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An Assessment of Tomato Production Practices in Danna Katchely, Azad Jammu Kashmir

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Abstract

Tomatoes have become one of the most popular and widely grown vegetables in the world. Out of 15 vegetables listed by the FAO tomato is placed sixth in terms of total annual world production. It is very important vegetable, having much nutritional value at comparatively low prices than other vegetables. It is consumed in every home in different modes, such as vegetables, salad, ketchup and other dishes. This study aimed at assessing the production practices that are followed in tomato production in Danna Katchely, AJK a major tomato producing area. The results indicated that the combined level of education accounted for 70% that included primary, matriculation and intermediate education. Primary level of education alone stood at 40%. About 30% growers were illiterate. Majority of the growers were well-experienced farmers and accounted for 50% having an experience beyond 20 years. Similarly, majority of growers followed traditional farm practices. They use animal power for land preparation; employ family labor in farm practices that includes planting, raising of nursery, irrigation, use of fertilizers, spraying, transplanting, harvesting, etc.

Key words: Tomato cultivation, farm production practices, Danna Katchely, AJK

Introduction

Tomatoes have become one of the most popular and widely grown vegetables in the world. Out of 15 vegetables listed by the FAO, tomato is placed sixth in terms of total annual world production. Agro-climatic conditions of Pakistan ranging from tropical to temperate allow growing 40 different kinds of vegetables and 21 types of fruits (Raja and Khokhar 1993). The domestic consumption and demand for tomato is increasing due to increase in population. It is very important vegetable, having much nutritional value at comparatively low prices than other vegetables. It is consumed in every home in different modes, such as vegetables, salad, ketchup, chatni and other delicious dishes. Due to its seasonal production in different places of Pakistan the availability of the tomato is being possible throughout the year (GovAJK 2001). The available tomato varieties in AJK have good yield potential.

It is also noted that from last few years it is declining due to some pest and diseases. Therefore, this crop needs special attention of extension workers, researchers, policy makers and growers to pinpoint the production practices, constraints and suggest remedial measures to enhance its production in AJK. This study aimed at the following objectives.

1) To assess the existing production practices followed by the tomato producers in AJK and 2) To offer recommendation in improving the existing traditional production practices.

Materials and Methods

Study area, data collection and method of analysis

The study was conducted in Danna Katchely area of Muzaffarabad district, AJK being the major tomato growing area to assess production practices followed by tomato growers.

This study was based on primary data collected from tomato producers during 2004. Sample survey was carried out and personal interviews were held to collect the information. Before launching the survey questionnaire was pre tested and was improved accordingly. Key informant technique was also followed to get authenticated information.

The survey included 100 randomly selected tomato growers.

There are many estimation techniques. Frequency tables are very useful in knowing the trend related to a particular variable. The same technique was followed in analyzing results of this study. Percentage method was used to assess farmers' responses. The assessment was carried out in two parts. Part A is related to percentage analysis on age, education and experience of farmers and farm size, tenancy status, soil type, farm power, sources of

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irrigation, use of fertilizer, tomato varieties, insect pests, labor use, harvesting; etc,.
Similarly, part B is related to percentage analysis on tomato production practices including land preparation, farmyard manure, planting time, raising nursery and planting methods.

Results and Discussion
This part is divided in to two parts. Part A refers to profile of tomato growers and part B discusses the details related to tomato production practices:

A. Profile of tomato growers
This section describes the demographic profile of the tomato growers including age, education and farming experience, farm size, land tenure status, soil type, power and irrigation source etc.

