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Research Article

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Trend of crop area shifting and profitability analysis of cotton and maize in agro-ecological zone of Vehari

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Keywords

Cotton,
Maize,
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BCR,
Vehari.

Abstract

Agriculture is an imperative driving wheel for the progress of developing countries like Pakistan. For maintaining the vibe of sustainable agricultural development, researchers and policy makers along with various departments work eagerly in this sector. Present study is designed to determine the trend of crop area shifting, yield comparison, resource availability and profitability analysis of cotton and maize crop in district Vehari. Primary data of 90 respondents were collected through a well-structured questionnaire from three tehsils (Vehari, Mailsi and Burewala) of district Vehari. Results indicated that mostly farmer were above50 years of age and had education level upto matric. Farmers had an average area of 21.2 acres had reduced the area of cotton crop from previous year comparison of 23.65 percent and increased the area of maize by 59.18 percent in comparison with previous year. The financial and economic costs for cotton and maize were calculated and on that basis benefit cost ratio for cotton and maize came out to be 1.005 for cotton and 1.13 for maize. So the benefit cost ratio is more for maize than cotton. Respondent farmers were shifting their cropped area from cotton to maize crop mainly due to short duration of maize crop and more insect pest attack on cotton.

Introduction

The economic prosperity of the people of developing countries like Pakistan is tremendously dependent on the agricultural development. Agriculture supports three fourths of the country's population for its subsistence, employs 43.7 percent of the total labor force, accounts for 21.0 percent of GDP and recorded a growth of 2.1 percent against 2.9 percent growth rate of last year. The decline in its growth was due to drop in cotton production and other minor crops due to extreme weather but somehow compensated by the better output of rice, sugarcane, wheat and maize crops during entire year. Cotton (*Gossypium hirsutum* L.*)* having a share of 1.4 percent in GDP and 6.7 percent in agriculture value addition is an important source of raw material to the textile industry (GoP, 2014).Pakistan is the fourth largest producer of cotton after China, USA and India. Its overall contribution to the world production of cotton in 2004-2006 was 8 percent. It produces about 2.3 million tons of cotton. Cotton is the main cash crop of Pakistan. It is second in terms of area to wheat, which is the country's staple food. Area annually planted under cotton is around 3 million hectares and accounts for 15

percent of the total cropped area (Cororaton *et al*., 2008).Textiles, Pakistan's largest industry and a major source of employment in manufacturing depend on cotton farming for its supply of raw material. Cotton and its made-ups contribute 65 percent of the foreign exchange earned from merchandise goods. It also supply's feed for livestock and dairy farming. Cotton picking which is highly labor-intensive activity, is an important source of employment for rural women, providing supplementary income to rural farm and non-farm households (Cororaton *et al*., 2008).Maize (*Zea mays* L.) which is known in many English-speaking countries such as corn is a domesticated grass by indigenous people in Central America in prehistoric times. The Aztecs and Mayans cultivated it in numerous varieties throughout central and southern Mexico, cooking or grinding in a process called nixtamalization. Later, the crop has become popular thanks to America (Khan, 2010).It is planted on an estimated area of 1.117 million hectare with an annual production of 4.527 million tonnes showing an increase of 5.4 percent over the last year (GoP, 2014).The large production (97 percent of the total production) comes from two major provinces Khyber Pakhtunkhwa and Punjab. Khyber Pakhtunkhwa contributes 57 percent of the total area and 68 percent of total production whereas Punjab contributes 38 percent of the total area and 30 percent of total maize grain production. Very little maize 2-3 percent is produced in the province of Sindh and Balochistan (Naqvi and Ashfaq, 2013). Main objective of the study was to calculate the profitability analysis of cotton and maize in district vehari. A particular objective of the study is to check the trend of shifting of crop area from cotton to maize in district vehari.

Materials and Methods

The primary data used in the study in hand was collected from field survey in Vehari district by the experts of Adaptive Research Farm, Vehari during the year 2014-15. Purposive sampling technique was adopted to select the respondents. All the tehsils of district i.e. Vehari, Mailsi and Burewala were selected. Out of these tehsils, 5 villages of each tehsil were randomly selected and 6 respondents were interviewed by the research team. Total sample size was 90 farmers. A well designed and pre-tested questionnaire used to collect information from the selected respondents. The questionnaire included both ended (i.e. close and open) in order to check the positive and negative response of respondents. Themonetary data regarding costs involved in each crop production level and plant protection function to increase the income, yield and profit were collected for cotton and maize crops. Economic ratios like net returns and benefit cost ratios of cotton and maize were calculated to find the most profitable crop in terms of total and net revenue. More specifically the Benefit Cost Ratio (BCR) for each variety was calculated by following procedure:

