



Factors Affecting Wheat Production in Districts Loralai and Jaffarabad Baluchistan

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ARTICLE INFO

Article History:

Received: September 21, 2023

Revised: December 10, 2023

Accepted: December 11, 2023

Available Online: December 12, 2023

Keywords:

Wheat Yield

Amount to DAP

Amount of Urea

Number of Canal Irrigation

Tube Well

JEL Classification Codes:

O13, Q13, Q15

ABSTRACT

The present study aims to identify the main factors affecting wheat production in the upper zone of the Loralai District and the plain zone of the Jaffarabad District. Data was collected from the farmers by purposive sampling method. A structured questionnaire was developed for collecting data from the farmers. A total of 85 growers were identified for data collection from the study area. A multiple linear regression model was used to assess the significant factors affecting the production of wheat. The yield of wheat was considered a dependent variable. The multiple regression model indicates that the amount of DAP and Urea applied to wheat crops, number of canal irrigation accessible and tube well irrigation availability were significant factors associated with yield of wheat in the study area.

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.



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Citation: Ismail, M., Israr, M., Khan, Z., Muhammad, Z., & Muhammad, N. (2023). Factors Affecting Wheat Production in Districts Loralai and Jaffarabad Baluchistan. *IRASD Journal of Economics*, 5(4), 924–928. <https://doi.org/10.52131/joe.2023.0504.0169>

1. Introduction

Agriculture sector provides multiple service for Pakistan including improving economy and providing food. Industries get raw material from agriculture sector like cotton is an essential export of Pakistan, and the textile industry also depends on this sector for raw materials. Livestock also depend on agriculture in form of food. Agriculture sector supply raw material to almost all sector of economy. These raw materials include wheat, rice, sugarcane, maize, barley, corn, sorghum, pulses, cotton, etc (Shafiq, Gillani, & Shafiq, 2021). Agriculture is the backbone of Pakistan's economy, approximal 68% of the residents are associated with farming through the proffering, proceeding and distribution of key agriculture products. Its share in GDP of Pakistan is 21% (Bajkani et al., 2014).

Wheat is crucial cereal crops grown on 200 million hectares of farm land in the whole world. Wheat is the second importance cereal crop in the world. Around the 21% of the food used in the world depends on wheat crops (Reeves, Thomas, & Ramsay, 2016). Developing countries consumed 75% of global wheat production (BizVibe, 2019). It is rich with protein and other important element of human diet (Salekdeh & Komatsu, 2007). It is grown in large areas of Pakistan to ensure food security in the country. Wheat is occupying the largest farmland

Pakistan cannot produce wheat which meet to its demands, although, self-sufficiency in wheat yield is claimed (Aslam, 2016). An effort is made to enhance the wheat yield by providing modern technologies to the farmers of country but unfortunately the required level of wheat yields not achieved yet (AMIS, 2018). Almost all-important crops yield is found lower than the required level. The reasons might be climate changes and stagnant cultivated area (GOP, 2019).

The country faced difficulties to fulfil the demand of consumer. Among these crops, wheat is the most important one, therefore, it is crucial to detect other method of increasing wheat yield despite adoption of management practices, improved inputs and technologies (Dorosh & Rashid, 2013).

2. Literature Review

According to Yang, Harrison, and Wang (2023) main factors influence wheat yield were, socioeconomic factors, cultivation management measures, and environmental factors, input costs and economic benefits, variation in management, soil fertility and climatic factors. Khan et al. (2021) conducted study on assessing the associated factors responsible for wheat yield in rural district Charsadda, Khyber Pakhtunkhwa Pakistan. In their study regression model was used which showed that tractor, fertilizer, seed, and pest/weed inputs positive related while labour and animal costs were negatively related to wheat yield. Shah et al. (2020) highlighted factors affecting production of major crops in District Bahawalpur. They used Multiple Linear Regression (MLRM) models to assess the significant factors which are; plough and rotavator number, planking, irrigation, seed type, DAP, seed treatment, and urea fertilizer, latest varieties, weed spray, farmyard manure, certified seed, diseases and pests' sprays, soil type (kalrathi), home seed, weeds, pests' attack and diseases.

Mburu, Ackello-Ogutu, and Mulwa (2014) found farm size is positively related with both wheat yield and technical efficiency metrics. Their study further shows that area planted with cotton does not, however, ability to show with wheat yield. Farmers' education, distance to agricultural extension, and farm size are the main elements that minimize inefficiency at the farm level.

Ali, Rehman, Nasir, and Ranjha (2011) evaluated how Pakistan's agriculture policy has affected wheat production. They found that government policies affect the production of wheat. Rashid, Sadaqat, Khan, and Ahmed (2019) ascertains how wheat productivity and production related to the prices that the Pakistani government's agriculture policy promised with growers. Their findings indicated that a supportive price strategy, proper water availability, and technology all worked together to increase the nation's wheat production. The findings indicated that shocks have an impact on both wheat productivity and production. Abbas, Sheikh, Sabir, and Nighat (2005) conducted study in central Punjab in order to identify the main factors associated with low production of yield. They found that no use of weedicides, lodging, hailstorm in area, attack of aphids/rust and poor management respectively were the main factors, causing low wheat productivity.