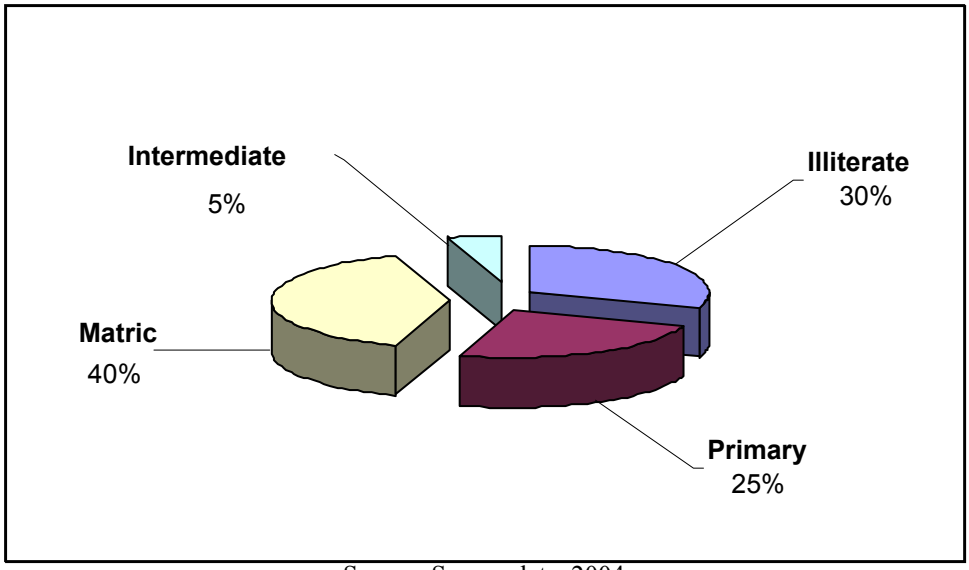
1. Age of the respondents
Table 1 shows the age distribution of the selected growers. Results show that 50 percent of the respondents belonged to the age group of 30.1-45 years followed by the age group of above 45 years (30%) and 20 percent respondents belonged to the age group of 20-30 years.

Table 1. Distribution of respondents by age

Age (years)	Number	Percent
21- 30	20	20
30.1- 45	50	50
45-above	30	30
Total	100	100

Source survey data, 2004

2. Educational level
Information regarding the education level of selected growers is reflected in figure 1. It was found that 30 percent of the respondents were illiterate, 40 percent were matriculate, 25 percent had primary education and only 5 percent respondents had intermediate level of education.



Source: Survey data, 2004

Figure 1. Education level of tomato growers

3. Tomato growing experience
Table 2 contains information regarding tomato growing experience of selected growers. The results indicated that 50 percent respondents had tomato growing experience for more than 20 years, 30 percent had experience for 10.1-20 years and 20 percent had experience of 10 years or less.

Table 2. Tomato growing experience of growers

Experience (Years)	Number	Percent
Up to 10	20	20
10.1- 20	30	30
Above 20	50	50
Total	100	100

Source: Survey Data, 2004

4. Farm size and tenancy status
Table 3 reflects Farm size and tenancy status of the respondent growers. About 60 percent of respondents had less than 5 acres of land, followed by 20 percent each falling between 5 to 12.5 acres and more than 12.5 acres of land. It was also found that all tomato

growers were also the owners of their land as is shown in Table 3. Majority of the growers (60%) were small size owner tomato growers followed by 20 percent each in medium size and large size owner tomato growers.

Table 3. Farm size and tenancy of tomato growers

Farm size	Up to 5 (acres)	5.1-12.5 (Acres)	> 12.5 (Acres)	All
No. of respondents	60	20	20	100
Percent (farms)	60	20	20	100
Farm ownership Owner cultivator	60%	20%	20%	100%

Source: Survey data, 2004

5. Soil type

Tomato is grown on all types of soils from sandy to clay. Tomato can be grown well on well-drained soil. On sandy soils, tomato mature early, but silt or clay-loam soils are generally considered the most suitable for tomato production. Optimal soil pH is 6.0 to 6.5. Tomato is considered as 'heavy feeders' because of their rapid growth and long production season**.** Good texture of the soil is of primary importance. Poor and medium quality land can also produce good crop, if maintained properly. In the study area soil types were recorded according to the growers traditional (local) classification and terminology. For example, clay soil was described as 'pacci' whereas clay-loam was described as 'bhari' and sandy and sandy-loam as 'halki'. Table 4 shows that only clayey and clay-loam soils were existed in the study area. Majority (90%) of the respondents reported that they had clay-loam soils while remaining respondents (10%) were having clayey soils.

Table 4 Soil Types of the Selected Growers

Soil types	Number	Percent
Clayey	10	10
Clay loam	90	90
Total	**100**	**100**

Source: Survey data, 2004

6. Farm power

Land preparation is generally carried out with bullocks and few (10%) of the selected growers used tractor for land preparation while the majority (90%) of the growers prepared their land with bullocks (Table 5). After ploughing the land some farmers applied one to two planking as well.

