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Research Article

Profitability Analysis of Dates in District Kech, Balochistan

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Abstract

Pakistan ranks seventh among the world's leading date-producing countries, with Balochistan contributing 53% of national production (225,000 tons from 43.3 thousand hectares). District Kech alone accounts for 59% of the province's total output. This study assessed the profitability of date cultivation using primary data from 80 farmers in Kech. Major date-producing areas include Turbat and Panjgoor for high-quality dates, while Begum Jangi leads in cultivated area and output, followed by Halini, Hussaini, Goknah, and others. The total cultivation cost was estimated at Rs. 69.9 thousand per acre. Key cost components included land preparation (Rs. 14.8 thousand), orchard establishment (Rs. 19.5 thousand), operational expenses (Rs. 45.8 thousand), and marketing (Rs. 31.8 thousand). Purchase of palm suckers represented the largest share of establishment costs, while transportation dominated marketing expenses. Average yield was 77.3 maunds per hectare, with trees aged 10–20 years being most productive. Washakar fetched the highest market price, followed by Begum Jangi and Konzenabad, whereas Halini was mainly used for producing hydrated dates (Chhuhara). Net returns were Rs. 13.7 thousand per acre, with a cost–benefit ratio of 1:2.98, indicating overall profitability. Marketing analysis showed a consumer price spread of Rs. 3.5 thousand per maund. Retailers received the highest share (42.1 paisa per rupee spent), followed by middlemen (35.9 paisa) and growers (22 paisa). Growers had the lowest cost–benefit ratio (1:0.27), highlighting inefficiencies in the marketing chain. Key challenges included poor farm-to-market infrastructure, high transportation costs, limited market facilities, inadequate irrigation, lack of processing units, and absence of cold storage facilities.

Keywords: Date palm, Profitability analysis, Balochistan, Marketing margins, Farm-to-market infrastructure, Cultivation constraints, Cost–benefit ratio

Introduction

Agriculture is an important sector in the economy of Pakistan, as it provides a basis for food security and economic stability. According to the Economic Survey of Pakistan 2024-25, the agriculture sector accounts for 23.54 percent of the total GDP of the country and provides employment to about 37 percent of the total workforce of the country. The livestock sector is the largest sector within the agriculture sector, accounting for 14.97 percent of the total GDP and about 63.60 percent of the total agriculture sector, while the rest is accounted for by crops, forestry, and fisheries. Agriculture continues to be one of the main sources of livelihood for a large number of people in Pakistan, especially in the rural areas. With the ever-increasing population, the demand for food and agricultural products is also increasing, thus underlining the importance of the agriculture sector in ensuring food security and economic development in the country (GoP, 2025). To meet the growing demand, agriculture in Pakistan is gradually adopting modern practices. Farmers are moving away from traditional methods toward more advanced farming techniques to enhance both productivity and profitability (Fatima et al., 2016).

Similar to many developing nations, Pakistan faces challenges related to food insecurity, is a serious concern,

particularly due to rapid population growth and limited availability of food resources (Khan et al., 2021; Yousaf et al., 2018). According to the Malthusian population trap theory, population growth tends to exceed the capacity of available resources, leading to pressure on food supply and increased risk of food insecurity (Malthus, 1798). In Pakistan, agricultural productivity per acre remains relatively low compared to developed countries, which limits the country's ability to meet the increasing food demand of its growing population (Elahi et al., 2020; Aslam et al., 2024). Major staple crops such as wheat and rice are essential for food security; however, their production is often insufficient to fully satisfy the nutritional requirements of the population (Abedullah et al., 2007). In such situations, nutritionally rich and economically viable crops such as date palm (*Phoenix dactylifera L.*) play crucial role in improving food security and rural livelihoods. Date palm is a highly nutritious fruit rich in carbohydrates, minerals, and vitamins, making it an important food source in arid and semi-arid regions (Zaid & de Wet, 2002; Al-Shahib & Marshall, 2003). Date palm cultivation provides employment opportunities and income for rural populations, particularly in marginal areas where other crops cannot be grown efficiently (El-Juhany, 2010; Jonoobi et al., 2019). Moreover, date palm is well adapted to harsh climatic and soil conditions, including drought, salinity, and extreme temperatures, and can provide higher economic returns under such conditions (Manickavasagan et al., 2012). In addition, date palm trees help protect soil from erosion, reduce desertification, and provide raw materials for small-scale rural industries, thereby contributing to additional income and improved livelihoods for farming communities (Zaid & de Wet, 2002).

