1. GENERAL DESCRIPTION OF OLIVE GROWING IN MOROCCO

1.1 Introduction

Figure 1. Location of Morocco (Source: UN)

Owing to its adaptability to all the bioclimatic zones, olives are grown throughout Morocco, except for the strip along the Atlantic coastline.

Olive growing is undergoing major expansion, with olive crop area soaring from 600 000 ha in 2005 to 840 000 ha in 2011. According to forecasts, there is even further potential for expansion. By 2014, the area under olives is expected to have reached 990 000 ha through the implementation of nationwide olive development programmes.

The olive oil sector contributes up to 5% of upstream agricultural GDP and accounts for 15% of agricultural foodstuff exports.

The two branches of the olive production chain vary in significance:

I. Olive oil: Almost 75% of the olives produced in Morocco go for olive oil, mainly for the domestic market (the olive oil industry helps to cover 16% of Morocco's shortfall in edible oils). Olive oil generates 60% of the sector's revenue and 30% of its exports.

II. Table olives: Table olive production is oriented primarily at the export market. It represents 25% of olive production and generates 40% of sector revenue and 70% of exports (annual exports average nearly 60 000 t).

Olive trees are cultivated on 400 000 farms. Olive growing is an intense agricultural activity which generates almost 100 000 permanent jobs and figures heavily in the earnings of a large segment of poor farmers. It is also important in domestic consumption, especially in rural areas where its products are highly rated for their high energy value and nourishment. (Source: IOC questionnaire)

1.1. Socio-economic indicators

- **Area: 446 550 sq km (UN, 2008)**
- **Capital city: Casablanca (UN)**
- **Currency: Moroccan Dirham (MAD) (UN, 2008)**
- **Population: 31 992 592 (World Bank, 2009)**
- **Rural population: 43% (World Bank, 2010)**
- **Urban population: 57% (World Bank, 2010)**
- **Population growth rate: 1.2% (UN, 2005/10)**
- **Life expectancy: 73.4 years (women), 69.0 years (men) (UN, 2005/10)**
- **Main exports by quantity (tonnes): tomatoes, tangerines and mandarins (FAOSTAT, 09)**
- **Main imports by quantity (tonnes): wheat and maize (FAOSTAT, 2009)**
- **GNI per capita, PPP (current international $): 4 620 (World Bank, 2010)**
- **GDP per capita, PPP (current international $): 4 668 (World Bank, 2010)**
- **Employment in agriculture: 40.9% (World Bank, 2008)**
- **Employees in agriculture, female: 59% (World Bank, 2008)**
- **Employees in agriculture, male: 34% (World Bank, 2008)**
- **Employment in olive growing: 25 000 000 work days (IOC, 2009/10)**