Table 5. Farm power sources of tomato growers

Power source	Number	Percentage
Bullocks	90	90
Tractor	10	10
Total	100	100

Source: Survey data, 2004

7. Sources of irrigation

Water for irrigation purposes was sufficiently available for growing tomato in the study area. The respondent farmers followed proper doses and frequency of water application under particular soil and climatic conditions. There were also heavy rains in study area and farmers stored the rainwater in small ponds and used it for irrigation purposes. Large numbers of natural springs are found in the area and the water was used for irrigation as well as for drinking purposes. It was found that 55 percent of the farmers used rain ponds and 45 percent used spring water for irrigation (Table 6).

Table 6. Irrigation Sources of Selected Growers

Source of irrigation	Number	Percent
Rain ponds	55	55
Spring water	45	45
Total	**100**	**100**

Source: Survey Data, 2004

8. Use of fertilizer

It is recommended by the agriculture department that before transplanting the tomato seedlings, 48 kg each of DAP, Potash and Urea fertilizers per acre should be applied for better yield. However, growers did not follow these recommendations and they used fertilizer according to their own experience.

Table 7 indicates that 55 percent of the growers did not apply urea while 45 percent applied urea that was below the recommended dose. Same pattern was found in case of DAP where 80 percent growers did not applied DAP and only 20 percent applied DAP that was below recommended dose. It was also recorded that none of respondent applied potash fertilizer.

Table 7. Use of chemical fertilizer by tomato growers

Doses applied	Urea		DAP		Potash	
	Respondents	(%)	Respondents	(%)	Respondents	(%)
Nil	55	55	80	80	100	100
Below recommended	45	45	20	20	0	0
Recommended	0	0	0	0	0	0
Total	100	100	100	100	100	100

Source: Survey data, 2004

Generally, farmers consider indigenous practices to be better choice based on their experience that lead to maximization of net revenues. Furthermore, there is high risk in getting chemical fertilizer on time when it is required and the delay is disastrous. In case it is not available at crucial time then there are heavy losses in net revenues. Under such situation good option is avoid such losses. Furthermore, majority of framers are small growers owning a farmland of 5 acres or less. This may be a reason that improved and modern technology is not being followed as it increases cost of production.

9. Tomato varieties under cultivation

Tomato of sampled area was famous for its size and shape. The average weight of a tomato was recorded as 300 grams. A single variety 'Hense' was grown in the area being a local variety. It was found that 100 percent farmers planted 'Hense' variety. In a study conducted at Rawalakot district, AJK performance of five Russian varieties (Raickoi Naclazdenie, Belai Nalev, Ceberckoi Ckorocpelai, Novichok, Patris) and one local variety of tomato were studied during the year 2003. The results indicated that maximum plant height and size of fruit were observed in variety Raickoi Naclazdenie, whereas maximum number of flower clusters and fruits per plant were observed in 'Patris' (Hamid et. al, 2005). Farmers were inclined to grow local variety. Perhaps such practice is based on their experience for getting maximum yield from a proven product as compared to foreign varieties and may take some time to be accepted in the future time period.

10. Insect-pests and diseases

Various fungal, bacterial, viral and mycoplasmic diseases attack on tomato crop. A study was conducted in Sindh during 2004 on damping-off fungi viz., Rhizoctonia solani, Fusarium oxysporum f.sp. lycopersici, Macrophomina phaseolina, Alternaria solani and Verticillium albo-atrum were isolated rotted rot pieces of tomato seedlings. It was also reported that Rhizoctonia solani was isolated with highest frequency i.e. 60.0% (Rajput 2004)

It was reported by the growers that severe losses occurred due to diseases. A disease attacked on almost all parts of the plant was reported but intensity of damage is more on fruit. The respondents reported following major insect pest and diseases. Jassids, White fly, Fusarium wilt, Bacterial wilt, Early and late blight, Damping off, Anthracnose and Virus. The results are given in Table 8. It was found that growers applied 2-3 sprays of pesticides to control the insect pests and diseases. Table 8 indicates that majority of the growers (73%) who applied 2 sprays whereas rest 27% applied 3 sprays in the tomato fields.

