



جامعة السلطان قابوس

Sultan Qaboos University

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## Date Palm and Food Security in Oman

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During his meet-the-people tour in November 2009, the late His Majesty Sultan Qaboos bin Said -may his soul rest in peace-, stated that “Date palm is the backbone for the food security in Oman” and ordered the establishment of the largest plantation ever, the One Million Date Palm Project. The vision of his Majesty was to establish state-of-the-art date palm farms that will be a model for future projects in the country. Such a project would have provided not only a sustainable food reserve, as the date is the most nutrient-rich fruit, but also an economic diversity project that was realized ten years later by the establishment of two national companies for date processing and exports.

Oman currently cultivates a little over 7 million date palms, much of which are planted in traditional farms throughout Oman. New date farms, however, have witnessed a change towards modern agro-systems, employing technologies like the drone to carry out pollination to mechanized harvesting and aerial pest control. There is also a spike in production, reaching over 300,000 tons annually, making the Sultanate one of the top 10 date producers in the world.



*One of the One million Date Palm Project Farms (Source: Diwan of Royal Court DG of One Million Date Palm Project)*

The date palm belongs to the plant family *Aceraceae* and its scientific name *Phoenix dactylifera* L., is an ancient crop plant that has been cultivated for centuries in many arid parts of the world, particularly in West Asia, the Middle East, and North Africa. In Oman, date palm is the most important and widespread crop that occupies the largest cultivated area reaching 50% of total farming in the country and constitutes 80% of all fruit crops grown. The date palm has great social, economic, nutritional, and religious significance.

The nutritious year-round fruits from hundreds of cultivars, and the multiple benefits of the palm by-products to the growers and the community, have given date palms special status among other crops with significant economic, cultural and religious importance in the country. A large number of cultivars, with over 250 female cultivars and over 20 male cultivars, also contributes to the permanence of date palm cultivation because of the extensive range of climatic adaptation, given that Oman has a diverse topography and a range of climatic zones. Because of its extensive cultivation in Oman and the multiple uses of the date palm in a

variety of products, the date palm has a special social status among Omanis. Consequently, date palm is the main plant for home gardens and landscaping as well, and it is widely grown even in areas where the climate does not allow for high-quality fruits or yield, such as in Dhofar in southern Oman or the Hajar mountains. Nonetheless, in regions suitable for date palm cultivation, dates constitute the major source of household agricultural income for many farmers as well as the main source of nutrition.

## History of Date Cultivation

Throughout history, date growers in Oman have mastered date palm cultivation and the cultural practices involved during the pre-petroleum era. Many travellers to Oman reported date palm cultivation as one of the best of its time, both in the agricultural practices and the quality of the produce. An American traveller and author Paul Popenoe wrote in his manuscript published in 1913, 'Date Growing in the Old World and the New', "The Fardh date growers of Oman, who are the cleverest Arab cultivators I have seen". This is not surprising since date palm has a long association with the Islamic religion, where it is mentioned in many verses of the Quran and the Hadith, and Omani-Arab civilizations, where much of the construction and day-to-day items were sourced out from the date palm.

The date palm has been in cultivation since 2,400 B.C. Drawings and manuscript writings, including stone inscriptions in archaeological sites in Oman, have indicated the importance of date palm to various civilizations in and around the Arabian Peninsula. Date palm reinforced its importance and status following the rise of Islam in Arabia. Due to its importance to this region, in particular, 21 references to date palm are cited in the Holy Quran and 300 in the writings of the Hadith. These emphasize the religious and cultural significance, in addition to the nutritious and economic importance, of date palm in the Sultanate.



*Traditional date palm farms usually irrigated with falaj system where water is channelled from underground wells to the farms.*

The Arabian Peninsula is an arid and semi-arid region of the world, that is mostly desert or mountains that do not fit the typical date palm farms we see today. However, Omanis manage to establish the world's best date palm groves and plant the best cultivars. Given its adaptation to the dominating harsh conditions, such as high temperature and long drought periods, the date palm is the most appropriate crop plant suitable for cultivation in Oman. This is particularly important in this country that is characterized by low rainfall (an average of 100 mm per year), whereas the rate of evapotranspiration is 10 fold. Traditional date palm farms also provide shading for a variety of other fruit trees such as lime, mango, and guava, as well fodder crops such as alfalfa.

## Economic Importance

Oman exports two main fruit produce, dates and bananas. Date palm is by far the most significant export commodity, mainly to United Arab Emirates (UAE), Saudi Arabia, and India. However, date exports remain very small compared to what the country produces. Oman exports 10 thousand to 15 thousand metric tons of dates, which ranges between 4-6 % of the total production annually. The low level of exports was attributed to the poor handling of dates, poor fruit quality, and the numerous pests and diseases that affect post-harvested dates in Oman. With the establishment of two companies that will open doors for exports, this situation is expected to improve in the coming years. Furthermore, improvement of fruit quality may lead to greater exports of dates to various parts of the world where demand for dates is increasing such as in Oceania, the Americas, and Europe. Fardh cultivar, which happens to constitute the largest cultivar of the One Million Date Project, is the most important processing cultivar in Oman. Fardh receives the least damage during packing and transport, resilient to poor handling conditions, unique to Oman, and is a stable nutritious food that is a prime as an export commodity, despite the lack of popularity locally compared to Khalas for example.



Dates of Barni, Khalas, and Khunaizi cultivars grown in northern Oman (Left) . Fardh dates at the transitional stage from khalal to rutab stage (Right).



## Research and Development

Published research work is lacking on various aspects of cultivation practices in Oman. Earlier research carried out at Sultan Qaboos University (SQU) focused on pollination, fertilizer application, irrigation, and utilization of date palm as the most significant issues. Recent work has focused on yield and fruit quality improvement and postharvest technology. The utilization of mechanical management and modern technology, such as the Internet of Things (IoT) and robotics will lead the way to a better future for date palm, better employment opportunities, and improved overall contribution to the economy and food security.



Researchers study the irrigation requirements of date palm at Sultan Qaboos University.

## Future Date Production and Marketing

The date palm tree can survive under relatively harsh climatic and soil conditions while many other crops cannot thrive under such adverse conditions. Therefore, it is an irreplaceable tree in irrigable desert lands that protect ground-level crops from heat, wind, and other threats and is an excellent plant species in terms of combating desertification. Due to these characteristics, the date palm tree has been grown in Oman and the Arabian Peninsula for centuries and it is considered to be the oldest fruit tree.

Dates have high nutritive value and are the main food source for Omanis since they began to sail the seas of this region, which can be traced back to the seventeenth century. Date cultivation and use of the fruit as a basic food commodity is believed to be an integral part of the Omani national heritage and social life.



Fardh is the most processed and is the main exported cultivar of date palm

The majority of palm date growers in Oman still use traditional methods for growing this crop from planting until it is marketed. They are using farming techniques that require only limited inputs of capital and cause minimal disturbance to the environment. Hence, the patterns of production seem truly sustainable and skills are being passed from generation to generation. Most of the traditional date palm growers are considered subsistence producers with the main objective to only supply enough food for the family needs.

Nonetheless, tremendous development has occurred in the production and distribution of dates during the last two decades. Now in many areas of the sultanate, date palm trees are very well developed in terms of cultivar selection, planting, harvesting, marketing, and storage. This is driven by model farms such as those established by the One Million Date Palm Project. The increasing use of modern technology will aid the pro-

duction of dates to increase its contribution to economic diversity, increasing employment opportunities, and ensuring sustainable food security for Oman.

