and HARC on durum wheat, onion and potato production

Table 1. Trained farmer's response on training needs assessment.

No.	Item	Debre Zeit (N = 40)			Melkassa (N = 40)			Holetta (N = 40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Consultation for need before training										
1	Not consulted	26	65.0	3.60**	18	45.0	0.40 ^{NS}	30	75.0	10.00***
	Consulted	14	35.0		22	55.0		10	25.0	
Consultation for need on knowledge (N = 14, 22 or 10)										
2	Not consulted	13	92.9	10.286***	20	90.9	14.727***	9	90.0	6.400***
	Consulted	1	7.1		2	7.1		1	10.0	
Consultation for need on interest (N = 14, 22 or 10)										
3	Not consulted	2	14.3	7.143***	3	13.6	11.636***	2	20.0	3.60**
	Consulted	12	85.7		19	86.4		8	80.0	
Consultation for need on practice (N = 14, 22 or 10)										
4	Not consulted	13	92.9	10.286***	21	95.5	18.182***	9	90.0	6.40***
	Consulted	1	7.1		1	4.5		1	10.0	

NS, **, *** Non significant or significant at P < 0.05 or 0.01, respectively
Source: own survey data (2007/08).

Table 2. Farmer's response on the content of the training.

S/ No.	Item	Debre Zeit (N=40)			Melkassa (N=40)			Holetta (N=40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Training relevancy with need										
1	a) Not relevant and need based	9	22.5	19.6***	1	2.5	36.10***	0	0.0	-
	b) Relevant and need based	31	77.5		39	97.5		40	100.0	
Relevancy of content of training										
2	a) Not relevant	1	2.5	36.10***	2	5.0	32.40***	4	10.0	25.60***
	b) Relevant	39	97.5		38	95.0		36	90.0	
Harmony of content of topics with farm operation										
3	a) Not harmonized	4	10.0	25.60***	2	5.0	32.40***	2	5.0	32.40***
	b) Harmonized	36	90.0		38	95.0		38	95.0	

, * significant at P < 0.05 or 0.01, respectively, Source: own survey data (2007/08).

technologies. The result clearly demonstrated that the trainings which were offered by the three research centres were relevant to their need on durum wheat, onion and potato extension packages at $P < 0.01$ levels of significance.

The relevancy of training with the need of the farmers was found to be lowest (77.5%) in the case of Debre Zeit and the highest (97.5%) for MRC and highest (100.0%) for HRC. These study areas are known for their production of durum wheat, onion and potato for commercial purpose. Thus, data clearly demonstrated that training on these produce and marketing is currently relevant as it is timely for the farmers to acquire agricultural knowledge on how to increase yield and quality. Appropriateness of content is situation driven (Hayami and Ruttan, 1985) that today farmers in the study area are engaged or planning to involve in producing for commercial purposes.

Although, the perceptions of the respondents regarding the relevancy of training they obtained can not be considered as a full endorsement for the procedure followed by the training organizations, the data clearly showed that the trainings that were offered by the three centres were relevant to the farmers need. This issue of developing appropriate content is critical to extension process; the performance of extension systems depends, in large part, on the appropriateness of its message (Campbell and Barker, 1997). On the other hand, timeliness according to the immediate need of farmers is an important factor deciding the training effectiveness and efficiency (Kefyalew, 2006) which is observed in the present study.

Duration of the training

This duration of training is important, as it can affect the effectiveness of the training in many aspects. The most important points under the dimension of duration of farmers training are the convenience of the selected time and the length of time that the training takes. In adult learning, time is an important factor which should be considered equally with other determining factors. It is one of the variables that signify the uniqueness of adult learners. The data were subjected to descriptive statistics (frequency and chi-square) and the results of the analysis are shown in Table 3.