2. BACKGROUND DATA

2.1. Olive oils

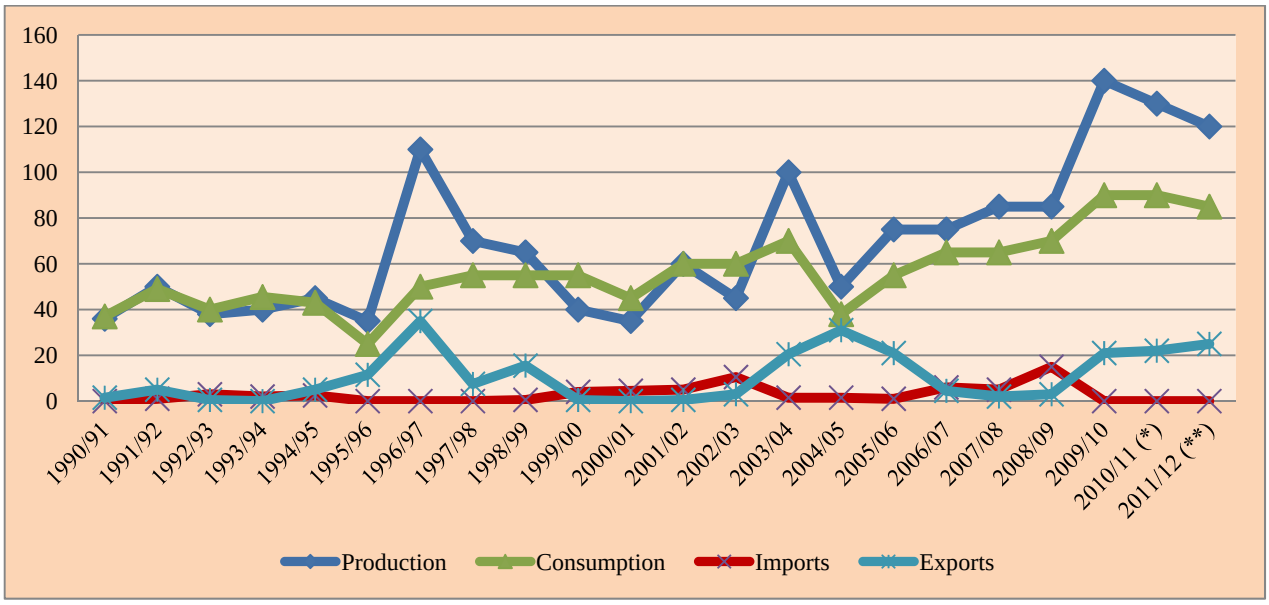

Figure 2. Olive oil production, consumption, imports and exports 1990–2012 (1 000 tonnes)
* Estimates
** Forecasts (Source: IOC)

Table 1.Olive oils (1 000 tonnes) (Source: http://www.internationaloliveoil.org/estaticos/view/131-world-olive-oil-figures)

	2000/01	*2001/02*	*2002/03*	*2003/04*	*2004/05*	*2005/06*	*2006/07*	*2007/08*	*2008/09*	*2009/10*
Production	35	60	45	100	50	75	75	85	85	140
Consumption	45	60	60	70	38	55	65	65	70	90
Imports	4.5	5.0	10.5	1.5	1.5	1.0	6.0	5.0	15.0	0.0
Exports	0.0	0.5	3.0	20.5	31.0	21.0	4.5	2.0	3.0	21.0

2.2. Table olives

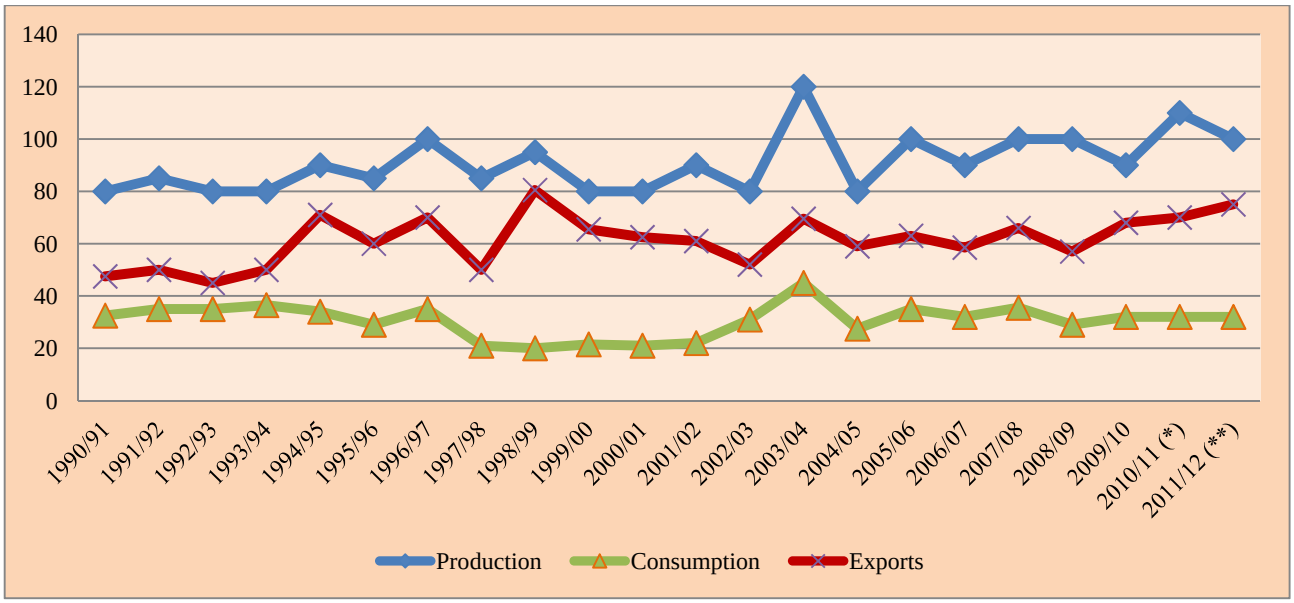

Figure 3. Table olive production, consumption and exports 1990–2012 (1 000 tonnes)
* Estimates
** Forecasts (Source: IOC)

