

Potentials of Date Palm Tree (*Phoenix dactylifera*) For Livelihood Sustenance in Northern Nigeria

Gujja, A.A., Umar, A.I., Halima, A.D., and Deborah, A.G

Department of Forestry, Faculty of Agriculture, Yobe State College of Agriculture, Science and Technology, Gujba P.M.B. 1104, Damaturu, Nigeria.

Department of Laboratory Science Technology, Faculty of Science, Yobe State College of Agriculture, Science and Technology, Gujba P.M.B1104, Damaturu, Nigeria.

ABSTRACT

This paper reviews the critical role of date palms in sustaining rural livelihoods across regions in Northern Nigeria, where they are a dominant feature. It examines the traditional and contemporary ways local communities utilize date palms, providing insights into their cultural and economic significance. Furthermore, the review explores the potential of date palms in ensuring food security and poverty reduction in these areas. It analyzes the nutritional value of dates and their contribution to a balanced diet. Additionally, it examines the economic benefits associated with date palm cultivation, including job creation, income generation, and diversification of income streams for rural households. It also sheds light on the marketing systems currently in place for date palm products in Northern Nigeria. It analyzes the efficiency and reach of these systems. Finally, the review recommends advancements in date palm production within Nigeria.

Keywords: *Date palm; livelihood sustenance; Food security, and poverty reduction.*

Introduction

Natural resources provide a substantial income for many rural households, without which the ability of many households to satisfy their necessities of life would be threatened (Khushk *et al.*, 2009). Close links exist between natural resources and the livelihoods of rural communities (Cheema *et al.*, 2008). In both national and international policies, the role of native domesticated fruit trees in the livelihoods of farmers is often neglected. Date palm (*Phoenix dactylifera L.*) is one of the most important fruit trees in arid and semi-arid regions (Khushk *et al.*, 2009). It is considered an important natural source of capital for rural livelihoods. Poor people generally depend upon a single staple food crop, which often lacks some essential amino acids, vitamins, and minerals (Christou and Twyman, 2004). The date palm fruits provide unique functional and nutritional values (El-Sohaimy and Hafez, 2010). This fruit contains a high percentage of carbohydrates, dietary Fibre, antioxidants, and minerals, all essential amino acids, and a variety of B-complex vitamins and vitamin A (Al-Gboori and Krepl, 2010; Al-El-Sohaimy and Hafez, 2010; Shahib and Marshall, 2003). Date palm is of great socio-economic concern as it also provides a wide range of products and services to local people (Mahmoudi *et al.*, 2008). In remote areas, by-products of date palm are used extensively for both household and commercial purposes, providing substantial returns to rural people (Hassan *et al.*, 2006). Modern technological improvements increase the possibility of industrial usage of date palms, such as paper-making, insulating material, and particle board (Agoudjil *et al.*, 2011; Gera, 2007). Further, this tree has great cultural and traditional importance in many date-producing countries, and with the increase of population in these countries, the demand for dates is expected to increase in the future (Chao and Krueger, 2007).

Jigawa holds a significant position in date production (Musa *et al.*, 2021). During the years 2007-2022, Nigeria imported 88,451 tons of dried dates and 4,687 tons of fresh dates, which amounted to \$36.033 million (Salman *et al.*, 2014). Ata *et al.* (2012) reported that unawareness of date palm production technology is the main factor in reducing yield and ultimately profit for date growers. The majority of date palm trees found in Nigeria are found in rural areas in scattered patterns in northern Nigeria, and most of them are propagated through seeds, having great genetic diversity (Ghosh *et al.*, 2010).

Date Palm - Soil, Climate, Planting, Varieties (*Phoenix dactylifera L*) Family: *Palmae*

Date palm is a nutritious fruit rich in sugar and iron, and is predominantly seen in desert oases. It is believed to have originated in countries around the Persian Gulf, such as Iraq (Mesopotamia) and Egypt. The flesh contains 60 – 65 percent sugar, 2 percent protein, 2.5 percent fiber, 0.4 percent fat, and 2 percent mineral matter. It is a good source of easily assimilable iron (7.3 mg/100g) and hence prescribed to patients along with honey (Zaid and De Wet, 2002a).

Climatic and soil requirements:

Dates can be successfully cultivated in areas having long hot summers and mild temperatures during flowering (February to April) and fruit ripening (May to August) with temperatures ranging from 25 to 29°C. As in the case of grapes, this crop also requires specific heat units (above a base of 100°C nearly 3000 units for successful fruit maturation. There should not be any rain or high humidity during fruit maturity and ripening. Otherwise, the fruits will be spoiled. The crop is susceptible to frost (Zaid and De Wet, 2002a).

Deep sandy loam is the best suited, though it is very hardy and can be grown in a wide range

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

of soil conditions. Better water holding capacity with good drainage is desirable. It can grow in alkaline and saline soil; however, the growth and productivity are affected (Zaid and De Wet, 2002a).

Cultivars:

Depending on the season of ripening, the cultivars are classified as early, mid, and late cultivars. Though 40 cultivars were imported from the Middle East and North Africa, only a few were found to be promising under Nigerian conditions.

Halawy: An early variety with small fruits. At full maturity before ripening (doka stage) the fruits are yellow in colour and free from astringency.

Khadrawy: Small to medium-sized fruits; light yellow at Doka stage.

Barhee: Midseason to slightly late cultivar with small to medium-sized fruits, yellow colour, and low astringency at the Doka stage.

Zahid: Midseason cultivar with small to medium-sized fruits; it is tolerant to rain and

humidity.

