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Modernizing Saudi Arabia's Dates Export Market via Leveraging Technology for Sustainable Growth in the Global Economy

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A B S T R A C T

The dates export market in Saudi Arabia presents both opportunities and challenges for the agricultural sector. This paper examines the current state of the dates market in Saudi Arabia, highlighting key challenges such as water scarcity, climate change, quality control issues, market access barriers, and competition. It explores the role of technology in addressing these challenges and enhancing the competitiveness of Saudi dates in the global market. Various technological advancements, including precision agriculture tools, drip irrigation systems, mechanized harvesting equipment, post-harvest technologies, traceability systems, and digital marketing strategies, are discussed in detail. By leveraging these technologies, Saudi date farmers and exporters can improve productivity, efficiency, quality, and market reach. The paper concludes by emphasizing the importance of strategic investment in technology and innovation to unlock the full potential of the dates export market in Saudi Arabia, driving economic growth and sustainable development in the agricultural sector

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INTRODUCTION

Date production in the Kingdom of Saudi Arabia (KSA) holds significant economic importance (Almodarra & Saghaian, 2016; Alabdulkader et al., 2017). Dates have long been revered as a symbol of abundance, nourishment, and cultural heritage in Saudi Arabia. Renowned for their sweetness, versatility, and nutritional value, dates hold a significant place in the country's agricultural landscape and collective identity. As one of the world's largest producers of dates, Saudi Arabia boasts a rich tradition of date cultivation that spans centuries, with the fruit playing a pivotal role in the nation's economy, culture, and cuisine. Against this backdrop, understanding the dynamics of date cultivation, production, and trade in Saudi Arabia is of paramount importance. Saudi Arabia has emerged as the world's third-largest producer of dates, a crop with historical roots dating back to 7000 B.C. Throughout the ages, dates have been integral to the region's culture and economy, symbolizing both sustenance and prosperity (Mahmoudi et al., 2008; Intezar et al., 2016). It's no coincidence that the emblem of Saudi Arabia prominently features a date palm nestled between two crossed swords, highlighting the significance of this fruit to the nation's identity. Despite technological advancements, the harvesting of the approximately 800,000 metric tons of dates produced annually remains a labor-intensive process, requiring each fruit to be hand-picked as it reaches maturity (OEC, 2023). In 2021, Saudi Arabia solidified its position as a global leader in date exports, with a total export value of $329 million in fresh or dried dates. This achievement placed Saudi Arabia at the forefront of date exporting nations. Furthermore, dates, whether fresh or dried, ranked as the 51st most exported product from Saudi Arabia during the same year. Among the top destinations for Saudi Arabian date exports were the United Arab Emirates ($87.6 million), Yemen ($33.6 million), Kuwait ($23.4 million), Morocco ($17.2 million), and Indonesia ($15.4 million) (OEC, 2023)

This study delves into the multifaceted realm of date cultivation within the Saudi Arabian context, aiming to illuminate key aspects of this vital industry. By conducting a thorough examination of existing literature, encompassing academic research, industry reports, and governmental publications, this study seeks to shed light on various dimensions of date cultivation, including agricultural practices, market trends, consumer preferences, and economic implications. Through a systematic analysis of literature and synthesis of insights, this study endeavors to provide valuable perspectives on the strategic significance of date cultivation in Saudi Arabia.

As the global demand for nutritious and sustainable food sources continues to rise, the role of dates as a staple crop and export commodity assumes greater prominence. By unraveling the intricacies of date cultivation in Saudi Arabia, this study aims to contribute to a deeper understanding of the challenges and opportunities facing the date industry in the region. This study aspires to inform policy decisions, guide agricultural practices, and foster innovation within the Saudi Arabian date sector.

In essence, this study serves as a comprehensive exploration of date cultivation in Saudi Arabia, acknowledging its historical legacy, economic significance, and cultural resonance. By examining the past, present, and future trajectories of date cultivation, this study endeavors to illuminate pathways for sustainable growth, value creation, and market expansion within this vital sector of the Saudi Arabian economy.