As indicated in Table 3 the quantitative data shows that, significantly higher frequencies of the trained sample farmers from DZRC, MRC and HRC responded that duration of the training period was limited to less than one week. Regarding the adequacy of training 77.5, 90.0 and 50.0% of respondents from DZRC and HRC replied that the periods allocated for the content of training were not sufficient. Concerning the sufficiency of training period, significantly higher frequencies of the trained farmers who obtained trainings from DZRC and MRC responded that the time allocated for the content of the training was not sufficient. Whereas, the frequency of trained farmers who had training at HRC replied that the training period was

sufficient to cover the content of the training. This was in agreement with the findings of Kefyalew (2006) that time fixed by the governmental organizations for training is too short. Training duration was not in line with the interest of the farmers but to the interest and provisions of the training organizations under the three research centres.

During the discussion made with the farmers concerning the duration of the training offered they clearly pointed out that the duration of trainings were found to be too short to grasp the desired level of knowledge. In most instances, the trainings were offered for only three days. According to farmers' discussion about the durations of the training they said that, most of the time, they give short term trainings and the experts rush to finish the content of the training within the specified time This also create problems for farmers who are in mixed age and educational background.

On the other hand, higher ($P < 0.01$) frequencies of trained farmers from all the three centres responded that the time of training was convenient. The appropriate timing for training helps the farmers to implement the training practically. Concerning consultancy of fixings duration, 60 % of the trained farmers' responded that they were not consulted by the MRC during fixing the duration of the training, although not significant. However, significantly higher percentage of respondents replied that they were consulted in fixing duration of training by DZRC and HRC.

Regarding the suggestion of the respondent about the duration of training for their future training programs, 55% of them said that, the training time should be for one month and 27% of respondent said that, it should be for 1-3 weeks. This shows that, the farmers have desire if the training is extended for longer durations. Regarding the preferred style of training to cover the content of training, 70% the respondents said that, the training content should be covered in relation to farm activity with intervals by following farm activities which might help farmers to implement the training into practice. CTA working document categorically suggested that: The aim of farmers training is not just to impart knowledge and skills in short intensive training courses, but to involve rural people in the development activities through a continuous process of learning week after week (Phil, 2007). When the training is imparted on daily life related critical activities, it should be continuous and complete, and well connected to the activities the beneficiaries undertake.

Generally, the majority of them suggested enhancing the duration of training program to improve the effectiveness of training that are being offered by MRC, DZRC and HRC. According to the responses of the farmers the farmers the most appropriate duration of training could be three weeks to one month.

Concerning the style of training significantly ($P < 0.05$) higher number of farmers who obtained training at DZRC and HRC indicated to have with interval style of training. In this case, if training is alternated with practical during

Table 3. Farmer's response on duration of training.

No.	Item	Debre Zeit (N = 40)			Melkassa (N = 40)			Holetta (N = 40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Duration of the training offered										
1	a) Less than one week	22	55.0	8.60***	29	72.5	30.65***	36	90.0	25.60***
	b) One week	10	25.0		10	25.0		4	10.0	
	c) One month	8	20.0		1	2.5		0	0.0	
Adequacy of training period										
2	a) Not adequate	31	77.5	12.10***	36	90.0	25.60***	20	50.0	11.00***
	b) Adequate	9	22.5		4	10.0		20	50.0	
Sufficiency of time allotted for training										
3	a) Not sufficient	30	75.0	10.00***	33	82.5	16.90***	12	30.0	6.40***
	b) Sufficient	10	25.0		7	17.5		28	70.0	
Convenience of training time for farmers										
4	a) Not convenient	15	37.5	10.00***	9	22.5	12.10***	3	7.5	28.90***
	b) Convenient	25	62.5		31	77.5		37	92.5	
Consulted while fixing duration										
5	a) Not consulted	12	30.0	6.40***	24	60.0	1.60 ^{NS}	7	17.5	16.90***
	b) Consulted	28	70.0		16	40.0		33	82.5	
Consideration of fixing duration (N = 28, 16 or 33)										
6	a) Not considered	6	21.4	9.14***	2	12.5	9.00***	6	18.2	13.36***
	b) considered	22	78.6		14	87.5		27	81.8	
Perceived appropriate duration for training										
7	a) One to three weeks	11	27.5	24.20***	11	27.5	27.00***	19	47.5	0.10 ^{NS}
	b) One month	22	55.0		23	57.5		21	52.5	
	c) Two month	1	2.5		2	5.0		0	0.0	
	d) Four month	6	15.0		4	10.0		0	0.0	
Preferred style of training										
8	a) Continuous	12	30.0	6.40***	27	67.5	4.90**	3	7.5	28.90***
	b) With interval	28	70.0		13	32.5		37	92.5	

