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AN ECONOMIC ANALYSIS OF MAJOR CROPS IN DISTRICT CHINIOT, PAKISTAN

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ABSTRACT

This study was aimed to estimate cost benefit analysis and water usage of different crops in district Chiniot during 2018. Primary data was collected on a questionnaire by interviewing the farmers from different tehsils of Chiniot. A sample size of 40 farmers was used for data collection. Rice, sugarcane, wheat, and maize are mainly grown in District Chiniot. Cost benefit techniques were used to check the benefits of different crops in this region. It is found that wheat and rice are more beneficial for farmers as they need less water and give the farmers more earnings than other crops. It is suggested that crops that are providing more benefits economically and environmentally should be encouraged to harvest.

Keywords: Economic analysis; Cost benefits ratio; Agriculture prices; Irrigation.

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INTRODUCTION

In District Chiniot mainly sugarcane, rice, wheat, and maize are grown. Although this district comprises flat fertile land and has access to canal irrigation, most of the cultivation is done through tube well irrigation. There is very limited access to canal water, so farmers prefer using diesel or electric water pumps. That increase in their production cost is counted as a major portion of input cost for crop production. Price distortions, water shortages, the uncertainty of crops prices are still a big hurdle for the agricultural sector of Pakistan. Between 2010 and 2015, the per hectare yield of wheat in Punjab has dropped, whereas rice and cotton yields have not shown any signi_cant improvement (Punjab Development Statistics, 2016). There had been an uncertain situation not only for the farmers but also for food security in Pakistan. Since we had adopted the green revolution in 1960, at that time, significant growth has been seen in the agriculture sector, but our country is still facing food shortages (Spielman et al., 2016). Price fluctuations, climatic hazards, water shortage, and market imperfections are the sole reason for agricultural deprivation and depression.

The agriculture sector is the largest sector that shares a lot with the manufacturing industry, and it engages a huge labor force (GOP, 2020). Agriculture is the backbone of Pakistan's economy, and a consistent and integrated policy should be adopted. All political parties must continue that policy with the same spirit and seriousness that that sector deserves. Pakistan has been experiencing a pattern of boom and recession for many years. Its economy is sensitive to unseen situations like pandemic, weather conditions, global issues, etc. To combat that scenario a concrete, stable policy reforms needed to be taken. We had plenty of natural resources and large size of the population. We must invest in human capital that will be able to utilize the resources efficiently. The majority of our population are connected directly or indirectly to that sector and earn their livelihood. According to Khan et al. (2011), poverty can be reduced by promoting the productive capacities of farmers. Progress in agriculture will ensure economic development and boost the socio-economic condition of a large economic sector. Agricultural development will help to remove poverty and make the dream of sustainable growth possible. Ministry of national food security and research must make

integrated efforts to ensure food availability, improved nutrition, and better per-acre crops production. Table 1 showed growth in agriculture sector of Pakistan during the time period of 2013 and 2018.

Table 1. Agricultural growth in 2013-18 (base year 2005).

Years	Crop	Livestock	Fisheries	Forestry	Agriculture
2013-14	2.64	2.48	0.98	1.88	2.50
2014-15	0.16	3.99	5.75	-12.45	2.13
2015-16	-5.27	3.36	-15.2	14.31	0.15
2016-17	1.22	2.99	3.25	-2.33	2.18
2017-18	4.66	3.62	1.23	2.58	3.94

Source: Economic Survey of Pakistan (2018-19).

It has been seen that whenever agriculture is focused on budgets and the government shows some concern, there should always be a positive and significant impact on agricultural production. Negligence of government and climatic conditions are the core hazards for this sector. Water resources and management were improved in 2013-14 it showed 2.50% growth in agriculture.

In 2014-15, credits machinery and fertilizers were provided to farmers, which showed a positive impact on crop growth. In 2015-16 heavy rains destroyed crops, particularly cotton, less credit was taken by farmers, and it badly damaged the agricultural growth. In the next year's government tried to provide cheap fertilizers, electricity and pesticides to maintain positive agricultural growth. Livestock supported with its positive growth, but forestry in 2014-15 and 2016-17, crops and fisheries in 2015-16 showed negative growth. All sectors must have simultaneous growth for the overall stable growth of the agriculture sector. In this tenure, the government couldn't succeed in giving an agricultural policy although the national food security council drafted it.

