

# **THE WORLD DATE PRODUCTION: A CHALLENGING CASE STUDY**

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## **ABSTRACT**

The Date Palm Research and Development Program in the UAE, Co implemented by the UAE University and the United Nations Office For Project Services (UNOPS) since 16 June 2000, will be presented. The Project's background and justification, its development objectives along with the immediate objectives, outputs and activities will also be discussed.

## **INTRODUCTION**

Date palm is found in both the old world (Near East and North Africa) and the new world (American continent) where dates are grown commercially in large quantities. The date belt stretches from the Indus valley in the east to the Atlantic in the west. In order to have a clear picture on the geographical distribution of date palm, it is worth looking at it from the following aspects: (i) Distribution according to latitude, (ii) Distribution according to altitude and (iii) Number of date palms in the world.

The distribution according to latitude for both northern and southern hemispheres is illustrated in Tables 1 and 2. The extreme limits of date palm distribution are between 10°N (Somalia) and 39°N (Elche/Spain or Turkmenistan). Favourable areas are located between 24° and 34°N (Morocco, Algeria, Tunisia, Libya, Israel, Egypt, Iraq, Iran,...). In USA date palm is found between 33° and 35°N. Because of climatic factors, the date palm will grow, but will not fruit properly outside the above defined geographical limits.

Altitude is very important since it imposes the availability of water and the temperature limits which largely determine the distribution of date palm in the world. In fact, date palm grows and flourishes from 392 m below sea level to 1,500 m above with an altitude range of 1,892 m.

## **Number of date palms in the world**

The world total number of date palms is about 100 million, distributed in 30 countries and producing between 2.5 and 5 million tons of fruit per year. However, it is worth mentioning that accurate statistics on the number of date palms are not always available and not easy to collect. Even when some numbers are available, it is not clear to which category they belong: are they adult producing, young palms, total or both, ...?

If we look at the distribution, region by region, we find that Asia is in the first position with 60 million date palms (Saudi Arabia, Bahrain, UAE, Iran, Iraq, Kuwait, Oman, Pakistan, Turkmenistan, Yemen, ...); while Africa is in the second position with 32.5 million date palms (Algeria, Egypt, Libya, Mali, Morocco, Mauritania, Niger, Somalia, Sudan, Chad, Tunisia, ...).

Mexico and the USA have 600,000 palms followed by Europe (Spain) with 320,000 and Australia with 30,000.

Table 3 illustrates the date palm cultivated area per country and shows that Iran has the largest superficies with 180,000 hectares (ha) followed by Iraq, 125,000 ha. Morocco has 84,500 ha while Saudi Arabia, Algeria and Egypt each have approximately 45,000 ha. In the remaining date growing countries it varies from 2,500 to 22, 000 ha.

Date growing countries located in the southern area of the Mediterranean Sea have approximately 35 million palms (35% of world total). Based on 200 palms/ha, they have a date palm superficies of about 175,000 ha.

Table 4 illustrates the increase in the number and percentage of the date palm culture in four North African Countries. Morocco, because of the damage caused by Bayoud disease and in order to rehabilitate its plantations, is programming the production by tissue culture techniques and the plantation of approximately 2.5 million palms by the year 2007. Once implemented it will ensure an increase of 58.88%. If we look at the annual percentage increase, Morocco and Egypt are the leaders with 3.93 and 2.63,

respectively. Tunisia and Algeria follow with an annual percentage increase of 1.84 and 1.10, respectively.

Looking at the areas where date palm have been harvested (ha), it is clear from Table 5 that the world harvested area has increased more than threefold (from 238 522 ha in 1961 to 770 795 ha in 1996) during a period of 35 years yielding an average annual increase of about 8.6 %.

The same table illustrates that during 1996, the top 10 producing countries with regard to harvested areas are in the following order: Iran (153 000 ha), Iraq (116 000 ha), Saudi Arabia (95 000 ha), Algeria (87 000 ha), Pakistan (73 915 ha), Morocco (44 400 ha), U.A. Emirates (31 005 ha), Tunisia (29 480 ha), Oman (28 000 ha), and Egypt (26 000 ha). These 10 countries, on their own, make up approximately 88 % of the world's total harvested area.

