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Date Value Chain Analysis, Development, and Competitiveness of Date Palm Products in the Sultanate of Oman

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Article info

Abstract

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This paper considers the vision of how to develop an efficient value chain and development strategies to improve the value chain in Oman. The main key factors of inclusive and sustainable development of the date value chain are determined to carry out the appropriate actions for improving the date palm sector in Oman. To explore the challenges and opportunities leading to the improvement of the marketing, commercialization, and competitiveness of dates and date palm products in this country, an analytical tool guideline (SWOT) was framed. Such analysis is useful to raise awareness to create policies for improved marketing of dates. Based on the SWOT analysis, the diversification of date varieties, and orientation toward modern plantations are the most important strengths of the date value chain. However, the increasing competition in regional and global date markets is the major threat to the date sector in Oman. There is a good possibility to promote the date processing industry in Oman given the rising demand for fresh and processed dates in national and international markets. A profitable and competitive date palm sector could be achieved by focusing on high yield and commercial varieties to ensure higher date palm productivity and the orientation toward adoption of quality standards to meet international market demand.

1. INTRODUCTION

Date palm cultivation plays a strategic role in the Gulf Cooperation Council (GCC) countries since it is an important income-generating crop and contributes significantly to the national economy of many GCC countries. In addition, date fruit has proved to be a critical factor in ensuring food and nutritional security during food shortages and crises in desert farming systems and oases; and date palms play an important role in the development of sustainable agriculture in the desertic zones of the Arabian Peninsula (AP) because they significantly contribute to increasing the resilience of these areas to climate change. Due to the historical and cultural importance of date palms in GCC countries, dates are ranked as a major priority. In this context, the project

“Developing Sustainable Production Systems for Date Palm in the Gulf Cooperation Council Countries – GCC,” funded by the GCC Secretariat, was implemented in partnership with ministries of agriculture, agricultural authorities, and agricultural research institutions and universities in the six GCC countries and the International Center for Agricultural Research in the Dry Areas (ICARDA). The major objectives of the project are to improve date palm productivity per unit of water and rationalize the use of available resources to make production sustainable. The date palm sector remains an advantageous industry with a continuous increase in international demand. The global production of dates has been rising, exceeding 9 Mt in 2019 – an increase of 23% compared to 2010

(FAOSTAT, 2022). Although date palms are grown mainly in four regions of the world, the Arab countries provide 75% of world production. Date production of the GCC countries – Kingdom of Bahrain, United Arab Emirates (UAE), State of Kuwait, State of Qatar, Sultanate of Oman, and Kingdom of Saudi Arabia (KSA) – alone represents 25% of the global date demand (FAOSTAT, 2022). Despite the fluctuation in its contribution to the national economy between the Arabian Peninsula (AP) countries and the existing challenges, the date palm sector remains of significant cultural importance in all these countries. In addition, for some of them, date palm cultivation plays a strategic role in some countries (e.g., Oman), since it is an important income-generating crop and contributes significantly to the national economy.

In the Arabian Peninsula region and more precisely the GCC countries, 185,473 ha were dedicated to date palm production in 2019. According to the latest statistics, the cultivated area dedicated to date palm cultivation is greatest in the KSA, with 117,881 ha in 2019; followed by the UAE with 34,119 ha. The lowest areas allocated to date palm are recorded in Qatar and Bahrain with 2154 and 2490 ha, respectively (FAOSTAT, 2021). Despite the cultural, environmental, and economic importance of date palm cultivation in the Arabian Peninsula, a remarkable decrease in the harvested area of date palms was recorded in most GCC countries over the period 2011–2019, except Kuwait and Bahrain where areas increased by 51% and 11%, respectively. In the remaining GCC countries, in 2019, the harvested area under a date palm in KSA declined by 24% compared to 2011; followed by Oman and UAE with declines of 19% and 17%, respectively (Table 1). Qatar had the lowest reduction rate,

9%, from 2011–to 2019 (FAOSTAT, 2021).

In GCC countries, total date production has continuously increased from 1,653,200 t in 2011 to 2,380,500 t in 2019. Despite the reduction in area under date palm cultivation, KSA is the largest date producer in the GCC countries with an average of 1,130,500 t from 2011 to 2019; followed by Oman with 330,800 t, UAE with 316,800 t, and Kuwait with 101,500 t. Qatar and Bahrain have low-date production with averages of 26,700 and 13,300 t, respectively (FAOSTAT, 2021). In KSA and Oman date production has increased by 53% and 39%, respectively. However, increase rates fluctuated in Bahrain, Kuwait, Qatar, and the UAE. There are clear differences in date yield between GCC countries. Despite the low quantity of produced dates, the highest yield was recorded in Kuwait with an average of 36.6 t/ha over the period 2011–2019. This high date palm yield could be the result of the adoption of good agricultural practices (GAP) or the use of a selected variety. In the other GCC countries, date palm yield did not exceed 13 t/ha. Over the period 2011–2019, average yields in Oman and Qatar were 12.1 and 11.3 t/ha, respectively. The lowest average yields were in Bahrain, UAE, and KSA with 4.8, 8.7, and 9.1 t/ha during the same period, respectively (Fig. 1).

