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Rice Yield Estimation in Sawat Region Incorporating The Local Physio-Climatic Parameters

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Rice production in Sheikhupura Punjab Pakistan will be examined in this study. Farmers in Pakistan's distant rural areas aren't using their resources effectively. As a result, inefficient decisions are made that waste time and money. Pertinent data were used to analyze rice production. Agricultural inputs such as fertilizer as well as labor, capital, training, and rice price, all have a substantial impact on the District's ability to produce rice. The outcomes of this study point to the importance of each of these elements in rice production. Rice production is hampered by a lack of physical capital, technical skills, and the advancing age of farmers. Finally, it is advised that the government take specific measures to improve water systems, farmer training, input availability, and loan access in order to raise rice output.

Keywords; Yield estimation, Physical tactical, Technical skills, Rice.

Introduction

Agriculture is Pakistan's largest economic sector, contributing 24% of GDP and employing 47.0% of the country's workforce[1][2]. As a result of Pakistan's broad geographic area and diverse agroecological characteristics, rice is an important agricultural crop [3][4]. In order to maintain food security, the country relies heavily on rice. Rice is a staple in the diets of over 70% of Pakistani households, making it a necessary component of the national diet [2]. Rice is a nutrient-dense meal, making up 47 percent of calories and 35 percent of protein in a typical diet. Consequently, rice is Pakistan's most important cash crop, providing a key source of food and income for millions of Pakistani households across the country [5][6][7]. For the majority of the world's population, rice is the most readily available, required, and cost-effective food source. Rice is one of the world's most popular foods because of its ubiquitous availability. Food security issues in Pakistan are addressed via rice cultivation, as well. To ensure Pakistan's economic progress, relief of poverty and food insecurity, and an increase in GDP and export revenues, rice production must be effective [8][9][10].

Asia's tropical and sub-tropical regions have produced approximately 90 percent of the world's rice. Many of these farmers are still small-scale and under-resourced. Because of the widespread use of Chinese hybrid rice seeds, Pakistan's rice production has increased faster than that of other major crops like wheat and maize in recent decades. Between 2000 and 2010, rice production in the country grew at a pace of 1.6 percent each year. Pakistan is the eighth-largest rice producer in the world, although it swiftly dropped out of the top ten [2][11].

As Pakistan's per capita rice consumption rises at a 2.8% annual rate, the country will need to implement policies to improve rice production in order to meet the rising demand. Per acre, Pakistan produces less rice than its neighboring countries [12][7]. Despite a significant flow of high-yielding Chinese crops entering the country, Pakistan's output per hectare is predicted to be less than 2.56 tonnes. " Regardless, global production per acre is 4.7 tonnes. A shortage of inputs, poor farming practices, and inefficient use of fertilizer all contribute to Pakistan's low per-hectare yields. Therefore, it was necessary to identify the root causes of this decline in output. This study aims to examine the factors that affect rice production [13][14][7].

Several recent studies have attracted attention to the topic, including Tanko and colleagues (2016) and Khan and colleagues (2018)[15][16], all of which looked at the factors that affect rice production in various nations. Despite the fact that the subject has been addressed in Pakistan by Iqbal et al. (2001), Mundlak et al. (1997), and Memon et al. (2015)[15][17][18], we tried to conduct research in an efficient way. The next section of this study covers materials and processes and a model specification for production function; nevertheless, the interpretation of empirical results and conclusion are provided in the next two sections.

Results

Agricultural researchers revealed that the average age of farmers is 45 years old, with a 12-year level of agricultural experience. The vast majority of rice growers are well-versed in their art. Given their extensive expertise in rice farming, it's safe to assume that these farmers have been doing it for some time. Some formal education is available to the remaining 75% of illiterate farmers. A large majority, 47%, are still in elementary education. Illiteracy among farmers prevents them from taking advantage of modern agricultural technologies and practices. These farmers are now just concerned with their old-fashioned farming methods, as a result. Farmers are also becoming more illiterate, with only a quarter selling their products directly to the public. It doesn't get much better for farmers; 65 percent of their monthly income is below 20,000 PKR. A large majority of farmers are in need of financial assistance. Farmers are unable to make improvements to their operations because of a lack

of funds. In other words, high per-acre yields can only be achieved if the farmers are well-off. More than 70% of farmers received loans from the informal sector, but just 10% of farmers received loans from ZaraiTaraqiati Bank Ltd. (ZTBL). Farmers in the study area tend to be men who have a limited amount of land.

According to the statistics, the variable is exactly as predicted by economics. Paddy zones have demonstrated that they can absorb extra capital and input to boost rice output with capital and labor support. Research shows that capital has a stronger impact on agricultural production than labor due to its higher marginal productivity.

Credit, fertilizers, gasoline costs, operating costs, monthly revenues, rice prices, technology, education, credit sources, and marketing all have an impact on rice yield. Despite this, there is no doubt that factors such as age, experience, and size of the farm all have a negative impact on output. Most of the farmers in the area are poor and underprivileged, thus they cannot afford to use high-quality rice-growing inputs. Due to the farmers' inability to absorb the high costs of rice production's high-priced ingredients, rice output is inversely correlated with input costs. As a result, a 1.5% reduction is justified.

The price of rice fell as a result of an increase in input prices. Long-term training and advancements in technique and technology can also enhance the district's rice yields per acre.

Pesticides and agricultural experience are not statistically significant in the results at the 1% and 5% levels, but farm size, irrigation, seed type, and the number of laborers are. According to the CDPF's findings, rice production is already sensitive to an increase in return to scale.