Table 2.Table olives (1 000 tonnes) (Source: http://www.internationaloliveoil.org/estaticos/view/132-world-table-olive-figures)

	2000/01	*2001/02*	*2002/03*	*2003/04*	*2004/05*	*2005/06*	*2006/07*	*2007/08*	*2008/09*	*2009/10*
Production	80	90	80	120	80	100	90	100	100	90
Consumption	21.0	22.0	31.0	45.0	27.5	35.0	32.0	35.5	29.0	32.0
Exports	62.5	61.0	52.0	69.5	59.0	63.0	58.5	66.0	57.0	68.0

2.3. Total area planted

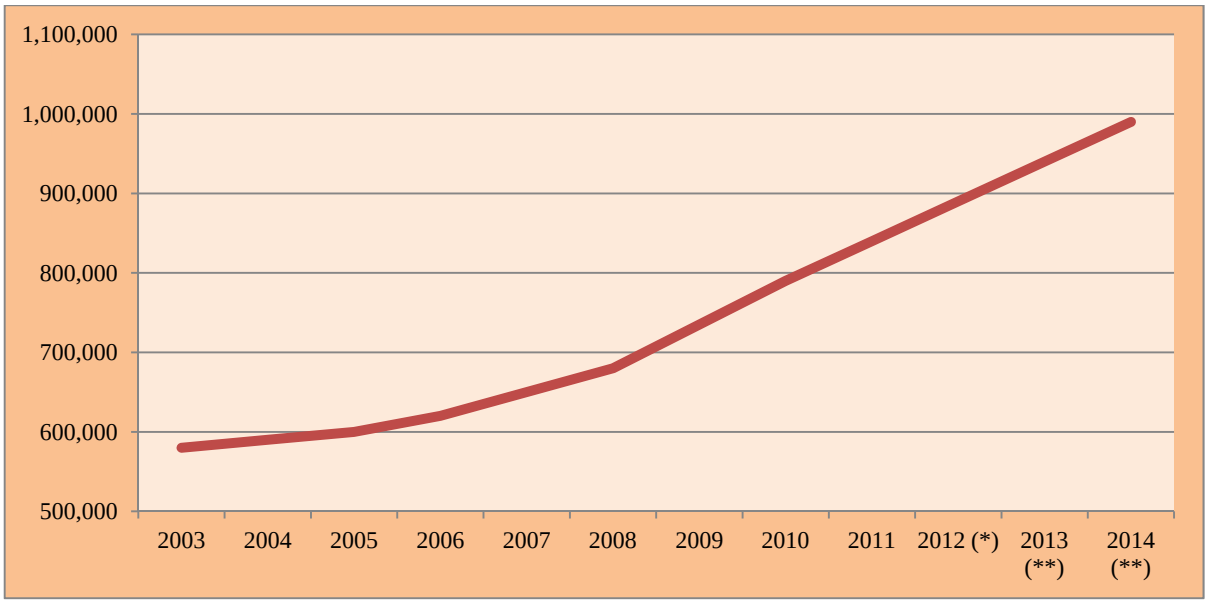

Figure 4. Changes in area planted with olive trees (ha)

* Estimates
** Forecasts (Source: IOC)

3. OLIVE INDUSTRY IN MOROCCO

3.1. Historical background

The olive is the principal fruit tree cultivated in Morocco where it has spread across the whole of the country owing to its ability to bear crops in a variety of growing conditions and its adaptability to highly adverse soil and climatic conditions.

Historical research into the beginnings of olive growing in Morocco, backed by the remains found at Phoenician and Roman sites (Volubilis and Lixus), reveal that it dates back to the first millennium B.C.; oil mills and vessels are tangible evidence of its ancient historical origin, which is tied up with the colonisations of the Mediterranean cultures.

3.2. Orchard resources

Taking 2009 as the basis (the benchmark year for the IOC questionnaire), olives were grown on 735 000 ha of land. As already mentioned in the introduction, olive crop area has been surging since 2005 and looks poised to reach 990 000 ha by 2014.

