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Effect of Extension Programs on Adoption of Improved Farm Practices by Farmers in Adana, Southern Turkey

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Abstract

This study was undertaken to ascertain the effect of extension training on adoption of improved farm practices by farmers in Adana, Southern Turkey. It was discovered that most (72.5%) of the farmers were women and were educated. Most of them were also married. Generally, the farmers received training on crops such as wheat, sugar beet, maize, barley, cotton and water melons improved farming practices. The medium of training included farm/home visits, farmers' meeting, and radio. Others were television, newspapers and agricultural exhibitions. The methods mostly used to train the farmers were individual contact method, group and result demonstrations, audio and film shows. Improved practices adopted by farmers were improved varieties of arable crops, spacing, row planting, tillage practices, and fertilizer application, weed control, and disease and pest control. The trainings on all the arable crops were very timely and apart from yam seeds, other crop inputs were readily available. Adoption of improved crop practices/technologies correlated significantly and positively with timeliness of training (r=0.91) and method of training (r=0.79). Timeliness of training correlated significantly with method of training (r=0.95). Number of media used correlated significantly with adoption of improved crop technologies (r=0.46) also availability of inputs correlated with timeliness of training (r=0.47) at 5% level of significance. It is, therefore, recommended that training of farmers be intensified to enhance adoption of other crops improved farm practices; more extension agents should be employed to increase the use of home visits and demonstration.

Keywords: extension training, farmers, adoption, improved farm practices

1. Introduction

Adana is a major agricultural and commercial center in southern Turkey. The city is situated on the Seyhan River, 30 kilometers inland from the Mediterranean, in south-central Anatolia. It has a population of 1.6 million, making it the fifth most populous city in Turkey. Reputed most with its extraordinarily fertile lands and certainly broad range of agricultural products, Adana is the centre of a region called "Cukurova", the agricultural coastal lowlands. Adana is the marketing and distribution centre for Çukurova agricultural region, where cotton, wheat, corn, soy bean, barley, grapes and citrus fruits are produced in great quantities. Farmers of Adana produce half of the corn and soy bean in Turkey. 34% of Turkey's peanut and 29% of Turkey's orange is harvested in Adana. Most of the farming and agricultural-based companies of the region have their offices in Adana. Producer co-operatives played significant role in the economy of the city. Çukobirlik, Turkey's largest producer co-operative, has 36,064 producer members in 10 provinces and services from planting to marketing of cotton, peanut, soybean, sunflower and canola. Since rural development involves strategies designed to improve the economic and social life of the rural area. An important objective of rural development is to increase agricultural productivity with a view to enhancing farmer's income and standard of living. Improved practices provide the main venue for increasing productivity in a country's agriculture. In fact rural development can be promoted through stimulating the adoption of new/ improved agricultural practices. Consequently, the survey specifically concern rural women and their decision to adopt/accept improved crop practices, which if they show positive attitude towards, will help boost their farming practices.

According to Van Den Ban and Hawkins (1999), the goal of extension is to ensure that increased agricultural productivity is achieved by stimulating farmers to use modern and scientific production technologies developed through research. Williams (1989) viewed extension as an out-of-school system of education for teaching farmers (adult, women and youths) how to raise their standard of living by their own effort using their own resources and providing them with scientific knowledge to solve their problems. For farmers to use or adopt the findings of research institute, There are number of factors that

influence the extent of adoption of improved practices such as characteristics or attributes of technology; the adopters or clientele, which is the object of change; the change agent (extension worker, professional, etc.); and the socio-economic, biological, and physical environment in which the technology take place Cruz (1987). Farmers have been seen as major constraint in development process, adoption for them is viewed as a mental

