AN ANALYSIS OF SUGARCANE PRODUCTION WITH REFERENCE TO EXTENSION SERVICES IN UNION COUNCIL MALAKANDHER-PESHAWAR

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ABSTRACT

Keeping in view the importance of sugarcane in Khyber Pakhtunkwa, Pakistan the present study was initiated in December 2008. The study was based on primary as well as secondary data. The universe of study consisted of Union Council Malakandher of District Peshawar, Pakistan. Total sample size was 80 for this study. Majority of the respondents i.e. 91% consisted of small size of landholding and poor finical resources, 90% of sample respondents were illiterate and used traditional method of cultivation. Extension services were criticized and their role in adoption and diffusion technology was negligible. Area under sugarcane cultivation was decreased in the study area, and yield of sugarcane decreased by 31% during the last five years. The main factors responsible for low sugarcane production were poor finical condition of the farmers, lack of technical know how, unavailability and high prices of chemical fertilizers and high yielding varieties in local market, and in-efficient and in-effective role of extension staff. Small farmers should be encouraged to invest in agriculture, through the provision of soft loans and technical assistance.

Key Words: **Sugarcane, Extension Service, Adoption and Diffusion**

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INTRODUCTION

Agriculture plays a pivotal role in Pakistan's economy, contributing to more than 24% of the GDP. It employs over 43% of the labors force and its share in export earnings amounts to 70% including processed agricultural exports (MINFAL, 2007-08). Pakistan's population is increasing at an annual rate of 2.7% adding about three million people every year. This necessitates focus on additional food production and output of farm produce. In view of the high man/land ratio and limited prospects of increasing arable land, increased production has to be achieved through increase in yield per hectare.

Sugarcane (*Saccharum officinarum*) belongs to family Gramineae. It is a tall perennial grass with culms evenly scattered or bunched in stools of 5-10 inches or more. The stalk is 1-2 inches in diameter and may be 10-15 feets or more in height under tropical climatic conditions. Sugarcane primary is a tropical plant that usually requires 8-14 months to reach maturity. The temperature should be high enough to permit rapid growth for 8-12 months or more in a year (Jan, 2001).

Among the leading sugarcane producing countries, Columbia has the highest yield per hectare i.e 123.0 tons ha^{-1} followed by Australia, Egypt and U.S. i.e 99.3, 87.3 and 74.6 tons ha^{-1} respectively. While the average yield in India is 69.7 tons ha^{-1}. Pakistan has an average yield of 43 tons ha^{-1}. The sugar recovery percentage (8.69%) is also lower than the world average (10.2%) (Akhtar, 2002).

In Pakistan, sugarcane is grown in the three zones, the tropical Sindh, the sub-tropical Punjab, and the temperate Peshawar valley. In Khyber Pukhtunkhwa, It was grown on 98600 hectares and the yield obtained 45 tons per hectares during year 2005-2006 (MINFAL, 2007-08). It is cultivated successfully on tropical area between 25° N and 28° S latitudes, mostly around the equator. It can also be grown well in sub-tropical areas where summer temperature favors this crop and irrigation facilities are available.

Pakistan is ranked fourth with respect to area while cane yield and recovery pushed down the country to twelfth (12) positions among the cane producing countries of the world. The production has increased at an average rate 24% and 11.7% per annum largely due to the additional acreage (Mian and Saeeda, 2003).

The yield potential of the existing cane varieties in Pakistan is less than that grown in other countries of the world. Yet agricultural technology in vogue is poor and inadequate to explore their inherent potential to maximum extent. To catch these sugarcane producing countries in cane yield, it is necessary to develop our extension system (Niaz, 1990).

Peshawar is considered to be one of the most important sugarcane growing tract of Pakistan, which lies between 32^0 and 36^0 N latitude. This valley is characterized by extreme weather. The summer season is characterized by high humidity, which in the presence of high temperature becomes a tropical condition and hence congenial atmosphere for sugar production.

