

Economic Linkages and Supply Chain Analysis of Date Palm in Baluchistan

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Abstract

The date palm is an essential fruit in Pakistan, economically and religiously valued. Thriving in hot climates, it grows well in southern Punjab and Baluchistan, serving as a crucial food source. This study evaluates the Economic Linkages and Supply Chain Analysis of Date palms in Baluchistan. The respondents included stakeholders, such as growers, wholesalers, and retailers, with a sample size of 102 individuals. Data were collected through well-structured interview schedules tailored for each stakeholder group and analyzed using the Statistical Package for the Social Sciences (SPSS). The findings reveal that Panjgur growers produced more than Kech. Regarding experience, 66.7% of Kech wholesalers had 6 to 15 years of experience, compared to 53% in Panjgur. Additionally, 33.4% of Kech wholesalers had over 15 years of experience, whereas this was true for 26.7% in Panjgur. Panjgur wholesalers spent more on purchasing date palms than those in Kech. Income-wise, about 13% of Kech wholesalers earned up to ten lakhs, with one-third of Panjgur wholesalers in this category. Meanwhile, 47% of Kech wholesalers earned between ten and thirty lakhs, compared to 40% in Panjgur. Retailers in Kech reported higher profits, with 84% earning more than 250,000 rupees, while 66.7% of Panjgur retailers earned over 250,000 rupees. There is a need to enhance stakeholders' production and marketing strategies. Specifically, growers should be equipped with modern technology to increase their profit margins and reduce fruit wastage.

Keywords: Date Palm, Economic Value, Date Growers, Wholesaler and Retailers.

Introduction

The date palm is one of the oldest fruit trees in the Arab region, extensively cultivated for its sweet edible fruit. Its native distribution is unknown due to its long history of cultivation, but it likely

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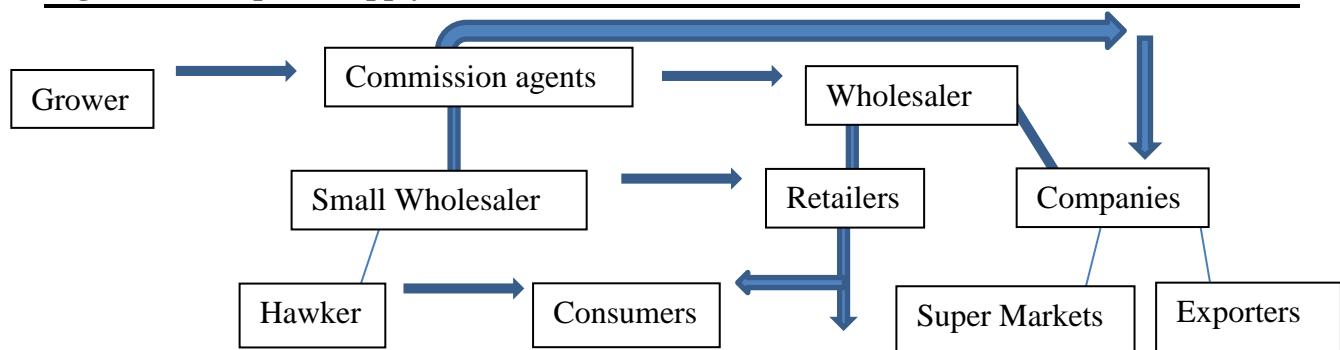
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originated in the desert oases of northern Africa and possibly southwest Asia. The date palm tree has numerous uses and significant economic importance, particularly in improving desert ecologies. Traditionally crucial in the Islamic world, the demand for dates is expected to rise with population growth in these countries. In Pakistan, date palms provide food and numerous other products extensively used in rural and urban areas. Primary date palm-producing regions of Sindh province include Khairpur, Sukkur, and Naushahro Feroze (Bureau of statistics, 2009).