process which an individual passes through in deciding to use an innovation. (Cruz 1987).
Koppel (1978), opined that the predominant role of technology is facilitating major improvement in agriculture productivity. Therefore, it is important to know how farmers perceived improved practices for better understanding of their choice in decision of adoption or not. Improved practices are one of resources for agricultural production. According to Ingold (2002), transfer of technology as that which embraces all efforts to make sure that the farmers adopt new technology? He stressed the fact that for transfer of technology to occur, it must embrace inputs, support, advice and other essentials so that the farmer would have no reason to reject the technology. For any innovation or technology to be adopted, Van Den Ban and Hawkins (1999) opined that it must pass through a process of adoption, which involves awareness, interest, evaluation, trail and adoption. The success of the adoption process depends very much on effective training by extension agents. Effectiveness of training is determined by the methods and techniques used. Different media can be used in training the farmers. These include farm or home visit, farmers meetings, use of radio, television, video tapes, process demonstration, and flip chart. Farm or home visit creates room for interpersonal communication (Nnadi and Akwiwu, 2005). It gives the farmers liberty to ask and answer questions for further discussion or verification of ideas, process, etc. Farmers' meetings have the advantages of creating opportunity for farmers to interact among themselves and aids adoption of improved farm practice. Radio, television, tapes (audio and visual) can be used to reach out to a large number of target audiences at the same time, but it has the disadvantage of lack of feedback.
Method of training farmers according to (Nnadi and Akwiwu, 2005) varies from practical demonstration to result demonstration, the use of drama, photographs, film shows, tapes, tours, group discussions, conferences, etc. It may involve a combination of more than two methods for effective training to take place. In order to promote food and raw materials production, extension approach had to be modified. From this modification, the training and visit approach evolved. This entails training the farmers in groups, members of this group train other farmers on the improved extension training innovations. This effort is to create desired change in the behaviour of farmers. In spite of these efforts, which are expected to result to increased food production, farmers continually lack ways to improve their own processes. The result of this study will be a guide to extension service management in their training policy design and training program designing in the future.

1.1. Objectives of the study

The objective of this study is to determine the effect of extension programs on adoption of improved farm practices by farmers in Adana. Specifically, it is to
(i) Identifying & Examining the various methods employed in training the farmer and in the area and,
(ii) Ascertain the effect of training on adoption of improved agricultural innovation.

1.2. Hypotheses

Ho1: There is no significant relationship between method of training and adoption of improved crop production practices.
Ho2: There is no significant relationship between adoption of improved technologies and timelines of training.
Ho3: There is no significant relationship between adoption of improved crop technologies and total number medium used in training.

2. Methodology

The climate favours the growth of different food and cash crops. The most prevalent crops in the region are Maize, wheat and cotton. In the rain fed areas of Adana, the other crops are cotton and barley. In the irrigated areas the most prevalent crop is maize, tree crops (citrus), cotton, vegetable and sugar beet. (kusadokoro and Maru, 2004). The population for the study comprised the food crop farmers resident in the rural settlement of the three major districts of Adana, Namely: Seyhan, Yuregir and Ceyhan. Multi-stage sampling method was used to select two local municipal areas from each of the three agricultural zones, two farming communities from each selected local municipal and ten food crop farmers were randomly selected from each of the selected farming communities. These totalled to a sample size of one hundred and twenty (120) food crop farmers. Primary data were obtained through the use of a structured interview schedule. This was administered by the author. The survey essentially consist two parts, although the details of each farm survey are somewhat different. One contains questions on household characteristics, cropping pattern, sales and cost of agricultural activity. The purpose was to understand the feature of agriculture and farm management practices employed in Adana. The other contains the questions related to extension services and programs provided for the farmers by the government, NGOs operating in the area and the various ways by which farmers are able to adopt new practices for improved cropping results, the timeliness of such trainings and its impact on the cropping regimes and the attendant feedback mechanisms in place to help farmers liaise with researchers enabling a greater farmer-research institute relations in setting research agendas. In this paper the second part of the questionnaire was used. Data obtained were subjected to statistical analysis using descriptive statistics such as frequency counts, percentages and mean. Inferential statistics such as Pearson's product moment correlation (PPMC) analysis was

applied to analyse the three hypotheses.