Worldwide production of dates is estimated at 5.4 million metric tons, making it a major fruit crop in the global agricultural market. Dates are widely traded around the world owing to their high nutritional value and ability to thrive in arid and desert conditions. In 2001, Egypt, Saudi Arabia, Iran, Pakistan, and Iraq were the major date-producing countries, which together accounted for close to 69 percent of the total global production (Botes & Zaid, 2002). Pakistan ranks as one of the leading date-producing nations and is among the top ten producers globally. The production levels of the leading date-producing countries in 2016 are presented in Table 1, as per the production data reported by the Food and Agriculture Organization.

Table 1. Top dates producer countries in the world ranking.

Rank	Country	Production (1000 metric tons)
1	Egypt	1,373.82
2	Saudi Arabia	1,122.82
3	Iran	1,016.61
4	United Arab Emirates	900
5	Algeria	690
6	Iraq	619.18
7	Pakistan	557.28
8	Oman	268.01
9	Tunisia	180
10	Libya	165.95

Source: FAO (2016).

Date palm is recognized as one of the most important fruit crops in Balochistan, ranking second only to apples in terms of production and economic value. The Makran division is a major hub for date cultivation, producing approximately 227,000 tons from around 20 different varieties. Despite this high production, only a small portion reaches the market, which restricts farmers' income potential. Makran is also considered the country's second-largest date-producing region, following Sukkur. An economic assessment conducted by Baloch et al. (2014) in District Kech, Balochistan, involving 60 date palm farmers and some marketing intermediaries, highlighted that the district is well-known for high-quality dates, with Begum Jangi being the dominant variety

in terms of both cultivated area and production. Other important varieties are also grown in the region.

Similarly, Fatima et al. (2016) investigated the production costs and returns of date palm cultivation in Pakistan using a sample of 40 growers from three purposefully selected villages. The study applied a simple budgeting approach to calculate production costs and returns. Findings revealed that the total cost of production per acre included expenses for pruning, labor, irrigation, fertilizers, chemicals, and marketing, with pruning and crop management accounting for the largest share (27.67%) of total costs. The average gross and net returns per acre were PKR 451,200 and PKR 390,480, respectively, demonstrating that date palm farming is a highly profitable agricultural activity in the study area.

The research emphasized the major date palm variety found in the region of District Kech in Balochistan, known as Begum Jangi, which has been identified as the prominent date palm variety in terms of production and economic returns compared to other date varieties. Special emphasis has been given to the profitability of date cultivation at the optimum level, especially in terms of production costs and revenue generation rather than marketing. To enhance the accuracy of the research, the sample size of the respondents has been increased in order to avoid any possible errors in the research. The study was done with the aim of finding an estimate of the revenue generated from the production of dates in the District Kech of Balochistan. The study also sought to examine and analyze the various costs associated with the production of dates in the study area, with the aim of understanding the cost structure. The study was to evaluate the profitability of the production of dates by comparing the revenue with the total cost of production.

Methodology

The methodology offers a scientific approach for obtaining, examining, and interpreting the information needed to accomplish the study's objectives. This chapter will describe the procedures and methods employed for obtaining and examining the data, with a focus on determining the profitability of date cultivation in District Kech, Balochistan. The study aims to investigate the profitability of date cultivation in a given area. To achieve this, a structured approach to research was adopted, focusing on District Kech as a study area. 80 respondents was selected, and the sample size was determined using suitable sampling formulas and supplemented with a study of relevant literature. This chapter provides an overview of the study area, sampling method, and the research tools used for the purpose of analysis. Estimation of the cost of production and net returns from the cultivation of dates on both per acre and per hectare bases was the main concern of the analysis.

Descriptive Statistics

To analyze the findings of this study, descriptive statistics were employed to determine the frequency and percentage distribution of various characteristics of date growers.

Arithmetic Mean

The average was calculated using the formula:

$$AM = \sum \mathbf{X} \backslash N \quad (1)$$

Where:

AM = Arithmetic Mean

∑X = Sum of all observations

N = Total number of observations

Percentage

Percentage values were computed using the formula:

$$P = \frac{F}{N} \times 100 \quad (2)$$

Where;

F = Frequency of a particular class

N = Total number of observations

Percentages were tabulated to allow easy comparison across different categories.