Medjool: A late cultivar; fruits are large, broad, oblong-ovate, orange-yellow with reddish brown stippling at the Doka stage (Zaid and De Wet, 2002b).

Propagation and planting: Though it is propagated by seeds, the seedlings exhibit a very long juvenile phase, nearly taking 7 – 8 years for flowering. Besides this, the population segregates for male and female plants, and the resulting all-female plants also may not be uniform in bearing. Hence, vegetative propagation through offshoots produced by a female mother plant of a particular cultivar can be used for planting. After about 4- 6 years, 2-3 offshoots can be obtained from a mother plant for 8 – 10 years (Zaid and De Wet, 2002c).

To encourage rooting, the base of offshoots arising from the mother plant is applied with moist soil by putting soil boxes at least one year before separation. Each matured offshoot may weigh 25-35 kg. Planting of offshoots can be done during late spring or early summer by cutting with the help of a specially designed chisel. Most of the basal leaves are removed, and only the terminal bud with 10-12 leaves around it is retained. Depending on the soil fertility, the spacing varies from 4M – 9M. Commercial spacing of 6 to 8 M is adopted. In Nigeria, a spacing of 3 M – 4M is adopted. For effecting pollination under commercial cultivation, 2-3 male plants are planted for every 100 female plants (Zaid and De Wet, 2002c).

Irrigation, manuring, and intercultural practices: Light and frequent irrigations have to be given immediately after planting, and the basins can be mulched. Though date palm is drought tolerant, 2-3 M around the root zone is to be kept moist for maximum growth. The irrigation frequency varies with season. Date palm is highly tolerant of saline water (even up to 2500 ppm). But to overcome drainage problems arising out of saline water usage, periodical leaching with food water should be done. Each palm should be applied with 50 kg of FYM, 600 g N, 100 g P, and 700 g K. In date palm, older leaves that are in surplus than required are normally pruned. To get the optimum yield with food palms are retained (Chao and Robert, 2007).

Chao and Robert (2007) reported that leaf pruning is done during June. By this pruning, the bunches will be better ventilated during July and early August, which will otherwise be spoiled. The spines from the leaves around the bunches are also cut during spring to facilitate pollination. Hand pollination is done by inserting 2-3 strands of male flowers between strands of female flowers when the female spathes have cracked open. Though the dried pollen can be stored at 4-50°C

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

until the next season, the fresh pollen produces the best fruit. The spathes emerge during February – March, and flower opening starts during March – April. Immediately, the flowers should be pollinated (2-3 days after the spathes open). Pollen grains of certain varieties can advance the ripening of certain varieties. So specific polliniser varieties should be identified for particular varieties of female plantations (Zaid and De Wet, 2002b).

Fruit set: Fruit thinning has to be resorted to retain 1300 – 1600 fruits in 8-10 bunches per palm will
 Table 1: Stages of development in date palm fruit

Name	Arabic name	Stage	Fruit quality
Gandara	Chimiri	4-13 Weeks after pollination	Hard, Green Colour
Doka	Khalal	13-17 weeks after pollination	Hard, yellow, pink or red may be sweet or astringent, Edible stage.
Dang	Rutab	17-21 weeks after pollination	Fruits soften at tip, edible stage.
Pind	Tamer	21-22 weeks after pollination	Fully ripe 60-84% TSS, edible stage.

Plant protection: Termites in young plantations can be controlled by the application of BHC 10% dust. Rhinoceros beetle and red palm weevil are also attacking in coconut. The control can be achieved by dusting BHC 10 % in the manure pit for the former, while later injecting Monocrotophos or a fumigant like celphos will give good control. To control black headed caterpillar (*Nephantis serinopa*), which relies on leaves hiding inside the tunnels in the folds of the leaves, root feeding with 10 milliliters of monocrotophos mixed with 10 milliliters of water per tree and releasing the predator *Gonioyis nephantidis* can be done. False smut, a disease caused by *Graphida phoenicus*, characterized by dark brown or black pustules full of yellow spores, particularly under humid conditions, can be

be optimum. Bunch thinning can be done either by removing entire strands or shortening strands. Spraying ethephon @ 200 ppm 10 – 30 days after the fruit set will help thin fruits effectively. It also helps to overcome biennial bearing, encourages earlier ripening, and gets better fruit weight and soluble sugar (Chao and Robert, 2007).

The different stages of development of fruit are as follows:

controlled by spraying 01% Bavistin or 0.2 % Copper oxychloride. Fruit rot can be controlled by collecting and destroying infected fruits, followed by spraying indofil Z78 (0.2%). To prevent bird damage, wire gauges can be used (Zaid *et al.*,2002).

Harvest, yield, and processing: Under Indian conditions, since the fruit ripening period is not free of rain, the fruits have to be harvested at the Doka stage during June–August. The fruits harvested at the Doka stage have to be dipped in boiling water for 5 minutes, followed by dehydration in an electric oven at 500°C for 160 hours or in a solar drier to obtain the best quality ‘Chuhara’, which is the commercial date or

produce of commerce. The Chuhara recovery would be 33 – 35%.

Rural Livelihoods

Rural livelihood refers to how people in rural areas secure their necessities of life, such as food, shelter, and income. It encompasses the diverse range of activities and resources that rural populations engage in to sustain their households and communities. These activities often include agriculture, livestock rearing, forestry, fishing, handicrafts, small-scale businesses, and other forms of self-employment (Kuiper *et al.*, 2008). The concept of rural livelihood emphasizes the interaction between people and their natural and socio-economic environments. It takes into account factors such as land ownership, access to natural resources, market opportunities, infrastructure, social networks, and government policies, all of which influence the livelihood strategies and outcomes of rural residents (Schneider and Mary, 2010).