NS, **, *** non significant or significant at P < 0.05 or 0.01, respectively.
Source: own survey data (2007/08).

intervals it could enable the farmers to acquire both theoretical and practical knowledge. This was in line with the findings of Kefyalew (2006) who reported that the training period should not be on continuous basis, but with frequency intervals by breaking down into different segments of the year.

Training methodology

Trained farmers response to the methodology that was followed by the trainer was also evaluated in this study. The items included in this study to assess the methodologies employed while conducting farmers training programs were the usual methodologies used in the trainings (class room lecture, field practice, visit to demonstration sites, and peer group learning), the proportion of time allotted for the theoretical and practical aspects of the training, farmers preference to the methods employed, the reasons behind their preference to the methods they appreciate, and farmers participation during learning sessions in sharing their experience and incorporation of their indigenous knowledge to make the process participatory. The primary data obtained were subjected to frequency analysis. The output of the analysis is given in Table 4.

Table 4 displays farmers' responses on teaching methodology used by DZRC, MRC and HRC. The methodologies used during training session, the respondents indicated that the class room lecture, field practices and visiting demonstration fields are all important at varying degree, although some discrepancy was observed in the case of HRC. In the case of peer group learning, only very few respondents seemed to preferred this methodology.

Significantly ($P < 0.01$) higher percentages of farmers who obtained training at Debre Zeit (52.5%) and Melkassa (62.5%) Research Centres perceived that the proportion of the theoretical parts of the training was too much. However, the perceptions of trained farmers who had training from HRC perceived practical training as much. Kefyalew (2006) also found in his study that the theoretical session in farmers training was too much. When the respondents were asked about the methodology they preferred, combination of the methods giving higher emphasis to the practical sessions was indicated as an appropriate method to learn.

According to the survey data presented in this study, field training and practical demonstration was found to be the most appropriate methods for effective training under Debre Ziet, Melkassa and Holetta Research Centers. The results presented in this study also showed that visiting demonstration fields could be their second choice and appropriate for their training at all the three research centres. Class room lecture and peer group learning were the least preferred methodologies for farmers training as indicated by the respondents.

As can be seen from Table 4, 52.5 and 82.5% of the respondents from Debre Zeit and Holetta Research Cen-

tres, respectively, indicated that their participation during the training session was high. This means that the training topics and contents given by the training centres were interesting and had a strong relationship with their present farm activity. Under Melkassa Research Centre, significantly higher percentage 62.5% of respondents replied that the extent of their participation was medium while the remaining participants responded that the level of their participation (37.5%) as high. None of the respondents perceived the extent of participation during the training period as low under Melkassa Research Centre.

This study showed that the extent of sharing their experience for their colleagues during the training session was medium with those farmers who obtained their training from DZARC and HARC, whereas a larger number of respondents perceived that extent of sharing experience during the training period was high (60.0%) at MARC. This shows that the training topics and the methods of training which were given by the training centres were found participatory and enabled them to share their experience with other participants.

Concerning the extent of indigenous knowledge, the data presented in the Table clearly showed that 55% of the respondent indicated that their knowledge had been highly improved during the training of different topics related to the durum wheat and onion extension packages that were disseminated by DZARC and HARC. However, at Holetta Research Centres, the utilization of incorporation of indigenous knowledge in training content was found to be low. The findings generally indicates the need more consideration of the local wisdom of farmers in the training content and methodology, which might help to improve the technologies generated in the research centres, as the local adaptability and appropriate refinement would be possible only if due consideration is given to their indigenous knowledge.

