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Economic Analysis of Different Rice Verities Cultivated in Shahdadkot District of Sindh

Abdul Baseer[1], Imam Udin Palal[2], Muhammad Bilal[3], Naeem Qadir[4], and Haris Ali[5].

Department of Agricultural Economics[123], Department of Statistics[4], and Agribusiness Management[5],
Faculty of Agricultural Social Sciences
Sindh Agriculture University Tandojam.
Author's email:jamalibaseer40@gmail.com | imamrazaimamraza7@gmail.com

ABSTRACT

This research investigates the economic analysis of different rice varieties cultivated in district Kamber-Shahdadkot. Primary and secondary data sources were used for descriptive research, where multistage random sampling method was applied. Thus, from three Talukas, two Union Councils (UC) were randomly selected from each Taluka, where 20 respondents from each UC (120 in total) were personally interviewed. The results show that average age of the respondents was 30.82 years, where majority (49.67 percent) of them were illiterate. Results further show that, the findings of this study disclose that average input cost was incurred in rice production was estimated at Rs. 13955 per acre, average capital cost and market cost was estimated Rs. 34013.33 per acre. However, an average of physical productivity per acre of all verities was 76.49 mounds (40 kgs) rice grain and 8.24 bundles (Binds) of chuff in the study area. The highest physical productivity was estimated of Guard-53 variety of rice. The revenue productivity was estimated for Almas, Diamond, Guard-53, Higrow, IRRI-6, Pukhraj varieties was Rs. 293794.5, Rs. 305981, Rs. 323427, Rs. 301011, Rs. 213520 Rs. 288585 respectively. The highest benefit cost ratio and input out ratio of diamond variety was estimated, which was about 1:5.45 and 1:6.45 respectively. Through this research, it is calculated that the diamond variety was most profitable in the study area; therefore, farmers should cultivate profitable variety in order to maximize their profitability.

Keywords: Economic analysis, Kamber-Shahdadkot, Profitability, Benefit-cost ratio & Rice Verities.

INTRODUCTION

Rice is an important food and cash crop in Pakistan and the second staple after wheat. In 2023–24, rice continued to be the most promising crop, with a notable 22.2 percent rise in area, from 3.0 million hectares to 3.6 million ha. Compared to 7.3 million tonnes the previous year, its production climbed 34.8 percent to 9.9 million tonnes in 2023–2024. It

contributes 2.5 percent of value added to agriculture and 0.6 percent of GDP. Increased acreage under cultivation, combined with favourable monsoon rains, higher rice prices, and improved export possibilities over the previous year, contributed to the increase in rice production (GoP, 2023).

However, government and non-governmental organizations should devise appropriate policy about production systems i.e. marketing, transport storage, production costs, marketing margins, consumption, exports, recommended verities, capacity of land and water resources to increase production (Young et al. 1998)

Rice plays an important role in Pakistan's economy. Often, agriculture creates productive employment for 45 per cent of the country's workforce and 60 per cent of rural people depend on the sector for their livelihood. It plays a crucial role in ensuring food security, promoting overall economic growth and reducing poverty. Economists believe that Pakistan is facing international challenges because of the difficult economic environment in developed countries. Pakistan is the sixth most populous country in the world with the 34th largest economy and is purely fertile land. In Pakistan, rice is the second most important staple food crop and has long been a significant source of foreign cash. Pakistan is a specialist in growing rice and meets domestic demand for high-quality rice. There are 25.71 million heads of rice planted, 8.7% higher than there were 23.65 million heads the previous year (Khoso, 2015).

Rice is the staple food for billions of people worldwide. Although there are many various growing environments and methods for producing rice, the most widely utilized technique in the in the world is submersion in water. The only cereal that can thrive for extended periods of time in water is rice. This is the staple food most widely consumed by most of the world's population, especially in Asia. According to FAO statistics, this is the third largest producer of agricultural products in the world after sugar cane and maize (FAOSTAT, 2012).

As a cereal, rice is the staple food consumed most by most of the world's population, especially in Asia. It is the second largest food crop in the world. Rice is the most important cereal for human nutrition and caloric intake, accounting for more than one-fifth of global human calorie consumption. Rice cultivation is well suited for countries and regions with low labor costs and high rainfall because it is labour intensive and requires adequate water resources. Rice can be planted anywhere, even on steep slopes. Although the motherland is home to some parts of Asia and Africa, the trade and exports of many cultures around the world have become popular (FAOSTAT, 2006).