In 2009, there were 415 000 agricultural holdings in Morocco where olive orchards were grown, almost 60% of which were under 5 ha. Three categories emerge when olive resources are itemised by orchard age (Source: IOC questionnaire):

- Young orchards (< 5 years old): 135 240 ha (18.4%)
- Orchards at full bearing (5–50 years old): 496 860 ha (67.6%)
- Old orchards (> 50 years old): 102 900 ha (14%)

When looking at density, a distinction has to be drawn between dry-farmed and irrigated crop. Orchards on dry-farmed orchards, located mainly in the olive-growing regions of the North and Centre, have a density of 100 trees/ha. Under irrigated conditions – the case of olive orchards in the South – the density is 160 tree/ha.

Two types of irrigation are practised: perennial irrigation in the olive-growing areas covered by the Regional Agricultural Development Boards, such as Haouz, Tadla, Errachidia, Souss-Massa, etc., and supplemental irrigation, located primarily in the regions of Marrakech, Beni Mellal, Azilal, Taza, El Kelâa, Boulemane, Oujda and Nador.

Crop yields in 2009/10 were almost on a par in conventional and organic olive orchards, working out at 2.04 and 2.00 kg/ha respectively, while they reached 5.00 kg/ha in orchards growing olives for oil and table olive production under geographical indication schemes.

Cultural practices and harvesting are totally mechanised on 10 000 ha (1.4%) and partially mechanised on 455 000 ha (62%); a further 270 000 ha (36.6%) cannot be mechanised.

3.3. Location

The main producing areas stretch across almost the whole of Morocco, except for the Atlantic coastline, although the geographical breakdown of orchards reveals that there are three major areas:

- North: Chefchauen, Taounate and Ouezzane where the soils are poor, the terrain is rough and the rainfall is 1 000 mm/year.
- Centre: Taza, Fez and Meknes where the soils are rich and deep, the terrain is not very rough and the rainfall is between 450 and 500 mm/year.
- South: Haouz, Tadla, Safi and Essaouira where the soil is quite rich, the terrain is flat, the rainfall is less than 400 mm/year and orchards receive perennial or supplemental irrigation.

3.4. Varieties

The olives grown in Morocco mainly belong to the 'Picholine marocaine' population variety, which accounts for over 96% of the country's olive assets. The remaining 4% is made up of the 'Picholine du Languedoc', 'Dahbia' and 'Meslala' varieties, which are grown on irrigated land (Haouz, Tadla, El Kelâa), and some Spanish and Italian varieties such as 'Picual', 'Manzanilla' 'Gordal' and 'Frantoio'. (Source: Ministry of Agriculture)

The National Agricultural Research Institute began surveying the 'Picholine marocaine' variety a few years ago under its varietal improvement programme in order to select the top performing clones. This work has led to the selection of two worthwhile clones, called 'Haouzia' and 'Menara', which are currently being disseminated.

Picholine marocaine

This variety is well adapted to the soil and climatic conditions throughout Morocco. It has undergone selection to introduce clones with specific characters in new orchards. It is hardy and has a medium rooting ability.

Its start of bearing and time of flowering are intermediate. It is partially self-compatible and it has a medium pistil abortion rate. It produces abundant pollen. Owing to its resistance to drought, it is used as root-stock for the 'Picholine Languedoc'. Its productivity is high but alternate.

It is a typical dual-purpose variety. When intended for pickling, it provides every kind of product, from split green olives to ripe black olives. It is freestone. It gives a medium oil yield at the mill (20%). The oil is excellent quality and has a very high oleic acid content. Another characteristic of the oil produced from this variety is its resistance to freezing (it remains fluid at even -12ºC). Hence, it is used for canned products. It is sensitive to olive leaf spot.

Meslala

This productive variety is of medium hardiness. It is grown in areas that are irrigated or that have good rainfall. It is rated highly for green pickling, but it can also be used for producing good quality oil although it does give a medium yield at the mill. It has a medium rooting ability. It comes into bearing late and its time of flowering is intermediate. It is self-compatible and it has a medium pistil abortion rate. It produces abundant pollen. Its productivity is high and alternate. The fruit has a low removal force and a low oil content. It is freestone.

It is resistant to olive leaf spot but appears to be very sensitive to olive knot.