The paper's structure unfolds as follows: After this introduction, it progresses to provide a fundamental understanding of the role of dates in the Saudi Arabian agricultural landscape. Subsequently, it explores the strategic functions of date cultivation, encompassing agricultural practices, market trends, consumer preferences, and economic implications. The paper then examines the contribution of date cultivation to Saudi Arabia's agricultural sector and overall economy. Following this, it discusses the integration of modern agricultural technologies in date cultivation and its implications for productivity and sustainability. The paper proceeds to highlight future directions and implications for the Saudi Arabian date industry, concluding with a summary of key findings and offering final remarks.

METHODOLOGY

The methodology employed in this study adopts a comprehensive approach to analyze literature on date cultivation in Saudi Arabia. Beginning with an extensive review across academic databases, journals, and reputable sources in agricultural studies, the focus is on identifying pertinent studies, articles, and publications related to date cultivation, production, marketing, and consumption within the Saudi Arabian context. Predefined selection criteria ensure the inclusion of relevant and methodologically sound sources. Extracted information is systematically organized and analyzed thematically to uncover recurring patterns, trends, and insights specific to the Saudi Arabian date industry. Special emphasis is placed on understanding factors influencing cultivation practices, market dynamics, consumer preferences, and the economic impact of the date sector. Through interpretation and synthesis of findings, the study aims to offer valuable insights and actionable recommendations to enhance date cultivation practices, market access, and economic benefits in Saudi Arabia.

This methodology ensures rigor and relevance in analyzing literature and contributes to a deeper understanding of the strategic significance of date cultivation within the Saudi Arabian agricultural landscape.

Saudi Vision 2030 and Agriculture Sector

Asif (2023) discussed about the establishment of the Al Madinah Heritage Company (MHC) by Saudi Arabia's Public Investment Fund (PIF) with the aim of developing sustainable agriculture in Medina. The focus of MHC is to enhance the quality and production of Ajwa dates in the region, aligning with the goals of Saudi Vision 2030 to diversify the economy. Majed al-Assaf, Head of Consumer Goods and Retail in the MENA Investments Division at PIF, emphasizes the significance of the dates industry in Saudi Arabia's food and agriculture sector and its role in achieving Vision 2030 objectives. MHC will leverage the latest agricultural technologies to promote sustainable agriculture in Medina and increase the production and distribution of Ajwa dates, both locally and internationally. Ajwa dates are renowned for their nutritional value and cultural importance, particularly among Muslim pilgrims visiting Medina (Argaam, 2023).

The G20 Agriculture Ministers' meeting held in Niigata, Japan, focusing on sustainable agriculture, technologies, food security, and investment transparency. His Excellency Abdulrahman Abdulmohsen A. AlFadley, Saudi Minister of Environment, Water and Agriculture, chaired a session on G20 Members' contributions to achieving Sustainable Development Goals, emphasizing the importance of collaborative efforts to address global challenges. AlFadley highlighted Saudi Arabia's commitment to national policies and strategies aimed at promoting food and water security, sustainable agricultural development, and ecological balance, in alignment with Saudi Vision 2030 (MEWA, 2019).

Dates Market in Saudi Arabia

The primary market for dates in Saudi Arabia is located in Buraydah, the capital of the north-central Al-Qassim region, situated approximately 330 kilometers northwest of Riyadh, the Saudi capital. This region boasts the highest number of date palm trees in the kingdom, surpassing 7 million in total. According to the Saudi National Center for Palms and Dates, the annual production of fresh dates in Saudi Arabia constitutes approximately 15 percent of the global output, amounting to 1.3 million tons per year from a staggering 28 million palm trees. With over 1,000 square kilometers of land dedicated to date palm cultivation across the country, Saudi Arabia cultivates approximately 400 different varieties of dates. Annually, during a 35-day festival held in high

summer, farmers from Al-Qassim and neighboring regions convene for what is deemed the largest event of its kind (Xinhua News Agency, 2019).

