Chapter 12
Date Palm Status and Perspective in Cameroon

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Abstract Date palm tree is an economic crop which is grown in the Sudan Savannah and Sahel regions of North Cameroon. Its role in food production, foreign exchange earnings, raw materials for industries, and income and employment generation makes it a crucial asset for national economic development. Yet, Cameroon does not figure among the date-producing nations in Central Africa and the world. World date production is led by Egypt with 1,350,000 mt, followed by Iran with 1,088,040 mt, and Saudi Arabia with 1,052,400 mt. Data available for 2009 placed Niger as the highest producer in West Africa with 37,794 mt. No data exist on date palm production in Central Africa. Actions have been taken to increase date palm production in Cameroon. A number of elite cultivars were introduced in 2005–2006, thanks to a technical cooperation program with the FAO. Seven well-known cultivars (Ghanami, Khalas, Khadrawi, Medjool, Barhi, Ambarah, and Zahidi) have been introduced in rural areas. At present, the Cameroonian government, through its agricultural diversification policy, encourages the production of date palm by making available improved planting material, training, and the creation of an actual production sector. These will likely result in the future to the classification of Cameroon among date palm-producing countries.

Keywords Agriculture • Cameroon • Date palm • Diversification • Extension • Local cultivars

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12.1 Introduction

The socioeconomic life of the entire area of the African savannah depends upon the production of annual food crops and cotton. But in the hot and humid tropical zones, cultivation by plowing necessarily leads to the mineralization of organic matter and soil degradation after a period of 15–30 years, affecting the soil's texture, fertility, and management system (Boli et al. 1991).

As recently as 40 years ago, when farmers felt that the soils were depleted, they abandoned their farmed sites for a long-fallow period (10–50 years), and the village moved to clear new land; this slash and burn shifting cultivation system was the main important cultivation system (Boli et al. 1997).

Now, shifting agriculture is no longer acceptable in some parts of Africa (Roose 1994) because of the low proportion of suitable farmland (often <30 %), pressure on land (we have reached the limit of local farmland), population pressure (the population doubles every 25 years), and the development of permanent village structures like tracks, mills, wells, churches, clinics, and sheds for agricultural equipment and supplies.

It is in this context that agricultural diversification policy was deemed important to boost agricultural production and improve the income of the rural population. Agriculture in northern Cameroon is not generally very productive (Boli et al. 1997); yields of major crops remain low and the majority of farmers live below the poverty line. However, we cannot say that these producers have remained inactive. They showed, on the contrary, great innovation by highlighting new land by reclamation, using more intensive techniques, adopting new crops, implementing the original institutional arrangements, and inserting themselves into the regional economy.

If the diversification of agricultural production is primarily based on annual crops, the current systems are not sustainable. Nevertheless, in northern Cameroon, the introduction of several annual cash crops, including soybeans (*Glycine max*) and sunflower (*Helianthus annuus*), has taken place. However, to enhance the diversification initiative, fruit production, such as the production of mango, guava, lemon, etc., which have a strong socioeconomic importance. The production of date palm in northern Cameroon remains little known, but it has great potential importance. It is within this context that the Government of Cameroon, with the support of its bilateral and multilateral partners, is committed to boost date palm production in northern Cameroon and consider the date palm as a cash crop. This chapter focuses on promoting date palm in North Cameroon and also to identifying the main strategies for date palm production. Very little general information or economic data exist on date palm in Cameroon. However, in sub-Saharan African areas such as Cameroon, date palm is expected to contribute to the goal of agricultural diversification. Realistically, we think that by 2035, Cameroon could expect date palm to be among the top five major crops in the Sahelian zone of the country.

12.1.1 Overview of Cameroon

The Republic of Cameroon is located in Central Africa; it extends from the Gulf of Guinea to Lake Chad, between 2° and 13° north latitude and 8°30′ and 16°10′ east longitude. The country has a surface area of 475,650 km^2 with a long coastline of 402 km. Triangular in shape, its length from north to south is 1,400 km and from east to west is about 800 km. It is bordered to the south by Equatorial Guinea, Gabon, and Congo, to the west by the Atlantic Ocean and Nigeria, to the north by Lake Chad, and to the east by Chad and the Central African Republic. Cameroon has many physical assets, including considerable hydroelectric potential, an impressive variety of agricultural activities, and important mineral resources such as bauxite and cobalt. It is also provided with potential natural areas that remain to be developed (Atlas de l'Afrique 2000).