Gross margin=Total Revenue/ Returns (Rs/acre) – Financial/ Total variable cost

Net Margin =Total Revenue/ Returns (Rs/acre)– Economic cost

Benefit Cost Ratio = CNR / CTC

Where, CNR = Crop net revenue and CTC = Crop total cost of production

More and more the value of Benefit Cost Ratio more will be the net return. Furthermore, descriptive statistics was also performed by employing SPSS. Latif*et al.* (2015), Hussain *et al.* (2006) and Abbas *et al*. (2012) used the same methodology to check the profitability estimation of rice crop varieties.

Results and Discussion

Socio Economic Characteristics of Farmers

Socioeconomic and demographic variables have much importance during the analysis in social science research. Socioeconomic characteristics can affect the purchase pattern and adoption of latest technology. The important demographic variables are age, marital status, family size, farming experience and education of farmers etc.

Table 3.1 represents distribution of respondents according to age, education, experience, marital status and family size in the study area. Age is an important socioeconomic variable and positively accounted in agriculture farming (Zhengfei and Lansink, 2006 and Fleischer *et al*., 2008). Table shows that 34.4 percent of farmers were in the range of above 50 years old. About 31.1 percent of respondents were in the range of 31 to 40 years while 26.7 percent of farmers were in the range of 41 to 50 years. Education is also an important socioeconomic variable and educated people can do farming practice in a better way. According to research findings, 16.7 percent of respondents were illiterate, 22.2 percent were primary, 21.1 percent were middle, 24.4 percent were Matric, 10 percent were intermediate and 5.6 percent were graduates. Experienced farmers understand crop management and marketing activities relatively better. Hence, they are able to obtain higher

crop yield and increase their income. The data in table shows that 6.7 percent of farmers had experience regarding farming in the range of 1 to 5 years, 21.1 percent of farmers were found with experience regarding farming in the range of 6 to 10 years, 17.8 percent of farmers possessed experience regarding farming in the range of 11 to 15 years, 20.0 percent of farmers lied in the range of 16 to 20 years' experience,6.7 percent of farmers were in the range of 21 to 25 years' experience and 27.7 percent of farmers had experience greater than 25 years. Among the sampled respondents, a vast majority of farmers i.e. 84.4 percent was married and only 15.6 percent of respondents reported to be single. Regarding family size in the study area, 37.8 percent of farmers had family members greater than 8. More than half i.e. 52.2 percent of farmers were found with family members from 5 to 8. Remaining 10 percent of farmers reported family members in the range of 1 to 4.

Table 3.1.Age, Education, Experience, Marital Status and Family Size

Particulars		Frequency	Percent
Age of Respondent	21 to 30 (Years)	7	7.8
	31 to 40 (Years)	28	31.1
	41 to 50 (Years)	24	26.7
	Above 50 (Years)	31	34.4
Education level	Illiterate	15	16.7
	Primary	20	22.2
	Middle	19	21.1
	Matric	22	24.4
	Intermediate	9	10.0
	Graduation	5	5.6
Farming experience	1 to 5 years	6	6.7
	6 to 10 years	19	21.1
	11 to 15 years	16	17.8
	16 to 20 years	18	20.0
	21 to 25 years	6	6.7
	Above 25 years	25	27.7
Marital Status	Married	76	84.4
	Single	14	15.6
Family Size	1 to 4 (No.)	9	10.0
	5 to 8 (No.)	47	52.2
	Above 8 (No.)	34	37.8

3.2Tehsil wise cropping Intensity

Table 3.2 shows the tehsil wise cropping intensity of the study area. Cropping intensity was calculated on the basis of small (0-12 acres), medium (12.5 to 25 acres) and large (more than 25 acres) farmers. These categories were made in line with the studies of Abbas *et al*. (2012), Usman and Ashfaq, 2013, Anwar *et al*. (2009), Khan *et al*. (2011), Hussain *et al*. (2012) and Jariko *et al*. (2011).Results from the analysis depicted that in tehsil Vehari large farmers had more crop intensity i.e. 182.1% than medium (168.8%) and small (164.9%) farmers. Same pattern of results were obtained from tehsil Maisli where large farmers had more crop intensity i.e. 189.7% than medium (179.8%) and small (179.8%) farmers. On other hand, in thesil Burewala, the results showed variation where medium farmers had more crop intensity i.e. 173.7% than small (160.7%) and large (154.1%) farmers. The results clearly showed that in terms of crop intensity large farmers from thesil Vehari and Mailsi were more efficient than other categories, while in tehsil Burewala medium farmers were more efficient than other categories.