3. Results and Discussion

Socio-economic characteristics of respondent

3.1Gender

The results in Table 1 show that majority (72.5%) of the respondents were female, this further suggests that Women play an indispensable role in farming and improving the quality of life in rural areas. Over 80% of women in developing countries provide 60-80% of all agricultural labor (Mahmood, 2001). Accordingly, women represent a major force to rural change; a largely untapped resource that could boost rural economy, higher growth rate and increased food production as their contributions is overwhelming and cannot be overemphasized (Matthews- Njoku and Adesope, 2003).. Thus, considerable attention has been given in recent years to the fact that a large proportion of agricultural work in any country is done by women (Van den Ban and Hawkins, 1985).

3.2 Age

Table 1 shows that most (38.3%) of the respondents were between the ages of 41 - 50, while 29.2% were in the age bracket of 31 – 40 years. The implication is that the respondents were youthful and active, but matured.

3.3 Education level

Majority (35%) of the respondents had adult / non formal education (Table 1) while 33.3% had primary education and 17.5% had no formal education. Others had secondary education (10%) and tertiary education (4.2%). The implication is that most of the respondents had one form of education or the other. Though at low level, education is expected to enhance adoption of farming techniques.

3.4 Marital status

Table 1 **i**ndicates that majority (80%) of the respondents were married while 10.8% widowed. This indicates a level of responsibilities in respondents sampled as they were Married, divorced or widowed.

3.5 Types of crops for which farmers received training on improved practices

All the respondents (100%) received training on maize, while 95% in Barley, 85% water melon and 63.3% on sugar beet (Table 2). They all participated in the improved maize cultivation practices because maize is a staple crop in the area as it's consumed by household and the used in producing animal feed and fodder. The establishment of feed mills also encourages its cultivation. The grains are healthier sources of energy compared to other sources; hence the respondents were encouraged in their cultivation. The water melons serve as cheap and natural sources of minerals and vitamins for them and the market for them is also very lucrative.

3.6 Medium/media of training by extension agents

Majority (95.8%) were trained by the application of home/ farm visit (Table 3), 91.7% through farmers meeting, 98.3% through radio, and 80% through television. Few were trained through newspaper 8.3% and agricultural shows 15.8%. This confirms the finding of Adebo and Ewuola (2006). It is, however, cheaper to reach out to farmers through group meetings, television and radio.

3.7 Methods for farmers' training by extension agents

The methods of training (Table 4) farmers by extension agents mainly include group demonstration, method demonstration, result demonstration, audio and film shows. The results indicated that radio - audio (95.8%) and method demonstration (77.5%), film shows (75.8%) were mostly used to train farmers, followed by result demonstration. All other methods were not adequately employed to train farmers. This confirms the finding of Adebo and Ewuola (2006).

3.8 Timeliness of training of farmers by extension agents

Table 6 indicates that all the crops covered in extension training had mean scores higher (than the cut - off score of 2.50, with maize ranking highest (mean 3.84), followed by barley (mean 3.23), wheat (means 3.60), Water melon (mean 3.59) cotton (Mean 3.42) in degree of timeliness of training by agricultural extension agent. Since maize is the major crop grown in the area being the staple crop, coupled with the demand for it, it was taken most seriously in the study area by the farmers and Agricultural Department, the major public funded provincial extension agency in Adana, housed in the Ministry of agriculture.

3.9 Availability of farm inputs to farmers

The farm inputs for all crops covered by training were readily available to the farmers (Table 7) where the planting materials of maize ranked highest in level of availability (Means 3.75) followed by barley (Mean 3.63), wheat (mean 3.58), water melon (mean 3.13) cotton (Mean 3.10) of production inputs. This is an indication that the agricultural procurement and extension agencies were working closely in order to meet the needs and aspirations of farmers in the study area in order to promote food security. This enhances the development of confidence in the agriculture extension agents by the farmers.