The foundation of current Cameroonian agriculture originates from the German colonial era of the late nineteenth century. The Germans chose to develop crops used as raw materials for European industries. At that time, opportunities were provided for these promising products. Farm work was poorly paid and the use of forced labor common, but commercial agriculture led to the emergence of the first railroads, ports, and other infrastructure. The first crops developed were rubber, oil palm, coffee, and cocoa. Production areas, where the first settlers planted these crops, began in the coastal zone, progressing towards the interior. Agriculture was marked by two types of operations: large plantations established by settlers using hired labor and small family farms. The first large plantations were established in the south and west along the Atlantic Coast.

Infrastructure was developed around the first economic centers. The initial goal was to export the production. There was a dominant trend in the development of some crops to supply Western markets. The subsequent French colonization reaffirmed this belief and added new crops. Thus cotton was grown in the northern part of the country, an area also favorable to growing date palm. At the time of independence in 1960, Cameroon was a prosperous country with a diversified agriculture which was export and/or industrially oriented.

The period since independence was one of strong economic growth. Based on the results of agriculture due to the nationalization of major industries and major currency gains realized, the country launched the development of other sectors with the state as the main actor. National strategic choices focused on the development of import substitution industries and the establishment of large parastatals to compensate for the absence of a private sector. The emphasis was on cash crops inherited from the colonial era with the encouragement of smallholdings by improving public services. Despite these efforts, agricultural production remained stagnant except for sugarcane whose development expanded rapidly after the creation of the CAMSUCO (Cameroon Sugar Company).

The progress which took place with food crops was somewhat different. These crops do not directly benefit from government actions. Development efforts appear

to be related to population growth and the goal of food self-sufficiency. The crops receiving attention are extremely varied, but the major crop groups consist of carbohydrates (i.e., roots, tubers, and plantains), cereals, and oilseeds. Although there is an apparent increase in production, there is a marked deterioration in output per capita. This is due to lower yields related to soil depletion, inadequate production techniques, aging plantations of perennial crops, aging farmers, and the rural to urban exodus (MINADER 2008).

The high price of cash crops has long hidden the structural weaknesses of Cameroonian agriculture. In the early 1980s, a drastic fall in prices of major raw materials plunged the country into a deep recession that halted the reforms. This manifested itself in the suspension of implementation of the 5-year plans and a return to austerity policies with structural adjustment. In agriculture, specific policies had been developed for the advancement in support of a partnership policy. A liberalized environment involved required divestitures and accountability of actors who were then called upon to organize and take over management of the activities.

Crop diversification is a new model to overcome the uncertainty of farm income related to the volatility of exports and to ensure an acceptable income for producers. Administrative structures have also evolved to have limited missions when they do not disappear completely.

Unofficially and informally, the introduction of date palm goes back hundreds of years to the days of slavery. However, Cameroon only became actively interested in the date palm from the 2000s. In 2006 Cameroon introduced the first elite date palms, through an FAO technical cooperative program. It involved importation of seven cultivars from the UAE: Ghanami, Khalas, Khadrawi, Medjool, Barhi, Ambarah, and Zahidi. The main objective was food security, improved food quality, and also in response to drought.

12.1.2 Importance of Agriculture to Cameroon

Cameroon's economy is quite diversified. It is mainly based on the agriculture and forestry and petroleum sectors (MINADER 2008). Agriculture and forestry are key sectors of the national economy and account for 42 % of gross domestic product (GDP). This justifies the importance of reviving agricultural research as concerns cacao, coffee, cotton, bananas, and rubber. This cash-crop farming contributes 40 % to agricultural exports and provides 72 % of food products (MINADER 2008). The agricultural contributions are important to the development of the rural sector and to poverty reduction through better integration of agricultural research (Atlas de l'Afrique 2000).

Cameroon has considerable agricultural potential, both in terms of food production and export crops. In the southern part of the country, family farms exist, devoted to food production (tubers, plantains, maize) and cash crops (cacao, coffee) in a mixture of small farms, along with large industrial plantations specialized in oil

palm, rubber, or bananas. Agricultural systems in the northern part of Cameroon combine cereal crops (sorghum, maize), vegetables, and cash crops (cotton, in particular). Cameroon is also a livestock-raising country. Cattle are herded predominantly in the Adamawa Region. In the west and around urban centers, poultry and pig production has increased considerably (Atlas de l'Afrique 2000).