Selection criteria for training participants

The trained farmers' perceptions on participants selection criteria followed by DZARC, HARC and HARC before implementation of training on durum wheat, onion and potato extension package were assessed. The data were analyzed using descriptive statistics (frequency and chi-square) and the results are displayed in Table 5. At Debre Zeit, the participants were selected by all agencies while the training organization selected most of the participants at Melkassa. In the case of HRC, the respondents perceived that the Wereda Office of Agriculture selected the participants for training. The reason for this is that before organizing the main training on potato extension package the farmers were selected for field demonstration by Wereda Office of Agriculture in collaboration with the research centre. As can be seen from data, trained farmers were heterogeneous in terms of their age at DZARC, MARC and HARC with the average ages of 45.07, 37.53 and 40.73 years, session, and the resource persons

Table 4. Farmer's response on teaching methodology.

S/ No.	Item	Debre Zeit			Melkassa			Holetta		
		Trained farmers(N = 40)			Trained farmers(N = 40)			Trained farmers(N = 40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Methodology of training										
1	a) Class room lecture	12	30.0	6.6**	15	37.5	12.20***	2	5.0	13.00***
	b) Field practice	13	32.5		16	40.0		18	45.0	
	c) Demonstration site visit	12	30.5		5	12.5		11	27.5	
	d) Peer level learning	3	7.5		4	10.0		9	22.5	
Proportion of theory and practice										
2	a) To much theoretical session	21	52.5	12.2***	25	62.5	15.35***	8	20.0	8.60***
	b) To much practical session	5	12.5		8	20.0		22	55.0	
	c) Theoretical and practical session proportional	9	22.5		7	17.5		10	25.0	
	d) Such proportions were not considered	5	12.5		0	0.0		0	0.0	
Method appropriate training for farmers										
3	a) Class room lecture	3	7.5	24.6***	5	12.5	25.40***	0	0.0	22.50***
	b) Field practice and practical demonstration	22	55.0		22	55.0		35	87.5	
	c) Visiting demonstration fields	12	30.0		12	30.0		5	12.5	
	d) Peer group learning	3	7.5		1	2.5		0	0.0	
Extent of participation during training										
4	a) Low	2	5.0	15.05***	0	0.0	2.50 ^{NS}	0	0.0	16.90***
	b) Medium	17	42.5		25	62.5		7	17.5	
	c) High	21	52.5		15	37.5		33	82.5	
Extent of sharing experience										
5	a) Low	2	5.0	19.60***	1	2.5	21.65***	1	2.5	20.15***
	b) Medium	20	50.0		25	62.5		15	37.5	
	c) High	18	45.0		14	35.0		24	60	
Extent of indigenous knowledge use										
6	a) Low	18	45.0	0.40 ^{NS}	18	45.0	0.40 ^{NS}	35	87.5	22.50***
	b) Medium	0	0.0		0	0.0		0	0.0	
	c) High	22	55.0		22	55.0		5	12.5	

NS, **, *** Non significant or significant at P < 0.05 or 0.01, respectively.

Source: own survey data (2007/08).

Table 5. Farmers' response on participants' selection criteria.

S/ No.	Item	Debre Zei (N = 40)			Melkassa (N = 40)			Holetta(N = 40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Who selected the farmer trainees										
1	a) By training organization	11	27.5	0.40 ^{NS}	34	85.0	48.20***	0	0.0	36.00***
	b) The <i>Wereda</i> office of Agriculture	9	22.5		4	10.0		39	97.5	
	c) The Peasant Association leader	9	22.5		2	5.0		0	0.0	
	d) The Development Agent	11	27.5		0	0.0		1	2.5	
Nature of participants crop grown										
2	a) Heterogeneous	34	85.	19.60***	37	92.5	28.90***	7	17.5	16.90***
	b) Similar	6	15.0		3	7.5		33	82.5	
Nature of participants Age										
3	a) Heterogeneous	39	97.5	36.10***	39	97.5	36.10***	40	100	-
	b) Similar	1	2.5		1	2.5		0	0.0	
Nature of participant education										
4	a) Heterogeneous	38	95.0	32.40***	39	97.5	36.10***	40	100	-
	b) Similar	2	5.0		1	2.5		0	0.0	
Nature of participants farming experience										
5	a) Heterogeneous	37	92.0	28.9***	37	92.5	28.90***	39	97.5	36.10***
	b) Similar	3	7.0		3	7.5		1	2.5	