A detailed assessment of date palm yield shows that it was characterized by a fluctuating growth rate in GCC countries. In Bahrain, Kuwait, and the KSA, the date palm yield growth rate was 15%, –20%, and 55% in 2015, respectively, and correspondingly –1%, 7%, and 6% in 2019. Oman and Qatar were distinguished by stagnation in date palm yield growth rate over the period 2017–2019 with 14.7 and 12.0 t/ha, respectively. However, the yield growth rate in the UAE varied from 36% in 2013 to –16% in 2017 and 5% in 2019 (Fig. 1).

In Oman, significant efforts have been deployed to promote this sector. Nevertheless, research and development results remain far from expectations due to low-quality varieties, high post-harvest losses and low exported quantities of dates. Although all these deployed efforts, this sector is not yet performing well. In general, the average yield is relatively low, with date production distinguished by fluctuating growth rates and export value that is significantly lower than expectations. Oman like all GCC countries has given special attention to the date palm sector through research and

Table 1. Harvested area (ha) of date palms in GCC countries (2011–2019).

Country	2011	2015	2019
Bahrain	2246	3237	2490
Kuwait	2277	2741	3447
Oman	31,348	24,120	25,382
Qatar	2366	2300	2154
KSA	156,023	109,427	117,881
UAE	41,159	37,362	34,119
Total GCC countries	235,419	179,187	185,473

Source: Own elaboration from FAOSTAT (2022).

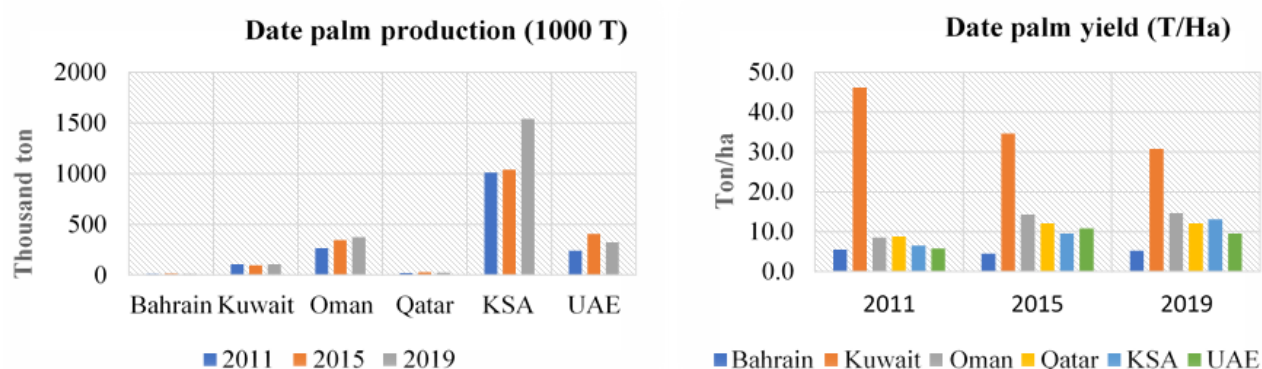


Fig. 1. Date palm production and productivity in GCC countries.
Source: Own elaboration from FAOSTAT database (2022).

development; however, the sector still has enormous room to grow in these countries (Dhehibi et al., 2018). Nevertheless, for a sector of such economic and cultural importance, the efforts deployed to develop its performance remain insufficient. However, if the date palm sector is so important, then a key question is “why is the sector not performing well and not competitive?” This may be due to several constraints and challenges facing the local and international commercialization and marketing channels for date fruit. To address the different constraints of the date palm sector, efforts should focus on integrated national and regional strategies. In this context, the second research question of our study is “what are the appropriate strategies for developing the date palm sector and improving the competitiveness of date products?”

To this end, a value chain analysis and assessment of the date palm sector was conducted for Oman. The value chain concept was first developed in 1960 to describe the agricultural commodity chain through analysis of inputs and outputs and quantitative measures of cost and value-added (Mac Clay and Feeney, 2019). A value chain is defined as “a full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers and final disposal after use” (Kaplinsky and Morris, 2002).

Having said that, this paper aims to set up a strategic planning framework leading to the most appropriate decision-making to

sustainably develop the date value chain in Oman by providing a vision on how to develop an efficient value chain and development strategies to improve the value chain. Therefore, the main objective of this study is to determine the key factors of inclusive and sustainable development of the date value chain. To implement the appropriate actions for improving the date palm sector in Oman, there is a specific focus on the systematic constraints in the sector that deals with production, agricultural operations, palm management, and the transition to production, harvesting, processing, and marketing. Special attention is also given to the critical threats and opportunities of the competitive environment to solve specific problems along the date value chain and to improve the added value of date palm products. Therefore, this study includes the following specific objectives:

- To analyze the date value chain in Oman.
- To identify the systemic constraints and upgrading opportunities of the date value chain in developing value-added products and byproducts.
- To develop and suggest strategic actions that contribute to improving marketing, commercialization, and competitiveness of dates and date palm products in this country.