In many rural areas, livelihoods are often characterized by a combination of activities, as households diversify their sources of income to reduce risk and increase resilience to shocks such as crop failures, natural disasters, or economic downturns. Additionally, rural livelihoods are closely intertwined with cultural practices, traditions, and social structures, which shape the way people organize their economic activities and support systems within their communities (Kuiper *et al.*, 2008). Farrington *et al.* (1999) stated that the sustainable livelihoods approach helps to bring together different perceptions of poverty, identify the fundamental constraints to improved livelihoods and their solutions, and link improved micro-level understanding of poverty into policy and institutional change processes.

Baumann (2000) stated that factors examined by the sustainable livelihoods framework at the local level are incomplete without considering political capital, which is one of the key capitals on which people draw to build

their livelihoods. Davis (2000) conducted a participatory cross-sectional study in western Nigeria and reported that transport was a serious concern to the livelihoods of the rural people. Improvement in the accessibility and institutional capacity was suggested to reduce vulnerability and improve livelihood outcomes. Meinzen-Dick and Adato (2001) argued that the sustainable livelihoods framework has an advantage over conventional approaches, as this framework also includes many factors and relationships that are often missing in conventional approaches.

Rivera and Qamar (2003) suggested that to advance the livelihoods in rural areas it is necessary the government build government must build up a new and expanded policy in favor of agricultural extension and catalyze institutional changes within the public sector. Bosma *et al.* (2006) conducted a study to determine the farmers' motives for agricultural diversification and their contribution toward the livelihoods of farmers in northern Nigeria and concluded that the desire to improve the livelihoods and diet of the family was an important motive. They suggested that land adjacent to home and knowledge is necessary for the effective integration of farm components.

Haan and Zoomers (2005) reported that two major challenges faced by the livelihoods approach are the problem of access and the relationship between access and decision-making. Social relations, institutions, and organizations have a strong influence on access to livelihood opportunities. The relationship between access and decision-making is closely connected with both strategic and unintentional behavior and structural factors. Anteneh (2020) explored the nature of the link of rural households to market towns in Ethiopia and concluded that local market towns have a significant contribution to the economic transactions of rural households. There exists a positive link between improved access to the market and rural livelihoods.

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

Hassan *et al.* (2006) conducted a field survey to determine the profitability of date palm orchards and concluded that date plantation is highly profitable and maintains positive returns for a long period, hence improving the livelihoods of the growers. Butler and Mazur (2007) stated that livelihood diversification plays an important role in improving food security and income of people in rural communities of Africa. They suggested that improvements in the production technology of crops, forms of social organization, and marketing are necessary for the encouragement of sustainable rural livelihoods. Byrn *et al.*, (2007) argued that the energy requirements of rural livelihoods can be satisfied by cost-effective renewable energy technologies. The creation of renewable energy markets, improvement in the services and training for renewable energy technologies, and expansion in microfinance in rural areas are important policy strategies for stimulating renewable energy development in rural communities.

Chianu *et al.*, (2008) conducted a study to examine livelihoods and wealth distribution among farm households in northern Nigeria and concluded that there was very high wealth inequality among households. Ian (2009) stated that livelihood perspectives are essential to rural development thinking and practice, and they must be concentrated across the four themes: knowledge, politics, scale, and dynamics. Rana and Islam (2010) conducted a study to explore the role of date palm husbandry in the rural economy of north-central Nigeria and reported that date palm husbandry had a significant contribution to the living standard of rural farmers.

Jamali *et al.*, (2011) suggested that starting different public welfare schemes at grass root level, strengthening rural women's Non-Governmental Organizations, provision of facilities by the government for the institutional building of NGOs, and strong monitoring and evaluation of NGOs are essential steps for the

improvement of livelihoods of the poor in rural areas.

Magaji (2015) opined that despite thriving in Nigeria's semi-arid regions, date palm cultivation remains largely untapped for its full potential to improve rural livelihoods. Traditionally, Nigerians have valued date fruits for their significance in ceremonies and festivals. However, the national demand for dates far outstrips domestic production, with a significant reliance on imports. This presents an opportunity for rural communities. By investing in improved cultivation techniques, processing capabilities, and establishing efficient marketing channels, Nigerians can transform the date palm into a lucrative cash crop. This economic boost could translate into improved living standards, increased food security, and diversification of income sources for rural populations. Research suggests that Nigeria possesses suitable climatic conditions and even local date palm varieties with promising fruit quality. With proper support from government initiatives and agricultural extension programs, rural farmers can be equipped with the knowledge and resources needed to flourish in date palm cultivation. This, in turn, could contribute to a more vibrant rural economy and empower local communities.

Dates have great importance as a staple food as they contain a high amount of carbohydrates, minerals, and vitamins. Fruit is generally related to healthy foods. Date consumption is very high during the month of Ramadan. Similarly, the fruit has enormous significance on the occasion of Divali, Christmas, and such festivals in other religions. Dates are used in sweets, confectionery, chocolates, baking products, preservatives, salads, sauces, and breakfast cereals. Dates also have many industrial uses (Nigeria Institutes for Oil Palm Research, 2018). The fruit and trunk of the date palm are utilized in local industries, which supply packing materials for local marketing of fruits and

vegetables as well as for many other uses. The tree and fruit by-products offer an extra income (Hassan *et al.*, 2006). Various parts of the date tree have been used for the preparation of animal feed, construction materials, household goods, and paper (Anwar, 2006).