Four major crops, wheat, rice, sugarcane and maize are grown in district Chiniot. The Objective of the study is to find out the expenditures and output of these crops. It was estimated which crop is more suitable in district Chiniot with respect to farmer's economy as well as better for environment and water management.

METHODOLOGY

A questionnaire had been designed to calculate the input costs and production of the five crops grown in district Chiniot. Primary data has been collected from 40 farmers in the district Chiniot by a convineint sampling technique. Data collection was done by direct interviewing technique. Benefit Cots Ratio (BCR), Nominal Protection Coefficient (NPC), and other values were estimated in the Excel sheet.

RESULTS AND DISCUSSION

Net Benefits of Crops

In Table 2 net benefit of all four crops are calculated using data. Using data average production, sale price and cost have been estimated to calculate the net benefits for each crop that has been harvested in this area of Punjab.

Table 2. Net Benefits (per acre) 2017-18.

Crops	Average output per acre (mound)	Average Sale price	Gross sale	Total cost	Net benefit	Crop duration
Sugarcane	950	145	137,750	74,275	63,475	12 month
Rice	47	1400	65,800	43,391	22,409	4 months
Wheat	45	1200	54,000	22,701	31,299	6 months
Maize	80	1000	80,000	47,427	32,573	3 months

Source: Authors own calculation.

Net benefits of wheat and rice are more than other two competitive crops similarly rice and sugarcane crops need more water than wheat and maize. Among these four crops, sugarcane is a yearly grown crop that occupies the land for a complete year.

Sugarcane and wheat are the crops where prices are determined by the government. In 2018 Rs. 185 was the rate of sugarcane for one mound, but data showed that farmers were getting Rs. 145 for one mound, but in 2019, the case was reversed. The sugarcane industry was offering more than Rs. 200 price for sugarcane mound, but the industry couldn't complete their target due to crop deficiency. Demand for sugarcane in 2019 was so high, whereas supply was short. These two years showed huge price fluctuation in the sugarcane crop.

Wheat producers in 2018 were getting Rs. 1175 a mound of their product was much below the price set by the government to support this crop. Rice prices with subject to a variety of rice vary from time due to availability and demand of that crop, whereas maize showed a stable price behavior. There are more than 86 sugar mills in Pakistan. It is a huge industry providing employment and enhancing industrial growth, but for the grower of sugarcane, fear of uncertainty remains until he gets paid properly for his investment.

In Table 3, benefit cost ratio (BCR) has been calculated. It presents cost benefit ratio of five crops grown in district Chiniot during the year 2018. This is a rough way to calculate the benefits of a crop. If the value of BCR is greater than zero, it means that the crop is feasible to harvest, and it is quite wise to invest in this crop. Comparison of BCR showed that apparently sugarcane has 0.85 higher benefit cost ratio but actually wheat four months crop having 1.69 BCR and Maize three month crop having 0.68 BCR are more acceptable crops economically.

The government gives support prices and subsidies to sugarcane and wheat crops; both are very important crops of our agricultural sector. The farmer is benefiting more from other crops and damaging less to the water table. So the support policy must be revised and seen more minutely.

Table 3. Benefit cost ratio.

Crops	Benefit per season	Cost per season	BCR	Result
Sugarcane	63,475	74,275	0.85	Greater than 0
Rice	22,409	43,391	0.51	Greater than 0
Wheat	31,299	22,701	1.37	Greater than 0
Maize	32,573	47,427	0.68	Greater than 0

Source: Authors own calculation.

Sugarcane and rice growers face uncertain price situations every season; if they are given more prices, they are encouraged to grow more next year. According to Shahzad et al. (2019), Minimum support price policies have reduced wheat's competitiveness in the international market. That situation develops supply increase which ultimately results in price fall. Other substitute crops like grains and vegetables must be taken into account similarly livestock could help farmers and complete the need for dairy in the district. The crops which need less water, fewer pesticides, and meet the demand of people must be ranked for cultivation.

The present study is not just estimating the budget of each crop but also trying to analyze the water usage for each crop sown in district Chiniot. Delta in irrigation is used to estimate water usage for each crop separately.