In Pakistan, date palm cultivation is a crucial agricultural activity, especially in Sindh and Baluchistan provinces, offering substantial socio-economic benefits. The sector employs millions, including growers, processors, traders, and exporters, and generates significant foreign exchange earnings (Fatima et al., 2016). Dates are renowned for their sweet taste, nutritional value, and therapeutic benefits, including substantial antioxidant, antibacterial, antifungal, and anti-proliferative properties (Aziz et al., 2024). Pakistan is a significant player in the global date market, ranking 4th in production. Over 300 varieties are cultivated in Khairpur Mirs, Sindh alone (Markhand & Abulsoad, 2007). Date palms thrive in arid and semi-arid regions, tolerate extreme temperatures and saline conditions, and are a staple food providing rapid energy and essential nutrients. The total cultivated area in Pakistan exceeds 97,107 hectares, with an estimated annual production of over 467,756 tons (Suhail et al., 2020).

Figure 1: Date palm Supply Chain Structure



Turbat, Panjgur and Kech districts produce large quantity of date palm fruits in Baluchistan province, but due to lack of transport facilities, mismanagement in marketing, non-technical unskilled labor and lack of survey it is being wasted and gets low margin profit. This is the reason why date palm produces low income for growers and its role in Pakistan economy is hindered. By the good supply chain good value addition and good marketing date palm fruit can get a chance to success in industry of date palm business (Ashraf et al., 2018).

Research Objectives

1. To identify the growers' trend of dealing with date fruit.
2. To identify the wholesalers' trend of dealing with date fruit.
3. To identify the wholesalers' trend of dealing with date fruit.

Importance of the Study

A vast area of Baluchistan is covered with date palms. Different stakeholders are involved in the sale and purchase of dates. In this way, dates play an important role in sustaining and supporting the income of farmers, wholesalers, and retailers. The current study is, therefore, designed to

understand how the stakeholders are engaged in earning through date production, how much they are spending on fruit production, how they are processing the fruits, and how much profit each stakeholder is earning.

Methodology

It is a process for achieving the purpose such as organized method, procedure, or way of investigation engaged by or appropriate to a specific discipline or design art which is followed in offering material for instruction the lecture technique. This chapter of thesis especially focuses on the different procedures and instruments to collect data and its analysis. It also decides the suitable procedures for collecting data. A suitable methodology for research holds the significant position because it helps to get the solution research problems by selecting appropriate methods to collect and analyze data. Thus the accurate methodology guarantees the destination of valid and reliable findings.

All the date palm growers residing in District Baluchistan constituted the population of the study. There are 26 districts in the study Province. It was impossible to deal with all of the district growers due to limited time and resources. Two districts i.e. Kech and Punjgur were selected Purposively as these district has the maximum Date Production, among all other districts of Baluchistan.

From the selected district, tehsils were selected proportionately according to the number of growers in each tehsil. So four tehsils from Kech, which has the maximum number of growers were selected and one tehsil from Punjgur selected.

Moreover, for the sample size was drawn equally from each District. The sample includes Wholesaler (15), growers (30) and the Retailers (6) from each district. Thus it makes the sample size of 102.

Interview Schedule Preparation

Interview schedules were prepared while keeping in view the objective of the study, before using these interview schedule for the data collection. After ensuring the validity, they were used for the data collection purpose.

Data Analysis

After the collection of data, the final data were analyzed by the statistical software named as Statistical Package for Social Sciences (SPSS). Different Statistical values were computed by using SPSS.

Results

According to above mention tables, in Kech district a vast majority (83.3%) of the growers had up to 15 acres of land under cultivation while in District Punjgur about half (53.3%) of the farmers fall in this category. It was interesting to know that the growers claimed that the total area which is under cultivation is same under the date cultivation. In both district vast majority (90% in each district) of the growers fell in the category those have experience of more than 10 years to 50 years, for selling of date (Kech and Punjgur).