Cameroon has a diverse agricultural sector as a result of its various agroecological zones. For this reason, there is a wide range of crops and livestock species. The importance of the agricultural sector in Cameroon's economy is quite large. Despite a gradual decline in importance since political independence in 1960, agriculture has continued to play a key role in the national economy as far as GDP of the rural sector is concerned. Indeed, in 2005, the agricultural sector contributed 20 % to the national GDP with an annual growth rate of 4.1 %, as compared to 3.4 % growth reported for the rest of the economy (MINADER 2008). Agriculture provides employment to more than 60 % of the active population and has the lowest unemployment rate. In terms of export taxes, the rural sector contributed 54.5 % in 2003. The sector is also important in terms of tax collection. The importance of the rural sector in the PRSPs (Poverty Reduction Strategy Papers) is pronounced. The part of the budget used for food consumption is very high at the household level; this percentage is 43 % for all households and 53.4 % in poor households. Within the African subregion, the Cameroonian agriculture plays a central role. A large proportion of the Cameroonian production is in fact exported to neighboring countries (Atlas de l'Afrique 2000; MINADER 2008). Since independence, the rural sector has played a leading role in the national economy. The golden age of the 1970s was built on the strength of cash crops, such as coffee, cacao, banana, tea, and cotton, and their rising world prices. Agriculture still occupies almost 75 % of Cameroon's population and urban centers depend on it for the supply of food products (MINADER 2008).

However, the development of Cameroon's agriculture faces many obstacles. These include farms suffering from poor access to credit for both investment and inputs, like fertilizers and pesticides, and a degraded natural environment. The isolation of some production areas makes market access difficult. Despite some progress, related professional organizations in the country still lack structure. In this context, despite the great potential of its agriculture, Cameroon is still importing food. Rice and wheat are the largest agricultural imports by volume. The production of cane sugar and vegetable oils is insufficient, which requires the country to fulfill its requirements on the international market. Despite the existence of an expanding domestic market, which is an immediate outlet for domestic production, food crop production continues to decline because of poor cultivation practices and soil degradation.

In Cameroon, the date palm can play a role in strengthening food security, providing environmental protection, and generating income for farmers and to improve the international balance of payments by reducing imports and providing potential exports. However, the promotion of the date palm cultivation in Cameroon requires that a national strategy be developed.

12.1.3 Cameroon Environmental Conditions

Cameroon is divided into four primary agroecological zones: Sudano-Sahelian, high-Guinean savannas, highland, and rainforest; the latter can be further subdivided into areas of monomodal and bimodal rainfall. Within each agroecological zone, several cropping systems are being practiced.

Fruit tree cultivation is practical and appropriate to all the agroecological zones; however, some fruit crops are specific to certain of them. These include coconut in the humid forest zone and date palm in the Sudano-Sahelian zone.

Rainfall varies from one area to another within the country. Annual precipitation reaches 4,000 mm in the coastal area but amounts to only about 300–500 mm in the area of Kousseri in the Far North. However, in North Cameroon where natural stands of date palm are found, there is an annual rainfall of 300–1,000 mm per year.

Depending on the climate, there are areas of high temperatures (30–35 °C) and high relative humidity (>80) prevailing throughout the year (the coastal zone) but also areas with average annual temperatures of 20–25 °C, as in the case of the forest area in the center of Cameroon. In the northern zone, the annual range of temperature is characterized by two periods: one of high temperatures (40–45 °C) from late February to late June and another of dry cold conditions marked by low temperatures (18–25 °C) from late November to January. During the remainder of the year, the temperatures are stable with an average around 30 °C.

Physical characteristics of the land in Cameroon can be classified into: (a) highland regions such as the Mandara in the north, the Adamawa Plateau in the center, and the highlands to the west which extend southwestward to the Atlantic Ocean in a mountain chain with the highest peak of Mount Cameroon at 4,070 m and (b) plains mainly in the coastal area and extending inland to include the plains of Chad, Diamare, and Benue.