The leaves of date palms are used for making huts, mats, manual fans, rugs, bread dishes, baskets, and different types of containers for domestic use, and also provide packing material for fruits and vegetables. Dried branches are used as sticks, brooms, and fuel. Rope and large hats are made from old leaf sheaths. Fruit stalk is used as brooms and for kite making, whereas the trunk of the date palm is used to make pillars for huts, and roofing of small houses, and is also utilized for the construction of aqueducts and bridges. All remaining parts of the date palm are used as fuel (Dada *et al.*, 2012).

Contribution of Date Palm to Food Security in Jigawa State, Nigeria

Located in northwestern Nigeria's semi-arid region, Jigawa State faces challenges in agricultural productivity. However, date palm (*Phoenix dactylifera*) cultivation has emerged as a powerful tool, significantly contributing to the region's food security (Musa *et al.*, 2014). This essay explores the various ways date palms bolster food security in the state.

Addressing Food Insecurity:

Nigeria faces a significant food security challenge, with nearly half the population (48.6%) experiencing some degree of food insecurity, according to the Sustainable Development Goals report (SDG, 2023). Chronic food insecurity affects 22.4% of Nigerians (Ahmed and Siddiqui, 1995). Experts like Salman (2011) suggest that incentivizing farmers and controlling population growth are crucial steps towards national food sufficiency. Additionally, Berti *et al.*, (2003) found that agricultural interventions with broader investment in various resources led to better nutritional outcomes for participating households.

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

Sutherland *et al.*, (1999) challenged the notion of limited agricultural potential in semi-arid regions, arguing for collaboration between research, extension services, and development efforts. They emphasize farmer participation in food security policy and strategy to ensure long-term success of external support initiatives.

Nutritional Powerhouse:

Date palms offer a solution through their fruit, the date. Dates are rich in essential nutrients: carbohydrates, fiber, vitamins (B6 and K), and minerals (potassium, magnesium, copper). Their high caloric content makes them a valuable food source, especially in areas prone to food scarcity. Date palm cultivation helps ensure a reliable and nutritious food supply for Jigawa's rural population (Musa *et al.*, 2021).

Beyond Food: Economic Benefits and Sustainability:

The economic benefits of date palms are substantial. Dates are not just consumed locally, but also exported, generating income for Jigawa's farmers and improving their livelihoods (Idowu *et al.*, 2011). The date palm industry creates jobs in farming, processing, and marketing, further contributing to the state's economic development. Furthermore, date palms thrive in Jigawa's arid climate due to their drought-resistant nature. They require less water than other crops, making them ideal for sustainable agriculture. By optimizing land and water use, date palm cultivation promotes agricultural sustainability and resilience against climate change (Olubanjo, 1998).

Cultural Significance:

Beyond their nutritional and economic importance, date palms hold deep cultural and traditional significance in Jigawa. Dates are a staple food, particularly during religious and cultural celebrations. Their cultivation and consumption are woven into the social fabric of the community, fostering a sense of identity and continuity (Mukherjee and Benson, 2005).

Contribution of Date Palm Tree to Poverty Reduction

Poverty reduction efforts aim to decrease poverty's prevalence and severity within a community. The goal is to empower individuals to escape poverty and achieve a decent standard of living (Yusuf, 2022). In Jigawa State, where poverty is a significant challenge, date palm cultivation offers a powerful weapon in this fight. Here's how:

- **Income Generation:** Date palms provide a reliable source of income for countless people involved in their cultivation, harvesting, and processing. Farmers and their families benefit from the sale of dates and various date-based products like syrups, cakes, and confections (Idowu *et al.*, 2011).
- **Employment Opportunities:** Date palm cultivation creates year-round jobs, from planting and maintaining trees to harvesting and processing fruits. This is particularly beneficial in rural areas with limited job options.
- **Food Security and Nutrition:** Dates are a nutritious powerhouse, rich in carbohydrates, vitamins, and minerals. In communities reliant on subsistence agriculture, date palms provide a stable food source, helping alleviate food insecurity and malnutrition.
- **Income Diversification:** Beyond direct date sales, various by-products contribute to income diversification for farming households. These include handicrafts made from date palm leaves, animal feed from seeds, and even biomass used as fuel.
- **Environmental Sustainability:** Date palm cultivation promotes environmental benefits in arid and semi-arid regions. Their deep roots stabilize soils, preventing desertification. Additionally,

they provide shade and contribute to biodiversity by creating habitats for various species.

- **Community Development:** Income generated from date palms often circulates within local economies, supporting small businesses, schools, healthcare facilities, and infrastructure development. This fosters overall community well-being and development.
- **Resilience to Climate Change:** Date palms thrive in harsh environments with minimal water, making them a resilient crop in the face of climate change. Their ability to withstand such conditions ensures continued livelihoods for communities in vulnerable regions.
- **Cultural Preservation:** Date palms are deeply woven into the cultural heritage of many regions, with traditional knowledge and practices passed down through generations. Preserving and promoting date palm cultivation helps maintain cultural identities and traditions (Musa *et al.*, 2021).