Table also depicts growers experience of date fruit production. In each study district, 90% farmers fell in the category of more than 10 years to 50 years. Question regarding the production was also inquired, majority (60%) of the farmers residing in the Kech district reported their production up to 40 tons and 30% of the farmers reported their production more than 40 tons to 100 tons. While the farmers of Punjgur, one third (33.3%) of the respondents in Pajngur had the production up to

40 tons while about 43% farmers reported production more than 40 tons to 100 tons and about

District Kech Growers			District Punjgur Growers		
Total cultivated area in Kech (Acre)			Total cultivated area in Punjgur (Acre)		
Cultivate Area	f	%	Cultivate Area	F	%
Up to 15	25	83.3	Up to 15	16	53.3
>15-30	3	10.0	>15-30	6	20.0
>30-45	0	0	>30-45	5	16.7
More than 45	2	6.7	More than 45	3	10.0
Distribution of Growers based on Area under Date Fruit					
Up to 15	25	83.3	1-15	16	53.3
>15-30	3	10.0	>15-30	6	20.0
>30-45	0	0	>30-45	5	16.7
More than 45	2	6.7	More than 45	3	10.0
Distribution of Growers on the base of selling of date Experience					
Up to 10	1	3.3	Up to 10	1	3.3
>10-30	15	50.0	>10-30	14	46.7
>30-50	12	40.0	>30-50	13	43.3
More than 50	2	6.7	More than 50	2	6.7
Experience of date fruits production / years					
Up to 10	1	3.3	Up to 10	2	6.7
>10-30	14	46.7	>10-30	12	40.0
>30-50	13	43.3	>30-50	15	50.0
More than 50	2	6.7	More than 50	1	3.3
Total date Yield in tons					
Up to 40	18	60.0	Up to 40	10	33.3
>40-100	9	30.0	>40-100	13	43.3
>100-160	2	6.7	>100-160	4	13.3
More than 160	1	3.3	More than 160	3	10.0

23% of the farmers had production above 100 tons annually.

Table 1: Growers response regarding farm area, production and selling of the fruits

Profit of Grower

Figure 1: Profit/acre of Growers residing in Kech

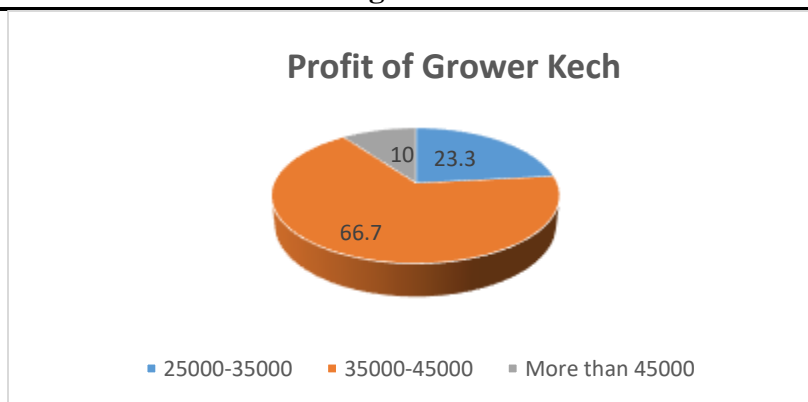
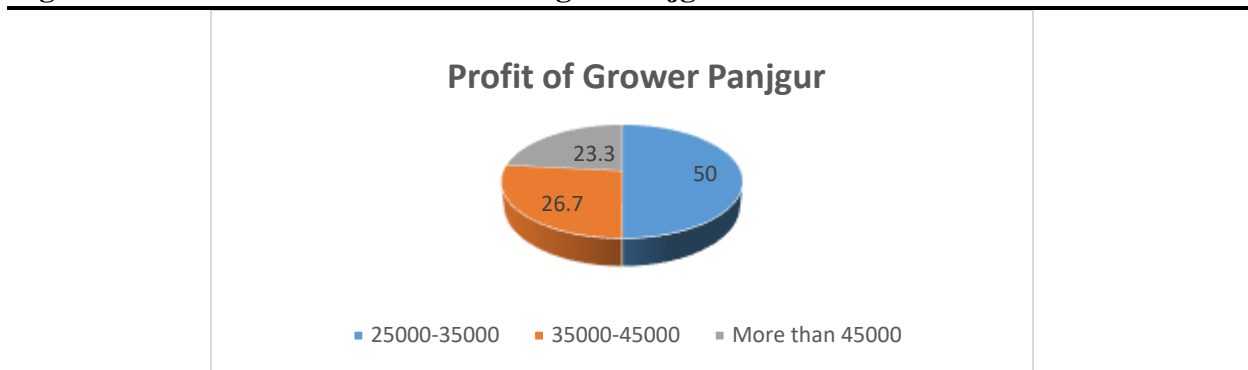