In Saudi Arabia, the cultivation of date palms is a prominent feature of agricultural production, with an impressive count of over 34 million date palms spanning across various regions. The highest concentration of these date palms is found in the Al Qassim region, followed closely by Medina and Riyadh. Serving as a cornerstone of agricultural activity in the Kingdom, these date palms contribute significantly to the overarching goals of achieving food security and fostering sustainable agricultural development (Gulf News Report, 2023). Notably, between 2020 and 2021, Saudi Arabia experienced significant growth in its date export markets, with the United Arab Emirates ($31.4 million), Yemen ($10.6 million), and Malaysia ($6.5 million) emerging as the fastest-growing destinations for Saudi Arabian date exports (OEC, 2023). This upward trajectory underscores the increasing global demand for Saudi Arabian dates and the nation's pivotal role in supplying this prized commodity to international markets.

Figure 1 illustrates the harvested area of dates globally in 2022, broken down by prominent countries. Saudi Arabia occupies the third position, boasting a harvested area of approximately 156.46 thousand hectares. Meanwhile, Iraq takes the lead in palm date production worldwide, with a harvested area reaching approximately 278 thousand hectares in 2022.

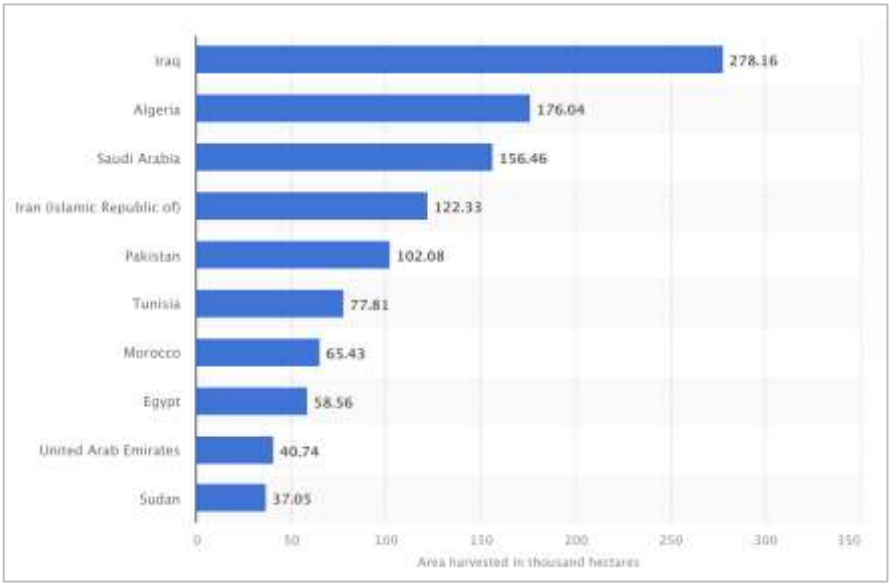

Figure 1. Harvested area of dates worldwide in 2022, by leading country (in thousand hectares)*

Source: (Shahbandeh, 2024)

The global value of date exports has reached $2.3 billion annually, according to a Saudi government minister (Arab News, 2023). The Minister of Environment, Water, and Agriculture, Abdulrahman Al-Fadhli, highlighted the significant contribution of the date sector to the economy, with over 200 million palm trees covering 1.5 million hectares of land in Saudi Arabia. Al-Fadhli emphasized the importance of date cultivation in achieving food security, sustainable agricultural development, and job creation in rural areas. Additionally, the article mentions the challenges faced by the industry, such as climate change, diseases, and low global consumption rates. The International Dates Council, with a two-year renewable budget of $4 million, aims to raise awareness about the sector and has proposed marking 2027 as the International Year of Date Palm (Arab News, 2023).