In 2006-07 the total area under sugarcane in district Peshawar was 11866 hectares and it increased to about 0.37% i.e 11893 hectares in 2006-07. The production of sugarcane slightly increased from 611377 tones in 2005-06 to 613556 tones during 2006-07 (MINFAL, 2006-07).

There are many reasons for decrease of sugarcane production like land size, literacy ratio, poor extension services and provision of trainings, poor financial conditions of farmers, lack of modern agro-technical practices, mis utilization of the available resources, low credit to farmers, reluctance towards adoption of new techniques, unawareness about inputs and their unavailability like fertilizers, irrigation water, pesticides, improved seed varieties, advanced machinery, lack of information sources, little knowledge about marketing, government's top down programs, political interference, and many other constraints are faced by farmers (Iqbal, 2006).

In Pakistan agriculture extension is the system of introducing modern techniques and ideas to the farmer for incorporating them into their farming practices. The extension services therefore, not only inform farmers to improve their status of farming and prepare cropping pattern, but also motivates them to use improved agricultural implements and adopt the modern agricultural practices according to their socio-economic status. The government of Pakistan idealized the need for agricultural development to increase agricultural productivity in the country to meet food requirements of our increasing population (Hemandez, 2000).

The present study aims to determine the main constraints in sugarcane production and also to analyze extension services provided to sugarcane growers in the study area. It will provide the bench mark/base line survey for further research to be carried out either at macro or micro level.

MATERIALS AND METHODS

The study was based on primary data and the interview schedule was used as research instrument for the collection of data needed for the study. The data for the study were collected in November-December 2008. Union Council Malakander of district Peshawar – Pakistan was the universe of the study. A list of villages was prepared with consultation of Agricultural Officer, and four villages namely Bacha Ghari, Kolalano Ghari, Lakari and Regi were randomly selected. List of sugarcane growers was prepared with the help of Agriculture Officer and 15% of the farming population was selected randomly from each selected village (hence the sample size n=80). The data were analyzed statistically using computer software: Statistical Package for Social Science (SPSS) percentage and chi-square test were calculated.

RESULTS AND DISCUSSION

Landholding

According to Lodhi and Kamil (2000) that area under sugarcane cultivation was reducing, as farmers are shifting to other crops cultivated in Peshawar. They considered un-favorable weather condition, small holding of land, shorter season of sugarcane, and diseases and pests, as some of the important reason for low sugarcane yield. They further pointed out that more than half of the sugarcane acreage in any year was estimated to be a raton crop in the country.

Land holding plays an important role in scientific farming. It has been shown that size of land holding is the major factor, which determined the adoption and diffusion of agricultural-technology (Dinar and Yavon, 1992).

Table 1. ***Landholding Size of respondents***

Location	Land holding size				Total
	Blow 5 acres		6-10 acres		
	No.	%	No.	%	
Bachea Ghari	15	75	5	25	20
Kolalano Ghari	20	95	1	5	21
Lakhari	23	100	0	0	23
Regi	15	93	1	6	16
Total	**73**	**91**	**7**	**9**	**80**

Source: Field Data

The field survey indicated that large farmers had an edge over small farmers. Table 1 shows that majority of respondents i.e 73 (91%) were small farmers. Only 9% were medium farmers i.e. 6-10 acres. None of the sample respondents were have more then 10 acres of land, therefore information were not displayed in Table 2.

Type of Land

Type of land plays a major role in production of sugarcane production. Different types of land has various production of sugarcane because some types of lands are suitable for sugarcane production.