The collected data were further analyzed using the simple budgeting method to estimate production costs. A cubic cost function was applied to demonstrate how total costs respond to changes in output (Debertin, 2012):

$$TC = f(Q) = \beta_0 + \beta_1 Q_1 + \beta_2 Q_2 + \beta_3 Q_3 \quad (3)$$

In this model, β_o represents fixed costs, while the remaining terms ($\beta_1 Q_1 + \beta_2 Q_2 + \beta_3 Q_3 + \ldots\ldots + \beta_n Q_n$) represent variable costs.

Net revenue (NR) was calculated as the difference between total revenue (TR) and total cost (TC):

$$NR = TR - TC. \quad (4)$$

Gross margin (GM) was determined using:

$$GM = TR - TVC. \quad (5)$$

$$TR = P * Q \quad (6)$$

$$TC = C * Q \quad (7)$$

$$TVC = P_x * X \quad (8)$$

Substituting TR and TC into the net revenue equation, we get:

$$NR = PQ - CQ = f(P, C, Q) = \gamma_0 + \gamma_1 P + \gamma_2 C + \gamma_3 Q \quad (9)$$

Where,

Q = Output of the respective vegetables.

TC = Total cost of production

NR = Net revenue

P = Output price

C = Cost per unit produced

The cost and profit analysis was done on the basis of the date farming and its impact on the livelihood of the farmers was to be assessed on the income level of both strata of the study area. In addition to this, the constraint in the farming system was also studied and ranked simply by the perception of the farmers after raising questions on the date cultivation.

Results and Discussion

This section presents the analysis and interpretation of the cost, revenue, and profitability of date palm cultivation in District Kech, Balochistan. It begins with an overview of the socio-economic and demographic characteristics of the respondents, followed by an examination of the production costs and associated revenues. The study further provides a statistical assessment of date production, including estimates of total cost, gross revenue, net revenue, and output levels. The findings are discussed in relation to the study's objectives, relevant literature, and the data collected, offering a comprehensive understanding of the economic performance of date palm farming in the study area.

Cost of production of date palm per acre in the study area

The cost of production of a crop refers to the total expenses incurred in cultivating that crop, including both pre-harvest and post-harvest activities. In the present study, the cost of date palm production encompassed expenses for pruning and general tree care, land preparation, fertilizers, chemicals, irrigation, labor, land, and marketing. All costs associated with pre-harvest activities were included, with the exception of marketing

expenses, which were considered separately.

The cost structure of the date palm crop under District Kech is given below in Table 2. The results revealed that the cost incurred on pruning and maintenance activities, mostly done during the off-season to ensure the trees' productivity and well-being, averaged Rs. 7,225 per acre. The cost incurred on irrigation, mostly the cost of electricity for pumping groundwater, averaged Rs. 6,738.75 per acre as all the farmers were using electric tube wells for irrigation. The cost incurred on fertilizers, although limited for chemical fertilizers like DAP and urea, averaged Rs. 4,506.25 per acre. Labour costs, including crop management, irrigation, input use, and harvesting activities, were found to be high at Rs. 19,562.50 per acre due to the shortage of labour during the season. Marketing costs like loading/unloading, packing, weighing, and transportation were found to be Rs. 2,226.87 per acre on average. Land rent is the cost of utilizing agricultural land and was found to be Rs. 14,858.75 per acre. Moreover, land preparation activities like ploughing and leveling were found to cost an average of Rs. 14,571.25 per acre. In conclusion, as shown in Table 2, the average cost of producing dates under the study was estimated to be Rs. 69,906.38 per acre.

Table 2. Per-acre production costs of Date Palm.

Input	Mean	Percentage%
Pruning/cutting/Caring	7225	10.33
Irrigation	6738.75	9.63
Fertilizer	4506.25	6.44
Labor	19562.50	27.98
Marketing	2226.87	3.18
Land Rent	14858.75	21.25
Land preparation	14571.25	20.84
Total	69906.25	100

Source: Survey Data, 2017.