There are many soil types with the lateritic clays most common in southern Cameroon. In the north, mainly ferruginous tropical soils are found. These soils characterize the tropical areas (1,000 mm/year) with a pronounced dry season with rainfall for a period of 7–8 months and include the Sahelian and Sudanian zones. In northern Cameroon, tropical ferruginous soils represent about 1.9 million ha and constitute 60 % of cultivated land (Boli et al. 1997; Roose 1994). They are characterized by low clay content, significant leaching, and undeveloped surface structure, with a sandy clay horizon at depth. The organic matter content is low at the surface (1–2.5 %), decreasing rapidly with depth. They are acidic, with a pH of 5–6, and possess a low cation exchange capacity (CEC = 5–10 meq/100 g). The available water holding capacity (AWHC) is low (73 mm of water/80 cm of soil) (Roose 1994). These tropical ferruginous soils serve for date palm cultivation. Indeed, a good development of date palm already exists on these soils in the north. Production systems involve intercropping with cotton, peanuts, maize, soybeans, and cowpeas.

12.1.4 Evolution of Scientific Research in Cameroon

The Institute of Agricultural Research for Development (IRAD) is the research institution through which the Government of Cameroon has given new impetus to date palm cultivation. IRAD is in charge of testing production systems based on date palm cultivation and suitable cultivars. The complex history of IRAD needs to be explained in summary form.

Even before Cameroon's independence, scientific and technical research activities were undertaken by certain colonial institutions. In 1935, the Cameroonian Society Studies (SECAM) was created with the mission to investigate all matters relating to the social and human sciences, geology, ecology, and hydrology. The scientific work of SECAM led to the publication of the first scientific journal in Cameroon, The Bulletin of the Cameroonian Society Studies.

In the early years of independence, Cameroonian authorities expressed the political objective to make science and technology an engine of the development economy. The Federal University of Cameroon was founded in 1962, followed a year later by the Office of the National Scientific and Technical Research (ONAREST). Continued consolidation of new governmental systems led to the absorption of ONAREST into the General Delegation for Scientific and Technical Research (DGRST) in 1979 and the subsequent replacement of DGRST in 1984 by the new Ministry of Higher Education and Scientific Research (MESRES). The Ministry's Department of Scientific Affairs was given authority over the country's research institutes, including the Agricultural Research Institute (IRA) and the Institute of Animal Research (IRZ). The objective of the Department was to provide a collaborative framework allowing for the development of a truly national science and technology policy and to monitor its implementation through the Board of Higher Education and Scientific Research and Technology. However, activities were curtailed sharply during the economic recession in the period 1986–1997. As a result of decreased research funding, there was a decline of national scientific activity, and this was compounded by the cessation of publication of the journal Science and Technology, suspension of recruitment of researchers, and the reduction of nearly 50 % in the salaries of existing researchers. These circumstances led to a major demobilization of researchers resulting in a loss of credibility of the National System of Research, both domestically and internationally. It was not until a decade after the economic recession that the agriculture sector was given needed attention, with creation of the Institute of Agricultural Research for Development (IRAD), in 1996. IRAD's mission was to ensure the implementation of research in rural areas by assuming responsibility for the activities of the former IRA and the IRZ.

12.2 Cultivation Practices

Several problems hinder farming systems in the region of North Cameroon. We thus note soil degradation, variable rainfall, and also the socioeconomic context of the environment. We will highlight the soil and climatic parameters (Bourou et al. 2006).

In the savannah of northern Cameroon, where date palm is cultivated, intensive cropping of cotton/maize rotation in sandy areas has contributed to soil degradation over the past 15 years. However, shifting cultivation is no longer acceptable because of recent permanent village structures (houses, roads, boring wells, etc.) and the limited areas suitable for such agricultural activities. Research has been carried out to assess erosion hazards, factors of soil degradation, and restoration and to select cultural practices allowing intensive and sustainable production, without degrading the rural environment (Boli et al. 1991, 1997). Because of these reasons, a mixed cropping system was advised using date palm with some annual crops such as cotton, maize, cowpea, peanuts, and even millets or sorghum.

Over a period of 4 years, conventional tillage gave the best yields, but water and soil losses (loss in organic matter, clay, and loam in suspension) were critical and explained the rapid soil degradation. Reduced tillage in plantations under light litter reduced water and soil losses down to these of savanna. But during high-rainfall years, maize yields decreased 20–40 %; in response to increased nutrient leaching, 20 kg ha^{-1} of nitrogen must be added after heavy rainfall weeks (Boli et al. 1997). Scouring 50 mm of topsoil is involved in 30 % reduction of maize production. But after 4 years of cropping on runoff plots, it was observed that a difference of 4 mm of sheet erosion involved a 40 % reduction of maize yield.