NS, *** non significant or significant at P < 0.01.
Source: own survey data (2007/08).

respectively. This could show that the participants may have different degrees of farming attitude, experience and indigenous knowledge. This can create the opportunity to share their indigenous experience and knowledge among the participants during the trainings. This indigenous experience of the farmers may become the base for trainer to introduce further advances in science and technology related to a specific agro-technology.

Similar to the nature of crop grown and age of participants, education also was found to be heterogeneous with the range varying from 1-12 grades and with the average of grade 3.02, 2.45 and 2.55 grades under DZARC, MARC and HARC, respectively. This shows that the farmers who participated in the training program had different capacity and understanding level about a given topic in one training had to consider these differences

while handling the sessions. Obviously, their knowledge differences have its own effect on the effectiveness of training. In the case of farming experience also, heterogeneity was observed among the participants of training in all the three centres, which has implications on handling sessions effectively. According to farmers' opinion in group discussions, mostly participants in training were selected based on their educational and economic

capacity, and many times same persons were selected repeatedly. This indicates that there was a bias in selection of participants, at least sometimes, which might lead to marginalization of other farmers. Probably, the familiarity and close contact of them with the training organization or Wereda Office of Agriculture might have led to that situation.

Competency of resource person

This section deals with the competency of resource person as perceived by the respondents and result of the analysis is given in Table 6. As can be clearly seen from the data presented in Table 6, the farmers responded that the trainers were competent to train the farmers on contents of the topics. Regarding the trainer communication skill also the responses were positive.

Concerning the familiarity of the resource person, 65, 50.0 and 90.0% of the respondents from the sample associated with Debre Zeit, Melkassa and Holetta Research Centres suggested that the entire resource persons were familiar with the local situation. A resource person is usually not seen as someone whose task is to suggest alternatives, point out contradictions, draw attention to relationships of dependence, or prompt painful, critical scrutinize of assumptions, value frameworks, or behaviors. Instead, a resource person is often seen as someone who assists adults to locate individuals and material resources in order that they may complete learning efforts that they, as learners, have defined. This view emphasizes the primacy of the learner, grants a substantial measure of control to learners, and places learning directly in the context of learners' own experiences (Sullivan, 1998).

Place of training

In this section, the farmers' response on place of training is presented. Since farmers' training is concerned with experienced adults, the place of training may have great influence on their effectiveness in acquiring theories and practices associated with the package. The places for training were categorized into farmers' village training centres, Wereda office Agriculture and the Research Centres. Then, data were computed and analyzed using frequency distribution and chi-square test and results of the analysis are given in Table 7. There was no uniformity between the three research centres in the selection of training places. DZARC generally organized trainings in their research centre. MARC used farmers' village more while HRC utilized the Wereda Agricultural Office resource centres.

A strong system for training and organizational development is essential to ensure that extension educators develop programs that are technically sound, conveniently delivered, and economically valuable and customer focused (Richard et al., 2004). Therefore, based on the results presented in this study organizing training at

research centres was found to be preferable for its existing training facilities and demonstration materials. Also, organizing training at farmers' village training centres was found to be significantly ($P < 0.001$) better than at Wereda offices.

As can be seen from Table 7, the farmers who obtained training on durum wheat extension package at DZARC has chosen the research centre as a best place for organizing future trainings. The farmers who participated in training on onion extension package at MARC recommended farmers village as a suitable place for organizing training. On the other hand, the farmers who participated in training on potato extension package at HARC recommended Wereda Office of Agriculture as a suitable place for organizing training. The probable reason for this could be that potato and onion extension packages were widely adopted and hence farmers are producing this produce for commercial purpose. This clearly implies that there is easy access to potato and onion farms during the time of training, if training is to be held in Farmers Village Centre or Wereda Office of Agriculture.