The above-mentioned 10 countries had a different increase in harvested area for the period between 1961 and 1996. The United Arab Emirates is the leader with an increase of about 62 %, followed by Pakistan with 8.30 %, and Saudi Arabia with 4.32 %, while the remaining countries had an increase of between 2 to 3 % (Tunisia, 2.95 %, Morocco, 2.47 %, Algeria, 2.29 %; and Oman, 2.15 %). Egypt, Iran and Iraq had an increase of less than 2 %.

### **World production**

Date Production is a world agricultural industry producing about 5 million tonnes of fruit. The date fruit, which is produced largely in the hot arid region of South West Asia and North Africa, is marketed all over the world as a high value confectionery and fruit crop and remains an extremely important subsistence crop in most of the desert regions. A decline in productivity of the industry in the traditional growing areas over the last decade, due to political, socio-economic and technical constraints, has created opportunities for other under-exploited production areas of the world, including the Southern African subcontinent.

The world production of dates has increased from about 1,8 million tonnes in 1961 to 2,8 million in 1985 and 4,8 million in 1996. The increase of 1,86 million tonnes since 1982 represents an annual expansion of about 5 %.

The major date producers in the world are situated in the Middle East and North Africa. During 1996 Iraq and Iran had about 35 % of the harvested area of the world. Trade figures indicate that about 93 % of the date harvest is consumed locally and that by far the majority of these palms are not of the well-known export varieties.

History shows the date palm is a traditional crop in the old world. It is only in recent years that the date palm has been introduced as modern plantations in USA, Israel and in the southern hemisphere (Australia, Namibia, South Africa).

During 1996, the top five date producing countries (Table 6) were Iran, Iraq, Egypt, Saudi Arabia and Pakistan, accounting for about 73 % of total production. If the next five most important countries are included, i.e. Algeria, United Arab Emirates, Sudan, Oman and Morocco, then this percentage rises to 92 %. This clearly indicates that most of the world's date production is concentrated in a few countries in the same region.

Most of the major date producing countries have steadily expanded production over the last 10 years, representing a 41 % increase over the period 1985 to 1995. Over the same period, date exports increased by only 24 %. The United Arab Emirates' increase has been exceptional. Their production increased with 308 % from about 60,000 tonnes in 1985 to 244,644 tonnes in 1996.

### **Date exports**

During 1996, about 322,000 tonnes of dates were exported with a total value of about US\$ 258 million. When this figure is compared with total production, it is clear that about 93 % of the dates produced are consumed within the producing countries.

There was a steady increase in world export, from about 260,000 tonnes in 1961 to 300,000 tonnes in 1980. A sharp decline in exports was experienced from 1981 to 1984 after which exports increased again to over 400,000 tonnes in 1989 and 1990. During 1991 there was a sharp decline in exports again, resulting in a net export of only 243,000 tonnes. This decline is due to the fact that Iraq exported only 20,000 tonnes compared to 248,000

tonnes in 1989 as a result of the trade boycott imposed on Iraq following its invasion of Kuwait in 1991. It is interesting to note that exports from Iran increased from 13,000 tonnes in 1989 to 120,000 tonnes during 1994, compensating for Iraq's reduced exports.

The five leading exporting countries as from 1991 are: Iran, Pakistan, Tunisia, Algeria and Saudi Arabia. Of these five countries, only two, i.e. Tunisia and Algeria achieve high export prices. Their price of US\$ 2,600 and 3,500 per tonne respectively in 1996, is due to their strategy of targeting the high value European markets while Iran, which exported a much lower quality dates, only achieved US\$ 400 per tonne in 1996.

There is a wide variation in the average export prices achieved by different countries (Table 7). Higher export prices are achieved by Israel, Tunisia, USA and Algeria, which have developed a specific export strategy, to grow top quality varieties and target the higher priced European markets. These high prices are achieved by growing varieties such as Medjool and Deglet Nour, as well as ensuring a better quality control and targeting the higher value of prepacked fresh fruit market. It is interesting to note the price that France achieves on its re-exports mainly to other European countries.

The major exporting countries in terms of volume, i.e. Iran and Pakistan, achieved much lower prices, US\$400 and 468, respectively during 1996. The majority of their fruit being exported is in bulk for the market in India.

### **Date imports**

World date imports varied greatly over the period 1961 to 1996. During 1961 world date imports were 285,000 tonnes and reached a high of about 440,000 during 1973. The world market then experienced a decline and only 180,000 tonnes were imported in 1984. Thereafter imports increased gradually and reached 430,000 in 1987, while imports during 1996 were recorded at almost 380,000 tonnes.