2. DATE PALM VALUE CHAIN IN OMAN

2.1. Overview of date palm sector in Oman

According to the Omani agricultural census, date palm is the primary agricultural crop in Oman, and it constitutes 78 % of all fruit crops produced and 23 % of the total agricultural area

in the country (National Centre for Statistics and Information, 2022). Oman is ranked eighth in the world in date production and second in the GCC countries (FAOSTAT, 2022). The cultivated date area was increasing between 2011 (e.g., 31,348 ha) and 2019 (e.g., 25,382 ha) indicating a decrease in the harvested area during this period. From a historical perspective, since 1980, there has been an increase in production reaching nearly 300,000 t (in 2011); however, that was followed by a rapid decline in the following years for several reasons such as the periodic occurrence of tropical cyclones and flooding that destroys date palm plantations coupled with long drought periods. The production has picked up since 2004 but continues to fluctuate from year to year (Al Yahai and Khan, 2019). This production has grown by an average of 4% during the period 2016-2022 (FAOSTAT, 2022). In terms of date palm yield, Oman is ranked second in the GCC countries with an average of 14.4 t/ha, in 2020 (Fig. 2).

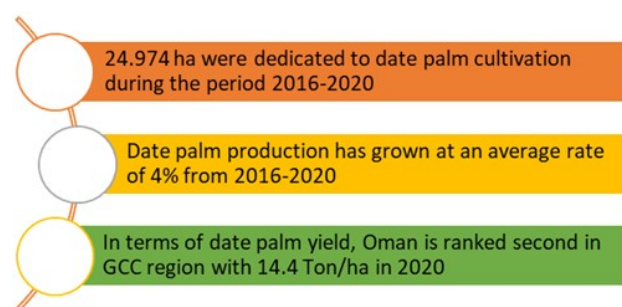


Fig. 2. Overview of the date palm sector in the Sultanate of Oman.

Source: Own elaboration from FAOSTAT database (2022).

2.2. Date palm value chain map in Oman

Food marketing is defined as “the activities that take place within the food system between the farm gate and the consumer” (OTA, 1978). The marketing system performs the required functions to deliver food products from producer to the final consumer through a marketing channel. Generally, marketing channels include processing, packing, wholesaling, retailing, storing and transportation functions. Nevertheless, marketing channels for dates include initial processing at farm level after harvest, transport to the local market, processing and packaging at factory level and transport to final consumers.

In the past, direct marketing, in which farmers provide dates at the farm gate to the final consumer, was the only date marketing channel in Oman. Eventually, date marketing channels in Oman evolved into a food marketing system including several value chain actors such as farmers, collectors, wholesalers, trailers and date-processing factories.

The date palm value chain in Oman involves a variety of stakeholders, which are performing in different nodes of the value chain from input supply to production, collection, processing, wholesaling and retailing, and finally export. It also involves actors that are providing support services to different functions of the value chain, including financial services, extension services, training services, and packaging.

In Oman, the two main types of dates producers, namely, traditional small-scale dates and the modern plantations, engage in different types of horizontal and especially vertical linkages, which start with the providers of supporting services (extension and training services, packaging, financial services, etc.) and the suppliers of the inputs. Traditional small-scale date orchards channel their fruits to collectors and brokers, retail traders, wholesaler traders, dates processors, rural and urban domestic markets as well as modern dates producers which through this increase their volumes to meet the demands of their buyers. The modern dates' plantations in turn supply mainly the wholesale traders, processors, and exporters, which normally find large volumes as an attractive way to reduce transaction costs. The dates collectors assume the brokerage role and facilitate the flow of the dates to the retail traders, wholesale traders, processors, and the domestic market outlets. Dates wholesale traders make their stock from the producers, collectors, and retailers and link up with processors, other second-tier wholesale traders, and exporters. Processors sell their products to retail traders, second-tier wholesale traders for export, and the domestic market. The end market for the dates' value chain involves both the rural and urban domestic market and the export market of the main importing countries (Mbaga, 2012).

There is an important channel distinction between dried dates and fresh dates, which are not distributed and marketed in the same way. The channel for the distribution of dried fruit follows a commercial pattern adapted to the

nature of its products. On the other hand, there is a distribution channel for fresh fruit presenting a completely different situation, with very specific buying habits, and above all completely different logistical constraints. In this context, dates will be bought, for example, by fruit and vegetable wholesalers each week on the national markets of major conurbations. The packaging of dried fruit and fresh fruit also differs. Whereas dried fruit can be hidden away in closed packaging, such as packs and boxes of different kinds to target both the local and export markets, fresh fruit needs to be seen and is normally sold loose or in transparent packaging exclusively in the local market.