3.10 Hypotheses

Adoption of improved crop technologies correlated significantly and positively with timeliness of training (r = 0.91) and method of training (r = 0.79). Timeliness of training correlated significantly and positively with

method of training (r = 0.95) at 5% level of significance (Table 8) the null hypotheses 1, 2, and 3 were accepted. Also, number of media used had significant positive correlation with adoption of improved crop technologies (r= 0.46). Availability of inputs correlated with timeliness of training both at 1% level of significance. However, adoption of improved crop production practices did not have a significant correlation with availability of inputs ((r = 0.047). This is not at variance with Adebo and Ewuola (2006). This significant correlation shows that timeliness of training is accompanied by increases in adoption of improved crop production technology. It also indicates that increase in number of training method used increased adoption rate. Further increase in the number of media used brought increase in adoption rate. The implication is that timeliness of training and method of training could help to stimulate the interest of the farmers, which stimulate trial and successful trial leads to adoption. This translates into increase in yield and income positive correlation between availability of inputs and timeliness of training an improved crop. Production practices indicate that as farm inputs are available to farmers, it enhances the time of training and adoption of improved crop production practices. This is in agreement with the works of Cruz FA. 1978; Adebo and Ewuola, 2006; Okoye, 1989; Adeleke, 1985; that if inputs are supplied at the right time, adoption of farm innovation will increase.

4. Conclusion

The results showed that adoption of improved crop production practices was influenced by timeliness of training, and methods of training. Number of media used had a weak correlation with adoption of farming technologies taught to the farmers. This implies that the training has tremendous effect on adoption of improved crop production practices. The training was, therefore, effective since most of the technologies were adopted by the trainee farmers. In view of the above findings, it is recommended that:

i. Extension agents of the provincial Agricultural Department should intensify training given to the farmers in order to enhance their adoption of improved farm practices

ii. More extension agents should be employed to increase the use of demonstration and farm / home visit, which is most preferred by farmers.

The effectiveness of a training program depends not only on the number of farmers that receive information but also on how successful that approach and or methods influences farmers' decision to adopt a given technology (Ricker-Gilbert *et al*., 2008; Doss, 2006). Different technologies have different attributes of knowledge and information requirement sets. These sets are likely to objectively determine the types of methods used in sharing them for use, if the adoption of the technology in question is to succeed. For relatively 'knowledge-based' innovations like PPT[1], the uptake is likely to depend on how extensive and intensive farmers are trained and the effectiveness of approach employed (Padel, 2001). If ineffective methods are used, farmers are likely to spend more time searching for more relevant information thus increasing the information search costs. This, therefore, implies the need to evaluate the effectiveness and efficiency of the methods being used in order to isolate the ones which are not only effective but also efficient, contingent on resource availability. Given that information is packaged and presented differently in different ways, there is likelihood of variations on the effects these methods could have on technology adoption (Daberkow and McBride, 2001; Mauceri *et al.,* 2005). There is therefore an additional need to determine these differences in order optimize the use of those practices that have greatest impact on adoption and within the realm of available resources. Several studies have shown the impact of different information sources on farmers 'probability of adopting a particular technology. For example, information from crop consultants had the largest impact on adoption of precision farming than media sources in the United States (McBride *et al.,* 1999; Daberkow and McBride, 2001), while farmer field schools had the greatest impact on adoption of integrated pest management (IPM) than field days and media in Ecuador and Bangladesh, respectively (Mauceri *et al*., 2005; Ricker-Gilbert *et al*., 2008). Moreover, access to active information sources such as visits, media, agricultural shows (as demonstrated in this study), seminars and demonstrations raised the probability of full adoption of organic farming compared to access to passive information sources such as periodic contacts with extension agents in Greece (Genius *et al.,* 2006). These studies, although carried out in the developed countries where conditions and circumstances are different from those in the developing world, they clearly demonstrate that technology adoption could be influenced, among other factors by the medium by which the training is done. Extension contact alone may not promote adoption if information dissemination pathway being used is ineffective or inappropriate (Agbamu, 1995). Furthermore, knowledge may be an important variable, but how farmers receive information from different sources has a more

[1] 'Push-Pull' technology (PPT) developed by the International Centre of Insect Physiology and Ecology (*icipe*) and partners has been preferably rated by farmers in the simultaneous control of these biotic constraints.This technology involves intercropping maize with fodder legumes in the genus *Desmodium* and planting around this intercrop Napier grass (*Pennisetum purpureum,*Schumach) as a trap plant. Volatile chemicals released by desmodium repel stemborer moths (push component) while allelo-chemical released by its roots suppresses *Striga* weeds (KHAN et al., 2000; TSANUO et al., 2003; KHAN et al., 2008a, 2008b).

significant effect on adoption than just mere knowledge acquisition (Mauceri *et al.,* 2005). This in essence implies that combining the impact of different dissemination methods on adoption may sometimes be misleading since the actual impact and magnitude of each method may not be discernible. Moreover, there is expected interaction between these sources of information which need to be addressed when quantifying adoption, a fact that most of the previous studies ignored.

