

INVESTIGATION INTO EFFECTIVENESS OF THE FARMER FIELD SCHOOL IN TOMATO PRODUCTION IN DISTRICT SWAT

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ABSTRACT

The study was conducted to investigate the effectiveness of the Farmers Field School (FFS) in tomato production in district Swat of Khyber Pakhtunkhwa province. The study was carried out in four villages of Swat namely; Kotlai, Parrai, Rangilla and Qabershah. For primary data collection 80 respondents were selected for the study, 20 farmers were selected from each village for the study. It was discovered that maximum (29%) of the respondents of the study area belonged to age group 41-50 years. In terms of educational level, mostly (39%) were illiterate. FFS had an influence over different parameters of study. Majority of the sampled respondents were purely tenant which were 53% of the total sample respondents. Major problems faced by the sample respondents were insect/pest attacks which were stated by 28% and the second was non-availability of seed was reported by 23% of the total sampled respondents. The main source of irrigation was found to be tube wells irrigation system. The average cost of tube-well was Rs. 10800.00. Before FFS the average seed rate was found 290.50 gram/ acre. Before FFS seed cost of Rs 1518.2 per acre. However, after FFS seed cost of Rs. 3835.0 while decrease seed cost before and after FFS was 130.39 kg per. The farmers have plant to plant space before FFS 25 cm while after FFS it was increased to 30 cm.. The cost of fertilizer before FFS was found to be Rs. 13948 per acre which after FFS changed to Rs. 5080.0. Before FFS the cost of crop protection was much higher that is Rs. 6462.5 per acre which reduced to Rs. 829.25 after FFS. The (FYM) Farm Yard Manure before FFS was Rs. 7918.6 per acre and after FFS it was increased Rs. 9398 per acre. The average yield of tomato production before FFS was recorded as 9508.8 kg per acre which increased to 12735kg per acre after FFS through the adoption of modern techniques of tomato production recommended at FFS to the farmers that resulted in higher income of Rs. 640250 after FFS as compared to income before FFS i.e. Rs. 401880. Majority (74%) of the respondents of the study was satisfied from the FFS services and was willing to adopt that approach in future as well. It is recommended that more and more FFS should be established in other parts of the province to enhance agricultural productivity so that the food requirements of the ever increasing population of the province be met.

Key words: Farmer Field School, Tomato, Production, Swat, Khyber Pakhtunkhwa

I. INTRODUCTION

The country of Pakistan has a vast and immense natural resources which covers the climatic and agro ecological zone of that area. Therefore it such climatic condition in the zone capable it to produce many types of foods products. As we know that agriculture directly and as well as indirectly plays its role in the growth of economy. This role can be easily realized in the growth of economy right from three various directions. First it produces food and fiber for local consumer and local industries. Second is the contribution to the foreign exchange earnings. Third, major industries depend on agriculture raw material for example sugar, leather, textile, etc. Apart from these it provides for the industrial products. GoP, 2010).

In swat valleys many crops are grown. Tomato is the need of every recipe and especially fruits and vegetables are of the daily domestic use. Tomato botanical name is *Lycopersicon esculentum* Mill and belongs to Family Solanaceae The genus *Lycoersicon*. It is almost used in all over the world and have second ranks after potato in terms of using in the world. (Lohano and Mari, 2005).

Two crops of tomato are grown annually in Pakistan. One in summer months, for which in November seeds are sown and in the winter seedlings are kept covered to protect it from frost. When the frost danger is over, in the months of February- March they are transferred to another field. In the months of May harvesting process is starts and continues till August month. Second is winter crop, which is cultivated only in those places where no danger frost is occurs during in winter season. In the month of June the seeds are sown and in the month of July- August the seedling are transferred to field. In the months of November harvesting period of tomato crop is starts. From 2005 to 201he production of tomato crop in Pakistan was raised from 468.1 to 476.8 tones that is still less than from utilization line. According to Ministry of Food (MOF), in 2005 -2010 the tomato production of Agriculture and Livestock department was raised from 64.6 to 77.9 tones, in the Punjab province. The production was decreased from 161.6 to 119.3 tones in Khyber pakhtunkhwa province. The production of tomato crop was also decreased from 193.6 179.2 tonnes in the Baluchistan Province. While the production of Sindh province was raised

from 48.3 to 100.4. Firstly rainfall with hail, they are decrease tomato cultivation area , and the diseases etc. are the main causes for decreases in tomato production. (GoP, 2010).