In summary, in Oman, the marketing channels for dates include on-farm selling, retailers, local markets, date factories, and export (Fig. 3).

There are therefore mainly three channels through which date flow from the farm to local and foreign consumers/export market:

- Dates can be sold at the farm gate and from there, dates are marketed either directly to the final consumer at the local market or to the local wholesale market.
- Dates can be marketed directly to wholesalers

and from there to retailers either before reaching the local market or directly to the local market.

- Dates can be marketed directly to wholesalers and from there to the processing factories for processing and packaging before being shipped to the retailers' trader and then to the final consumer (local or export).

2.3. Date palm export market in Oman

In general, the size of the export market is a significant indicator of the development of any sector of the economy. Therefore, the trend of date trading reflects the importance of the date palm sector in each country. The findings displayed in Table 2 summarize the trade matrix of dates for GCC countries. In terms of several partner countries, the UAE is ranked first as a date exporter in the GCC region with 116 export destinations in 2019; this is followed by the KSA which exports dates to 85 countries. However, the date export market is relatively inactive in Qatar with no exports in 2019. Oman and Kuwait exported dates to six and 12 destinations in 2019, respectively, compared to 19 and 14 in 2015 (FAOSTAT, 2021).

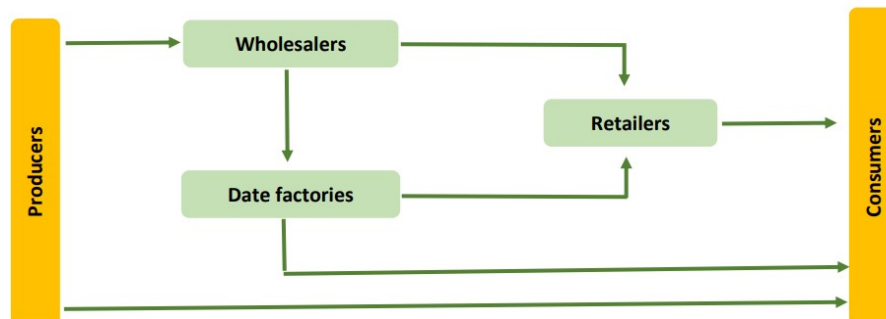


Fig. 3. Date value chain map in Oman.

Source: own elaboration from Date Value Chain training data, (2021).

Table 2. Number date importing countries for each GCC country.

	2015			2019		
	Number of partners	Export quantity (t)	Export value (1000 US\$)	Number of partners	Export quantity (t)	Export value (1000 US\$)
Bahrain	3	10	17	6	69	56
Kuwait	14	564	395	12	3669	4748
Oman	19	9142	11,978	6	12,856	16,960
Qatar	62	535	353	0	0	0
KSA	66	120,358	136,262	85	182,317	229,610
UAE	102	309,782	171,897	116	212,831	218,378

Source: Own elaboration from FAOSTAT database (2022).

In value, KSA and UAE were the leading dates exporting countries of the GCC in 2019, and Bahrain and Kuwait were the lowest exporters with 56,000 US\$ and 4,748,000 US\$, respectively (FAOSTAT, 2022). The value of exports from Oman was 11978 US\$ in 2015 with an export quantity of 9142 t. In 2019, this export value has been increased to reach a value of 169060 US\$, with a quantity of 12856 t. This suggests that Oman is ranked as the third exporting country in the GCC countries, with India, Qatar, and the UAE the major importers of Omani dates (Fig. 4). The findings reveal intensive date exchange among GCC countries since Oman is an exporter and importer partner to the UAE, which is an importer partner to the KSA despite being the second-largest exporter in the GCC.

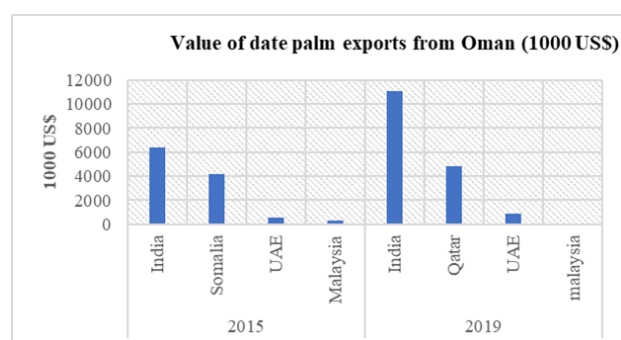


Fig. 4. Date palm export values in Oman.

Source: Own elaboration from FAOSTAT database (2022).