Tropical soil restoration is very difficult because of the low storage capacity of kaolinite clay, the high rate of organic matter mineralization, and significant losses through erosion and leaching. After 5 years, analytical characteristics of the topsoil were not improved. But within 3 years, a high level of production was obtained on degraded sandy soils considered suitable for date palm cultivation in this region.

The combination of trees and annual crops is very old in agricultural landscapes. Today, new forms of agroforestry are emerging to meet the constraints of current agricultural systems. The main changes compared to traditional agroforestry are the choice of species, the arrangement of trees, and their density. Introduced agroforestry based on date palms increases the value of the operation, without significant reduction in farm income. Date palms in agroforestry also allow the operator to offer a different picture of the farming profession by having a positive visible impact on the landscape. Agroforestry systems produce more biomass per hectare, particularly compared to rotation, where there are separate trees and agricultural crops. It helps to improve the natural soil fertility and thus offers the possibility of reducing the need for inputs and preserves the soil against erosion and protects groundwater.

Cultural practices are characterized by the use of appropriate tools to increase labor productivity while maintaining soil quality. In this context it is essential to use, within different ecological zones of the country, the best-adapted agricultural tools. Such is the case of the hand planter, a manual tool able to sow one hectare by hand. The establishment of a process of production and maintenance of these types of tools at the village level is needed to ensure the sustainability of their use. The development of appropriate farming techniques, suitable extension services, making available farming equipment, and support for the creation of centers for multiplication of planting material are all needed (PNUD 1996).

The fight against crop pests is a major concern to the authorities in the countries of the region. Due to the high cost of chemical pesticides and the human and environmental risks their use entails, each country has recognized the need at a regional level. Indeed, the problem of crop protection can only be resolved through cooperation between, for example, member countries of the Lake Chad Basin (LCB). To do this, the LCB has opted for Integrated Pest Management (IPM), which favors non-chemical methods, protects the environment, and is very inexpensive for the farmer. It combines the use of resistant cultivars, agronomic techniques, biological control, effective phytosanitary measures, and direct participation of the farmers.

12.3 Genetic Resources and Conservation

Biodiversity of the date palm refers to variation within the species, while genetic diversity represents the heritable variation that can be found within and between oases, populations, and cultivars of the date palm throughout its distributional range (Dada et al. 2012). Conservation of genetic diversity is essential for present and future functioning of oasis agroecosystems and the well-being of their human communities. Recently, there has been increasing awareness of and interest in the need to adopt a holistic view of dynamic conservation and sustainable utilization of date palm within its natural habitat, especially oases (Eneh and Nwawe 2000). A thorough understanding of date palm genetic diversity and how it is structured in different oases, populations, and cultivars is essential for its dynamic conservation and sustainable use. It will help farmers, scientists, and policymakers determine what to conserve, as well as where to conserve, and will improve the understanding of the taxonomy, origin, and evolution of this unique fruit tree. Additionally, this knowledge is essential for germplasm collecting and the efficient use of the cultivated species and their wild relatives for crop improvement. The vast array of adaptive genetic variation present in date palm, which is generally quantitative and responsive to habitat differences, often reacts to biotic, abiotic, and anthropogenic factors. Genetic diversity studies on date palm have clearly demonstrated that there is a direct association between population characteristics and the environments (i.e., oases) in which they grow, whereas ecological factors largely determine the extent and distribution of genetic diversity in wild populations (Dada et al. 2012).

Local seedling date palms (*dibinojeh naoura*) with outstanding adaptation to climatic, edaphic, and management factors have been observed in Cameroon, especially in arid areas of the north (Elhoumaizi 2007). They are used essentially for ornamental purpose (Fig. 12.1). No particular data have been collected about these local date palms in relation to vernacular name, cultivar identification, and morphological and molecular characterization.