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		Frequency	Valid Percent (%)
Age	20-30 Years	9	7.5
	31-40 years	35	29.2
	41-50 years	46	38.3
	Above	30	25
Education	No formal	21	17.5
	Primary School	40	33.3
	Adult Education	42	35
	Secondary	12	10
	Tertiary	5	4.2
Gender	Male	33	27.5
	Female	87	72.5
Marital Status	Single	80,0	62,0
	Married	27,0	20,9
	Divorced	12,0	9,3
	Widowed	3,0	2,3

N=120

Table 1: Socio-economic characteristics of respondents

Crops	**Frequency**	**Percentage**
Maize	120	100
Wheat	91	75.8
Barley	114	95
Cotton	97	80.8
Sugar beet	76	63.3
Water melon	102	85

Table 2: Types of crops for which farmers received training on improved practices

Training Medium	**Frequency**	**(%)**
Farm/ Houses Visit	115	95.8
Farmers group meetings	110	91.7
Television	96	80
Radio	118	98.3
Newspapers	10	8.3
Agricultural Exhibition	19	15.8

Table 3: Medium of training by extension agents

Methods	Frequency	(%)
Method Demonstration	93	77.5
Result demostration	76	63.3
Group demostration	89	74.2
Audio	115	95.8
Film shows	91	75.8
Posters/Pictures	12	10
Tours	5	4.2

Table 4: Methods of farmers' training

Farm Practices	Maize	Wheat	Barley	Cotton	Sugar beet	Melon
Improved Varieties	116(96.7)	63(52.5)	110(91.7)	114(95)	107(89.2)	102(85)
Spacing	116(96.7)	60(50)	113(94.2)	110(91.7)	104(86.7)	98(81.7)
Row planting	116(96.7)	63(52.5)	107(89.2)	112(93.3)	107(89.2)	100(83.3)
Weed Control	166(96.7)	63(52.2)	110(91.7)	114(95)	107(89.2)	101(84.2)
Disease Control	116(96.7)	63(52.5)	110(91.7)	112(93.3)	107(89.2)	99(82.5)
Pest Control	41(34.2)	63(52.2)	110(91.7)	111(92.5)	104(86.7)	102(85)
Tillage practices	109(90.8)	54(45)	40(33.3)	111(92.5)	105(87.5)	100(83.3)
Feritliser Application	95(79.2)	51(42.5)	40(33.3)	36(30)	43(35.8)	96(80)

Table 5: Farmers adoption of improve farm practices

Crop	Score	Mean	Decision	Rank
Maize	461	3.84	vt	1
Wheat	428	3.60	vt	3
Barley	447	3.73	vt	2
Cotton	410	3.42	vt	5
Sugar beet	382	3.18	vt	6
Water Melon	431	3.59	vt	4

Cut off score = 2.5 (2.5=Timely,>2.5= very timely, <2.5 not timely) v.t. =very timely

Table 6: Timeliness of farmers' training by extension agents

Crop	Score	Mean	Decision	Rank
Maize	450	3.75	R.A	1
Wheat	333	2.78	A	6
Barley	435	3.63	R.A	2
Cotton	430	3.58	R.A	3
Sugar Beet	375	3.13	R.A	4
Water Melon	372	3.10	R.A	5

Cut off Score = (2.5-2.99 = available, >2.99= reading available, 2.5=not available, RA=reading available, A=available, NA= not available

Table 7: Availability of farm inputs to farmers

	1	2	3	4	5
Tımelıness of training	1.000				
Technology Adoption	.910*	1.000			
Training Methods	.951	.797*	1.000		
Various Medium employed	.5901	.4552	-.1649	1.000	
Abailability of Inputs	.4738	0.467	.384*	.4276	1.000

Table 8: Correlation matrix of study variables