Figure 2: Profit/acre of Growers residing in Punjgur

The above-mentioned graphs depict the profit of growers, who were categorized into three groups based on their profit range: 25,000-35,000, 35,000-45,000, and above 45,000 rupees. In the first category (25,000-35,000 rupees), 23.3% of the growers in Kech district fell within this range, while 50% of the growers in Punjgur fell into this category. In the second category (35,000-45,000 rupees), about 66% of the growers in Kech and 26% of the growers in Punjgur fell within this range. In the third category of profit (more than 45,000 rupees), 10% of the growers in Kech and about 23% of the growers in Punjgur belonged to this category.

Table 2: Wholesaler

District Kech Wholesalers			District Punjgur Wholesalers		
Experience of selling date fruit					
Experience	f	%	Experience	f	%
Up to 5	0	0	Up to 5	3	20.0
>5-15	10	66.7	>5-15	8	53.3
>15-25	4	26.7	>15-25	3	20.0
>25	1	6.7	>25	1	6.7
Cooling system for date fruits					
Yes	7	46.7	Yes	9	60.0
No	8	53.3	No	6	40.0
Quality attributes (Size, Sweetness, shape etc.)					
Yes	11	73.3	Yes	10	66.7
No	4	26.7	No	5	33.3
Package of quality Dates fruit					
Yes	13	86.7	Yes	11	73.3
No	2	13.3	No	4	26.7
Deal with wastage					
Animal Feed	10	66.7	Animal Feed	8	53.3
Sell to market	5	33.3	Sell to market	7	46.7
Dates quality meets with standers provide by grower					
Yes	13	86.7	Yes	11	73.7
No	2	13.3	No	4	26.3

From the table, it can be concluded that the wholesalers in the district of Kech have more experience than those in the district of Punjgor. The majority (66.7%) of Kech wholesalers have 6 to 15 years of experience, compared to 53% of Punjgor wholesalers with the same range of experience. In Kech, 33.4% of wholesalers have more than 15 years of experience, whereas 26.7% of wholesalers in Punjgor have more than 15 years of experience.

District Kech Wholesalers			District Punjgur Wholesalers		
Total Purchase cost date fruit					
Up to $1.5*10^6$	4	26.7	Up to $1.5*10^6$	2	13.3
$>1.5*10^6 - 2*10^6$	6	40.0	$>1.5*10^6 - 2*10^6$	6	40.0
$>2*10^6 - 3*10^6$	2	13.3	$>2*10^6 - 3*10^6$	3	20.0
$>3*10^6$	3	20.0	$>3*10^6$	4	26.7
Labor Cost					
Up to 10^5	5	33.3	Up to 10^5	7	46.7
$>10^5 - 1.5*10^5$	7	46.7	$>10^5 - 1.5*10^5$	4	26.7
$>1.5*10^5 - 2*10^5$	3	20.0	$>1.5*10^5 - 2*10^5$	1	6.7
$>2*10^5$	0	0	$>2*10^5$	3	20.0
Total Transport cost					
Up to $2*10^5$	6	40.0	Up to $2*10^5$	5	33.3
$>2*10^5 - 2.5*10^5$	3	20.0	$>2*10^5 - 2.5*10^5$	5	33.3
$>2.5*10^5 - 3.5*10^5$	3	20.0	$>2.5*10^5 - 3.5*10^5$	4	26.7
$>3.5*10^5$	3	20.0	$>3.5*10^5$	1	6.7
Total date fruit Income					
Up to 10^6	2	13.3	Up to $2*10^6$	5	33.3
$>10^6 - 3*10^6$	7	46.7	$>2*10^6 - 3*10^6$	6	40.0
$>3*10^6 - 4*10^6$	4	26.7	$>3*10^6 - 4*10^6$	3	20.0
$>4*10^6$	2	13.3	$>4*10^6$	1	6.7