District Swat is a hilly area, situated between the hindukush hill. This series runs in the direction of South and North and has a different altitude in district Swat, starts from 600 meters in the South Direction on the top of the ocean. This secular and traditional district was a large state and it is independent in 1969. District Swat is situated in the North Khyber pakhtunkhwa, 30° East Longitude and 35° North Latitude and they are closed together by the sky – hilly area. Gilgit and Chitral are located in the North side of District Swat, in the West side District Dir are located and in the South side District Mardan are located. District Swat is separated in to tow tehsils, namely Swat and matta.

The Swat weather is controlled by various factors which include the latitude, altitude and the Indian summer monsoon, this is because of that Swat is located in temperate zone. Apart from aforementioned the cyclonic current that comes in winter from the Mediterranean sea. The temperature of Swat in winter is recorded -2°C. The minimum one which is occurred from December to March, known to be the most severe temperature in the region. Whereas the maximum temperature is recorded 34°C in the region. The ratio of precipitation in the Swat valley are recorded from 1000mm to 1200mm that appeared in three rain-bearing seasons means the three stages of rain-bearing. December starts with rain and prolonged till the end of February. In the mid January to the end of February the snow fall takes places. However this snow fall takes place in the start of December to the end of March, as soon as the spring rain falls that expended from March to May. In this spring rain falls thunder stones and larger raindrops occurred. The month of June are so much dry that commenced by summers rains, starting from July and ending in the end of September..(www.swat.com,2013).

The district Swat valley has a great as well as aesthetic significance because the location of Swat nestled in the region where South Asia, China and Central Asia meet. The tourists are fond of the peaks covered by snow and scenic beauty of Swat valley in Pakistan, popular by the title of Switzerland of the East. The nearby spots are of tour are also the prime destination for tourists, hikers and archeologists, that are Kalam, Malam Jabba , Mahod take etc. The popularity of Swat valley is also known by certain Fruits and nuts produced in the area. Some fruits are

consumed locally where some are exported for revenue, as are the regions high quality quality honey, apricots, almonds, peaches, walnuts and pistachios are the prime fruits. This valley popularity also known by the shooting grounds. The shooting seasons starts from October and lasted in the mid of March. The physical regions of the swat into two parts, the mountainous ranges and plains. The plains area of swat district is 5337 square kilometers with the population of 1.75 million (census report, 2008). This area is divided into tow tehsils, the matta tehsil and swat tehsil. The urban literacy rate is 48.05% and rural is 25.53 %. Pashto is the main language. The other area is high mountains, meadows and clear lakes, this place has great natural beauty that is popular in the name of “Switzerland of the region” "(www.swat.com,2013).

The Farmer Field School is derived from the two words of Indonesian language i.e. Sekolah Lapangan. during the first step in 1989 FFS was recognized by FAO. The programe was started because of the antagonist pest *Nilaparvatalugens* (brown plant hopper). This rice pest is destroyed 20,000 hectares land of rice crop in central java. The Indonesian country starts an emergency project in which 1, 20,000 farmers was trained. This mainly focused on recording and reducing the application of pesticides which were considered to be harmful and killing natural enemies of brown plant hopper. In 1986 and 1987 technicalities were refined for IPM and in 1988 national IPM was launched with a core curriculum for training the farmers. The Farmers Field School approach was not only instructing the farmers but it focused to make better decision through education. (James, *et al.*, 2010).