Table No. 3.2: Tehsil wise cropping Intensity

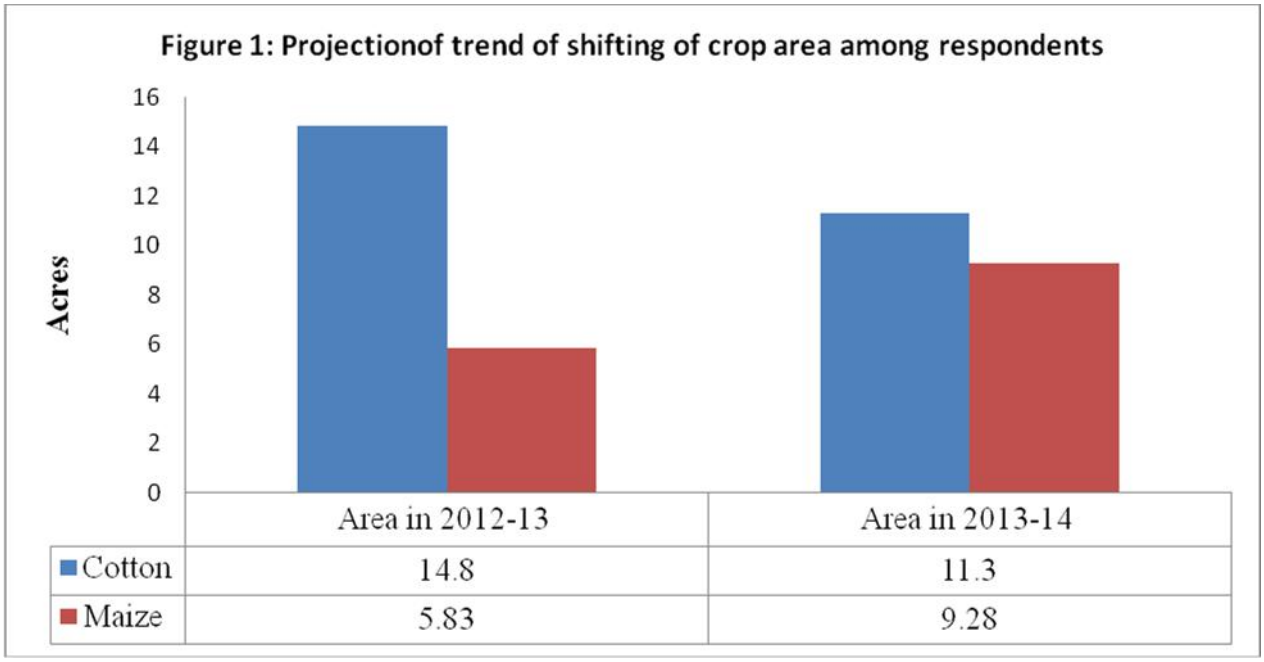
Category		Crop Intensity (Percentage)
Vehari	**Small (0-12.5 acre)**	164.9
	Medium (12.5 to 25 acre)	168.8
	Large farmer (More than 25 acre)	182.1
Mailsi	**Small (0-12.5 acre)**	179.8
	Medium (12.5 to 25 acre)	181.5
	Large farmer (More than 25 acre)	189.7
Burewala	**Small(0-12.5 acre)**	160.7
	Medium (12.5 to 25 acre)	173.7
	Large farmer (More than 25 acre)	154.1

3.3Trend of change of crop area among respondents

Table No. 3.3and figure 1 clearly indicates that respondents had shifted their area from cotton to maize crop. From last year cotton area decreased by 23.65 percent while the area of maize crop was increased by 59.18 percent. Results of shifting trends from Cotton to Maize are consistent with the study Laris *et al*., (2015) who concluded that shifting trend in above mentioned crops are due to loss in soil fertility. Brown *et al.*, (2012) announced this trend as bi-directional i.e, in some areas it is from Cotton to Maize and in other areas it is from Corn to Cotton in Zimbabwe.

Table No. 3.3: Trend of change of crop area among respondents

Category	Area in 2012-13	Area in 2013-14	Percent change in area
Cotton	14.8	11.3	-23.65
Maize	5.83	9.28	59.18



3.4 Financial cost of cotton and maize

Basic statistics for the whole farm analysis indicate that mean seed costs for cotton and maize were 2012 and 5792 rupees per acre. The cost of maize seed is more due to use of hybrid seed varieties for more production. Basic statistics for the whole farm analysis indicate that mean treatment cost of cotton and maize were 238 and 225.5rupees each per acre (Table 3.4).