Among several phases of training, evaluation is a process to determine the relevance, effectiveness, and impact of activities in light of their objectives. Unfortunately, the general discussions made with key informants under the three agricultural centres indicated that there was no evaluation of farmers' training program that was offered by the centres. The probable reason for not conducting evaluation of the training could be lack of a systematic needs assessment that can guide and serve as the basis for the design, development, delivery, and evaluation of the training program. Moreover as found in many other organization in Ethiopia (Kefyalew, 2006 and Ousman, 2007), the training organizers might not consider its value in completing the training process and end up conducting the training. Raab et al. (1987) demonstrated that there are three phases of a training process such as planning, implementation, and evaluation. Absence of training evaluation phase from the EIAR extension training program, therefore, could lead to lack of information on the immediate results of the training activities. Also, Tyler (1971) perceives training evaluation as a mechanism for the analysis of the effectiveness of the objectives.

Conclusion

The result clearly shows that the training offered by the research centres was effective in terms of knowledge of technologies and attitude of trained farmers towards the extension packages. However, the training cycle which includes planning, implementation and evaluation was not strictly followed, as the centres focused on the transfer of technologies developed at their respective mandate areas. The result of this study clearly show that there was no need assessment done in all research centre. The content of training were relevant with the need and farm operation. The survey results clearly indicate that, the re-

Table 6. Farmers' response on the competency of resource person.

S/ No.	Item	Debre Zeit (N = 40)			Melkassa (N = 40)			Holetta (N = 40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Competency of resource person										
1	a) Not competent	1	2.5	36.10***	6	15.0	19.60***	0	0.0	-
	b) Competent	39	97.5		34	85.0		40	100	
Communication skill of resource person										
2	a) Poor	2	5.0	32.40***	5	12.5	22.50***	1	2.5	36.10***
	b) Good	38	95.0		35	87.5		39	97.5	
Familiarity of resource person to farmers										
3	a) All are familiar	26	65.0	23.45***	20	50.0	17.15***	36	90	57.95***
	b) Only some are familiar	13	32.5		19	47.5		3	7.5	
	c) All are not familiar	1	2.5		1	2.5		1	2.5	
Approach of resource person										
4	a) Not friendly	3	7.5	28.90***	24	60.0	1.60 ^{NS}	21	52.5	0.10 ^{NS}
	b) Friendly	37	92.5		16	40.0		19	47.5	

NS, *** Non significant or significant at P < 0.01.
Source: own survey data (2007/08).

Table 7. Farmers' response on place of training and their preference.

S/ No.	Item	Debre Zeit (N = 40)			Melkassa (N = 40)			Holetta (N = 40)		
		f	%	χ^2	f	%	χ^2	f	%	χ^2
Place of training										
1	a) Farmers village	12	30.0	15.20***	25	62.50	15.35***	12	30.0	6.40**
	b) Wereda office	4	10.0		7	17.50		28	70.0	
	c) Agricultural Research Centre	24	60.0		8	20.00		0	0.0	
Preferred place of training										
2	a) Farmers village	1	2.5	36.10***	25	62.50	17.15***	15	37.5	2.50 ^{NS}
	b) Wereda office	0	0.0		4	10.00		25	62.5	
	c) Agricultural Research Centre	39	97.5		11	27.50		0	0.0	

NS, **, *** Non significant or significant at P < 0.05 or 0.01, respectively
Source: own survey

search centres give training for less than one week. The training time was not sufficient to cover the content of training and the farmers suggested that, the future training should be for one month. The method of training methodology that suggested by the farmers were practice and practical demonstration were the most important and appropriate for training. The centres were highly participating on the farmers to share their experience. The extent of indigenous knowledge was high. The result of the study contacted on the three research centre clearly indicate that, the centre participate farmers from mixed educational, experience, ethnicity and area. The resource persons who participated in the training had communication skill, good approach with the farmers and familiarity with the existing reality.

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