These local cultivars are the product of centuries of interaction between farmers, the genetic and breeding systems of the date palm, and the environment. The breeding systems of date palm, as well as several ecological pressures, affect the distribution of intrapopulation variability and determine the genetic composition of cultivars. In addition, selection for ecological adaptation may have resulted in the accumulation of genotypic and/or phenotypic differences in plants derived originally from identical clones but grown under different environmental conditions and/or management practices. The natural breeding system of the date palm is still determined to an extent by climatic factors such as wind. In Cameroon, apart from recent introductions (2005–2006) by the Technical Cooperation Programme (TCP/FAO) of elite cultivars (Ghanami, Khalas, Khadrawi, Medjool, Barhi, Ambarah, and Zahidi), no other improved cultivars have been introduced;

Fig. 12.1 Local date palm used for ornamental purpose

all those observed in northern Cameroon are considered local (Bourou et al. 2006; Elhoumaizi 2007). Wild palm species have breeding systems somewhat distinct from those of the domesticated species and, therefore, present different problems with respect to their biodiversity, collection, maintenance, and regeneration in the field. These cultivars are mostly associated with annual crops, such as cotton, maize, or groundnut (Fig. 12.2).

No special technical conservation of in vitro date palm plants exists in Cameroon; what conservation is done is in situ. There is no plan at present to set up the technology to identify trait-specific molecular markers.

12.4 Plant Tissue Culture

Plant tissue culture techniques are used to regenerate a whole plant from cells or plant tissue culture medium, using modern techniques of cell culture (McCubbin et al. 2004). It produces plants free of viruses and any other infections; in addition it has the capacity to quickly produce a large amount of plantlets. It is used for the creation of new plants, the multiplication of commercial plants producing few or no offshoots, or the conservation and propagation of rare species. Typically, plant cells (in fact only one or a few cells are enough) are placed on a sterile growth medium including sucrose as a source of energy, vitamins, and nutrients and placed in an environment with temperature, humidity, and light carefully controlled. Tissue

Fig. 12.2 Barhi cultivar in an associated system with cotton

culture operates on the principle that each cell possesses the necessary and sufficient potential to multiply and especially to organize differentiated tissues to reconstruct a plant with its DNA, the totipotency of plant cells (McCubbin et al. 2004).

In Cameroon, up to now, tissue culture exists only for the banana plant. Some private organizations are engaged in collaboration with scientific research institutes. These include the Centre for Agricultural Research for Development of Ekona at Nkolbisson and the Agricultural Research Station of Njombe (Bourou et al. 2006). In the private companies, banana plantlets are transferred to soil (vermicompost) from plant media. This process is done for acclimatization of plantlets to the soil as they were previously grown in plant media. After growing for some days, the plantlets are transferred to the field.

In Cameroon, three methods of tissue culture can be considered for date palm: (a) meristem culture or stem apex, which remains the most generalized technique and ensures the reproduction of true-to-type plantlets, (b) regeneration of plants by formation of new buds and roots on callus, and (c) somatic embryogenesis, which allows obtaining embryos and plant regeneration from somatic cells. These three methods are well known among Cameroonian researchers but little practiced. Tissue culture plants often have improved physiology and morphology, giving them the benefits of starting force, better than rooting cuttings or layering (NIFOR 2008). No direct application has been made on the date palm in Cameroon; however, in vitro date palm seedlings were introduced into Cameroon in 2005–2006. These came from the Marionnet Laboratory in the UAE and DPD Laboratory in the UK (Bourou et al. 2006; Elhoumaizi 2007). Plans exist for future tissue culture work on date palm in Cameroon.

12.5 Cultivars Description

Up to now in Cameroon, no local date palm cultivars have been named, identified, or described in terms of morphological or molecular characteristics and so on. Date palms are found in the North and Far North but are limited to scattered individual trees and recent plantings from seeds obtained from imported date palm fruits. Isolated date palm plants are common at residences around villages in the North and Far North of Cameroon. Date palm plantations (of more than 60 palms) also can be seen around the walls and villages of Garoua, Guider, and Maroua (Bourou et al. 2006; Elhoumaizi 2007). Some plantations were established with seeds from fruits imported from Saudi Arabia, some ranging in area between 0.4 and 1.0 ha. Several farms with older plants, 10–16 years of age, exist in the region of the Far North, for example, Diamare, Mayo-Sava (Far North), Mayo-Louti, Benue, and Mayo-Rey (North) (Bourou et al. 2006; Elhoumaizi 2007). Besides these private initiatives, the Regional Delegation of Agriculture and Rural Development of the Far North began in 2001, as part of crop diversification and environmental protection and promotion of date palm growing through farmer organizations (FOs).