Production of date palm

The production performance and profitability of date palms in the study area are presented in Table 3. The average yield of the primary date palm product was estimated at 140.25 maunds per acre, which is below the potential yield reported in previous studies (Atta et al., 2016). The areas with relatively lower date palm yields in the study region could be attributed to various factors, including inadequate availability of quality inputs, inefficient utilization of inputs, irrigation constraints, seasonal shortages of essential inputs, and inadequate access to technical information and improved management techniques (Afzal et al., 2006).

The same has been found by Karim et al. (1999), who highlighted the point that productivity could be increased through efficient input use and better management of the orchard. In addition to the main product, date palm cultivation has provided by-products in the form of date palm leaves, which have provided income to the growers. The date palm leaves were estimated to be worth Rs. 28,800 per acre, while the other by-products were found to provide an additional income of Rs. 9,556.75 per acre.

These by-products are considered an important supplementary source of income for date palm farmers. The total gross revenue, which accounts for both revenue from the primary product and revenue from its by-products, was estimated at Rs. 206,656.75 per acre. After subtracting the total production costs, the average revenue was calculated at Rs. 137,047.42 per acre, showing that date palm cultivation is a profitable agricultural activity.

Table 3. Average output of date palm cultivation per acre.

Output	Unit or Mds acre^{-1}	Price/Unit Mds	Total
Main product	140.25	1,200	168300
By product	240	120	28800
Others	1194.60	08	9556.75
Gross revenue	206656.75		
Net revenue	137047.42		

Source: Survey Data, 2017

Gross Profits and Costs of Date Palm

Table 4 shows the gross returns and production costs involved in date farming. The average cost of production incurred by the farmers was Rs. 69,906.25 per acre. The average yield was recorded to be 140.25 maunds per acre, and the average price was Rs. 1,200 per maund. Based on the yield and price, the gross returns from the production of dates were estimated to be Rs. 206,656.8 per acre. The benefit-cost ratio worked out to be 2.95, showing that date farming is a profitable venture. It implies that if Rs. 1 is invested in date production, a return of Rs. 2.95 is earned.

Table 4. Gross profits and costs of Date Palm.

Gross profits and costs	Price (Rs)
Gross total cost	69906.25
Average yield	140.25
Average price	1200
Gross revenue	206656.80
Net Income	137047.40
BCR	2.95

Price Distribution across Market Participants

Price spread, as the term suggests, measures the difference between the amount of money the final consumer pays and the amount the producer of the agricultural commodity receives for the same quantity of the commodity. The information provided in Table 5 shows that the price of the date palm commodity rose significantly as it passed through the hands of the producers and reached the consumers. On average, the date palm growers received Rs. 3,710.00 per maund of the commodity from the wholesalers and commission agents. These middlemen sold the commodity to the retailers at Rs. 5,430.00 per maund, making a difference of Rs. 1,720.00 per maund. The same amount of goods was sold to consumers at a price of Rs. 7,210.00 per maund. The additional margin earned by the retailer would be Rs. 1,780.00 per maund. The total price spread between the producer and the final consumer would be Rs. 3,500.00 per maund. This shows how the intermediaries were able to absorb a larger share of the price paid by the final consumer, while the producer got a smaller share of the total price.

Table 5. Price allocation from growers to consumers in the date palm market of Kech district, Balochistan.

Sr.	Agent	Price Paid	Price Received	Price Spread	%Age
1.	Market Intermediaries (Wholesalers and commission agents)	3710	5430	1720	49.14
2.	Retailer	5430	7210	1780	50.86

Total	1720	1780	3500	100

Margins in the Date Palm Marketing Chain

The share of various agencies helps to understand the efficiency of the marketing for a particular commodity. It also helps to set appropriate pricing and marketing strategies. The share of various agencies in the marketing margins for the date palm commodity is shown in Table 6. The data indicate that middlemen, comprising wholesalers and commission agents, captured the largest portion of the marketing margin at 31.68%. Retailers received 24.69% of the marketing margin across different markets in the Kech district, Balochistan.

Table 6. Profit margins of market intermediaries in Date Palm marketing in Kech district, Balochistan.