Table 2. ***Distribution of respondents regarding type of land***

Location	Type of land								Total
	Silt loam		Clay loam		Sandy loam		Water logged loam		
	No.	%	No.	%	No.	5	No.	%	
Bacha Ghari	2	10	0	0	8	40	10	50	20
Kolalano Ghari	1	5	2	5	18	86	1	5	21
Lakhari	5	21	16	70	2	9	0	0	23
Regi	1	6	0	0	0	0	15	94	16
Total	**9**	**11**	**17**	**21**	**43**	**53**	**11**	**13**	**80**

Source: Field Data

Table 2 shows that 11% of the respondents were having silt loam, 21% of the respondents were having clay loam, 31% of the respondents were having sandy loam, while 13% of the respondents used water logged land for cultivating of sugarcane. The field data showed that clay loam is suitable for sugarcane production, which was possessed only by 21% respondents to total respondents.

Use of Agricultural Machinery

Gilbert (1990) reported that new technology was the vehicle for solving agricultural problems, the solution seems to be simple, but in reality it was not. Farmers in rural areas confront manifold problems, which create difficulties in the adoption of improved farm practices. The agricultural machinery have important role in production of sugarcane.

Table 3. ***Distribution of respondents regarding use of agricultural machinery for sugarcane production***

Location	Use different agricultural machinery for sugarcane production								Total
	Bulk Driven		Rotivator		Cultivator		Ridgers		
	No.	%	No.	%	No.	%	No.	%	
Bacha Ghari	20	100	20	100	10	50	1	5	20
Kolalano Ghari	19	90	21	100	5	23	1	5	21
Lakhari	21	91	23	100	8	34	3	13	23
Regi	14	87	12	75	8	50	8	50	16
Total	**74**	**92**	**76**	**95**	**31**	**39**	**13**	**16**	**80**

Source: Field Data

Note: The total may not tally because of multiple answers given by respondents.

Table 3 shows that most farmers used traditional methods of cultivating sugarcane, 74 respondents used bulk driven, 76 respondents were using rotivator, 31 respondents were using cultivator, and 13 used ridgers.

Sources of Information

The slow difference of new agricultural technologies was the result of poor knowledge and information in less developed countries (Obinne and Jimoh, 2000). The field survey showed that none of the sample respondent reported extension department as a source of information.

Table 4. ***Distribution of respondents by sources of information***

Location	Fellow farmers				Total
	Co-farmers/ neighbors		Friends/relatives		
	No	%	No	%	
Bacha Ghari	20	100	20	100	20
Kolalano Ghari	21	100	21	100	21
Lakhari	23	100	23	100	23
Regi	16	100	16	100	16
Total	**80**	**100**	**80**	**100**	**80**

Source: Field Data

Note: None of the sample respondents reported Agricultural extension department to provide information.

The data presented in Table 4 show that all the respondents got information either from co-formers/neighbor or relatives.

Problems faced during sugarcane cultivation

Table 5 shows that 80 respondents repeated high cost of weedicides, pesticides and insecticides as major problems, while 74 respondents reported that high yielding varieties of sugarcane were not available at right time and low cost in local market, 58 respondents mentioned about lack of technical knowledge as one of problems in production of sugarcane.

Table 5. Distribution of respondents regarding problems faced during sugarcane cultivation

Location	Problems faced by farmers during cultivating sugarcane								Total
	High cost of pesticides/ Weedicides		Lack of irrigation		Non viabilities of improved verities		Lack of technical knowledge		
	No.	%	No.	%	No.	%	No.	%	
Bacha Ghari	20	100	0	0	20	100	0	0	20
Kolalano Ghari	21	100	0	0	20	95	1	5	21
Lakari	23	100	0	0	23	100	1	4	23
Regi	16	100	0	0	11	69	3	1	16
Total	**80**	**100**	**0**	**0**	**74**	**92**	**5**	**6**	**80**

Source: Field Data

Note: The total may not tally due to multiple answers given by the respondents.

Table 6 ***Yield comparison of sugarcane during 2004 & 2008***

No of Observation	Average production (kg/acre)		Std deviation	Std. Error mean Std. error mean	Difference Mean	t-value	P-value
	2004	2008					
80	2358.75	1665.00	439.03	49.08	693.75	14.134*	0.000

* Significant at 1%

The results regarding mean difference between kg acre^{-1} productions of sugarcane is given in Table 6 show that there is a significant difference between yields of sugarcane kgacre^{-1} yield of sugarcane 2004 & 2008. We concluded that kg acre^{-1} production of sugarcane decrease at 31% after five years.