Basic statistics for the whole farm analysis reveal that mean land preparation cost of cotton and maize were5521 and4358.8rupees per acre. Basic statistics for the whole farm analysis represent that mean irrigation cost of cotton and maize were6456 and 6819 rupees per acre. Basic statistics for the whole farm analysis divulge that mean weedicide costs for the plant protection of cotton and maize were2921 and 861.3 rupees per acre. Basic statistics for the whole farm analysis explore that mean pesticide cost for the plant protection of cotton and maize crop from insect attack was 6192 and 665.4 rupees per acre. Basic statistics for the whole farm analysis show that mean fertilizer costs for cotton and maize were 12188 and 16155.8 rupees per acre. Basic statistics for the whole farm analysis divulge that mean Labour costs for cotton and maize were 3823and 3759.2 rupees per acre. Basic statistics for the whole farm analysis represent that mean threshing costs for cotton and maize were 7841 and 950 rupees per acre. Basic statistics for the whole farm analysis show that mean transportation costs for cotton and maize were 521.2 and481.6 rupees per acre.

All the mean costs of factors of production were added to calculate the financial costs of cotton and maize crop which turns out to be 47713 rupees/ acre for cotton and 40069 rupees/ acre for maize crop. The financial cost clearly depicts that it was more for cotton crop as compared with maize crop.

Table No. 3.4: Financial cost of the Whole Sample Analysis of Cotton and Maize

Factors of Production	Cotton	Maize
	Mean	Mean
Seed cost(Rs)/Acre	2012	5792
Treatment Cost(Rs)/Acre	238	225.5
Land Preparation Cost(Rs)/Acre	5521	4358.8
Irrigation Cost(Rs)/Acre	6456	6819
Weedicide Cost(Rs)/Acre	2921	861.3
Pesticide Cost(Rs)/Acre	6192	665.4
Fertilizer Cost(Rs)/Acre	12188	16155.8
Labour Cost(Rs)/Acre	3823	3759.2
Threshing/Harvesting Cost(Rs)/Acre	7841	950
Transportation Cost(Rs)/Acre	521.2	481.6
Financial Cost (Rs/acre)	**47713**	**40069**

3.5 Economic cost of cotton and maize productivity

The farmers were getting more returns from maize i.e. their gross margins per acre were Rs. 24892.Whereas farmers were getting less returns from cotton i.e. their gross margin worked out to be Rs. 21318 (Table 3.5).The average yield (kg/acre) for cotton was found to be 1151 kg/acre, while for maize it was found to be 2752 kg/acre. The total revenue/ returns (Rs/acre) for cotton was found to be 69031Rs/acre and for maize it was found to be 64961Rs/acre.

Table No. 3.5: Economic cost of maize and cotton Productivity

Items	Cotton	Maize
Yield (kg/acre)	1151	2752
Total Revenue/ Returns (Rs/acre)	69031	64961
Financial/ Variable Cost (Rs/acre)	47713	40069
Management charges	720	550
Investment incentive 9%	4285.62	3597.66
Land rent	15971	13309
Economic/ Total cost (Rs/acre)	68689.62	57525.66
Gross Margin	21318	24892
Net margin	341.38	7435.34
Benefit cost ratio	1.005	1.13

The economic/ total cost of cotton and maize crop was calculated by adding financial cost, management charges, investment incentive 9% and land rent, which was found out to be 68689.62 rupees/ acres for cotton and 57525.66 rupees/ acre for maize crop. The benefit cost ratio for cotton and maize was calculated by dividing the total revenue/ returns (Rs/acre) by the total cost of respective yield level and it came out to be 1.005 for cotton and 1.13 for maize. So the benefit cost ratio is more for maize than cotton.

3.6 Reasons for change in the area of cotton and maize crop by farmers

Among these reasons, 68 percent respondents reported that maize is a short duration crop as they could grow more crops in a year. About 52.3 percent of the respondents replied that maize crop is easy to grow/handle than cotton crop. About 23.7 percent of farmers reported that more expenditure were incurred on cotton than maize crop that's why they were shifting their area from cotton to maize crop.48.5 percent farmers reported that Cotton is sensitive crop as compared to maize as there was more attack of insect pest on cotton than maize. Less return from cotton crop was another reason of change of crop area as 17.8 percent farmers reported that reason

Table No. 3.6: Reasons for change in the area of cotton and maize crop by farmers