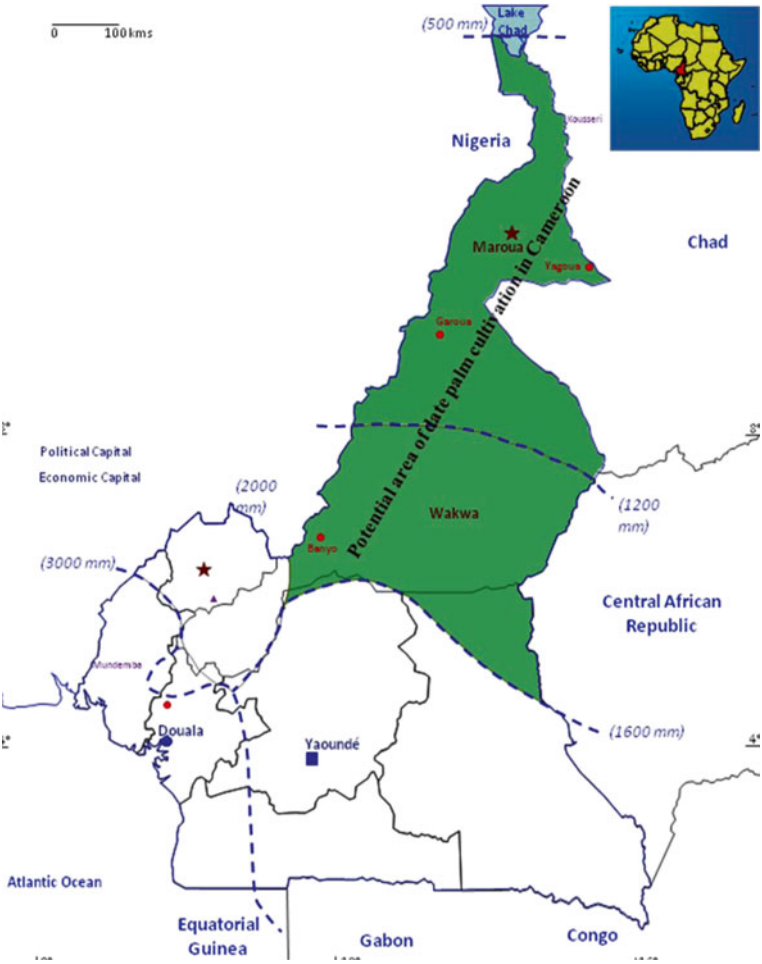

Fig. 12.3 A map of Cameroon showing the potential area of date palm cultivation

Climatic data indicate that conditions are suitable for date palm growing, especially in the Far North. The areas of Cameroon potentially suitable for date palm cultivation are shown in Fig. 12.3.

Overall date palm yields in Cameroon are low with fruit of very poor quality. This local production can only be used for home consumption. All initiatives thus far have been limited by two factors: first, the inadequate supply of improved planting materials and, second, lack of trained supervisors in techniques of date palm cultivation. Moreover, it should be noted that the date fruits are consumed by people of the northern part of the country and in major cities. The date palm is a prestigious plant in chiefdoms, the concessions held by some important community leaders (Bourou et al. 2006; Elhoumaizi 2007). In the north, a few land

developers have begun to establish date palm orchards. All these date palm plantations are located in the northern zone with an annual rainfall of around 700 mm. Despite the enthusiasm of the people of the North for the date palm in particular, research on the palm is limited to cultivar collections (Bourou et al. 2006; Elhoumaizi 2007).

12.6 Date Palm Production and Marketing

Currently no Cameroonian company produces and distributes young date palms. However, the Garoua Research Station's experimental orchard at Kismatari and IRAD is in the process of producing and releasing date palm offshoots in rural areas, derived from introduced improved cultivars in 2005–2006. This production technique is described as follows.

Two types of offshoots occur on the date palm in general: the lower which are older and the upper which are considered younger, the latter are not yet of concern in Cameroon. It is believed that lower offshoots are more active physiologically than the higher ones; they probably grow faster, the number of leaves produced increasing with age. In fact, the high offshoots have less carbohydrate than low offshoots, resulting in low root production and consequently a lower survival rate. It is also suspected that high offshoots develop when no fruit is on the palm (Eneh and Nwawe 2000; Mahmoudi et al. 2008).

Early offshoot removal is desirable because (a) it allows easy access to the palm, (b) it improves the development and fruit production of the parent tree, and (c) planting young offshoots is advantageous as they will produce a greater number of offshoots than older palms.