Punjgor wholesalers have more access to cooling systems than those in Kech, with 60% of Punjgor wholesalers reporting they have a cooling system, while only 46.7% of Kech wholesalers stated they have a cooling system for date storage.

Quality is the main attribute that leads to more profit, as approximately 73% of Kech wholesalers reported they know the quality attributes of dates, compared to about 67% of Punjgor wholesalers. Kech wholesalers were also asked about the handling of date wastage. According to the data, 66.7% of them offer wastage to animals, and 33.3% sell the wastage to the market. In Punjgor, about 53% of wholesalers offer waste to animals, and about 47% sell the wastage to the market.

The table depicts that Punjgor wholesalers were spending more on the purchase of date palms compared to the wholesalers of Kech. The majority (66.7%) of Kech wholesalers were paying above one lakh to labor, while 53.4% of Punjgor wholesalers were paying above one lakh to labor. Regarding the expenses of transportation for bringing the fruits from the orchard to the market, 66.7% of Punjgor wholesalers were bearing costs above two lakhs, while 60% of Kech wholesalers were paying the same amount.

Table 4: Retailers

District Kech Retailers			District Punjgur Retailers		
Do you have cooling system for date fruits?					
Yes	2	33.3	Yes	3	50.0
No	4	66.7	No	3	50.0
Area of purchase dates Fruit					
Wholesaler	2	33.3	Wholesaler	1	16.7
Orchard	4	66.7	Orchard	5	83.3
Daily purchase volume (Kg)					
Up to 100	0	0	Up to 100	1	16.7
>100-400	4	66.7	>100-400	3	50.0
>400-700	1	16.7	>400-700	2	33.3
>700	1	16.7	>700	0	0
Wastage volume of Date fruit					
< 5%	0	0	< 5%	0	
>5-10%	5	83.3	>5-10%	1	16.7
>10-20%	1	16.7	>10-20%	4	66.7
>20-30%	0	0	>20-30%	1	16.7
Profit margin					
>Up to 2.5×10^5	1	16.7	>Up to 2.5×10^5	2	33.3
> 2.5×10^5 - 3.5×10^5	1	16.7	> 2.5×10^5 - 3.5×10^5	3	50.0
> 3.5×10^5	4	66.7	> 3.5×10^5	1	16.7

Above mentioned table response of retailers regarding different questions asked from them by researcher. In Kech district, only one third (33.3%) retailers owned the cooling system for storage, while majority did not have this cooling system. Half of the respondents in Punjgur had access to the cooling system while half farmers did not have.

Total income was also inquired from the wholesalers. In Kech district, about 13% were earning up to ten lakhs, whereas in Punjgur district, about one-third of the wholesalers fell into this category. On the other hand, about 47% of Kech wholesalers were earning between ten lakhs and thirty lakhs, while 40% of Punjgur wholesalers fell into this category.

It was interesting to know that a high number of retailer were directly purchasing fruits from the orchard owners, one third retailer of Kech and some farmer (16.7%) of Punjgur were also purchasing from wholesalers. Moreover, majority of retailers (66.7%) of Kech stated they purchased above 100 kg to 400 kg of date on daily basis, while half of the Punjgur retailers were purchasing this quantity (>100-400kg). According to data, vast majority (83.3%) of the retailers of Kech were facing the wastage of fruits from 5 to 10% on daily basis and Punjgur retailers were facing more wastage of 10 to 20% faced by about 67% of retailers.