Haouzia

This recent variety belongs to a clonal selection of the 'Picholine marocaine'. It differs from the other clones selected in the number of perfect flowers per inflorescence, its early start to bearing, its greater suitability for leafy stem propagation and its higher productivity. It is hardy and has a high rooting ability.

When irrigated, the first fruiting occurs in the third year; its time of flowering is intermediate. It is partially self-compatible and it has a high pistil abortion rate. The 'Picholine Languedoc' is used as a polliniser for this variety. Its productivity is high and alternate. The time of ripening is intermediate. It is used for both oil extraction (yield of 23%) and green pickling. It is freestone.

It is highly resistant to olive leaf spot and tolerant of olive knot and drought.

Menara

This new variety is a clonal selection of the 'Picholine marocaine'. It differs from the latter in its better suitability for leafy stem propagation, the number of flowers per inflorescence and the higher number of perfect flowers it produces. It also differs in its early start of bearing and its higher productivity. It is very hardy and has a high rooting ability.

When irrigated, it grows and comes into bearing very quickly (third year). Its time of flowering is intermediate. Although partially self-compatible, it is advisable to grow it with a suitable polliniser such as the 'Picholine Languedoc'. It has a medium pistil abortion rate and it produces abundant pollen. Its time of ripening is intermediate. It is used for oil production (oil content of 24%), giving a good quality product, as well as for green or black pickling. It is freestone.

It is particularly resistant to olive knot.

(Source: World Catalogue of Olive Varieties, IOC)

3.5. Olive oil: production

In 2009/10, Morocco produced some 140 000 t of olive oils. Generally speaking, production has been moving up constantly. The same is true of the organic olive oil segment, which has expanded from 200 t in 2004/05 to 3 600 t in 2009/10.

This upward movement is also confirmed by the 41.77% increase in Moroccan olive oil production recorded between the averages for 1990/91–1999/00 and 2000/01–2009/10 (see Table 3).

3.6. Olive oil: processing sector

Traditional oil mills (maâsras) and large-scale or medium-scale facilities exist side by side in Morocco's olive oil processing sector.

The traditional segment comprises 15 257 oil mills with the capacity to crush 2 007 t/hour. In addition, there are 297 press mills with a production capacity of 187 t/hour and 288 continuous-process facilities (two or three-phase) with a production capacity of 679 t/hour, bringing aggregate production capacity to 22 976 t/ hour.

Owing to obsolete, antiquated equipment some mills still produce lampante grade oils which require refining to make them fit for human consumption. Other reasons are the poor quality of the olive fruits (due to pests and disease or to damage during pole harvesting) and their perishable nature, which is accentuated by the fact that the olives are transported in bulk and sometimes stored for a long time prior to crushing.

This combination of factors has a very negative impact on product quality as can be seen from the figures for 2009/10 when 60% of the oils produced were still lampante virgin grade and no more than 5% were extra virgin.

(Source: IOC questionnaire)

3.7. Olive oil: marketing, domestic consumption and foreign trade

The olive oil market is free. Prices swing widely from year to year in step with the volume of production and export opportunities. During the 2009/10 crop year, the average farm gate price paid to producers for conventionally grown oil-olives was DH 2.50-3.00/kg, and DH 3.00- 4.50/kg for organic crop. Oil-olives grown under GI status fetched a price between DH 3.50–4.50/kg (at an exchange of 1 euro = 11.50 dirhams).

In the case of virgin olive oils, the prices paid for product coming out of the mill were DH18–25/ L for non-organic product and DH 30–35/L for organic. GI olives fetched an average price of DH52/L.

Domestic consumption of olive oils has been rising almost constantly since 2000/01 (35 000 t), although with a dip in 2004/05, after which it recovered to reach a high of 90 000 t in 2009/10, helped by the bumper production that year, which also had a positive impact on exports, Further review of the consumption trend between the two periods shown in Table 3 reveals 35.97% growth in domestic consumption between the two decades. Per capita consumption of olive oils amounted to 2.57 kg/ head in 2010.

On the export front, in the last decade, Moroccan exports of olive oils have ranged between 0.0 t in 2000/01 and 21 000 t in 2009/10, with significant fluctuations in between. As can be seen from Table 3 below, the olive oil export sector grew by 29.87% from 1990/91–1999/00 to 2000/01–2009/10.