Reasons	Farmers Reported
Maize is a short duration crop	68.0%
Maize crops is easy to grow/handle	52.3%
More expenditures on cotton	23.7%
Insect pest attack is more on cotton crop	48.5%
Less return from cotton crop	17.8%

Conclusions and Recommendations

Present study was designed to determine the trend of crop area shifting, yield comparison, resource availability and economics of cotton and maize crop in district Vehari. The financial and economic costs for cotton and maize were calculated and on that basis benefit cost ratio for cotton and maize came out to be 1.005 for cotton and 1.13 for maize. So the benefit cost ratio is more for maize than cotton. Respondent farmers were shifting their cropped area from cotton to maize crop mainly due to short duration of maize crop and more insect pest attack on cotton. It is recommended to disseminate the approved adaptation and practices for the Maize crop to enhance profitability. Respondents were raising their voices against high input prices and low output price, Government should kept her eye on this matter to avoid exploitation in farmers. Furthermore, marketing problem in the study area should also be resolved.

References

1. Abbas, M., T. Mehmood, A. Bashir, M. Zafar and A. Afzal. 2012. Economics of Lallemantiaroyleana (tukham-ebalangoo) production in the low intensity cropping zone of the Punjab, Pakistan. Pak. J. Agric. Res, 25(2).
2. Anwar, M., I. S. Chaudhry and M.B. Khan. 2009. Factors affecting cotton production in Pakistan: empirical evidence from Multan District. MPRA Paper No. 22829
3. Brown, D., R. R. Chanakira, K. Chatiza, M. Dhliwayo, D. Dodman, M. Masiiwa, D. Muchadenyika, P. Mugabe, and S. Zvigadza. 2012. Climate change impacts, vulnerability and adaptation in Zimbabwe. International Institute for Environment and Development (IIED) Climate Change Working Paper, 3.
4. Cororaton C. B. A. Salam, Z. Altaf, D. Orden, R. Dewina, N. Minot and H. Nazli (2008). Cotton-Textile-Apparel Sectors of Pakistan; Situations and Challenges Faced. International Food Policy Research Institute (IFPRI) Discussion Paper.
5. Fleischer, A., I. Lichtman and R. Mendelsohn. 2008. Climate change, irrigation, and Israeli agriculture: Will warming be harmful? Ecological economics, 65(3), 508-515.
6. Government of Pakistan, 2013-14. Economic Survey of Pakistan, Economic Advisor's Wing, Finance Division, Islamabad.

7. Hussain, A., A. Saboor, M.A. Khan, A. Q. Mohsin, F. Hassan, and M.Z. Anwar. 2012. Technical efficiency of wheat production in Punjab (Pakistan): A cropping zone wise analysis. Pakistan Journal of Life and Social Sciences, 10(2), 130-138.
8. Hussain, A., N. R. Khattak and A. Q. Khan. 2008. Costs benefit analysis of different rice varieties in district Swat. Sarh. J. Agric. 24 (4): 745-748.
9. Jariko, G. A., M.A. Junejo, M.S. Rahpoto and M.Z. Shah. 2011. Socioeconomic factors affecting adoption of sunflower varieties in Sindh. Pak J CommerSoc Sci., 5(1):192-201.
10. Khan, A. D., 2010. Maize production fact sheet for Khyber pukhtunkhwa areas report prepared.
11. Khan, M. B., I. S. Chaudhry and M. H. Akhtar. 2011. Cost-Benefit Analysis of Cotton Production and Processing by Stakeholders: The case of Mutlan and Bahawalpur Regions. Seeds, 2, 3.
12. Laris, P., J. D. Foltz and B. Voorhees. 2015. Taking from cotton to grow maize: The shifting practices of small-holder farmers in the cotton belt of Mali. Agricultural Systems, 133, 1-13.
13. Latif, M. T., F. Sher, M. Hussain, M. F. Iqbal, M. Q. Waqar and M. A. Ali. 2015. Profitability estimation of rice varieties in wheat-rice cropping pattern in Agro ecological zone of Gujranwala. Int. J. Adv. Multi. Res. 2(8): 32-36.
14. Naqvi, S.A.A. and M. Ashfaq, 2013. Estimation of technical efficiency and it's determinants in the hybrid maize production in district chiniot: a cobb-douglas model approach Pak. J. Agri. Sci. 51(1), 181-185.
15. Usman, M. and M. Ashfaq. 2013. Economics analysis of tuberose production in Punjab, Pakistan. Sarhad J. Agri., 29(2): 279-284.
16. Zhengfei, G. and A. O. Lansink. 2006. The source of productivity growth in Dutch agriculture: a perspective from finance. American Journal of Agricultural Economics, 88(3), 644-656.

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