Table 8. Numbers of sprays applied by tomato growers

No. of spray	Frequency	Percent
2 sprays	73	73
3 sprays	27	27
Total	**100**	**100**

Source: Survey data, 2004

11. Labor use

The type and quantity of required labor play a vital role in better yield and post harvest handling to avoid sizable losses. Table 9 shows the number and type of labor used by the growers for different farm practices in tomato production. It is evident that for transplanting, 56 percent family labor (male) and 45 percent family labor (female) was engaged and only 3 males and 2 female workers were engaged on hired basis. In case of FYM application, 61 percent family labor (male) and 36 percent family labor (female) was engaged while only 3 males workers were engaged on hired basis. Similarly, 87 percent family labor (male) and 13 percent family labor (female) were engaged for chemical fertilizer application and no worker either male or female was hired. The

engagement of family labor showed same pattern in irrigation, manual weeding and picking of tomatoes. The engagement of family labor remained dominant in tomato production.

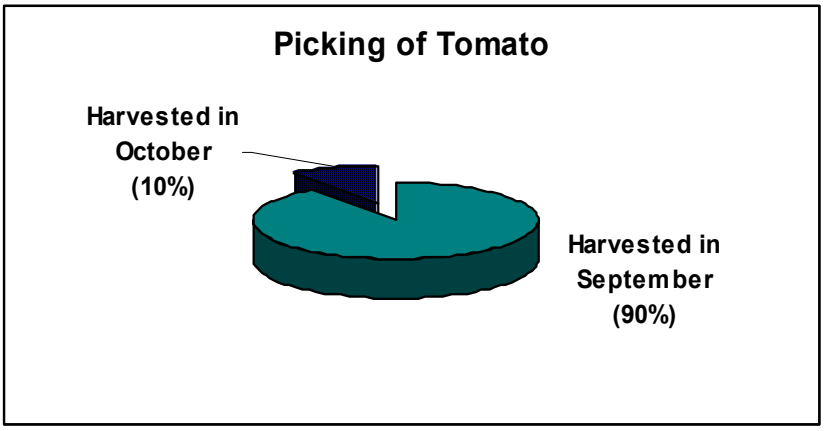
Table 9. Labor use for farm practices by tomato growers (%age)

Practices	family labor (male)	Family labor (female)	hired labor (male)	hired labor (female)
Transplanting	56	39	3	2
FYM application	61	36	3	0
Chemical fertilizer application	87	13	0	0
Irrigation	76	24	0	0
Manual weeding	64	34	2	0
Picking	55	45	0	0

Source: Survey data, 2004

12. Harvesting of tomato crop

The time of picking is also plays an important role in tomato quality. Figure 2 shows the picking time of crop during the season. It was found that 90 percent growers harvested the crop in the month of September while 10% harvested the crop in the month of October. The time of picking is also important and is mainly determined by the commitments of farmers to the traders for long distance transportation. After harvesting timely marketing is crucial. The purpose of exchange of commodities for money and vice-versa is to have access to a variety of products (Baki *et al*, 1997). The farmers, who mainly bring their produce to the local market, picked tomatoes early in the morning while those farmers who transport their produce to Muzaffarabad or Rawalpindi, picked it in the late morning and evening time to make it ready for transportation. It was found that majority (82%) growers picked the crop in the morning while remaining (18%) picked in the evening.



Source: Survey Data, 2004

Figure. 2 Picking months of tomato crop

B. Tomato production practices

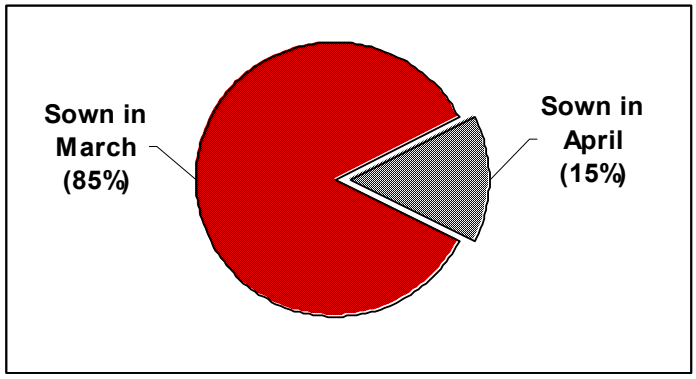
The basic target of the grower is to obtain high yields through adopting proper management practices and production technology. Production of any commodity depends on the combination of different inputs and resource allocation.