The introduction of high-yielding varieties of fertilizers, pesticides and irrigation has greatly increased the output of rice and expanded the area under rice cultivation. However, yields and areas have stagnated in the past two decades. The two most important causes of

this stagnation are the lack of adequate irrigation water and increased plantation costs. India will need to produce more rice if it is to meet growing demand, and it is expected to reach 130 million tons of polished rice by 2030. As there is little room for increased rice acreage (due to urbanization and severe water stress) additional production must come from land less, less water and less human labour. With the introduction of high-yielding varieties and the improvement of crop management techniques, the average rice yield has increased significantly. However, a significant income gap still exists. Under such circumstances, SRI may be a suitable choice to produce more food with less input. SRI is a new rice growing system developed by the American Pacific Union in the early 1980s. Henri de Laulanie "is a comprehensive practice involving less seeds, water, fertilizers and pesticides (Durga & Kumar 2013).

Hybrid rice is produced by crossing two different parental strains of rice. The result of such crosses is that the F1 generation is stronger than either parental line. The improved quality of the f1 generation referred to as heterocyst can make excellent agronomic traits, high yield, strong disease resistance, more effective use of soil nutrients, weeds control better. For years, conventional crop breeders have been aware of and have made use of the great traits provided by plants with distinct genetic crossings, such as heterozygosis's. The natural tendency of rice to self-pollinate has historically restricted the yield of hybrid rice cultivars. To get around this problem, Chinese researchers developed the first generation of hybrid rice in 1974 using the three-line hybrid technique, which is based on cytoplasmic male sterility (CMS) lines and cross combinations. (khoso 2015).

The present study was conducted to compare the cost and revenue from different varieties grown in district Kamber-Shahdadkot. Generally, The input-output relationship and cost-revenue comparison of several rice types are the main topics of this study. with the objectives; (i) to assess the status of rice production in Sindh; (ii) to estimate the costs and returns input ouput ratios of different rice varieties cultivated in the study area; and (iii) to identify the issues and constraints faced by the rice growers in the study area.

MATERIALS AND METHOD

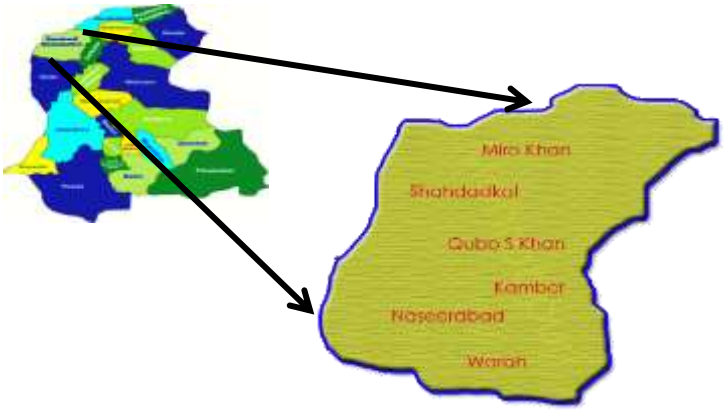
This section indicates the methodology used for this study, including the sampling procedure as well as the data collection technique in order to analysed and fulfil the objectives, which were designed in the proposed project.

Study area

Kamber-Shahdadkot District from Sindh province was selected for this research, the districts headquarter is located at Kamber, was established (separated from District Larkana) on 13 December 2004. Kamber-Shahdadkot shares its borders with three districts of Baluchistan on the west, Khuzdar, Jaffarabad and Jhal Magsi. Its southern borders relate to district Dadu, where the District Larkana is on the east and district Jacobabad is on the north.

The district is famous for rice cultivation in the province that is why this district was considered for this research project.

Figure 1: Study area location



Sampling procedure and sample size

The present study was carried out by descriptive research survey method; the survey was conducted by a multistage random sampling method. At first stage the District Kamer-Shahdadkot was selected for this research because we search that which variety is more profitable for farmers in this district; the district is comprised over three sub-Taluka Kamber, Miro khan, Shahdadkot, at second stage 2 Union Councils (UC) were randomly selected from each Taluka, where at final stage 20 respondents from each UC were personally interviewed through a pretested questionnaire. Thus, 120 rice growers was included as sample for this research. The goal of the study was to determine whether the type of rice is more lucrative for the residents of the Kamber-Shahdadkot area. The research's conclusions may also be useful to agricultural economists and policymakers in understanding the cost-benefit factors in the Kamber-Shahdadkot district.

Questionnaire

Through regular in-person interviews and observations, the necessary data were gathered and recorded on a pre-tested questionnaire. the data regarding the respondents' transportation networks, input-output revenue, and cost-benefit ratio. The basic data was gathered using an interview schedule. Interviews conducted in person were used to get the data. After the questionnaire was pretested in the field and a few small adjustments were made, the survey was eventually released. The language of the questionnaire was English, but it was administered in Sindhi, which was an understandable language, in order to have more accurate and maximum information from the respondents. Data analytical measures: Analytical processing was a crucial stage in transforming research data into a meaningful and sufficient format. For the purpose of presenting the compiled data, a tabulation plan was created. With the use of Microsoft Excel software, preliminary data analysis including frequency distribution, descriptive statistics, and exploratory analysis was performed to complete the tabulation plan. The results are explained in the next section.