In Asia and Africa countries the Farmer Field School (FFS) programme is developed through agriculture extension . In this approach the farmers are provided training of 15 weeks in which they identify the concepts of ecosystem, analyze the ecosystem by discussion and evaluate ideas by doing series of sample experiments. They observe the plants and insects of their area and after that they agree on managing the crop by their observation their experiences and weather forecasts. The farmers not only learn management of insects/pests but also water management, application of fertilizer and time of pesticide spray.

It is necessary to remember that Farmer Field School is a type of method which provides a learning environment to the farmers to make them achieve the objectives of using optional inputs and increasing their output and income. In some programs the quality is suffered and

initial goals are not met when the expansion and number of Farmer Field Schools become the success criteria of program. Farmer Field School are same as an adult education process through which the Farmers learning in their own environment in informal method. Farmer Field School are those school in which the farmers meet with each other on weekly basis in their fields. The learning methods of their school by technology transfer, participation and explore the knowledge based on principles of adult education such as learning by experiments etc. (Davis and Place, 2003).

Objectives of the study

1. To analyze the effect of Farmer Field School in tomato production.
2. To analyze farmers perception regarding tomato production.
3. To find out problems/constraints of farming community in tomato production.
4. To formulate recommendations based on the study findings.

MATERIALS AND METHODS

The study was carried out in District Swat. In Swat main crops are maize, rice, and wheat while tomato and onion are the most growing vegetables. the selection of the study area through National Integrated Pest Management (NIPM) and Agriculture Extension education and Communication Dept (AEE). The project was for establishing Best Agricultural practices (BAP) among farmers through FFS. There are so many villages in District Swat but the registered villages with Farmer Field School were fifty. Twelve FFS on rice, ten on tomato, eight on fresh bean, ten on maize crop and ten on onion crops. Four village of tomato were studied purposively so it was not possible to cover all the fifty villages. FFS farmers will be are same in each village. A list of all tomato FFS participants were obtained from Rangila, Parrai, Qabershah and Kotlai. From every village 20 farmers were selected purposively which have 80 sample size.

Two types of data were used in the research. These include primary and secondary data. The primary data were collected through a questionier and the secondry data were collected through published and unpublished matarials.

The Statistical Package for Social Science (SPSS) v.16 was utilized for analyzing the data so that to know the perception of farmers regarding the role of Farmers Field School in increasing production of tomato crop. The results were summarized in-terms of count and percentages. The comparisons were made for tomato crop individually to test whether the difference was significant for cost, yield and income before & after FFS or not by using paired t-test. Interview schedule was used to collect the data regarding cost, yield and income of tomato crop. The $t = \frac{\bar{d}}{sd/\sqrt{n}}$ formula for t-test was used in this study as follow.

Which follow a t- distribution with (n-1) degrees of freedom, under the null hypothesis.

Where:

$$d = X_a - X_b \text{ (Difference between after and before)}$$

$$\bar{d} = \text{Mean of d-values}$$

$$sd = \sqrt{\frac{1}{n-1} \sum (d - \bar{d})^2} = \text{is the standard deviation of d-values.}$$

$$n = \text{n of pairs.}$$

RESULTS AND DISCUSSIONS

Age of the respondents

It is to be studied that age is most necessary factor as it has influence new techniques and new idea over to reject or accept. It has been found in many social studies that age plays most important role in innovation and dissemination of knowledge. Although dissemination of knowledge and new techniques are positively correlated with age (Crusan *et al.* 1982). In the

study area the respondents were categorized into four different groups. Those farmers whose age group of 21- 30 years, 31-40 years, 41-50 years and above 50 years age wise distribution is presented in Table I. Majority respondents (36.25%) were found at the age of 41-50 years. Majority of the sampled respondents were purely tenant who were 53% of the total sample respondents.