Baluchistan province have 347190 S.q Km area which is more than other provinces of Pakistan (*Total area of Pakistan*, 2023). Unfortunately, this province wheat yield is lower than Punjab and Sindh provinces (Saeed, Qasim, Mahmood, & Akhtar, 2021). Moreover, Wheat yield

in the province is well below the potential and the province is deficit in wheat production. The Baluchistan contributes overall high area than other provinces and production lower than Punjab and Sindh provinces. Therefore, the researcher motivated to conduct study in this province in order to identify the factors affecting wheat yield. For these purposes two districts from the province are selected; Loralie and Jaffarabad.

3. Material and Methods

In order to characterize and analyze the wheat production system, quantify the level of input, and address other relevant concerns, primary information is gathered from the farmers in the study area. The inspection was conducted from the plain and upper state of two different zones of Baluchistan. The main focus of study is factor affecting wheat production in Loralai and Jaffarabad districts of Baluchistan. The data was collected using purposive sampling method. The estimated contribution of each element to wheat production was calculated using a multiple regression model. Since the model was estimated in linear form, the values of the parameters displayed how much each production element contributed on its own. Total wheat production is calculated as the dependent variable.

Stepwise analysis was used to choose the best-fit model out of all the variables that were thought to be responsible for Baluchistan's wheat output. The best model, based on probability criteria, had the following variables, amount of DAP, amount of Urea, number of canal irrigation accessible, tube well irrigation availability.

The regression model is as under,

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1X_1 + \hat{\beta}_2X_2 + \hat{\beta}_3X_3 + \hat{\beta}_4X_4 \tag{1}$$

Where,

- \hat{Y} is the yield of wheat,
- $\hat{\beta}_0$ is the intercept regression,
- $\hat{\beta}_i$ are the regression coefficient,
- X_1 is amount of DAP,
- X_2 is amount of DAP,
- X_3 is the no. of canal irrigation accessible,
- X_4 is the tube well irrigation availability.

4. Result and Discussion

Total of 85 growers were selected for taking information through structure questionnaire. Their age is shown in Table 1. The growers having age range from 18 to 24 are 8(9.41%), from 25 to 31 are 13(15.29%), from 32 to 38 are 23(27.06%), from 39 to 45 are 7(8.24%), from 52 and above are 5 (5.88%). Most of the growers in study area were found young, that is, their age ranges from 32 to 45, the reasons might be the old age persons could not able to do farming due to hard working in this filed.

Table 1
Age of the Growers in Selected Sample from the Study Area

Age	Number of Growers	Percentage
18–24	8	9.41
25–31	13	15.29
32–38	23	27.06
39–45	29	34.12
46–52	7	8.24
52 and above	5	5.88

Table 2 shows estimated regression coefficient, t value and P values. The predictors variables, amount of DAP and Urea fertilizer, number of canal irrigation accessible, tube well irrigation availability are significantly associated with dependent variable yield of wheat in the study area. These predictors are significantly associated with yield of wheat as their p values are less than 0.05. moreover, the coefficient of determination R-square is 0.31 which shows that 31 percent of variation in wheat yield is explain by the predictor's variable included in the model.

Table 2
Result of Regression Model

Factors	Coefficient	Standard Error	P value
Intercept	0.32	-2.700	0.010
Amount of DAP	0.108	-1.10	0.003
Amount of Urea	0.229	2.30	0.03
No. of canal irrigation accessible	1.120	4.00	0.00
Tube well irrigation available	1.30	4.70	0.00

R-square=0.31

Khan et al. (2021) and Shah et al. (2020) found that the application of DAP and Urea are significant factors responsible for wheat yield. Thus, our result is match to them. Shah et al. (2020) found that irrigation method plays vital role in production of yield. Our result is similar to them.

5. Conclusion

The aim of this research was to pilot a full inquiry to recognize the main elements of the fall of Baluchistan's wheat efficiency. It is found that the amount of DAP, amount of Urea, number of canal irrigation accessible and tube well irrigation availability are significant factors associated with yield of wheat in the study area. It is highly recommended that farmer should be aware by government concerned department that they ensure appropriate use of fertilizer. Also, government should ensure proper irrigation of wheat crops in the study area.

Authors Contribution

Muhammad Ismail: Study design, Concept topic idea, conclusion, supervision direction

Muhammad Israr. Provided guidance for data analysis.

Zahid khan: Initiated the core idea of performed data analysis and drafting.

Zaid Muhmmad: Reviewed and revised overall quality and writeup of the manuscript.

Niaz Muhammad: Reviewed, supervised overall study

Conflict of Interests/Disclosures

The authors declared no potential conflicts of interest w.r.t the research, authorship and/or publication of this article.

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