Table 8 reflects five-year averages of date imports for selected countries since 1961. The main importers were India, United Arab Emirates (UAE) and Europe. For the five year period 1991 to 1994 India imported,

on average, 67,000 tonnes while UAE imported 35,000 tonnes, accounting for 38 % of the import market. However, an analysis of the annual imports of the UAE shows that imports declined from 1989 from over the 100,000 tonnes to 12,000 tonnes during 1994. This decline corresponds with an increase in their production of 100,000 tonnes over the same period.

### **Problems Hindering the Development of the World Date Industry:**

Several problems and obstacles are hindering the development of the date industry around the world. In North Africa (i.e. Morocco & Algeria), the bayoud disease caused by *Fusarium oxysporum f.sp. albedinis*, is the major disease and already caused the destruction of about 12 million date palms.

In the Near and Middle East, the Red Palm Weevil (*Rhynchophorous ferrugineus*) is causing severe damages to the date plantations in these growing areas.

On the production side, several date growing countries are still using traditional techniques for this important culture. There is still a great space for improvement in the field of date palm cultural practices, pre and post harvest, packaging and marketing.

From the propagation side, and while tissue culture is becoming the commercial technique to mass propagate date palm, several voices are arising against the true to typeness of the plants derived from such techniques (mainly the asexual also called somatic embryogenesis). This true-to-typeness is verified with several means (isoenzyme, histology, RFLP, RAPD, other finger printing techniques,..) but the follow up in the field is the most recommended approach.

Among the abnormalities observed so far with tissue culture-derived plants are the dwarfing, broader leaves with compact growth habit and twisted inflorescences. Seedless fruits, polycarpy and late flowering (up to 7 years after planting) are also commonly observed abnormalities.

The possible causes are various and could be summarized as follows:

- Environmental factors (Diseases, nutrition and climate);

- Physiological factors (Juvenile stage and the level of Auxins / Cytokinins ratio used in the multiplication process);
- Human factor either through technical practices (i.e.: Poor pollination);
- *In Vitro* propagation conditions mainly the technique used, the nature and concentrations of growth regulators, the length in culture, the source of explants,...).

It is recommended to establish an international specialized committee in the field of biotechnology and tissue culture to ensure a close follow up on the tissue culture-derived date palms.

TABLE 1

**Latitude Limits of Date Palm Cultivation in the Northern Hemisphere of the Old World.**

<b>Limits</b>	<b>Country</b>	<b>Region / District</b>	<b>Parallel</b>
<b>Northern</b>	Pakistan	N.W.F. Province - Bannu	33° N
		Makran - Siahan Mountain Range	27° N
	Iran	Hajabad	28°18' N
		Aliabad	28°36' N
		Fasa	28°57' N
		Baluchistan	29°07' N
		Qasr-i-Shirin	34°31' N
		Kazarum	29°37' N
		Shiraz	29°36' N
	Darab	28°46' N	
	Turkmenistan	Kizyl Arvat	39° N
		Bam	29°07' N
	Iraq	Basra	30°34' N
		Fao	34°53' N
		Along the Tigris-Samara	34°12' N
		Along the Euphrates - Rawa	34°30' N
	Syria	Abukemal	34°27' N
		Taza Khurmatu	35°18' N
		Kirkuk	35°27' N
	Palestine, Israel and Lebanon	Jericho, Jerusalem	32°
		Araba desert	30° to 31°
		Capernaum	32°53' N
		South of Tripoli-Rift Valley	34°26' N
	Cyprus and Turkey	Nicosia	36°10' N
		Antalya	36°34' N
	Algeria	Touggourt	33°09' N
		El-Kantara	35°14' N
	Spain	Elche	38°17' N
	Egypt	Cairo	30°02' N
	Tunisia	Gabes	33°57' N
	Morocco	Erfoud	31°26' N
	USA	Indio/Ca	33°43' N
	Mauritania	Atar	20°38' N
		Nema	16°50' N
<b>Southern</b>	India	Turbat	25°59' N
		Gujarat	23° N
	Pakistan	Sind-Kotri	25°22' N
	Arabian Peninsula	Muscat	23°37' N
		West of Aden	12°36' N
	Somalia	Genale/Mogadiscio	1°47' N
	Djibouti	Hambali/Djibouti City	11°30' N
	Ethiopia	Dirre Dawa	10°15' N
	Sudan	Kamlin/Nile	15°02' N
	Cameroon	Rei Buba / Garua	8°40' N
	Chad	Lettire	13°40' N
	Niger	Guidimouni/Zinder	13°45' N
		Bilma	18°50' N
	Burkina Faso	Dori	14°10' N
	Mali	Kolokani	13°20' N
		Kidal	18°27' N
		Kayes	14°26' N
	Senegal	Bakel	14°51' N