Table 7. ***Association between type of landholding and sugarcane production***

Land use for sugarcane production	Sugarcane Production (kg acre^{-1})						Total
	1200		1500-1800		1950-2250		
	No	%	No	%	No	%	
Clay loam	2	8	5	19	19	73	26
Sandy loam	9	21	23	53	11	26	43
Water logged loam	11	100	0	0	0	0	11
Total	**22**	**27**	**28**	**35**	**30**	**37**	**80**

Chi square value is 49.84* with P-value 0.000

*Significant at 1%

The results regarding association between type of land and sugarcane production are given in Table 7 It shows that the relationship is statistically significant as (P<0.01) and we reject the null hypothesis of no relationship between the two variables. It is concluded that the type of land affect production of sugarcane.

Table 8. ***Association between literacy status and sugarcane production***

Literacy status	Sugarcane Production (kg acre^{-1})						Total
	1200		1500-1800		1950-2250		
	No	%	No	%	No	%	
Illiterate	18	25	26	36	28	39	72
Literate	5	50	2	25	2	25	8
Total	**22**	**27**	**28**	**35**	**30**	**37**	**80**

Chi square value is 2.261 with P value 0.323

The results regarding association between literacy status and sugarcane production are given in Table 8. It shows non significant (P>0.1) relationship between these two variables. We conclude that literacy status did not effect sugarcane production.

Table 9. ***Association between size of Land Holding and Sugarcane Production***

landholding	Sugarcane Production (kg acre^{-1})						Total
	1200		1500-1800		1950-2250		
	No	%	No	%	No	%	
Below 5 acre	18	25	27	37	28	38	73
6-10 acre	4	57	1	14	3	29	7
Total	**22**	**27**	**28**	**35**	**30**	**37**	**80**

Chi square value is 3.55** with P value 0.10

**Significant at 10%

The results regarding association between size of landholding and sugarcane production are presented in Table 9 suggests that the relationship is statistically significant as (P=0.1) and we reject the null hypothesis of no relationship between the two Variables.

Table 10. ***Association between use of Nitrogen and sugarcane production***

Use of Nitrogen (kg)	Sugarcane production (kg acre^{-1})										Total
	1200		1500		1800		1950		2250		
	No	%	No	%	No	%	No	%	No	%	
46	13	46	8	29	3	11	3	11	1	4	28
92	6	15	16	40	1	2	13	32	4	10	40
138	1	8	0	0	2	17	1	8	8	67	12
Total	**20**	**25**	**24**	**30**	**6**	**7**	**17**	**21**	**13**	**16**	**80**

Chi square value is 43.381* with P value 0.000

* Significant at 1%

The results regarding association between difference doses of nitrogen and sugarcane production are presented in Table 10 shows that there is significant (P<0.01) relationship between these two variables. We conclude that chemical fertilizers are one of the most important ingredients of green revolution technology.

Table 11. ***Comparison between use of chemical fertilizers in sugarcane production***

Fertilizers	Average doses of chemical Fertilizers used for sugarcane production		Std deviation	Std. mean	Error	t-value	P-value
	Used	Recommended dose					
Nitrogen	82.80	64.00	-18.8	31.40		5.356*	0.000
Phosphorus	16	43	27	8.05		-29.998*	0.000

* Significant at 1%

It is clear from Table 11 that in case of Nitrogen and Phosphorus the results are highly significant and we conclude that there is significant difference between recommended doses of fertilizers and adopted doses. In case of Nitrogen farmers were using high doses than recommended once, but farmers were using less kg acre^{-1} of phosphorus then recommended doses. This is mainly due to high prices of fertilizers as well as non-avalibility at local market. It is also concluded that farmers were using right amount of FYM.