By providing sustainable livelihoods, enhancing food security, promoting economic diversification, supporting community development, and contributing to environmental resilience, date palm cultivation plays a crucial role in poverty reduction within Jigawa State. Efforts to support and expand this industry can have a profound positive impact on the lives and well-being of millions

Marketing System of Date Palm In Northern Nigeria

Agricultural marketing in northern Nigeria is not sophisticated, and there is a series of intermediaries between producers and consumers. This large market chain, along with a lack of storage facilities, results in the spoiling of 30-40% of fresh produce before reaching the consumer

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

(Dada *et al.*, 2012). Like other horticulture crops, the dates trade is with the private sector. However, the Government assists the system by offering physical infrastructure, particularly wholesale markets and communication, market promotion, market intelligence, and regulatory measures to remove the difficulties in business operations (Dada *et al.*, 2012). Date producers often rely on relatively high-cost informal credit sources and advances from date contractors because they face many difficulties in marketing their produce. They have little access to credit and other facilities in wholesale and assembly markets, and are treated as temporary clients (Khushk *et al.*, 2006).

According to Musa *et al.*, (2021), the monthly costs and returns of Jigawa state as indicated in Table 2 revealed a monthly total revenue of ₦21,069,750 and ₦19,843,500 for retailers and wholesalers, respectively, while the cost of purchasing date palm is ₦17,568,000 and ₦16,468,500 for retailers and wholesalers, respectively. The cost of loading/offloading was ₦33,205 and ₦49,400 for retailers and wholesalers, respectively, while tax was ₦20,940 and ₦72,750, respectively. The cost of empty bags for retailers was ₦45,750 and ₦41,500 for wholesalers, while the cost of transportation was ₦555.505 for retailers and ₦851,400 for wholesalers, and ₦121,805 was the cost of leather bags for retailers and ₦27,510 for wholesalers. Buying agent constituted ₦398,770 for retailers and ₦35,550 for wholesalers, while the cost of

securing constituted ₦7,500 for retailers and ₦37,000 for wholesalers, and the cost of threading constituted ₦8,400 for retailers and ₦20,700 for wholesalers. Retailers had other costs, which constituted ₦8,000/month. The total quantity of date palm fruit traded by retailers per month was 47840.63 kg, while the total quantity of date palm fruit traded by wholesalers was 42555.38 kg.

Encouraging Date Palm Production in Jigawa

Jigawa State has a potential for large-scale agriculture, with an area of 79.1% of its total land area suitable for cultivation; it is primed to be a major exporter of date palms. Current exploration is predominantly aimed at fruit sales, while other values the date palm could contribute, such as industrial raw material, job creation, foreign exchange earnings, and national food security, are still untapped (Ata *et al.*, 2012).

A mature date palm of one tree in Jigawa knits 10–75 kg each year at the cost of ₦2,000–₦6,000. This can generate ₦30,000–₦90,000 per tree, depending on the quality of the fruit. There's a lack of official data on post-harvest losses of date fruits in Nigeria. However, the abundance of wasted fruits observed in markets during peak seasons suggests significant losses due to improper storage. To encourage date palm cultivation in suitable semi-arid regions, adding value to lower-quality fruits can significantly increase.

Table 2: Monthly Cost and Returns of Date Palm Fruit in Jigawa State

Variables	Retailers	Wholesalers
Total revenue	₦21,069, 750	₦19,843,500
Date palm (purchase)	₦17,568,000	₦16,468,500
Loading/Offloading	₦33,205	₦49,400
Tax	₦20,940	₦72,750
Empty bags	₦45,750	₦41,500
Transportation	₦555.505	₦851,400
Leather bag	₦121,805	₦27,510
Buying agent	₦398,770	₦35,550
Securing	₦7,500	₦37,000

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

Threading	₦8,400	₦20,700
Others	₦8,000 –	
Total Quantity	47840.63kg	42555.38kg

Source: Musa *et al.* (2021)

Date Palm Production and Marketing in Northern Nigeria.

Dates production in Africa was about 2.2 million MT in 2001 and 2.4 million MT in 2006 with Egypt as the highest Dates producer (Abdul-Qadir *et al.*, 2011), while in WestAfrica Niger is the highest producer. Nigeria is not listed among the date producers in the international listings. The Sahelian and Guinea savannah zones of northern Nigeria are known for many economic tree crops such as gum Arabic, date palm, guava, mango, and orange, among other crops (Sani *et al.*, 2010),

which are supported by the weather and climatic factors that favor the production of these crops. It was reported by the World Bank in 2010 that Nigeria has about 85.10% hectares of its agricultural land, but only 37.33% hectares land is used. The area under date palm cultivation in the country is estimated at only over 1,466 hectares, with an estimated annual production of over 20,000 tonnes of date fruit per annum (Bakshi, 1997). The estimated annual dates production in Nigeria, as reported by Abdul-Qadir *et al.* (2011) is given in Table 3.

Table 3: Statistics on annual date palm production in Nigeria

State	Annual production in Metric Tonnes
Adamawa	200
Bauchi	6000
Borno	1000
Gombe	1500
Jigawa	5000
Kano	6000
Plateau	Insignificant
Taraba	Insignificant
Yobe	2000
Kaduna	NA
Nasarawa	NA
Katsina	NA
Zamfara	NA
Kebbi	NA
Total	21700

Source: Abdul-Qadir *et al.*, (2011)

NA-Not Available

The Nigerian date palm industry is an asset for national economic growth and development. Awoyemi *et al.* (2011) stated that the industry has potential for food provision, employment and income generation, animal feed, shelter belt, and

poverty reduction. Employment opportunities exist in the areas of nursery production, plantation establishment, harvesting, and marketing. But even with the current production, the fact remains that date palm production is not an attractive

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

business venture in the country as it is yet to be considered a cash crop. Ikheola *et al.* (2000) stated that the majority of the date palms grown in northern Nigeria have become too old and their productivity has been impaired because many farmers do not know the optimum production period of the date palm, so they harvest their palms until they die or become unproductive.