RESULTS AND DISCUSSION

In this section, the findings of the present research regarding the socioeconomic status of the respondents from Kamber-Shahdadkot District have been provided. Whereas the socioeconomic status of respondents, including their age, education, and cropping information, includes rice crop, land preparation, seed rate, fertilizer application, pesticide spray, and harvesting. Marketing price, market commission, transportation, loading/unloading willingness to pay for their local development have been documented after analysing the collected data from the study area.

Socioeconomic description of the respondents; In this section the results regarding the socioeconomic condition (age, school, etc.) are given.

Socioeconomic characteristics of the respondent

Table-1: Socioeconomic characteristics of the respondents

Description	Statistics
Total respondents	120
Age of the respondents (Year) (Average)	30.82
Literates (Percentage)	50.33
Illiterate (Percentage)	49.67

According to the above table, the sampled respondents' average age was approximately 30.82 years, indicating that they were mature decision-makers who could handle any situation that arose in both their personal and professional lives. The results were consistent with Magsi et.

al. (2015), where the majority of them were literate and 50.33 percent and 49.67 percent were illiterate.

Input cost

Input costs were incurred for all cultural operations throughout the cultivation period in the study area. These operations encompass land preparation of the produce.

Table -2. Variety wise per acre input cost of the rice growers (in rupees)

Particulars	**Rice varieties**					
	Almas	**Diamond**	**Guard-53**	**Higrow**	**Irri-6**	**Pukhraj**
Jungle clearance	350	300	400	500	400	470
Clod crushing	400	400	400	400	400	400
Preparation of nursery	800	900	950	800	600	750
Irrigation labour	500	550	600	500	400	450
Transplantation	2600	2700	2900	2700	2650	2760
Application of fertilizer of / F.Y.M.	600	500	550	450	530	530
Application of insecticide/weedicide	400	450	500	400	550	400
Harvesting	5000	4500	5500	4300	4700	4600
Labour in threshing	2700	2500	2000	2200	2200	2650
Loading	500	600	550	450	450	540
Fixed Cost per acre	500	500	500	500	500	500
Total labour cost	**14350**	**13900**	**14850**	**13200**	**13380**	**14050**

This table presents the per acre input costs associated with various rice varieties, detailing the specific labour and operational expenditures incurred by rice growers. The data

showcases a comparative analysis of costs across six rice varieties: Almas, Diamond, Guard-53, Higrow, Irri-6, and Pukhraj. Each category of labour, such as jungle clearance, nursery preparation, irrigation, transplantation, and harvesting, is itemized with associated costs, illustrating variations in input requirements for each variety. The total input cost was Rs. 13955 an average per acre, reflecting the economic consequences of choosing different rice varieties. The result similar as Ahmed (2014) he observed that the average per acre input cost was 9600 in the study area. This information is critical for understanding the financial burdens on rice producers and could inform decisions regarding agricultural practices and variety selection to enhance economic viability in rice cultivation.

Capital cost and market cost

Capital refers to the physical items utilized in production, and it is essential in defining the type of farming. It is a variable-value production element that is critical to increasing productivity. Marketing costs for rice growers include expenses incurred as agricultural goods migrate from the farm to the final customer, covering transportation, loading, unloading, and commission payments.

Table- 3. Variety wise capital cost and market cost per acre (in rupees)

Particulars	Rice varieties					
	Almas	**Diamond**	**Guard-53**	**Higrow**	**Irri-6**	**Pukhraj**
Ploughing	2550	2600	2750	2850	2770	2250
Levelling	950	1000	900	850	970	700
Seed	11500	9680	12450	11550	3880	11550
Fertilizer	9000	9300	9550	9450	7550	8560
Pesticide	1500	1300	1400	1290	1100	1150
Insecticide	600	700	1120	1200	1160	1100
Threshing	7500	7200	8450	8350	6550	8250
Tractor Loading/unloading	780	770	810	800	600	790
Computerized kanta	250	250	250	250	250	250
Bank Tax in case of cash	470	460	480	470	360	470
Commission charges	300	300	330	320	240	320
Total capital cost	**35400**	**33560**	**38490**	**37380**	**25430**	**35390**

The analysis presents the capital and market costs for various rice varieties, detailing expenses incurred per acre for essential agricultural operations such as ploughing, levelling, and fertilization. Total capital and market cost ranged from Rs. 25,430 for the IRRI-6 variety to Rs. 38,490. The average capital and market cost across all varieties was calculated as Rs. 34275, notably higher than the Rs. 13,565 reported by Hussain et al. (2008). Overall, these calculations underscore the economic viability of different rice varieties in the study area, ilutrating how capital and marketing costs influence productivity and profitability in rice cultivation.