Table 12. ***Comparison between area under sugar cane during 2004 and 2008***

No of Observer	Area under sugarcane cultivation		Std deviation	Std. error mean	Difference	t-value	P-value
	2004	2008					
80	5.900	3.481	1.875	.210	2.419	11.538*	0.000

* Significant at 1%

It is clear from Table 12 that there is significant difference between area under sugarcane cultivation during 2004 and 2008. It is concluded that area under sugarcane production is decreased in study area after five years.

CONCLUSION AND RECOMMENDATIONS

It is concluded from the result of study that; majority (91%) of respondents consisted of the small size of landholding and having poor finical resources, 90% of respondents were illiterate and used traditional methods of cultivating sugarcane. Extension worker badly failed to introduce their work among the farming community. The roles of extension services remained very poor, and the extension department could not facilitate the farming community in all aspects. Almost all respondents got information from co-farmers or relatives. High yielding varieties of sugarcane were not available at the right time and reasonable price in local market. Yield of Sugarcane decreased by 31% during the last five years (2004-2008). There were significant difference between recommended

doses of chemical fertilizers and using doses adopted. High prices and non-availability of chemical fertilizers in the local market affected the use of these fertilizers, which alternately affect the production. It was also concluded that area under Sugarcane cultivation was decreased in study area.

Government should provide required amount of loan to the farmers to agricultural purpose at soft terms and conditions and low interest rate. Government should control the prices of all necessary inputs and give subsidy to farmers. There is a need to direct the attention of concerned authority to activate extension services. Extension activities need to be propagated through all groups and mass communication.

REFERENCES

Akhtar, M. 2002. Sugarcane research and development in Pakistan. J. Sci. Tech. & Dev. 1(18): 15-21.

Dinar, A. and D. Yaron. 1992. Adoption and abandonment of irrigation technologies. J. Agric. Econ, 2(1): 360-373.

Gilbert, N.W. 1990. A critical (M.S.U) Rural Development Paper No.(6). Fafling System Res. Deptt. of Agric. Econ. Michigan Univ. USA. pp.18-20.

Hemandez, B. 2000. A methods for assessing the economic desirability of leaving sugarcane plants standing. World Agric. Econ. & Rural Sociol. 3(2): 395-402.

Iqbal, M. 2006. Effect of farmers field school on rice, sugarcane and tomato productivity in District Malakand. M.Sc (Hons) Thesis, The Univ. of Agric. Peshawar, Pakistan. pp.56-57.

Jan, O. 2001. The search of suitable sugarcane verity in Pakistan Valley. West Pakistan J. Agric. Res. 2(3): 91-95.

Lodhi, A. and T. Kamil. 2000. The Pakistan Sugar Industry; An Economic and Policy Analysis, Special Report Series No.8, Pakistan Economic Analysis Network (EAN) Proj, Islamabad, Pakistan. pp.16-18.

Mian, M.N. and Saeeda. 2003. Farm productivity size and tenure and estimation of domestic resource cost for major crops in NWFP. Center for Appl. Econ. Studies, The University of Peshawar, Pakistan. 106-116.

MINFAL. 2006-07. Annual Report. Ministry of Food, Agric. & Livest. pp.27-28.

MINFAL. 2007-08. Annual Report. Ministry of Food, Agric. & Livest. pp.29-30.

Morris, D.R., R. Perdomo, G. Powell and G. Montes. 2005. Fertilizer nitrogen as a factor to prevent sugarcane yield decline in organic soil. USDA-ARS, Sugarcane Field Station, Florida Crystals, South Bay, FL. 39-47.

Naiz, M. 1990. Some policy issue in sugarcane and sugar production. Pakistan Sugar J. 4(4): 1-4.

Obinne, C.P. and M. Jimoh. 2000. Re-training needs of village extension agents in Nigeria. A study of Benue State. Agric. Res. 2(1-2): 55-66.