1. Land preparation

Better land preparation is considered a basic task for better crop production. A good land preparation is necessary for proper and rapid growth of the crop. Normally deep ploughings might be done half feet below the surface and sub soil. It was found that none of the tomato growers applied deep ploughings and leveling to their lands and about 75% plowed their land once in a season with cultivator followed by planking. It was also estimated that 90 percent growers used bullock power for cultivation and other practices while the rest of the growers used hired tractor at the rate of Rs.250 per acre for single plowing.

2. **Farm yard manure (FYM)**
The FYM provides necessary soil nutrients for healthy, vigorous and productive plant growth. The level of fertility of the soil in which they are being grown needs to be maintained. Therefore, growers must regularly apply FYM in their fields. The FYM should be properly mixed with the soil followed by irrigation. It was found that 90 percent growers applied FYM in the tomato fields. It was also investigated that the growers normally used 1 trolley/ acre of FYM. The cost of FYM per trolley ranged was Rs. 1500 per acre.

3. **Planting time and raising of nursery**
In most parts of the AJK tomato can be cultivated round the year depending upon the climatic conditions. Planting time plays an important role in the growth and yield of any crop. During the survey it was noted that growers usually plant their crop earlier for getting better market prices. However, it was also reported that early crop is a risky one in terms of germination of seed. The growers usually decide the planting time for rapid and successful growth by monitoring the climatic conditions of the area. While results of a study conducted by Holder et al. (2003) in hilly area of Bangladesh narrated that the plants planted in mid April performed the best yield (26.78 tones ha^{-1}) as compared to other planting times (Holder et al., 2003).
In northern AJK however, only one (spring) crop was being sown. The recommended time for rising of nursery is in the months of February and March. For the autumn crop, the nursery is raised in the months of July and August. For the late autumn crop the nursery can be raised in the month of September. Generally the seed was sown on the beds by broadcasting. Soon after sowing it was covered with a thin layer of FYM for uniform and better germination. There was a regular use of irrigation water from sowing of nursery to the time of transplanting. Mostly, seedlings were transplanted after 40 – 45 days. Survey result indicated that in sampled area 85 percent respondents sowed the tomato nursery in the month of March and remaining 15% planted in the month of April (Figure 3).



Source: Survey Data
Figure 3. Planting time of tomato nursery

4. Planting methods
Tomato is usually planted as seedling and then transplanted in to the field. In some regions of Pakistan growers used direct sowing by seed drills. However, in AJK majority of the growers planted tomato on ridges either prepared by tractor or manually. Growers usually raised seedlings for 30 to 60 days. During that period the grower took care of the seedlings for their survival. It was observed that seedlings were transplanted on ridges at a distance of 20-30 cm between plant to plant and 100 to 150 cm between rows to row. It was reported that transplanting as normally carried out during late afternoon that provide ample moisture to young seedlings to survive. Survey results show that all (100 percent) of the respondents raised nursery and then transplanted to the field and it was also found that 100 percent respondents prepared the ridges for tomato plantation manually.

Conclusions and Recommendations
The results of tomato production practices in Danna Catchfly, AJK reveals that the majority of growers were educated. The combined level of education accounted for 70% that included primary, matriculation and intermediate education. Primary level of education alone stood at 40%. About 30% growers were illiterate. Majority of the growers were well-experienced farmers and accounted for 50% having an experience beyond 20 years. Farming experience of the rest of growers was also quite enough ranging up to 20 years.
Similarly, majority of growers followed traditional farm practices. They used animal power for land

preparation, employ family labor in following farm practices that included planting and raising of nursery, irrigation, use of fertilizers, spraying, transplanting, harvesting; etc, The growers are owner-cultivators whether they own small, medium or large size farm. However, majority are small growers owning a farm 5 acres or less. This may be a reason that improved and modern technology is not being followed, as it may be high capital intensive.

It is recommended that tomato growers in Danna Catchfly, AJK needs motivation in the improvement of existing farm practices. The government should take an initiative by providing opportunities of technical education and training to farmers in the area of Best Management Practices (BMPs). This policy will lead to enhancement of the improved knowledge and farm practices of farming community and in return will lead to higher yields and farm income.

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