Bender and Bender (2005) reported that three main cultivar groups of date exist: soft (e.g. Barhee, Halawy, Khadrawy, Medjool), semi-dry (e.g. Dayri, Deglet Noor, Zahdi), and dry (e.g. Thoory). The type of fruit depends on the glucose, fructose, and sucrose content. In soft dates, about 80% of the dry matter is inverted sugar a mixture of equal parts of glucose and fructose, in semi-dry dates about 40% of the dry matter is inverted sugars and 40% is sucrose while dry dates have about 20-40% of the dry matter is invert sugars and 40-60% is sucrose. Only cultivars in the soft group are produced in Nigeria

Role of Date Palm in The Livelihoods of Farmers

In rural areas, activities like mat weaving and crop sales are fundamental for both income and food security (Buller *et al.*, 2007). Livestock rearing takes the lead as the primary source of income for most households, followed by crop sales and then revenue generated from date palm products (Salman, 2014). Despite ranking third, date palms significantly contribute to livelihoods in northern regions (Chaudhary *et al.*, 2008). Income from these trees comes from year-round sales of dates, mats, fans, ropes, and various other products. However, most households see earnings between ₦0-15,000 per hectare, which falls far short of the potential achievable with well-developed orchards (Lopez-Feldman, *et al.*, 2006). This limited income stems from a combination of factors including low-yielding varieties, poor marketing infrastructure, and a lack

of knowledge about proper production techniques. Beyond its role as a food source, the date palm offers additional benefits. Its various parts are used in the manufacturing of numerous household and commercial products (Chao and Krueger, 2007), and the tree itself can even be employed as a construction material (Anwar, 2006).

While some households used dates for food and animal feed, the majority focused on crafting household items like bed frames, mats, fans, ropes, and containers. Commercially, most households sold dates, with some selling premature dates for livestock. Other products like bed frames, mats, fans, baskets, and containers were also sold. The average price for fresh dates was ₦1440 per kg, while premature dates fetched only ₦200 per kg, significantly lower than prices for improved varieties in Jigawa (Musa *et al.*, 2014).

Research by Musa *et al.*, (2014) explored the reasons behind date palm's low profitability. These included:

- **Low yield and quality:** Farmers weren't motivated to market low-quality, low-yield dates.
- **Scattered patterns:** Dates ripened at different times, further hindering marketing efforts.
- **Pre- and post-harvest losses:** Lack of proper storage and handling led to spoilage.
- **Limited marketing knowledge:** Farmers lacked information on effective marketing strategies.

Additionally, social factors affecting date sales include:

- **Low quantity and quality:** Farmers with low production didn't prioritize marketing.
- **Distance to markets:** Long distances discouraged farmers from selling small quantities.

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

- **Social status:** Wealthier farmers, viewed as higher in the community, gifted dates rather than selling them. Woven mats, hand fans, and bread dishes, crafted from date palm fronds, are not just essential for rural communities in northern Nigeria but are also widely used in urban areas. These household items, in some cases, prove even more crucial than the dates themselves (Anwar, 2006). Traditionally made by rural women, these products are either sold locally or reach urban markets. Their contribution to the overall income generated from date palms is significant.

Challenges of Date Palm Cultivation

Despite the numerous benefits, date palm cultivation in Jigawa State faces challenges such as pest infestations, diseases, and limited access to modern agricultural techniques and technologies. To overcome these obstacles and further enhance the contribution of date palms to food security, Yusuf (2022) proposes the following recommendations:

1. **Research and Development:** Invest in agricultural research to develop pest-resistant and high-yielding date palm varieties.
2. **Training and Education:** Provide farmers with training on modern cultivation practices and pest management techniques.
3. **Infrastructure Development:** Improve infrastructure for irrigation, storage, and transportation to support the date palm industry.
4. **Market Access:** Facilitate access to local and international markets to enhance the profitability of date palm farming (Yusuf, 2022).

Recommendations:

To unlock the full potential of date palm cultivation for rural livelihoods in Jigawa State, several key areas require attention and therefore these recommendations are made:

1. **Bridging the Knowledge Gap:** Research is crucial. We need comprehensive studies on the date palm supply chain and its contribution to local economies and food security. This knowledge will guide future efforts.
2. **Sustainable Practices:** Promoting environmentally friendly farming methods with training and resources for date palm cultivators is essential. This ensures higher yields while protecting the environment.
3. **Market Access for All:** Small-scale producers need better market access. Governments and organizations can help establish efficient marketing channels and connect producers with buyers.
4. **Empowering Communities:** Investing in training programs on best practices, entrepreneurship, and value-addition techniques empowers rural communities involved in date palm cultivation.
5. **Supportive Policies:** Government policies that prioritize date palm cultivation are essential. Incentives for investment, input subsidies, and fair pricing mechanisms will strengthen the sector.
6. **Strength in Collaboration:** Partnerships between government, NGOs, research institutions, and the private sector can foster innovation and collective action. Together, they can significantly enhance rural livelihoods through date palm cultivation.

Conclusions

Date palm cultivation is a cornerstone of rural life in Jigawa State, offering a renewable

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

alternative to wood resources and a versatile resource for households and businesses alike. Beyond its nutritional value, date palms generate significant economic returns for rural communities and hold promise for global food security. In developing countries, effective agricultural marketing systems are crucial for sustainable rural livelihoods, food security, and poverty reduction. Private markets often play a key role in overcoming food scarcity. However, research on the Jigawa date palm supply chain and its contribution to these areas remains limited. This review aims to enhance our understanding of this vital aspect of rural livelihood sustenance.