Sr.	Agent	Price Paid (A)	Price Received (B)	Absolute Margin	%Age of Marketing Margin
1.	Market Intermediaries (Wholesalers and commission agents)	3710	5430	1720	31.68
2.	Retailer	5430	7210	1780	24.69

Net Earnings

Net margin refers to the earnings or profit that an individual agency manages to achieve after paying all the expenditures related to the marketing process. From an economic viewpoint, it is vital to analyze the net margins in order to comprehend the relationship between the cost incurred and the profit gained. Table 7 indicates the net margins for different marketing agencies, and it shows that retailers have the highest net margins, i.e., 85.34%, over their costs, while middlemen, i.e., wholesalers and commission agents, earned net margins of 75.23% over their costs in the date palm marketing process.

Table 7. Net earnings of market intermediaries in Date Palm marketing in Kech district, Balochistan.

Sr.	Agent	Absolute Margin(a)	Percentage(a)	Cost Amt (b)	Percentage b*100 /a	Net Margin (a- b=C)	Percentage C*100 /a
1.	Middlemen	1720	100	426	24.77	1294	75.23
2.	Retailer	1780	100	261	14.66	1519	85.34

Price Markup

Markup is calculated by dividing the absolute margin by the amount paid by the respective agent. It is an important indicator of the profitability of the business and is normally expressed as a percentage of the investment. In marketing date palm, it is important to calculate the markup for the assessment of the efficiency of the business and the agencies involved in it. From the results presented in Table 8, it is evident that middlemen, i.e., commission agents and wholesalers, received the largest share of the markup, i.e., 46.36% over the price paid to growers, followed by retailers who earned a markup of 32.78% over the price paid to middlemen for purchasing date palm in the Kech district of Balochistan.

Table 8. Margins earned by different agents in date palm marketing in Kech district, Balochistan.

Sr.	Agent	Absolute Margin	Price Paid	Markup %
1.	Middlemen	1720	3710	46.36
2.	Retailer	1780	5430	32.78

Distribution of Consumer Spending Among Marketing Agents

"Breakdown of consumer's rupee" means the share of retail price paid by consumers to different agencies of marketing, i.e., the retail price divided by the average net margin of each agency. It is a measure of the share of each agency, i.e., wholesalers, retailers, etc., of each rupee spent by consumers. As depicted in Table 9, retailers received the highest share, i.e., 42.10 paisa per rupee, while middlemen, i.e., in the date palm production and marketing system of Kech district, Balochistan, wholesalers and commission agents received 35.86 paisa per rupee spent by consumers, whereas producers obtained the smallest portion, only 22.04 paisa per rupee.

Table 9. Distribution of each consumer rupee among stakeholders in Date Palm Marketing in Kech district.

Sr.	Agent	Net margin	Breakdown of consumers rupee
1.	Middlemen	795.38	22.04
2.	Middlemen (wholesaler, commission agent)	1294	35.86
3.	Retailer	1519	42.10
Total		3608.38	100.00

Problems/constraints and their ranking

Table 10 presents the key challenges and constraints faced by date palm growers in Kech district, Balochistan, related to both production and marketing. The major issues reported by the farmers included inadequate farm-to-market infrastructure, high transportation costs, limited market facilities, poor availability of quality seeds, lack of date processing units and cold storage, insufficient supply of quality pesticides, high and irregular availability of fertilizers and farmyard manure (FYM), inadequate training programs, and absence of soil testing facilities. Among these, poor farm-to-market infrastructure and high transportation costs were ranked as the most critical, affecting all respondents (100%). Market facilitation, access to quality seeds and irrigation water, absence of processing units, and lack of cold storage were ranked as the second, third, and fourth most significant constraints, respectively. Issues related to quality pesticides and timely availability of fertilizers and FYM were ranked fifth, while limited training opportunities and absence of soil testing facilities were ranked sixth and seventh, respectively. These findings highlight the limited role of government support in improving infrastructure and providing production and marketing assistance to date palm growers in the district.

Table 10. Challenges faced by Date Palm growers and their ranking in Kech district, Balochistan.