Water Usage of Crops in District Chiniot

The costs of crops are not just the inputs used to grow crops, but water usage is the biggest and most important factor that has to be observed. Water scarcity is the biggest problem in the 21st century and the reason for global conflict between different countries. The farmers used tube wells to irrigate their crops, and now solar tube wells are in abundance in villages. Razzaq et al. (2018) made an economic analysis by using benefit-cost ratio and showed that farmers using drip irrigation earned higher margins in their crops. Water depletion is a serious threat to soil and the environment. Therefore, water usage has been a major concern for a researcher to evaluate its upcoming impact on the environment.

Delta is the total depth of the water needed for a crop during the complete period of crop cultivation and harvesting. It is denoted with the symbol Δ. For example, if a crop requires about 12 watering in season at the gaps of 10 days, and the depth of water is 10cm. Suppose the land for cultivation of that particular crop is Z hectares; the total quantity will be 1.20 X Z = 1.2 Z hectare-meters in a period of four months.

Table 4. Water usage of crops using delta technique.

Crops	Number of waters	Depth of water	Time	Delta value
Sugarcane	18	6.6 cm	Water required interval of 20 days for 300 days	120 cm
Rice	12	10 cm	Water required interval of 10 days for 120 days	120 cm
Wheat	5	7.5 cm	Water required interval of 28 days for 140 days	40 cm
Maize(Kharif)	8	8 cm	Water required interval of 11 days for 90 days	64 cm
Maize (Rabi)	5	8 cm	Water required interval of 17 days for 90 days	40 cm

Source: Authors own calculation.

As shown in Table 4 from a water usage point of view, it is obvious that rice consuming 120cm water in six months ranks first and sugarcane consuming 120cm in one year stands second. Most of the irrigation is done by tube well, so it has been declining water surface table and consuming a lot of energy to run that system. Undoubtedly, rice and sugarcane are cash crops and possess a very sound position in the agricultural economy, but due to maximum water use for irrigation. Azad and Alam (2004) analysed that substituting sugarcane with other crops like peas, watermelon, and onions can enhance farmers' economic and income levels and reduce the output of sugarcane.

Moreover, it has been reported that the availability of water for agriculture is expected to decrease from 72 percent to 62 percent in the period from 1995 to 2020, and globally, a decrease from 87 percent to 73 percent in developing countries (Khan et al., 2006). Farmers use irrigation water at an increasing rate, resulting in increased costs (Razzaq et al., 2019). Pakistan is going to face a severe shortage of water in the coming years and is likely to create havoc in the future. It is indispensable for the state to save water not only for agriculture but also for human consumption. Due to overpopulation, demand for water will rise in the social and economic sectors. It is strongly recommended to optimize the use of water for producing crops in Pakistan. Drip, sprinkle and spray irrigation should be used, and the crops which require less water must be cultivated.

Import Price Comparison (Nominal Protection Coefficient)

Price data of rice, wheat, sugar and maize are taken from index mundi. In Table 5, a comparison of domestic price and border price is made. Our country does not import these crops, so to compute the import prices of those crops, international sea route freight and domestic freight has been added.

The nominal protection coefficient is the ratio of border production price at farm gate and price of that commodity produced in the domestic market. It is suggested that if that ratio is greater than one, it must be supported by the government otherwise it could be taxed if the ratio is less than one.

Table 5. Nominal Price Coefficient.

Crops	Domestic price per mound (Pak rupee)	Domestic price per mound(Dollars)	Import price in Dollars	NPC
Sugar	60*40=2400	20.86	11.2	0.53
Rice	1800	15.65	16.8	1.07
Wheat	1200	10.43	8.4	0.80
Maize	1000	8.69	6.6	0.76

Source: Authors own calculation.

Except for rice, all other crops have low prices than international prices. According to Javed et al. (2018), Pakistan is losing its competitiveness in rice every year. Higher cost of inputs and price fluctuation in the agricultural sector results in losing competitiveness in global markets.

CONCLUSIONS AND RECOMMENDATIONS

The study results showed that wheat and rice are more beneficial for farmers as they need less water and give the farmers more earnings than other crops. It is suggested that crops that are providing more benefits economically and environmentally should be encouraged to grow. In the era of climate change water has been so precious, so crops which need less water should be encouraged to cultivate. District and provisional level studies should be conducted to check the economic and water efficiency of crops. To study the comparative cost analysis of crops produced in Pakistan detailed research is needed on a large scale.