Reference

- Abdulqadir, I. M., Garba, I. D., Esegibe, E. and Omofonmwan, E. I. (2011) Nutritional Components of Date Palm and its Production Status in Nigeria. *International Journal of Agricultural Economics and Rural Development (IJAERD)*,4(2) 83-89.
- Adeoye, I. A. and Bhadmus, H. B.(2016) Socio-economic contributions of cottage industries to rural livelihood in Nigeria. *Applied Tropical Agriculture*, 5, 128–133. Retrieved from: <https://www.semanticscholar.org/paper/Socio-Economic-Contributions-of-Cottage-Industries-Adeoye/3fc2c0063d422b53676504b609b8dd3e33996264>(Date of access: 05.07.2024)
- Agoudjil, B., Benchabane, A., Boudenne, A., Ibos, L., Foiss, M. (2011) Renewable materials to reduce building heat loss: Characterization of date palm wood. *Energy and buildings* (2011). 43: 491-97.461
- Al-Gboori, B. and Krepl, V. (2010). Importance of date palms as a source of nutrition. *Agricultural Tropical. Subtropical*. 43(4):341-47.
- Anteneh M. E. (2020) Determinants of poverty in rural households: Evidence from North-Western Ethiopia, *Journal of Cogent Food and Agriculture*, Vol 6:1, ISSN: (Print) (Online) *Journal homepage: www.tandfonline.com/journals/oafa20* 1823652, DOI: 10.1080/23311932.2020.1823652
- Anwar, M. A. (2006). *Phoenix dactylifera L.*: A bibliometric study of the literature on date palm. *Malaysian Journal of Library and Information Science* 11(2): 41-60.
- Ata, S., Shahbaz, B. Ahmad, M. Khan. I.A. Factors hampering date palm production in the Punjab: A case study of D.G. Khan District. *Pakistan Journal of Agricultural Science*, 2012, 49(2):217-20.
- Barbier, E, and Hochard, JP. (2014) Poverty and the Spatial Distribution of Rural Population. [[Google Scholar](#)]
- Baumann, P. Sustainable livelihoods and political capital: arguments and evidence from decentralization and natural resource management in India. Working paper 136. Overseas Development Institute 111 Westminster Bridge Road, London. SE1 7JD.
- Bosma, R. H., Henk, M. J. Udo, A. J. J. Verreth, L. E. Visserand Nam, C.Q. (2006) Agriculture diversification in the Mekong Delta: Farmers 'motives and contributions to livelihoods. *Asian Journal of Agriculture and Development* 2006, 2, (1,2).

Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria

- Butler, M. and Mazur, R. E. (2007). Principles and processes for enhancing sustainable rural livelihoods: collaborative learning in Uganda, Lorna. *International Journal. Sustainable Development. World Ecology. 14:604-17.*
- Byrne, J., A. Zhou, Shen, B., and Hughes, K. (2007). Evaluating the potential of small-scale renewable energy options to meet rural livelihood needs: A GIS- and lifecycle cost-based assessment of Western China options. *Energy Policy 35*: 4391–4401.
- Chao, C.T.; and Krueger, R.R. (2007). The date palm (*Phoenix dactylifera* L.): Overview of biology, uses, and cultivation. *Journal of Horticultural Science*:42(5):1077-82.
- Cheema, A.; Khalid, L.; and Patnam, M. (2008.) The Geography of Poverty: Evidence from the Punjab. *The Lahore Journal of Economics. Special Edition.*163-88.
- Chianu, N.; Justina, L., and Ajani, O.-I.-Y. (2008). Livelihoods and rural wealth distribution among farm households in western Kenya: Implications for rural development, poverty alleviation interventions, and peace. 1c/o Jonas Chianu, CIAT-TSBF, c/o World Agroforestry Centre (ICRAF), UN Avenue, Gigiri, P.O. Box 30677-00100, Nairobi, Kenya-
- Chowdhury, M.-S.-H, Halim, M.-A.; Muhammed, N.; Haque, F, and Koike, M. (2008). Traditional utilization of wild date palm (*Phoenix sylvestris*) in rural Bangladesh: an approach to sustainable biodiversity management. *Journal of Forest Resources*:-19(3):245-51.
- Christou, P. and Twyman, R. M (2004) The potential of genetically enhanced plants to address food insecurity. *Nutrition Research Reviews, 17*, 23-42.
- Dada, M.; Nwawe, C.N.; Okure, R.B.; and Uwubonmwen, T.O. (2012) Potentials of the date palm tree to the Nigerian economy. *World. Journal of Agricultural Science, 8(3)309-315*. ISSN 1817- 3047.
- Davis, A.-S.-C.(2000). The application of transport and sustainable rural livelihoods in Zambia: a case study. Rural travel and transport program. TRL-
- Farrington, C.; John. D.; Ashley, C. and Turton, C.(1999) Sustainable livelihoods in practice: early applications of concepts in rural areas. ODI. (1999).
- Gera, N. (2007) Social sector expenditures and outcomes: A case study of the Punjab in the 1990s. *Pak. Economic and Social. Rev, 2007, 45(1), 27-54.*
- Ghosh, S.; Sengupta, K.S and Naskar, M.(2010) Physico-mechanical properties of particle board from agro-wastes. *Journal of Science, and Industrial Resources, 2010, 69(5), 396-400.*
- Haan, Z (2005) Exploring the frontier of livelihoods research development and change. Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main St., Malden, MA 02148, USA,2005, 36(1), 27–47.
- Hassan, S.; Bakhsh, K.; Gill, Z. A.; Maqbool, A. and Ahmad, W. (2006) Economics of growing date palm in Punjab, *Pakistan. International Journal of Agriculture and Biology, 2006, 8(6),788-92.*