Educational status of the respondents

It is also very important factors that influence farmer's decision about tools of farming community and new skills. In the study area on the basis of their educational level farmers were categorized into five different groups. The farmers who were illiterate that was the first group in the Table II. The primary and middle level of educational of educational level of respondents having 2nd and 3rd group. The educational level of 4th group of the respondents having up to matric and the educational level of 5th group respondents having above matric. In the study area on the basis of their educational level the distribution of farmers are shown in Table II. .Majority (48.75%) respondents were no educated farmers. While (11.25%) respondents having education level above metric. The lake of awareness about education might be a reason of lower literacy rate in the study area (Ishaq *et al.*, 2007).

Number of family members of the respondents in the study area

There were categorized four different groups of the respondents on the basis of their family size, in the 1st group of 1-5 number of family size, 2nd and 3rd groups was 6-10 and 11-15 number of farmers of family size. The 4th group was 16-20 numbers of family members. The information about the number of family size was shown in Table III. In the study area maximum (30%) farmers was the 6-10 number of family size. The table shows that the dominant group with more family members is of the 11 to 15 members which is in contrast to the result of (Muhammad *et al*, 2011) who also showed in a study of micro credit role in agriculture productivity that in the area majority of the sampled respondents were from the family size with 8 to 10 members.

Comparison of seed rate, seed cost and plant to plant spacing per acre before and after FFS tomato at swat

Table IV shows the result of statistical comparison of seed cost, seed rate and plant to plant space and to check that Farmers Field School has any effect or not.

Comparison of Seed rate per acre before and after FFS

Table IV shows that before Farmers Field School mean seed rate of tomato was 290.50 gms per acre while after FFs it was reduced 130.39 gms per acre. The t value before and after Farmers Field School was 24.12. This is highly significant. These results of the study are in conformity with the findings of Gyali and Salokhe (1997) and Ciszinszky (1981).

Comparison of seed cost per acre before and after FFS

The difference before and after Farmers Field School was presented in Table IV. In the study area before Farmer Field School the mean seed cost was Rs. 3835.0 per acre and increased after FFS Rs. 4316.8 per acre. The t-value before and after FFS of seed cost was 31.39, so it was highly significant.

Plant to plant space

The difference before and after Farmers Field School was presented in Table IV. In the study area the plant to plant space before FFS was 24.43 cm while after FFS it was increased 30 cm. The t value of plant to plant space before and after FFS was (-12.26). So it shows 5% level of significance.

Comparison of cost of fertilizer, cost of crop protection and cost of farm yard manure before and after FFS of tomato at Swat.

Table V show the statistical comparison before and after FFS to know that this approach has any effect or not.

Cost of fertilizer

In the study area it was found that the cost of fertilizer before FFS was Rs. 5080 per acre while after FFS it was decreased Rs. 5080 per acre. The t value of cost of fertilizer was (61.48). it was also highly significant. The results are in line with the results of (Gyali and Salokhe 1997).

Cost of crop protection

Table V shows the statistical comparison before and after FFS of cost of crop protection. In study area it was discovered that before FFS mean cost of crop protection was Rs. 6462.50 per acre while after FFS it was reduced Rs. 829.25 per acre. The t value of crop protection was 54.75. This is highly significant. In the study area trichogramma cards chemical was used that is recommended by FFS. It is very cheaper and eco-friendly. The results are confirmation with the results of (Gyali and Salokhe 1997)

Cost of farm yard manure

Table V shows before and after FFS statistical comparison of cost of Farm Yard Manure. So cost of farm yard before FFS was Rs. 7918.60 per acre and after FFS was Rs. 8398 per acre.