3. DATE PALM VALUE CHAIN ANALYSIS AND DEVELOPMENT IN OMAN

3.1. Methodological framework and data sources

In preparation for the date value chain analyses and development, an exhaustive literature review was first conducted on the date value chain sector in Oman. Then, data collection in this country was undertaken using different national and international statistical databases covering the full spectrum of the date value chain, including production, productivity, and export markets. Furthermore, a SWOT (strengths, weaknesses, opportunities, and threats) analytical tool guideline was framed toward extracting insights and gathering up-to-date information on the status of the date value chain, exploring the challenges and opportunities to improve marketing, commercialization, and competitiveness of dates and date palm products in this country.

We believe that such analysis will certainly help policymakers and date palm program planners in establishing an enabling environment for improving production, productivity, and quality of dates, including local value chain development and raising awareness to create policies for improved marketing of dates nationally, regionally and globally.

The SWOT framework tool is an integrated method into a strategic management process, which consists of creating, implementing, and evaluating decisions that enable achieving of the objectives (Gurl, 2017). This SWOT analysis includes internal and external analysis. The first analysis focuses on identifying the present capabilities (strengths and weaknesses). The second analysis allows specifying the critical threats and opportunities of the competitive environment (HBS, 2005). This tool allows analyzing the present situation while identifying the necessary key factors for establishing future strategic projections (Tran et al., 2016). The SWOT analyses include two dimensions – internal and external factors – that combine the four components. The components of strengths, weaknesses, opportunities, and threats are presented in a 2 × 2 matrix table (Gurl, 2017). Strengths are the advantages (sources and skills) that distinguish an organization and give it a comparative advantage in the market; whereas weaknesses are the limits that affect organization performance and make it less efficient compared to competitors. Opportunities are the set of favorable conditions that allow reaching projected targets. However, threats are the external factors that harm organization development and make achieving goals difficult. Opportunities and threats can have an economic, social, cultural, environmental, political, legal, or governmental aspect that is relatively beyond control, unlike strengths and weaknesses which are under organization control and can be improved.

This analytical tool has been implemented with key relevant stakeholders who are actively engaged in promoting the adoption and mainstreaming of date palm farming systems in the framework of the project “Developing Sustainable Production Systems for Date Palm in the Gulf Cooperation Council Countries – GCC” implemented by ICARDA. The purpose of this analysis is to gather up-to-date information on the status of the date value chain and discuss

the challenges and opportunities to improve the marketing, commercialization, and competitiveness of dates and date palm products in Oman. Table 3 presents a matrix of the components of the SWOT analysis through a set of questions.

Table 3. SWOT analytical framework.

STRENGTHS	WEAKNESSES
Question: What is already in place that is contributing to improving the marketing, commercialization, and competitiveness of dates and date palm products?	Question: What are the challenges that need to be addressed to improve the marketing, commercialization, and competitiveness of dates and date palm products, and how?
OPPORTUNITIES	THREATS
Question: What are the existing and future opportunities to improve the marketing, commercialization, and competitiveness of dates and date palm products, and how they can be mobilized?	Question: What are the existing and dynamic risks to be guarded against to improve marketing and competitiveness of the date value chain (i.e., dates and date palm products), and what mitigation actions should be put in place to overcome these threats?

Source: Own elaboration from SWOT Analysis Instrument Tool (2021).

4. RESULTS AND DISCUSSION

4.1. Date palm value chain systemic constraints and upgrading opportunities

As indicated in the previous section, the date palm sector is of great importance for Oman. Evaluation of the date value chain reveals a reduction of areas occupied by date palm and a significant decrease in date production between 2011 and 2019. In addition, special attention has been given to this sector, and continuous interest in research and development and several other efforts have been registered throughout this country. Nevertheless, the sector remains unprofitable at the national level and internationally uncompetitive. Value chain analysis shows that sustainable development of the date palm sector can occur only if stakeholders address issues related to the different functions of the date value chain such as linkages between the value chain actors and support services. Based on data collected from the Omani NARS team, we identified several challenges along the date value chain (Table 4). The GCC countries, in general, and the Sultanate of Oman are distinguished by many date palm varieties but unfortunately, very few of these are marketed or even suitable for packing (Rocha et al., 2018). Since most farmers in Oman are small-scale, date offshoots are propagated by the traditional method, which

usually results in low-quality date varieties. Adopting tissue-culture technology is considered one major opportunity to improve offshoot quality and consequently product quality. Unfortunately, this technology is underdeveloped in Oman. However, most

farmers attribute their non-adoption of this type of technology to the high cost of inputs. Lack of date palm maintenance is one of the main limits in the production phase, which is due to the traditional management and cultivation practices in the majority of date farms (e.g., traditional farming systems) in Oman.