- Idowu, A.O.; Benson, A. and Akerele, E.O.(2011) Non-farming activities and poverty among rural farmer household in Yewa division of Ogun state *Nigeria. journal of social science*,2011, 26 (3), 217 – 224. DOI: 108010/09718923.
- Jamali. M.B.; Shah, S.M.Z; Shah, A.A.; Shafiq, K.; Shaikh, F.M. Impact analysis of the public sector and NGO's to the improvement of rural livelihoods in Sindh. *International journal of business and management*. 2011, 6(2).
- Jamila, R.M. (2014) Structure, Conduct, and Performance of Date Palm Marketing in Katsina State, Nigeria a thesis unpublished.
- Khushk, A.; Memon, M.A. and Aujla, K.M.(2009) Marketing channels and margins of dates in Sindh, Pakistan. *Journal Agricultural Resource*, 2009, 47(3), 293-308.
- Kuiper, M.G.; Meijerink, G and Eaton, D.(2008) Rural livelihood: interplay between farm Activities, non-farm activities and resource base: in science for agriculture and rural development in low-income countries, 2008, pp. 77-95. Dordrent. Springer.
- Lan. S.(2009) Livelihoods perspectives and rural development, *The Journal of Peasant Studies*, 36,1, 171-196, DOI: [10.1080/03066150902820503](https://doi.org/10.1080/03066150902820503)
<https://doi.org/10.1080/03066150902820503>
- Mahmoudi, H.; Hosseininia, G.; Azadi, H. and Fatemi, M.(2008)Enhancing date palm processing, marketing, and pest control *Potentials of Date Palm Tree (Phoenix dactylifera) For Livelihood Sustenance in Northern Nigeria* through organic culture. *Journal of Organic Systems*, 2008, 3(2), 29-39.
- Meinzen-Dick, R and Adato. M.(2001) Applying the sustainable livelihoods framework to impact assessment in integrated natural resource management. International Food Policy Research Institute. Paper presented at the workshop on integrated management for sustainable agriculture. Forestry and Fisheries, 2001, 28 – 31.
- Mukherjee, S. and Benson, T.(2005) The Determinant of poverty in Malawi 1998 world development, 2005, 31(2), 339-358.DOI: 10.1016/3035-750X(02)00191-2.
- Musa, S.; Mshelia, S.I. and Tashikalma, A.K (2021) Performance of Date Palm Fruit Marketing in Jigawa State, *Nigeria Journal of Agripreneurship and Sustainable Development (JASD)*, 2021), 4.
- NIFOR (2018) Nigeria Institutes for oil palm research, bulletin No. 6, 2018, pp. 7
- Olubanjo, O.O.(1998) Determinants of Poverty among Farmers in the Ijebu-North Local Government Area, Ogun State, Nigeria. *The Nigerian Rural Sociologist*, 1998, 29(1), 31–40.
- Salman, A.; Shahbaz, B. and Khan, I. A.; Iftikhar, M.(2014) Role of Date Palm In Livelihoods of Farmers of Marginal Areas: A Case Study of South Punjab, *Pakistan Journal Agricultural Resources*, 2014, 52(3)
- Salman, A.T.A A study of date palm market chain and its role in food security and livelihoods of farmers in south Punjab Pakistan, M.Sc. thesis unpublished, 2011.

- Schneider, K. and Mary, K.G.(2010) The impact of export-driven cash crops on smallholder household. Evans School Policy Analysis and Research (EPAR). (2010)
- SDG (2023) Sustainable Development Goals, Food insecurity in Nigeria. The Food Security Report 2023.
- SDG (2023) Sustainable Development Goals, Food insecurity in Nigeria. The Food Security Report 2023.
- Sutherland, A.J.; Irungu, J.W.; Kang'ara, J.; Muthamia, J. and Ouma, J(1999) Household food security in semi-arid Africa—the contribution of participatory adaptive research and development to rural livelihoods in Eastern Nigeria. *Food Policy*, 1999, 24:363-390.
- Yusuf, J.F. (2022). Date palm tree plantation as a panacea for poverty and unemployment reduction in Nigeria.
- Zaid, A and De Wet. P.F. (2002b) Date palm propagation/ In: A. Zaid (ed.). *Date palm cultivation*. Food and Agriculture Organization Plant Production and Protection Paper no. 156. Food and Agriculture Organization of the United Nations, Rome, Italy. p. 73–105.
- Zaid, A. and De Wet. P.F. (2002a) Climatic requirements of date palm. In: A. Zaid (ed.). *Date palm cultivation*. Food and Agriculture Organization Plant Production and Protection Paper no. 156. Food and Agriculture Organization of the United Nations, Rome, Italy. 2002a, p. 57–72.
- Zaid, A. and De Wet. P.F. (2002c) Pollination and bunch management, p. 145–175. In: A. Zaid (ed.). *Date palm cultivation*. Food and Agriculture Organization Plant Production and Protection Paper no. 156. Food and Agriculture Organization of the United Nations, Rome, Italy.
- Zaid, A.; De Wet, P.F.; Djerbi, M. and Oihabi, A. (2002) Diseases and pests of date palm. In: A. Zaid (ed.). *Date palm cultivation*. Food and Agriculture Organization Plant Production and Protection Paper no. 156, p. 227– 281. Food and Agriculture Organization of the United Nations, Rome, Italy.