4. Revenue productivity and input, output ratio

Revenue productivity is the cash received by the farmers from the sale of products. The rice growers realized the income from the offer of rice. It is figures by duplicating the

amount of physical efficiency sold with it cost per unit. It indicates that the value of output in the term of money.

Variety	Total cost (a)	Rice Grain revenue per acre			Chuff revenue			Total revenue d=(b+c)	Profit e=d-a	Input output ratio f=d/a	Benefit Cost ratio g=e/a
		Total Productivity (maunds)	Rate per maund	Total revenue (b)	Total Productivity	Rate per Bind	Total revenue (c)				
ALMAS	49750	78.86	3700	291782	8.05	250	2012.5	293794.5	244044.5	5.90	4.90
DIAMOND	47380	77.94	3900	303966	8.06	250	2015	305981	258541	6.45	5.45
GUARD-53	53340	81.36	3950	321372	8.22	250	2055	323427	270087	6.06	5.06
HIGROW	50580	80.78	3700	298886	8.50	250	2125	301011	250431	5.95	4.95
IRRI-6	38810	60.43	3500	211505	8.06	250	2015	213520	144710	5.50	3.72
PUKHRAJ	49440	79.6	3600	286560	8.10	250	2025	288585	239145	5.83	4.83

The table presents an analysis of revenue productivity and input-output ratios for various rice varieties, highlighting the economic performance of each variety based on total costs, productivity, and revenue generation. The total cost of production per acre is detailed alongside the respective rice grain and chaff revenue, showcasing the revenue earned per maund of rice produced. For instance, the Diamond variety has a total cost of Rs. 47,380, yielding a productivity of 77.94 maunds, which generates a total revenue of Rs. 303,966 from rice grain and Rs. 2,015 from chaff, resulting in a total revenue of Rs. 305,981. The profit derived from this variety is Rs. 258,541, resulting in an input-output ratio of 6.45 and a benefit-cost ratio of 5.45. Similarly, other varieties such as Almas, Guard-53, Higrow, IRRI-6, and Pukhraj display varying costs, revenues, and profit margins, indicating the economic implications of choosing specific rice varieties. The findings suggest that the Guard-53 variety, with the highest productivity of 81.36 maunds, also yields the greatest revenue and profit of Rs. 323,427 and Rs. 270,087, respectively. In contrast, the IRRI-6 variety, while having the lowest total productivity of 60.43 maunds, still generates a considerable revenue of Rs. 213,520, albeit with lower profit margins compared to the other varieties. Overall, the input-output ratios across the varieties reflect the efficiency of resource utilization in rice production, with values ranging from 5.50 for IRRI-6 to 6.45 for Diamond, Hussain et al. (2008). Reported that Fakhr-e-Malakand is a highest yielding variety as compared to all other

varieties. Thereby providing insights into the financial viability and effectiveness of each variety in maximizing returns for farmers.

Issues and constraints faced by the rice growers

Table-5. Issues faced by the rice growers (all)

Particulars	Description	Ranking
Low Price of the produce	86.67	1
Illegal deduction on produce	80.00	2
Shortage of water at the time of crop sowing	68.33	3
Less/ no visit of agriculture officer	61.67	4
High price of inputs (specially seed)	56.67	5
Un Registered or less reliable seed	51.67	6
Disease attack incidents	50.00	7

The table highlights several key challenges faced by rice farmers, including low market prices (86.67%) and illegal deductions (80.00%) that reduce their financial returns. Water shortages during sowing (68.33%) and limited visits from agricultural officers (61.67%) further hinder productivity. High costs of inputs, particularly seeds, along with unregistered or unreliable seeds, lower crop yields and quality. Frequent disease outbreaks also threaten crop health. These issues collectively delay rice farming sustainability and farmer livelihoods Shahbaz et. al., (2015).

CONCLUSION & SUGGESTIONS

The fact that farmers are having to deal with both low produce prices and growing input costs highlights the shortcomings of the current marketing system, which does not generate enough revenue for farming communities. Government-backed price control measures should be created to solve this problem and secure farmers from market swings. By protecting them from the negative consequences of unstable market conditions, ensuring fair pricing for their produce, and stabilizing earnings, these systems can ultimately promote a more successful and sustainable agricultural industry.

The majority of respondents reported farming as their primary source of income. To support sustainable agricultural practices in the region, the extension department should initiate farmer training programs.

According to the survey, the area's most profitable was the diamond variety. Farmer incomes can be considerably increased by supporting agricultural diversification and the production of marketable varieties like the diamond variety through extension and training services.

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