Table 1 provides data on the area of date cultivation and production in various regions of Saudi Arabia for the years 2010, 2011, and 2012. Riyadh consistently emerges as the region with the largest cultivation area and production output throughout the three years, with slight increases observed in both parameters. Makkah and Madinah also maintain significant cultivation areas and production levels, albeit with some fluctuations over the years. Qaseem, the Eastern Region, and Aseer exhibit relatively stable cultivation areas but varying production levels across the three years. Tabuk, Hail, and Al-Jouf, while having smaller cultivation areas compared to other regions, show notable production outputs, particularly in Tabuk and Hail. On the other hand, regions such as the Northern Region, Jazan, Najran, and Al-Baha demonstrate smaller cultivation areas and production outputs, with some fluctuations noted over the years. Overall, the total area of date cultivation and production in Saudi Arabia shows a gradual increase over the three-year period, indicating sustained growth in the country's date industry.

Table 1. Estimated Area and Production of Dates

تقدير المساحة والإنتاج لمحصول التمور حسب المناطق الإدارية

Estimated Area and Production of Dates, By Administrative Regions

Regions	2012		2011		2010		المنطقة
	الإنتاج Production	المساحة Area	الإنتاج Production	المساحة Area	الإنتاج Production	المساحة Area	
Riyadh	318303	42262	253507	42174	248327	42208	الرياض
Makkah	31779	7770	48014	8479	44882	8068	مكة المكرمة
Madinah	123177	18217	144896	18651	139924	18802	المدينة المنورة
Qassim	205603	39023	192667	39039	187561	39301	القصيم
Eastern Region	163576	15351	147652	14140	147305	13625	المنطقة الشرقية
Aseer	19880	4350	21033	4454	20119	4297	عسير
Tabuk	24301	4234	30216	2788	30679	2966	تبوك
Hail	92091	17634	102772	15860	109229	16187	حائل
Northern Region	460	121	140	39	152	40	الحدود الشمالية
Jazan	609	107	294	282	326	288	جازان
Najran	9601	2393	19831	3497	19326	3070	نجران
Al-Baha	2547	383	6279	1066	6618	1095	الباحة
Al-jouf	37135	4782	30804	5568	46898	5471	الجوف
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	الإجمالي

Challenges for Dates Market

At present, the Saudi Arabian government places significant emphasis on the development of date palm cultivation, while the private sector takes charge of project implementation (Aleid et al., 2015). Following ambitious expansion initiatives aimed at establishing new date palm plantations, the current focus revolves around continuous efforts to enhance existing date-growing areas. These endeavors involve the introduction of labor-saving cultivation methods, modern irrigation systems, improved packaging techniques, industrialization of fruit processing, and diversification of date palm products. For instance, there is a growing emphasis on maximizing the utilization of lignocellulosic residues from date palm trees (Mikki, 1998). Despite these advancements, various constraints hinder the development of date palm cultivation in Saudi Arabia. Despite its extensive history, research and development efforts in the field remain insufficient and fail to meet expectations. Overall product quality remains subpar, and both field and postharvest losses persist at high levels. Additionally, there is ample room for improvement in the utilization of date products and by-products. Recognizing these challenges, the Saudi Arabian government has identified date palm cultivation as a top research priority within the agricultural sector (Erskine et al., 2004).

The dates market in Saudi Arabia confronts various challenges that impact both domestic production and international trade. Among these challenges is the issue of water scarcity, which poses a significant obstacle to date palm cultivation due to the crop's high-water requirements and the country's limited water resources (Ismail et al., 2022). Moreover, climate change exacerbates this challenge, leading to unpredictable weather patterns, extreme temperatures, and heightened risks of pests and diseases, all of which adversely affect date palm health and productivity. Ensuring consistent quality control throughout the production and supply chain is another pressing challenge, as inadequate post-harvest handling, storage, and transportation processes can compromise the quality of Saudi dates and hinder their competitiveness in global markets (El-Sebaei and Al-Soliman, 2018). Additionally, accessing international markets is hindered by trade barriers, tariffs, and stringent regulations, necessitating compliance with international standards and the negotiation of favorable trade agreements. Competition from other major date-producing countries further intensifies the market landscape, emphasizing the importance of differentiation based on quality, variety, and branding (Intezar et al., 2016). Labor shortages during harvesting seasons, limited adoption of modern agricultural technologies, and the need for sustainable water management practices are additional

challenges that must be addressed to ensure the long-term viability and growth of the dates market in Saudi Arabia. Overcoming these obstacles requires coordinated efforts from government agencies, researchers, farmers, and industry stakeholders, along with investments in research and development, infrastructure, and market promotion initiatives.