Numerous factors must be considered when rooting offshoots, including the size of an offshoot (often expressed in weight), type (upper or lower), origin of the offshoot, method of removal and preparation for planting, and treatment of the offshoots after planting. To stimulate and promote rooting, the base of the offshoot should be in contact with moist soil for at least 12 months before removal. Production of high offshoots is primarily related to a particular cultivar character but also in some cases related to a damp climate. For these high offshoots, boxes or plastic bag materials can be fastened around the base of the offshoot. Another technique is to leave them on the mother palm until they are more mature. They are then removed and rooted in a nursery as in the case of the experimental orchard of Kismatari. Date palm offshoots in Cameroon are expensive, selling for about XAF 15,000 (EUR 22.68).

In Cameroon dates are appreciated by the people, but the date palm's future is uncertain. Dates are sold in bags of 100 kg by wholesalers and in various quantities by retailers. The price per bag of 100 kg in Kousseri fluctuates from XAF 40,000 to 45,000 (EUR 60.97–68.60) from September to May and XAF 45,000 to 50,000 (EUR 68.60–76.22) from June to August (Elhoumaizi 2007). The dates sold are dry

Fig. 12.4 Date palm price and quality in the North area of Cameroon

and of poor quality. The primary retail measure used is a 2.5 l container called a *goro*. The price range of a *goro* of dates is XAF 1,500–2,500 (EUR 2.28–3.81).

The human populations of the northern regions of Cameroon are all present or potential consumers of dates, along with about 6 million people in the large cities such as Yaounde and Douala. Dates of poor quality (Fig. 12.4) are sold at very high prices of about XAF 1,000 (EUR 1.52) per ½kg (Elhoumaizi 2007). During the period 1998–2003, about 34,000 kg dates were imported per year. A large amount of informal importation of dates also occurs across the borders from Chad and Nigeria. The date market in Cameroon is entirely in the hands of the informal sector. Dates consumed locally in Cameroon mostly come from Kousseri, through the northern areas from Chad (Faya - Largeau), Libya, Sudan, and Saudi Arabia (Bourou et al. 2006; Elhoumaizi 2007).

The main issues impeding development of a profitable date palm industry in Cameroon are the lack of (a) new cultivars and programs to encourage producers to plant offshoots rather than seeds, (b) skilled national date palm specialists, and (c) modern farming techniques for the date palm. Date palm could adapt well to the adverse conditions of the dry, warm areas of the Far North, providing they are supplied with adequate quantities of irrigation water.

The date palm can play a key role in the protection of the environment with the creation of favorable microclimatic conditions for the development of other understory fruit crops as well as functioning as oasis windbreaks. Date palm can also contribute to the generation of significant income by marketing the fruits and palm by-products. It should be noted that local date palm cultivars have an annual yield of only 15–20 kg of fruits/tree; therefore, considerable potential exists for much higher yields with the growth of improved cultivars. Enhanced quantity and quality of dates in Cameroon will also improve the international trade balance of the country through the export of dates to international (Europe) and regional markets such as the Sahelian countries, and finally it will generate jobs through the development of agriculture.

12.7 Conclusion and Recommendations

Date palm production can contribute to Cameroon's economy in the next few years. Current consumption of date fruit in Cameroon is mostly based on imports from the Middle East and neighboring countries, thus depleting foreign exchange reserves. Date imports could be eliminated with improved high-yielding cultivars adapted to Cameroonian ecological conditions. Cameroon has the capacity to produce enough dates to meet local demand and to earn foreign exchange through export of any surplus production into the international market. Perhaps the greatest potential in this respect lies in the commercial development of date products from naturally occurring cultivars with a ready market.

Cameroon is not yet established as a commercial date palm-producing country but has important potential in terms of human resources, ecological advantages, market, etc. Creating date palm plantations will not only add to the total economic GDP of the country but will undoubtedly check the increasing rate of desertification, and it will also make a positive impact on the diet of the people, thereby contributing to improving the standard of living of not only the farmers but the entire population. Cameroon has two harvesting seasons, wet and dry, which is an advantage for the country to compete on the international market when other countries that produce dates are out of season. More research is still needed to add to what has already been achieved. In order for the development of date products trade to result in tangible improvement in sustainable management of the date resources in the country, partnerships between rural producers, national policymakers, and the private sector are essential.

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