Most of the farmers, during their interview, complained about the expenditures on growing crops and uncertain returns from their production. The poor farmers took credits from lenders, which they had to pay at the harvest time. So they had to sell their crops in cash as early as possible. They sell their crops at less than the market price or government support price to pay back their loans. This ironic situation increases the misery of farmers. Government must ensure that farmers must have their due price. For this, micro credits should be offered to farmers on easy terms and with easy processing. The market system must be improvised for the better function of the agricultural markets. The agriculture sector is the industry's backbone, and the economy needs to be addressed seriously and minutely. Pakistan, blessed with leveled land, resources of water, and favorable climatic conditions for farming, is still struggling to ensure food security. Share in GDP and share in the total labor force has been declining over time, showing the uncertainty of growth in this sector. Shortage of water for cultivable land is a major issue that ruins productivity. Water reservoirs and proper groundwater management, salinity removal, and waterlogging are indispensable for progress and consistency in agriculture.

Livestock, fisheries, and forests are key sub-sectors that can contribute to increased production of the agriculture sector. In the last decade, there hasn't been much done for these sectors. Although some policies were announced for these sectors, there haven't seen any significant improvement. Livestock will not only fulfill the domestic nutritional needs but also helps to increase exports; similarly, the export of fish to the European Union will increase foreign reserves. Supports prices are very encouraging for farmers, and these efforts help and show improvement for the cultivation of crops. Most farmers had adopted mechanization and high variety seeds, fertilizers, and modern methods, specifically in large farms. Farmers had realized that it was an investment that could bring more amount of profit to them. The credit and insurance system should be improved and function fully. For this purpose, awareness should be given to

farmers, and procedures for credit grants and insurance schemes should be simple and time-saving. That would bring confidence in the farming sector. We must focus on agriculture research and development; all modern countries have high per acre production due to innovation and research. Research departments and universities must perform actively for this purpose.

REFERENCES

Azad, M. A. K., & Alam, M. J. (2004). Popularizing of sugarcane based intercropping systems in non mill zone. J. Agron, 3(3), 159-161.

Economic Survey of Pakistan (2019). Government of Pakistan, Finance Division, Economic Advisor's Wing Pakistan 2018-19.

GOP. 2020. Economic Survey of Pakistan (2019-20). Economic advisor's wing, finance division, Islamabad Pakistan.

Javed, I., Mustafa, G., Ashfaq, M., Yasmeen, R., Ghafoor, A., Yasin, M., Jaffari, A. A & Imran, M. A. (2018). Competitiveness in agricultural trade of Pakistan with United Arab Emirates. Pakistan Journal of Agricultural Sciences, 55(3), 703-711.

Khan, M. B., Chaudhry, I. S., & Akhtar, M. H. (2011). Cost-benefit analysis of Cotton production and processing by stakeholders: The case of Mutlan and Bahawalpur regions. Seeds, 2, 3.

Khan, S., Tariq, R., Yuanlai, C., & Blackwell, J. (2006). Can irrigation be sustainable?. Agricultural Water Management, 80(1-3), 87-99.

Punjab Development Statistics. (2016). Government of Punjab, Bureau of Statistics Punjab 65-Trade Centre Block, M.A Johar Town, Lahore, Punjab, Pakistan.

Razzaq, A., Qing, P., Abid, M., Anwar, M., & Javed, I. (2019). Can the informal groundwater markets improve water use efficiency and equity? Evidence from a semi-arid region of Pakistan. Science of The Total Environment, 666, 849-857.

Razzaq, A., Rehman, A., Qureshi, A. H., Javed, I., Saqib, R., & Iqbal, M. N. (2018). An economic analysis of high efficiency irrigation systems in Punjab, Pakistan. Sarhad Journal of Agriculture, 34(4), 818-826.

Shahzad, M. A., Razzaq, A., & Qing, P. (2019). On the wheat price support policy in Pakistan. Journal of Economic Impact, 1(3), 80-86.

Spielman, D. J., Malik, S. J., Dorosh, P., & Ahmad, N. (Eds.). (2016). Agriculture and the rural economy in Pakistan: Issues, outlooks, and policy priorities. University of Pennsylvania Press.