We may say that this is the best fit based on the regression's R-Square value of 0.81. According to R-Square scores, independent factors account for 81% of the dependent variable's variability.

Recommendations and Conclusions

According to this study's conclusions, several factors influence rice production. The study's findings were based on farmers' responses to a well-designed questionnaire. Random sampling techniques were employed to choose 200 samples for further investigation. As a result, elder farmers are reluctant to adopt new techniques and technology, which has a positive impact on rice production. To help farmers adopt fertilizers and other cutting-edge practices to increase agricultural output, the company's leadership must provide incentives like low-interest loans and evening workshops for adults. As part of its duty to assist farmers in adopting new technologies and practices, the government must educate and motivate them. In addition, the government must give long-term, interest-free loans to farmers in order to meet their banking demands. Subsidized inputs, improved physical infrastructure, and the introduction of contemporary agricultural technologies are all required in the study region, as are training programs for rice farmers.

References

[1] E. L. Birch, "Journal of the American Planning Association," no. April 2015, pp. 1–3, 2014, doi: 10.1080/01944363.2014.954464.

[2] E. A. S. and D. F. Wing, "Economic_Survey_2017_18," no. December, pp. 1–6, 2018.

[3] A. Y. Hoekstra and M. M. Mekonnen, "The water footprint of humanity," vol. 109, no. 9, 2012, doi: 10.1073/pnas.1109936109.

[4] S. Mahajan, M. Sharma, and A. Gupta, "Arima modelling for forecasting of rice production: A case study of India," Agric. Sci. Dig., vol. 40, no. 4, pp. 404–407, 2020, doi: 10.18805/ag.D-5029.

[5] D. Bocchiola, E. Nana, and A. Soncini, "Impact of climate change scenarios on crop yield and water footprint of maize in the Po valley of Italy," Agric. Water Manag., vol. 116, pp. 50–61, 2013, doi: 10.1016/j.agwat.2012.10.009.

[6] T. M. Zulqarnain Anwar, Zain Rafique1, Aamer Amin, "Impact Assessment of Organizational Stress in Agriculture Sector," Int. J. Agric. Sustain. Dev., vol. 3, no. 1, pp. 1–6, 2021.

[7] S. A. Shaikh, O. Hongbing, K. Khan, and M. Ahmed, "Determinants of Rice Productivity: An Analysis of Jaffarabad District –Balochistan (Pakistan)," Eur. Sci. Journal, ESJ, vol. 12, no. 13, pp. 41–41, May 2016, doi: 10.19044/ESJ.2016.V12N13P41.

[8] A. J. Challinor, J. Watson, D. B. Lobell, S. M. Howden, D. R. Smith, and N. Chhetri, "A meta-analysis of crop yield under climate change and adaptation," vol. 4, no. March, pp. 287–291, 2014, doi: 10.1038/NCLIMATE2153.

[9] K. Khan, M. A. Kamal, S. Ramazan, G. Khan, G. Ali, and S. Ahmed, "Impact of agricultural credit on livestock income: A case study of district Lasbela, Balochistan," Sarhad J. Agric., vol. 34, no. 2, pp. 246–250, Jun. 2018, doi: 10.17582/JOURNAL.SJA/2018/34.2.246.250.

[10] T. M. Hamna Butt, Aamer Amin , Shahida Haji, "Family Farming Improves The Livelihood in Highlands of Pakistan," Int. J. Agric. Sustain. Dev., vol. 3, no. 1, pp. 24–30, 2021.

[11] A. A. Saira Batool, "Drip Irrigation Toward Sustainable Future," Int. J. Agric. Sustain. Dev., vol. 3, no. 1, pp. 7–14, 2021.

[12] B. A. Kimball, "(1983) Carbon Dioxide and Agricultural Yield: An Assemblage and Analysis of 430 Prior Observations (AJ)," 1983.

[13] G. Deng, Y. Ma, and X. Li, "Regional water footprint evaluation and trend analysis of China d based on interregional input e output model," J. Clean. Prod., vol. 112, pp. 4674–4682, 2016, doi: 10.1016/j.jclepro.2015.07.129.

[14] S. Shrestha, R. Chapagain, and M. S. Babel, "Science of the Total Environment Quantifying the impact of climate change on crop yield and water footprint of rice in the Nam Oon Irrigation Project , Thailand," Sci. Total Environ., vol. 599–600, pp. 689–699, 2017, doi: 10.1016/j.scitotenv.2017.05.028.

[15] Y. Mundlak and R. Butzer, "The Determinants of Agricultural Production: A Cross-Country Analysis," Sep. 1997, doi: 10.1596/1813-9450-1827.

[16] A. A. Junaid Sabir, Kashif Shafique , Jamal Hasan, "Activism of Child Labour in Agricutural Sector," Int. J. Agric. Sustain. Dev., vol. 3, no. 1, pp. 15–23, 2021.

[17] M. H. Memon, K. Khan, M. Y. Abbass, G. Khan, and M. A. Kamal, "Impediments to Technology Adoption: A Case Study of Peach Production in District Swat, Pakistan.," J. Manag. Sci., vol. 9, no. 2, pp. 226–242, 2015, [Online]. Available: http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=112467292&site=ehost-live

[18] A. K. Chapagain and A. Y. Hoekstra, "The blue , green and grey water footprint of rice from production and consumption perspectives," Ecol. Econ., vol. 70, no. 4, pp. 749–758, 2011, doi: 10.1016/j.ecolecon.2010.11.012.