Table depicts that the Kech retailers were getting more profit as compare to Punjgur retailers. As about 84% of retailers stated that they were earning profit, more than 250000. While in case of Punjgur, 66.7% retailers were earning more than 250000 rupees.

Discussion

Similar study conducted by Baloch (2014) in Baluchistan depicted that about 59% of the growers had farms comprised of 7.37 hectares on average; while 39.51% had average farm size was 20.71 hectares. 12.59% possessed large size farms their average farm size was 34.60 hectares. The findings are totally different from the findings of table 1. The verities of Dates reported by Baloch

(2014) in Kech district was more than that of reported in the present study. They have reported the Begum Jangi, Hussaini, Goknah, Halini, Dishtari, Konzenabad, Muzwati, Pashpag, Shakri and Washakar. While in the present study only Begum Jangi, Hussani, Dishtari, Muzawati, Haleeni and Kharaba and Rabi dates varieties were reported.

Table 2 depicts the handling of wastage, according to the results the wastage was offered to animals similar finding reported by Hassan et al. (2006) reported that they offer the waste and low quality date fruits to the animal feed and also sell them at local market for sheep herders and dairies farms. This type of usage was also reported by Zabar and Borowy (2008) in Iraq where the low quality date sold for same as for animal feed. There is need to improve the shelf of the dates so that spoilage of fruit quality should be avoided. Cooling system is needed for the storage of the fruits, in Maghreb countries demand of cooling system is increasing because of the climatic change Afif et al. (2022). As indicated in table 2 that the trend of cooling system for the storage of fruits (date palm) existed in Baluchistan too.

The quality of the fruits is ensured by the stakeholders to fetch maximum profit, there are different quality parameters especially the taste, fruit color and size are the main indicators as mentioned in the table 2, stakeholder knows well these quality indicators. But there is the lack of the technology for keeping the quality sustained as reported by Aujla et al. (2007) The inability of our fruits to compete in the expensive markets of the world is because of non-availability of infrastructures like hi-tech labs for issuing various certificates for health and environmental safety, no coinciding of our fruits with the tastes and preferences of with high-price markets, expensive refrigerated transport facility, costly good quality packing material and other inputs needed in processing, and non-availability of credit on easy terms and conditions. All these factors not only affect quality but also result in confining our exports to cheaper markets of the world.

The quality also effects the margin of the profit. It is usually noted that growers earn little profit as compare to the wholesalers and to the retailers. In the present study it is observed that the growers' income is less than that of other stakeholders. There might be different reason as reported by Khushk et al. (2009) according to them date producers did not benefit from seasonal price variation, because they contract out their orchards at the time of flowering. It is also noted that producers face great difficulties in marketing their own produce. In assembly and particularly in wholesale markets, they are treated as temporary clients without access to the credit and other facilities extended to contractors. Without adequate access to market information they also face high price uncertainties.

Conclusion and Recommendations

From the findings, it can be concluded that Punjgor growers have more cultivated land under dates compared to Kech growers, though both have similar levels of experience in date farming. Despite higher production levels, Punjgor growers earn less profit than Kech growers. Kech wholesalers have more experience in dealing with dates but lack the cooling systems available to Punjgor wholesalers. However, Kech wholesalers are more knowledgeable about date quality and often sell waste dates as animal feed, whereas more Punjgor wholesalers sell waste to the market. Punjgor wholesalers face higher purchase and transport costs, while Kech wholesalers incur higher labor costs. Retailers in Kech enjoy higher profit margins than those in Punjgor, where fruit wastage is a more significant issue for retailers.

There is a need to improve the production and marketing strategies of the stakeholders. Specifically, growers should be equipped with the latest technology to increase their profit margins

and minimize fruit wastage. Additionally, introducing industries in the area for value addition of products and by-products is essential. Farmers should also be made aware of these opportunities.

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