Such constraints may affect yield and reduce date quality. Water shortage and quality (e.g., salinity) throughout the country is also a systemic constraint to date palm development, and more than 80% of date farms still use flood irrigation. For instance, mechanization in date farms is more efficient in reducing large quantities lost throughout the harvesting and post-harvesting process and consequently increases producers' incomes. In addition, there is insufficiently qualified labor for date palm practices in this date palm farming system. Ineffective or inappropriate use of pesticides generates the spread of pests and diseases, resulting in low date palm yield and consequently decreased profitability of the industry. Because dates are often eaten fresh, the data-processing sub-sector is not sufficiently. Date-processing factories are limited to date packing; in Oman, there are few date factories, and storage and packing stations are limited, affecting final product quality and consequently any added value. Moreover,

several other constraints and challenges are facing date marketing in GCC countries, including limited market linkages between

farmers and other strategic actors along the value chain. The absence of a wholesale market in Oman has direct repercussions on the selling

Table 4. Constraints and opportunities for expanding the date palm value chain in Oman.

Value chain functions	Constraints	Opportunities
Input supply and demand	<ul style="list-style-type: none"> - Low quality of date offshoots - High input cost - Water scarcity and salinity - Low quality of some date palm varieties - Weak extension programs - 	<ul style="list-style-type: none"> - Developing tissue-culture technology - Subsidizing inputs (especially certified offshoots and modern irrigation equipment) to improve date palm yield,
Production	<ul style="list-style-type: none"> - Small-scale production - Low productive capacity among date farmers - Lack of fertilization and absence of modern irrigation technologies - Poor pest and disease management - Lack of Good Horticultural Practices - Lack of modern technology for horticultural operations - Poor post-harvesting practices - Low labor skills 	<ul style="list-style-type: none"> - Encouraging horizontal linkages between farmers to minimize costs and increase their profitability - Improving the holistic extension system - Increasing awareness of good agricultural practices (GAP) certification - Improving quarantine and monitoring of pests and diseases (e.g., red palm weevil) - Improving staff capacities in modern technology use
Processing	<ul style="list-style-type: none"> - Focus on specific date varieties - Lack of storage and cooling stations - Date factories limited to packing - Low quality of date products due to lack of qualified staff 	<ul style="list-style-type: none"> - Introducing modern technology in processing such as drying technology to diversify date products - Facilitating access to new processing technologies and techniques (e.g., water) - Encouraging implementation of cold storage in production areas - Supporting expansion of date-processing factories - Enhancing date processors' capacity in processing techniques
Wholesaling and retailing	<ul style="list-style-type: none"> - Limited linkage between wholesalers and date producers - Losses along date marketing channels - Poor handling and low storage capacity - Price control by wholesalers 	<ul style="list-style-type: none"> - Improving linkage with producers to reach a win-win situation - Establishing more storage facilities - Orientation toward price control through market regulations
Output market	<ul style="list-style-type: none"> - Lack of access to market information - Inefficient marketing system - Competitiveness of GCC dates to Omani dates in regional and international markets 	<ul style="list-style-type: none"> - Activating the role of marketing cooperatives - Implementing market orientation - Increasing economic efficiencies along with the value chain nodes
Supporting services	<ul style="list-style-type: none"> - Absence of quality standards for date trade for the international markets - Lack of extension services covering all date palm production areas 	<ul style="list-style-type: none"> - Encouraging the establishment of food control laboratories - Increasing awareness of labeling and certification to meet international standards - Strengthening private sector engagement to enhance the performance of the date palm sector - Promoting small-medium enterprise engagement in date manufacturing
Business enabling environment	<ul style="list-style-type: none"> - Poor use of logistics services - Lack of finance for date processors - Lack of investment in the date palm sector from the private sector 	<ul style="list-style-type: none"> - Promoting awareness among public services - Improve the competitiveness of date products - Expand finance to date processors - Streamline funding procedures to encourage new investors in date palm cultivation

Source: own elaboration from Date Value Chain training data, 2021 (<https://dx.doi.org/20.500.11766/13685>).

price of date fruit and consequent profitability of the date industry. In addition, quality standards for marketing dates are not reaching the international standards, resulting in low quality, and added value of date products that do not meet the minimum marketing requirement. A low diversification of commercial date products is another constraint. For instance, processed dates are not available in the market in Oman during the whole year. With a further emphasis on the marketing of dates, several actors in the date value chain – including farmers, wholesalers, and factories – have complained about the limited availability of market information, which has led in some cases to flooding the market either by a large number of dates or offering varieties that are less preferred by consumers. This results in low prices and large waste in both cases.

4.2. Strengths, weaknesses, opportunities, and threats in the marketing, commercialization, and competitiveness of dates and date palm products in Oman

Strengths: The main strength of the Omani date palm sector is the diversification of date varieties, which means the better provision of consumer tastes and absorptive capacity of the date market for new agri-food products (e.g., date paste, molasses, and ethyl alcohol). In addition, orientation toward modern plantations is one of the most important strengths of the date value chain in this country. From a political point of view, the date palm sector is taking great importance in Oman's vision 2040 where the governmental policy is enhancing the sector by supporting investment in dates marketing and processing (Table 5). The strengths of the date value chain include support for farmers through providing places for date selling in commercial gatherings. In addition, specialized shops for date selling are numerous, and offers and discounts are permanent to encourage date consumption. This is due mainly to the long experience in date palm cultivation and high date consumption. Hence, e-marketing is a considerable strength allowing the spreading of date products. Date festivals are also the best occasions to

encourage farmers to pay more attention to date quality and packing. Government support for farmers (e.g., distribution of polycarbonate drying rooms) is one of the main strengths of the date sector to improve the profitability of date palm cultivation.