Sr.	Problems	Frequency	Percentage	Rank
1.	Farm to market infrastructure	80	100.00	1
2.	High transportation costs	80	100.00	1
3.	Market facility to growers	72	90	2
4.	Quality seed	66	82.50	3
5.	Irrigation water	66	82.50	3
5.	Lack of a date processing unit and cold storage	56	70	4
6.	Quality pesticides	49	61.25	5
7.	High fertilizer and FYM prices and timely availability	49	61.25	5
8.	Training of date palm growers for production and post-harvest handling	41	51.25	6
9.	Non-existence of soil testing facilities	36	45	7

Discussion

The findings of this study indicate that date palm farmers in Kech district achieved an average yield of approximately 43 kg per tree. In comparison, Ahmad et al. (2004) reported yields of 81 kg, 79 kg, 71 kg, and 63 kg per plant for the Hillawi, Aseel, Shamran, and other varieties, respectively. This suggests that actual yields in the study area are considerably lower than the potential, likely due to limited knowledge of modern date palm production techniques among farmers. Al-Abbad et al. (2011) highlighted that improvements in marketing logistics, particularly through agricultural cooperatives and more effective utilization of government subsidies, could enhance date palm production outcomes.

The study also estimated the total cost of date palm cultivation at Rs. 69,906.25 per hectare, comprising Rs. 14,858.75 for land-related inputs, Rs. 45,785 for initial orchard establishment, Rs. 45,785 for operational costs, and Rs. 32,023.42 for marketing expenses. Within the orchard establishment costs, the purchase of date palm suckers was the largest expense, followed by farmyard manure and ploughing charges.

The total land-related inputs were estimated at Rs. 50,903 per hectare, with transportation representing the largest share of marketing costs. The average date palm fruit yield was 77.29 maunds per hectare. Total revenue from date palm cultivation was estimated at Rs. 206,656.80 per acre, while total production costs were Rs. 69,906.25 per acre, resulting in net returns of Rs. 137,047.40 per acre and a cost–benefit ratio (CBR) of 1:2.95. These findings indicate that the cost of production is relatively high compared to the income realized by growers. Eskola (2005) similarly observed that date palm production involves high costs relative to average yields, often leading to an uneconomical CBR. To enhance profitability, farmers should be trained in improved production techniques and post-harvest handling practices. In comparative studies, Al-Hebshi (2007) reported a BCR of 1.67, net income of 101,238 thousand YR, and an internal rate of return (IRR) of 18%; in Wadi Surdud, Governorate of Hodeidah, the BCR was 2.63, net income 335,850 thousand YR, and IRR 20.7%. Furthermore, EPM analysis indicated efficiency levels of 56.31 in Hodeidah Market and 15.79 in Mukalla Market, suggesting that improvements in market efficiency can support long-term investment in date palm cultivation.

In the study area, the total price spread for date palms was Rs. 3,500 per maund by the time the produce reached consumers. Middlemen, including wholesalers and commission agents, earned marketing margins of 31.68% and 24.69%, with net margins of 75.23% and 85.34% and markups of 46.36% and 32.78%, respectively. For every rupee spent by consumers, retailers received 42.10 paisa, middlemen 35.86 paisa, and producers only 22.04 paisa. This translates to earnings of Rs. 5.82 (CBR = 1:5.82) for retailers, Rs. 3.03 (CBR = 1:3.03) for middlemen, and Rs. 0.27 (CBR = 1:0.27) for producers per rupee of cost. These results are broadly consistent with Hassan (2006), who reported a net profit of Rs. 50,527 in Punjab and a cost–benefit ratio of 1.48, indicating that date farming can be a profitable investment.

The relatively low cost–benefit ratio observed in Kech district can be attributed to the lack of communication infrastructure, limited farm-to-market access, and other factors that increase production costs. Al-Hebshi (2010) reported that middlemen earned profits of approximately $4,256 per hectare in the same year, corresponding to a 244% net marketing margin, highlighting that marketing conditions were unfavorable for small farmers, as production increased without a corresponding rise in income. The study also identified several major constraints faced by date palm growers: inadequate farm-to-market infrastructure and high transportation costs (ranked first by 100% of respondents), poor market facilities, low-quality seeds, and insufficient irrigation (ranked second), absence of date processing units (ranked third), and lack of cold storage facilities (ranked fourth). Other challenges, such as high input costs and limited access to fertilizers, farmyard manure, and pesticides, were ranked fifth, while training programs and soil testing facilities were considered less critical.

These findings align with Eskola (2005), who identified inadequate physical infrastructure, limited access to market information, and weak institutional support as key constraints in date palm production. Addressing these challenges through investments in infrastructure, credit facilities, and improved market information is essential to fully realize the potential of agricultural trade in poverty reduction. Similarly, Jari and Fraser (2009) reported that farmers who applied optimal input levels and adhered to quality standards were able to obtain

better market prices, reflecting their knowledge and entrepreneurial capabilities in date palm cultivation.