TABLE 2

**Latitude Limits of Date Palm Cultivation in the Southern Hemisphere.**

<b>Country</b>	<b>Region / District</b>	<b>Parralel</b>
Tanzania	Tabora	5° S
R.S.A.	Henkries Fontein	29° S
	Kakamas	27° S
	Klein Pella	27° S
Australia	Coward Springs	29°29' S
	Lake Harry	29°25' S
	Petra Bore	33°51' S
	Gasgoyne	25°03' S
	Hergott Springs (Now Marree)	29°39' S
	Oodnadatta	27°33' S
Namibia	Naute/Keetmanshoop	26°57' S
	Hardap/Mariental	24°33' S
	Aussenkehr/Karasburg	28°24' S
	Eersbegin/Kunene	20°09' S

TABLE 3

**Superficy and Total Number of Date Palms Around the World.**

Country	Number of palms (in 1,000)	Part of the world's total (%)	Superficy (in 1,000 ha)	Density of planting (number of palms/ha)
Iraq	22,300	22.30	125	178
Iran	21,000	21.00	180	116
Saudi Arabia	12,000	12.00	45	148
Algeria	9,000	09.00	45	200
Egypt	7,000	07.00	45	155
Libya	7,000	07.00	27.5	254
Pakistan	4,375	04.37	-	-
Morocco	4,250	04.25	84.5	50
Tunisia	3,000	03.00	22.5	133
Sudan	1,333	01.33	-	-
Mauritania	1,000	01.00	-	-
Oman	1,000	01.00	-	-
P.D.R. Yemen	800	00.80	6.4	125
U.A.E.	359	00.35	3.44	105
Somalia	204	00.20	0.35	577
Bahreïn	200	00.20	3.70	50
Israel	200	00.20	1.6	125
Palestine	60	00.06	0.25	200
Kuwait	38	00.03	-	-
Syria	12	00.01	-	-
Other countries	4,929	04.92	-	-
<b>WORLD TOTAL</b>	<b>100,000</b>	<b>100</b>	<b>770</b>	<b>173</b>

(Source: Djerbi, 1995; Options Méditerranéennes, 1996)

TABLE 4

**Increase in Number and Percentage of Date Palm in Algeria, Egypt, Morocco and Tunisia.**

Country	Years	Increase (in 1,000 palms)	Total increase (%)	Annual increase (%)
Algeria	1970 - 1994	1,488	16.53	1.10
Egypt	1990 - 1994	920	13.14	2.63
Morocco	1992 - 2007 (*)	2,500	58.88	3.93
Tunisia	1970 - 1991	1,161	38.70	1.84

(\*): Through a national programme to rehabilitate Moroccan date plantations that have been destroyed by Bayoud disease.

(Source: Options Méditerranéennes, 1996)

TABLE 5: Area Harvested in Date Palm Growing Countries (hectares) (from 1961 till 1996).