Strategies to increase Dates Export

It is essential to underscore the various avenues through which the export potential of Saudi dates can be enhanced. Al-Shreed et al. (2012) highlighted several relative advantages that Saudi dates possess, making them more appealing to global markets. These include the ability to provide high-quality products demanded by affluent nations, as well as the capacity to supply large quantities of lower-quality products to meet the demands of less affluent countries. Additionally, there is a suggestion to enhance the exporting packing industries to effectively compete with consumer preferences. Furthermore, the proposal includes introducing innovative packaging solutions for dates and leveraging the spiritual significance of Saudi dates, particularly within Muslim communities. Mikki (1998) also emphasized the importance of Saudi date manufacturers exerting additional efforts to explore new markets, engage in advertising, and employ propaganda strategies to address the considerable associated expenses.

Moreover, El-Sebaei and Al-Soliman (2018) indicated that the marketing margins of dates are significantly influenced by various factors depending on the cultivars studied, such as Khlas, Ruziz, and Shishi. These factors include the costs and methods associated with marketing, technical challenges related to transportation, packaging, sorting, and storage of dates, as well as behavioral aspects concerning knowledge of marketing methods, product quality, and pricing strategies (Ismail et al., 2022).

To increase dates exports from Saudi Arabia, a comprehensive and multifaceted strategy is essential. This strategy must encompass various aspects ranging from agricultural practices to international trade relations. By implementing a combination of approaches, Saudi Arabia can enhance its position as a leading exporter of dates globally.

First and foremost, substantial investments in research and development (R&D) are necessary to advance cultivation techniques and develop new date varieties that cater to the preferences of international markets. Research efforts should focus on improving yield, quality, and resistance to pests and diseases. By leveraging technological advancements and scientific research, Saudi Arabian

farmers can optimize their production processes and enhance the overall quality of their date crops.

Ensuring adherence to rigorous quality standards and certifications is crucial for gaining consumer trust and facilitating market access. Certifications such as ISO (International Organization for Standardization) and HACCP (Hazard Analysis and Critical Control Points) are widely recognized indicators of product quality and safety. By meeting these standards, Saudi Arabian dates can compete effectively in global markets, attracting discerning consumers who prioritize quality and safety in their food choices.

Investments in infrastructure development are also imperative to support increased production and streamline export logistics. This includes the development of efficient irrigation systems, modern storage facilities, and robust transportation networks. Improving infrastructure not only enhances the efficiency of the supply chain but also reduces post-harvest losses, ensuring that Saudi Arabian dates reach export markets in optimal condition.

In addition to enhancing production and quality, effective marketing strategies are essential for promoting Saudi Arabian dates in key export markets. Targeted marketing campaigns, participation in international trade fairs, and engagement with potential buyers are crucial for raising awareness and generating demand for Saudi Arabian dates. By highlighting the unique characteristics and superior quality of their dates, Saudi Arabian exporters can differentiate their products and establish a strong presence in the global market (Al-Ayed et al., 2023; Al-Ayed, 2024).

Furthermore, forging trade agreements and partnerships with importing countries can facilitate market access and reduce trade barriers. By negotiating favorable trade terms and tariffs, Saudi Arabia can create a more conducive environment for exporting its dates abroad. Collaborating with international partners also provides opportunities for knowledge exchange and capacity-building, further strengthening the competitiveness of Saudi Arabian dates in the global market (Al-Ayed et al., 2021).

Diversification of product offerings is another strategy that can help Saudi Arabia expand its dates exports. In addition to fresh dates, value-added products such as date pastes, syrups, and chocolates can cater to diverse consumer preferences and market segments. By offering a wide range of products, Saudi Arabianexporters can appeal to a broader audience and capitalize on emerging trends in the global food industry.