The t value of cost of farm yard manure was (-15.52) shows highly significant. The results are in accordance with the results of (Gyali and Salokhe 1997)

Table: I Distribution of respondents regarding their age

Village Name	Age group (years)				Total
	21-30	31-40	41-50	Above 50	
Kotlai	5 (6.25)	1(1.25)	8(10)	6(7.5)	20(25)
Parrai	4(5.00)	3(3.75)	6(7.5)	7(8.75)	20(25)
Rangilla	2(2.5)	4(5.00)	8(10)	6(7.5)	20(25)
Qabershah	5(6.25)	5(6.25)	7(8.75)	3(3.75)	20(25)
Total	16(20)	13(16.25)	29(36.25)	22(27.5)	80(100)

Source: Survey Data, 2014 Parenthesis are percentages

Table: II Distribution of respondents regarding their educational status

Village Name	Level of education					Total
	Illiterate	Primary	Middle	Matric	Above matric	
Kotlai	11(3.75)	4(5)	2(2.5)	1(1.25)	2(2.5)	20(25)
Parrai	10(2.5)	4(5)	3(3.75)	2(2.5)	1(1.25)	20(25)
Rangilla	8(10)	2(2.5)	7(8.75)	1(1.25)	1(1.25)	20(25)
Qabershah	10(12.5)	3(3.75)	5(6.25)	1(1.25)	5(6.25)	20(25)
Total	39(48.75)	13(16.25)	19(23.75)	5(6.25)	9(11.25)	80(100)

Source: Survey Data, 2014 Parenthesis are percentages

Table: III Distribution of respondents regarding family size

Village Name	Number of family members				Total
	1-5	6-10	11-15	16-20	
Kotlai	6(7.5)	4(5)	5(6.25)	5(6.25)	20(25)
Parrai	5(6.25)	3(3.75)	6(7.5)	6(7.5)	20(25)
Rangilla	3(3.75)	5(6.25)	6(7.5)	6(7.5)	20(25)
Qabershah	7(8.75)	4(5)	7(8.75)	2(2.5)	20(25)
Total	21(26.25)	16(20)	24(30)	19(23.75)	80(100)

Source: Survey Data, 2014 Parenthesis are percentages

Table: IV Statistical comparison of seed rate, seed cost, plant to plant and

row to row spacing of tomato before and after FFS (per acre) at Swat.

Particulars	Before FFS		After FFS		Difference		t -value	P-value
	Mean	SE	Mean	SE	Mean	SE		
Seed Rate(gm) per Acre	290.50	5.42	160.11	0.11	130.39	5.31	24.12	0.000
Seed Cost per Acre	5835.0	136.01	1518.20	7.32	4316.8	128.69	31.79	0.000
Plant to plant spacing(cm)	24.43	0.453	30	0.00	-5.57	0.453	-12.26	0.000

Source: Survey Data, 2014

Table: V Statistical comparisons of cost of fertilizer, cost of crop protection and cost of farm yard manure before and after FFS (per acre)

Particulars	Before FFS		After FFS		Difference		t -value	P-value
	Mean	SE	Mean	SE	Mean	SE		
Cost of fertilizer	13948.00	128.94	5080.00	67.58	8868.00	61.36	61.48	0.000
Cost of Crop Protection	6462.50	100.87	829.25	21.33	5633.25	79.54	54.75	0.000
Cost of Farm Yard Manure	7918.60	65.05	8398.80	68.88	-480.20	-3.83	-15.52	0.000

Source: Survey Data, 2014

Conclusions

- The role of Farmers Field School Participants was positively correlated with adoption and increasing production of tomato crop, in this study the role of Farmers Field School was very good and cannot be rejected.
- In the study area majority of the farmers faced many problems in the cultivation of tomato crop like improper marketing, lake of credits, non availability of seeds, lack of fertilizer and insect pest attacks.

- In the study area the production of tomato vegetables increased very highly due to Farmers Field School activities.

Recommendations

- The agriculture extension agents should visits in their field regularly after the completion of Farmers Field School program to help them and solve the problems of farmers.
- The participants of Farmers Field School should be provide to their farmers latest knowledge and new skills in their training to increase their production and the farmers solve their problems themselves.
- To carry the activities of Farmers Field School to increase the vegetables and crops production.
- The tools and inputs of agriculture have a positive role in the increasing of yield and so it is recommended to provide the quality inputs for the farmers at their field.
- In the results of this study the farmers of other area should be aware to identify their problems and increase their productivity.

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