Country	1961	1968	1975	1982	1989	1996
Algeria	38 000F(*)	59 000F	61 000F	68 000F	78 000	87 000F
Bahrein	1 600F	1 600F	2 300F	1 200F	1 600F	2 200
Cameroun	-	-	-	-	60F	90F
China	1 000F	1 150F	1 150F	1 800F	3 200F	4 800F
Egypt	20 000F	20 000F	20 000F	21 000F	25 000F	26 000F
Gaza Strip	-	600F	650F	200	210F	220F
Iran	78 000F	79 000F	80 000	120 919	120 913	153 000
Iraq	92 000C(*)	92 000C	140 000C	-	119 970F	116 000F
Israel	70F	200F	290F	530	1 050	1 600F
Jordan	150F	70F	92	13	24	230
Kenya	-	-	-	-	345F	345F
Kuwait	-	-	-	-	250F	250F
Libya	-	-	-	-	15 000F	15 000F
Mauritania	4 500F	4 700F	3 500F	3 500F	5 000F	12 000F
Mexico	811	750	527	482	606	500F
Morocco	18 000F	20 000F	23 000F	21 900	20 900	44 400
Niger	-	-	-	-	2 200F	2 200F
Pakistan	8 900	20 200	22 471	30 525	41 795	73 915
Peru	110F	95F	120	141	270	80
Qatar	-	-	-	677	967	1 800F
Saudi Arabia	22 000F	28 000F	53 121	68 583	68 305	95 000F
Somalia	-	-	-	-	2 400F	2 300F
Spain	405	620	751	542	516	500F
Sudan	8 800F	11 700F	14 000F	13 637	15 000F	18 000F
Oman	13 000F	13 000F	14 000F	20 194	25 000F	28 000F
Tunisia	10 000F	17 000F	12 000	18 000	20 000	29 480
Turkey	520F	590	850	950	2 710	3 300F
U.A. Emirates	500F	580F	2 200F	7 146	22 156	31 005
USA	1 700	1 724	1 660	1 660	2 020	2 226
West Bank	-	-	-	30	-	-
Yemen	10 456	10 100F	13 593	12 569	16 479	19 354
World	238 522C	290 679C	327 275C	414 198C	611 946C	770 795C

(\*) F stands for FAO estimate and C for calculated figure.

(Source: FAO Trade Stat. 1997).

TABLE 6

**Date production of main date producing countries in MT.**

<b>COUNTRY</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
World	3706500	3776380	4314140	4373650	4433900	4843045
						100%
Egypt	603490	603652	631290	646039	677934	738147
% of Total						15%
Iran	633837	578203	715662	774026	780010	855494
% of Total						18%
Iraq	566220	590000	612580	575820	600000	797000
% of Total						16%
Saudi Arabia	528074	552493	563008	567762	589261	600693
% of Total						12%
Algeria	209092	260515	261612	317184	285155	360637
% of Total						7%
Pakistan	292898	275157	576574	578574	531537	532531
% of Total						11%
United Arab Emirates	173110	230400	236135	236100	236965	244644
% of Total						5%
Sudan	140000	142000	130000	142000	140000	145000
% of Total						3%
Oman	125000	130000	133000	133000	133000	134000
% of Total						3%
Morocco	107000	82000	111100	62020	97600	79800
% of Total						2%

Source: FAO Agrostat database, 1996.

TABLE 7

**Export prices achieved by leading exporting countries.**

COUNTRY	PRICE IN US\$ PER TON						
	1990	1991	1992	1993	1994	1995	1996
France	3316	3363	3745	2198	3564	3456	3103
Israel	2685	2894	3314	2493	2932	2882	*
Tunisia	2836	2721	2884	2568	2705	2954	2630
Algeria	2052	2012	2826	2790	2500	3620	3500
USA	2051	2326	2352	2568	2484	2524	3036
Saudi Arabia	688	584	807	1387	819	635	684
Oman	718	771	692	630	649	555	455
Egypt	536	502	527	457	471	422	356
Pakistan	592	446	418	579	425	349	468
Iran	326	602	481	500	250	400	400
<b>World Average</b>	571	942	977	1062	855	908	802

Source: FAO Agrostat Database

TABLE 8

**Date imports for selected countries: 5 year averages since 1961.**

YEAR	VARIABLE	FRANCE	INDIA	UK	UAE	WORLD
1961 -	Volume: Ton	20,049	53,869	13,654	0	329,612
1965	Value: US\$	6,417	5,332	4,921	0	48,781
1966 -	Volume: Ton	18,326	60,158	11,976	577	343,763
1970	Value: US\$	7,094	5,238	5,020	66	52853
1971 -	Volume: Ton	15,253	41,226	13,009	2,876	364,723
1975	Value: US\$	11,880	4,593	7,204	369	78,168
1976 -	Volume: Ton	17,195	32,692	9,707	3,140	290,835
1980	Value: US\$	18,270	10,037	10,767	777	136,602
1981 -	Volume: Ton	14,212	33,066	9,421	13,298	205,455
1985	Value: US\$	22,085	13,934	13,666	3,805	162,572
1986 -	Volume: Ton	15,802	74,526	9,455	87,577	360,472
1990	Value: US\$	33,863	21,624	15,207	28,275	224,590
1991 -	Volume: Ton	18,985	67,471	11,527	35,158	271,503
1994	Value: US\$	43,946	18,950	16,107	10,095	258,424

Source: FAO Agrostat Database