Imports have also recorded large oscillations, going from 4 500 t in 2000/01 to 0.00 t in 2009/10 while peaking at 10 550 t in 2002/03. However, in average terms, percentage growth between 1990/91 and 2000/01–2009/10 has been spectacular (+284.61%) although in absolute terms the average tonnages are relatively low (Table 3).

Table 3. OLIVE OIL (Source: IOC)

	Average (t) 1990/91–1999/00	Average (t) 2000/01–2009/10	Change (%)
Production	52 900	75 000	41.77
Consumption	45 450	61 800	35.97
Imports	1 300	5 000	284.61
Exports	8 200	10 650	29.87

3.8. Table olives

As can be seen from Table 2, from 2000/01 to 2009/10 table olive production ranged within an interval between 80 000 t and 100 000 t, with a peak of 120 000 t in 2003/04.

Itemised by type, the 90 000 t produced in 2009/10 were made up of:

- 50 000 t of black olives (56%)
- 35 000 t of green olives (39%)
- 5 000 t of olives turning colour (6%)

Consumption has fluctuated somewhat over the seasons from 2000/01 (21 000 t) to 2009/10 (32 000 t). However, comparison of the average consumption figures for the two decades reported in Table 4 shows a steady performance, with 29 950 t in 1990/91–1999/00 and 31 000 t in 2000/01–2009/10. Per capita consumption came to 0.91 kg of table olives in 2010.

Moroccan imports of table olives are insignificant. In contrast, it does a large amount of trade in table olive exports, which have gone from 62 500 t in 2000/01 to 68 000 t in 2009/10, while the ten-year export averages (see table below) work out at 58 900 t for the first decade reported and 61 650 t for the second.

Table 4.TABLE OLIVES (Source: IOC)

	Average (t) 1990/91–1999/00	Average (t) 2000/01–2009/10	Change (%)
Production	86 000	93 000	8.1
Consumption	29 950	31 000	3.5
Exports	58 900	61 650	4.6

3.9. Future measures

The Moroccan State and the olive industry decided that the national olive growing sector needed to be overhauled in the medium and long term if it was to become more competitive and that all the economic stakeholders and players in the sector needed to be involved in this upgrading process.

In 2009 the two sides signed an agreement which was to be the framework for the implementation of a programme featuring concrete action targeted at the different branches of the commodity chain. This agreement fits into the broader scope of an ambitious agricultural development plan for Morocco known as the *Maroc Vert* plan (see Table 5).

Aimed at making the olive sector more competitive, the goals of this programme are for Morocco to grow olives on 1 220 000 ha of land, to produce around 2.5 million t of raw olives and to export 120 000 t of olive oil and 150 000 t of table olives by 2020.

Table 5. *MAROC VERT* PLAN FOR 2020: OBJECTIVES FOR OLIVE GROWING

Area (ha)	**1 220 000**
Total production of olives (t) **- Olive oil** **- Table olives**	**2 500 000** **330 000** **320 000**
Domestic consumption (kg/capita/year) **- Olive oil** **- Table olives**	 **4** **5**
Exports (t) **- Olive oil** **- Table olives**	**120 000** **150 000**

(Source: Ministry of Agriculture, Morocco)

The action planned to improve and restructure olive growing by 2020 entails:

- Creation of new orchards over an area of 440 000 ha;
- Renovation of 300 000 ha of existing olive orchards;
- Installation of micro-irrigation facilities in 136 000 ha of existing and new olive orchards;
- Identification of potential aggregation projects: 170 projects (Pillar I) and 340 projects (Pillar II);
- Strengthening of technology transfer, training and technical support schemes for producers in tune with industry needs;
- Strengthening of research on olive cultivation and olive oil extraction.

(Source: IOC questionnaire)

The main pivots of the programme agreement are:

- Completion of 510 integrated projects to improve productivity and quality
- Solid, long-lasting development
- Installation of two olive research clusters at Marrakech and Meknes to strengthen research efforts
- Promotion and export diversification
- Strengthening of supervisory and applied research programmes

(Source: Ministry of Agriculture, Morocco)

4. SOURCES

IOC questionnaire

IOC database

http://www.internationaloliveoil.org/estaticos/view/130-survey-and-assessment-division

United Nations

http://data.un.org/Default.aspx

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Ministry of Agriculture Morocco

http://www.agriculture.gov.ma/pages/acces-fillieres/filiere-oleicole