Weaknesses: Despite the efforts exerted in date value chain development, the date palm sector still has weaknesses (Table 5). Weaknesses of the Omani date palm sector include a lack of skilled labor that affects the quality and productivity of dates. Additionally, post-harvest operations are mostly neglected. Because dates are often eaten fresh, there are limited processing and packing factories in the country. Moreover, the poor vertical linkage between farmers and date factories is one of the main weaknesses hindering progress. Lack of market information is another weakness influencing the duplication and waste of date fruit in the local market. Lack of infrastructure for post-harvest handling, especially cold storage is another weakness coupled with insufficient investment in date production and manufacturing. In addition to the absence of a wholesale market, date marketing activities are not organized. It is thought that one of the weaknesses also is the fragmentation of date palm orchards where most of the farms are small-sized farms. This fragmentation dilutes and scatters the development efforts and reduces the profitability of the farms. Another weakness includes the high number of unproductive or low-quality date palm trees estimated to reach 2 million trees. There is also a lack of linkage between large-scale government companies (e.g., Nakheel Oman) and the small-scale farms that must be established to absorb the production of the small-scale farms in a win-win situation. Finally, the use of traditional cultivation practices (e.g., traditional date palm farming systems) is one weakness of the Omani date value chain. High waste of dates is noted along the value chain. The lack of feasibility studies on the profitability of date industries leads to the reluctance of investors to invest in date palm cultivation.

Table 5. SWOT analysis findings of the date value chain in Oman.

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> ➤ Oman's 2040 strategy. ➤ A government policy to invest in dates marketing and processing ➤ Long experience in date palm cultivation and high date consumption. ➤ Country's geographic location. ➤ Governmental interest in date festivals. 	<ul style="list-style-type: none"> ➤ Absence of wholesale market. ➤ Low quality of some date varieties. ➤ Inadequate infrastructure for post-harvest handling. Insufficient investment in date production and manufacturing. ➤ Fragmentation of date palm orchards. ➤ A High number of unproductive with low-quality date palm trees. ➤ Lack of linkage between large-scale government companies (e.g., Nakheel Oman) and small-scale farmers. 	<ul style="list-style-type: none"> ➤ Rising demand for fresh and processed dates in national and international markets ➤ Potential in global date markets. ➤ Trade groupings such as WTO and GCC and bilateral protocols between countries. ➤ Trademark of date factories enhances product marketing 	<ul style="list-style-type: none"> ➤ Increasing competition in regional and global markets. ➤ Pest and Diseases ➤ Climate change ➤ Soil degradation due to salinity

Source: Own elaboration from Date Value Chain training data, 2021 (<https://dx.doi.org/20.500.11766/13685>).

Opportunities: The growing international demand for dates and the huge number of potential commercial date palm varieties are the main opportunities for Oman. The Omani date palm sector enjoys opportunities of the availability of a market specially dedicated to Omani farmers, which is considered an important infrastructure allowing better date marketing (Table 5). In Oman, financial support is accessible to date processing factories. Orientation toward improving post-harvest handling procedures is one option to promote the date processing industry through Oman's 2040 strategy. Several other opportunities for Omani date palm products such as the rising demand for fresh and processed dates in national and international markets. Another opportunity for the sector is the multiple uses of dates in the food industry, thus raising the value of dates.

Threats: Threats are the external factors that negatively affect the date sector. Environmental factors such as soil degradation, soil salinity, and water shortage are the main threats to date palm production and productivity in Oman. Additionally, increasing competition in regional

and global date markets is the major threat to the date sector in Oman and harms the international market share of Omani dates.

5. STRATEGY FOR IMPROVED DATE PALM VALUE CHAIN AND COMPETITIVENESS OF DATE PALM PRODUCTS IN OMAN

To reach a sustainable production system for date palms in Oman, policymakers should recognize the need for pertinent coordination and collaboration between the value chain stakeholders within the country to overcome big challenges in the date value chain. The government plays an important role in removing bottlenecks and preventing the failure of the date market. Governments should focus on facilitator roles in improving the regulatory framework, logistic infrastructure, and public services.