Government support plays a crucial role in facilitating the growth of the dates export sector. By providing incentives, subsidies, and capacity-building initiatives, the government can encourage investment and innovation in date production and export activities. Policies that promote sustainability and environmental stewardship are also essential for ensuring the long-term viability of the dates industry and safeguarding natural resources for future generations (Al-Tit et al., 2022).

Continuous market research and analysis are essential for identifying emerging trends and opportunities in target export markets. By staying abreast of evolving consumer preferences and market dynamics, Saudi Arabian exporters can adapt their strategies and offerings to meet changing demand patterns effectively (Al- Zaidan et al., 2024).

Adoption of Technology for Dates Production and Export

The integration of technology across the dates export market in Saudi Arabia promises a transformative impact on the entire value chain (Ahmed et al., 2012). By harnessing precision agriculture tools like drones and satellite imagery, farmers can precisely manage date palm health, optimize resource allocation, and mitigate environmental risks, thereby boosting productivity and sustainability. Furthermore, the adoption of drip irrigation systems not only conserves water but also enhances nutrient delivery to date palms, resulting in healthier trees and higher yields (Alnaim et al., 2022). Mechanized harvesting equipment complements these efforts by automating labor-intensive tasks, ensuring timely and efficient harvesting operations, and reducing dependency on manual labor.

Post-harvest technologies, such as cold storage facilities and modified atmosphere packaging, extend the shelf life of dates, preserving their freshness and quality during transportation and storage (Kader & Hussein, 2009; Mohammed et al., 2019). This not only minimizes post-harvest losses but also enhances the marketability of Saudi dates in international markets, where quality standards are paramount. Moreover, implementing traceability and quality assurance systems empowers consumers to trace the origin and journey of dates, instilling confidence in product authenticity and safety (Abd Elwahab et al., 2019).

In the realm of marketing and distribution, digital platforms and e-commerce channels provide exporters with unprecedented opportunities to connect directly with consumers worldwide (Sturiale & Scuderi, 2017). Through targeted digital marketing campaigns and e-commerce platforms, Saudi date exporters can showcase the unique characteristics of their products, engage with consumers in real-time, and facilitate seamless transactions. This not only

expands market reach but also enables exporters to build brand loyalty and differentiate their products in a crowded marketplace (Alateeg & Alhammadi, 2023; 2024).

In essence, the strategic adoption of technology across the dates export market in Saudi Arabia drives efficiency, quality, and innovation, positioning the country as a global leader in date production and trade. By leveraging these technological advancements, Saudi Arabia can unlock new opportunities, overcome challenges, and sustainably grow its share in the competitive global dates market (Alateeg et al., 2024).

CONCLUSION

The dates export market in Saudi Arabia faces various challenges, including water scarcity, climate change, quality control issues, market access barriers, competition, labor shortages, and limited technology adoption. However, the integration of technology offers promising solutions to overcome these challenges and drive growth in the sector. By leveraging precision agriculture tools, drip irrigation systems, mechanized harvesting equipment, and advanced post-harvest technologies, Saudi date farmers can improve productivity, efficiency, and quality while conserving resources and reducing labor dependency. Additionally, traceability and quality assurance systems enhance product integrity and transparency, fostering consumer trust and facilitating market access. Moreover, digital marketing strategies and e-commerce platforms enable exporters to reach a wider audience, showcase product attributes, and drive direct sales, thereby expanding market reach and enhancing competitiveness. Through strategic investment in technology and innovation, Saudi Arabia can strengthen its position as a leading exporter of premium dates, capitalize on emerging opportunities in the global market, and navigate challenges effectively. By embracing a holistic approach that combines technological advancements with sustainable practices and market-driven strategies, Saudi date exporters can unlock the full potential of the dates export market, driving economic growth, job creation, and prosperity for the nation. Ultimately, the successful integration of technology across the dates export market will not only enhance the competitiveness of Saudi dates but also contribute to the sustainable development of the agricultural sector and the overall economy.

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