Alawadi et al. (2011) noted that investing in date palm plantations is a long-term endeavor, requiring several years of expenditure before any returns are realized. Farmers in the study area were often hesitant to provide information regarding varieties, planting density, tree age, input usage, land ownership, intercropping practices, production costs, yield, and selling prices. The study emphasizes the need for further research on high-quality date palm production and marketing, along with government support in the form of infrastructure development and subsidies. According to Ata et al. (2012), limited awareness of modern date palm production technologies is a significant constraint. Agricultural extension services were largely ineffective, as most respondents reported not receiving guidance on production practices. There is a pressing need to train farmers in areas such as irrigation, fertilization, pest and disease management, sucker transplantation, and post-harvest processing.

Conclusions

Turbat and Panjgoor are recognized as key districts for high-quality date palm production. In District Kech, the Begum Jangi variety is predominant in terms of both cultivated area and overall production, followed by Halini, Hussaini, Goknah, Dishtri, Konzenabad, Muzwati, Pashpag, Shakri, and Washakar varieties. High-quality varieties typically produce 40–50 kilograms per tree, whereas mixed or lesser-known varieties yield below the recommended levels. Among the 80 respondents across different farm categories, the total area under date palm cultivation was 943.34 hectares, with an average farm size of 21.01 hectares. The total production costs were estimated at Rs. 69,906.25 per acre, comprising land-related inputs of Rs. 14,858.75, orchard establishment costs of Rs. 45,785, operational expenses of Rs. 45,785, and marketing costs of Rs. 32,023.42. Within the orchard establishment costs, the purchase of date palm suckers accounted for the largest share, followed by expenditures on farmyard manure and ploughing. The total land-related expenses, including rent and taxes, were estimated at Rs. 50,903 per hectare, with farmyard manure, fertilization, pollination, and harvesting making up the largest portions of these costs. Among marketing expenses, transportation accounted for the highest share. The average fruit yield of date palms was 77.29 maunds per hectare. Trees under 10 years of age produced lower yields, productivity increased in trees aged 10–20 years, and declined in trees older than 20 years. The Washakar variety achieved the highest market price, followed by Begum Jangi, Konzenabad, and Goknah, while the Halini variety was mainly used for producing the hydrated form of dates, Chhuhara. Fruit quality and proper post-harvest handling significantly influenced market prices, with well-harvested and properly packed fruits fetching higher returns.

The net income from date palm cultivation per acre was estimated at Rs. 137,047.40, against total production costs of Rs. 206,656.80, resulting in a cost–benefit ratio of 1:2.95. The price spread from farm to consumer was Rs. 3,500 per maund, with wholesalers and retailers earning marketing margins of 31.68% and 24.69%, respectively, while producers received only 22.04% of the consumer's rupee. The most significant constraint reported by growers was inadequate farm-to-market infrastructure and high transportation costs. Other notable challenges included limited market facilities, poor-quality seeds, insufficient irrigation, absence of processing units and cold storage, high input costs, and restricted access to training and soil testing. Date palms are primarily cultivated in District Kech by middle-aged farmers and are harvested during the summer season. The main cost components of production include pruning, irrigation, labor, marketing, fertilizers, and land rent. Average output per acre was 138.60 maunds, generating a gross revenue of Rs. 206,656.80 and net revenue of Rs. 137,047.40.

Recommendations

Based on the findings of this study, several recommendations are proposed to enhance both the quality and quantity of date palm production in the study area. Date palm farming has been observed to be a highly profitable venture, and farmers should concentrate on those varieties that are economically beneficial and of high yield, such as Begum Jangi. The major problems, such as marketing and irrigation, should be overcome as soon as possible to improve the region's share in the national date production. Considering the favorable

climatic conditions in Pakistan, specifically in District Kech, Balochistan, both the local people and organizations should invest more in date palm improvement. In addition, the role of the government cannot be overemphasized in providing date producers with better infrastructure such as transportation, marketing, storage, and processing facilities to maximize revenue potential. It is also recommended that ceiling prices be set for various date types and revised every season to ensure that date farmers get a fair return on their products. Finally, training sessions should be held for date farmers to improve their technical efficiency and enable them to respond to the increasing demand for their products while maintaining high quality.

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