The Sultanate of Oman can increase the production and productivity of date palms by providing selected offshoots using tissue-culture technology that guarantees a higher yield. Moreover, the adoption of mechanization technologies and promoting research and development in the field of pest and disease control, water salinity and water use efficiency

management, and red palm weevil pest will certainly contribute to enhancing date quality and consequently the profitability of date palm cultivation. Thus, farmer support is the main responsibility of the government. Farmer support begins with learning about good and climate-smart agricultural practices (GAP) through field days, and the extension services providing continuous follow-up while explaining the importance of sector modernization via the introduction of mechanization and adoption of modern irrigation methods, offering workers training courses to improve their skills and establishing qualified laboratories that offer integrated pest and disease control. Financial support (credit accessibility) is a critical prerequisite: first, to motivate small-scale farmers to move toward certified inputs (key factors of high productivity), and second to continue date palm cultivation activity which has become linked to older generations. Governmental support continues by providing the necessary infrastructure (e.g., collecting center and cold storage) to market their products under favorable conditions that guarantee date quality.

Government intervention should continue in the processing phase. To improve the added value of dates, the government intervenes in the establishment of processing plants and date factories that absorb overproduction in the good production seasons. Improving the agro-processing industry may also absorb the large number of dates flooding the market during peak agriculture seasons, leading to low prices. In addition, the government assists in reducing the wastage of dates in different stages of the value chain by establishing government laboratories for quality standards and increasing awareness about certification and labeling. Wholesaling is a very important step in date marketing in Oman, which requires special attention from the government. The government should focus on increasing added-value activities through ameliorating market regulation and availability of market information (including the flow of date quantities and selling prices both at the national level and at the regional and international levels). Finally, improving the competitiveness of dates in the international market could be feasible through strengthening public and private partnerships to elaborate appropriate

and efficient marketing strategies, including adopting international norms and standards and conducting studies to determine the requirements of international markets and produce competitive date products issuing from this country.

6. CONCLUDING REMARKS, POLICY IMPLICATIONS, AND STRATEGIC ACTIONS

6.1. Concluding remarks

The assessment and analysis of the core functions of the date palm value chain in Oman reveal its low marketing and commercialization performance and absence of competitiveness of the dates produced by this country. This is mainly due to the following:

- Several planted date varieties are of low quality and not suitable for regional and international markets.
- Predominance of traditional harvesting and post-harvesting practices and processing.
- Lack of know-how of good agricultural practices (GAP) applied to date production.
- Little importance is given to such factors as labeling, organic farming, and the application of geographical indicators.
- Absence of marketing standards for most date varieties produced in the country.
- Most of the produced dates do not conform to the marketing standards of potential high-income markets (e.g., USA and EU) and, thus, are mainly oriented to the less profitable markets of South-West Asia (e.g., India).
- Low knowledge of international market requirements (e.g., international standards) and quality issues (e.g., dates processing).
- Important decline in date consumption in the country (i.e., youth).
- Shortage in national qualified and trained staff and labor.

6.2. Policy implications

To enhance the growth of the date value chain in Oman, a set of strategic recommendations should be considered:

- Because of the use of traditional farming methods in Oman, providing financial support for producers is recommended for them to adopt modern technologies and consequently improve the date farming system. To create additional added value to date products that

meet international requirements, encouraging certification and labeling of date palm products is also recommended.

- Agricultural extension is a key factor in improving farmers' knowledge and skills related to date palm management. Therefore, providing continuous training and advice through farmer field schools is recommended.
- Enhancing the productive capacity of unqualified labor in date farm management including pest and disease management, mechanization use in date harvesting, and post-harvest practices is recommended to enhance the productivity and profitability of date palm cultivation. To reduce the date waste, encouraging the establishment of more data-processing factories through promoting credit schemes is also recommended.
- Processing manufacturers should develop strong interactions with date producer organizations to ensure alignment of production procedures with specific international markets standards and norms.

6.3. Strategic actions

Given the significant challenges that Oman is facing and the existing marketing opportunities at national and global levels, a sustainable, profitable, and competitive date palm sector for this country is achievable. This is possible through implementing the following strategic actions:

- Increasing citizen awareness campaigns toward the consumption of dates as a complete food containing a high percentage of carbohydrates, vitamins, minerals, and fiber.
- Date palms play a major role in preventing soil degradation and desertification, so encouraging date plantations should be encouraged in all parts of the sultanate, and farmers and the private sector companies encouraged to increase their investment in date palm production.
- Focusing on high yield and commercial varieties to ensure that higher date palm productivity meets national and international market requirements.
- Orienting farmers toward modern methods of cultivation such as adopting water-saving technologies and mechanization technologies in date palm farming systems.
- Improving the storage capacity of small data-processing factories and incentivizing the

adoption of modern processing techniques to increase the added value of date products.

- Strengthening linkages with small-scale farmers and providing equipment for handling and packing of dates and supporting the expansion of data-processing factories and encouraging certification and labeling of dates.
- Supports large-scale commercial farms with high-yielding commercial varieties.
- Design and enforcement of rehabilitation programs for the low-quality date palm trees varieties by encouraging value-added products from such varieties.
- Establishment of pricing policy to support high-quality fruits to encourage farmers for improving their farming cultural practices.
- Orientation toward adoption of quality standards to meet international market demand.
- Strengthening marketing institutions and increasing funding of investment projects.

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