Morocco
Oilseeds sector review
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David Jackson
Commodity Market Specialist, LMC International

Yamina Cherrou
Agricultural Economist, Investment Centre Division, FAO

Nuno Santos
Economist, Investment Centre Division, FAO

COUNTRY HIGHLIGHTS
prepared under the FAO/EBRD Cooperation
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This joint publication of the Food and Agriculture Organization (FAO) and the European Bank for Reconstruction and Development (EBRD) reviews Morocco’s oilseed sector. It was prepared to identify policy options supporting the development of the sector.

A mix of quantitative and qualitative evidence was used to conduct the research, in particular a review of existing literature, field work, and the analysis of data collected through interviews with farmers, oilseed processing companies, and other industry stakeholders.

The study elaborates on prospects for oilseed production and consumption in Morocco as well as trade and policy measures. It provides meaningful international comparisons to assess the efficiency of both production and processing of oilseeds in Morocco. The analysis conducted on production efficiency looked into different typologies of farms and agro-ecological systems, possible rotations with cereals and other crops, the potential impact of extreme climatic events, and policy-induced distortions.

In terms of processing, the report provides an analysis of margins in an international context and discusses the impact of trade policies on the competitiveness of Moroccan oilseed crushing and refining. It also includes information on key market players and the sector dynamics. Moreover, the report looks at the expected growth of demand for oilseeds in Morocco in the form of direct consumption of vegetable oil and for livestock feed production. The study includes estimates of the expected evolution of demand for oilseeds in the country and its impact on the import bill. Finally, this review identifies key constraints and opportunities for the development of the sector and suggestions in terms of policy options.

The Moroccan oilseed sector has experienced a substantial decline since the 1990s. This process started with the elimination of high guaranteed minimum prices in 1996 and continued during the reforms of the internal market and trade liberalization programmes of the 2000s. The most important milestone of this period was the signature of the bilateral free trade agreement with the United States in 2006.
As a result, by 2011, 60 percent of the value of US agricultural exports to Morocco was composed of oilseeds and oilseed products. At the same time, combined vegetable oil and oilseed meal imports represented more than one-quarter of total Moroccan agricultural imports in 2011. The expected growth in domestic animal protein consumption will support this trend in the foreseeable future. While there is growing demand for oilseeds in Morocco, the supply side faces significant challenges from production to processing. Securing a viable future for the Moroccan oilseed complex will require delicate management.

While this report was being finalized, the Royal Government of Morocco advanced with a new important initiative for the oilseeds sector: the signature of a contract (“contrat programme”) with the Fédération Interprofessionelle des Oléagineux (FOLEA) – a professional association composed of the key oilseed supply chain actors – for the period 2013–2020. The full eight year programme is worth approximately MAD 421 million (USD 51 million), of which 28 percent is financed by the government. The programme target is to reach 127 000 hectares of cultivated oilseed crop surface in Morocco. Moreover, the new programme aims to produce 93 000 tonnes of oilseed oil in 2020, compared with fewer than 10 000 tonnes in 2011.
This study was carried out under the FAO/EBRD cooperation to inform EBRD’s agribusiness investments in the Southern and Eastern Mediterranean (SEMED) region. It was financed by FAO and by EBRD’s SEMED Multi-Donor Account (MDA), which provides grants for EBRD technical cooperation projects across all sectors of operations in Egypt, Jordan, Morocco and Tunisia. The SEMED MDA is funded by Australia, Finland, France, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom.

The document was developed in close collaboration with Agropol in view of the wider cooperation between FAO, Agropol and the Fédération Nationale des Syndicats d’Exploitants Agricoles (FNSEA), a French umbrella organization representing 20 000 local agricultural unions.

The main authors of the study are David Jackson, Commodity Market Specialist, LMC; Yamina Cherrou, Agronomist, Investment Centre Division, FAO; and Nuno Santos, Economist, Investment Centre Division, FAO. Nuno Santos was also responsible for the coordination of the research team, while local support, data gathering and information was provided by Mr. Azeddine El Brahli, Agronomist. Arianna Carita, Economist, Investment Centre Division, FAO, conducted a literature review and provided support for the implementation of the study.

The study benefited from previous research conducted by Agropol on oilseed production aspects and rotation with cereals. Substantial discussions and information exchanges took place with Guénaël Le Guilloux, Directeur, Agropol, as well as reviews by Frank Duroueix, Agronomist, CETIOM (Centre technique interprofessionnel des oléagineux et du chanvre), France’s technical centre for oilseed crops and industrial hemp.

Iride Ceccacci, and Hoda Youssef, Office of the Chief Economist, EBRD provided leadership and coordination on behalf of the EBRD, as well as comments on initial drafts of the study.
The authors would like to express their gratitude for the kind support and useful comments received from the Moroccan Ministry of Agriculture and Maritime Fisheries (MAMF), notably from Mme Asma Hamzaoui, Service Chief for Planning and Development Plans in the Crops Division, who was appointed as Government focal point for this study by the Secretary General of the MAMF. The report also benefited from constructive comments by industry stakeholders (from both the private and public sectors) present at the International Trading Summit on Grains & Oilseeds held in Casablanca, from 6 to 7 March 2013.

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<tr>
<td>ASAL</td>
<td>agricultural sector adjustment loans</td>
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<tr>
<td>CAGR</td>
<td>compound annual growth rates</td>
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<td>CAM</td>
<td>Group Crédit Agricole du Maroc</td>
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<td>COMADER</td>
<td>Confederation of Moroccan Agriculture and Rural Development</td>
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<td>COMAPRA</td>
<td>Compagnie Marocaine de Commercialisation de Produits Agricoles</td>
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<tr>
<td>DPA</td>
<td>Direction Provinciale de l’Agriculture (Provincial Agricultural Directorate)</td>
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<td>DSS</td>
<td>Directorate of Strategy and Statistics of the Moroccan Ministry of Agriculture and Marine Fisheries</td>
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<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>FAPRI</td>
<td>Food and Agriculture Policy Research Institute</td>
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<td>FDA</td>
<td>Fonds de Développement Agricole</td>
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<td>FOLEA</td>
<td>Fédération Interprofessionnelle des Oléagineux</td>
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<td>FTA</td>
<td>free trade agreement</td>
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<td>GATT</td>
<td>General Agreement on Tariffs and Trade</td>
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<td>GDP</td>
<td>gross domestic product</td>
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<td>GoM</td>
<td>Government of Morocco</td>
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<td>IED</td>
<td>income elasticity of demand</td>
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<td>IFS</td>
<td>International Foundation for Science</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<td>MAD</td>
<td>Moroccan dirham</td>
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<td>MAMF</td>
<td>Moroccan Ministry of Agriculture and Marine Fisheries</td>
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<td>MFN</td>
<td>most favoured nation</td>
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<td>OCE</td>
<td>Office de Commercialisation et Exportation</td>
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<td>ONICL</td>
<td>Office Nationale Interprofessionnelle des Céréales et Légumineuses</td>
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<td>ONT</td>
<td>Office Nationale de Transport</td>
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<td>ORMVA</td>
<td>Offices Regionale de Mise en Valeur Agricole</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>ORMVAD</td>
<td>Regional Office for the Agricultural Development of Doukkala</td>
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<td>PLV</td>
<td>Plan Maroc Vert</td>
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<tr>
<td>SBE</td>
<td>soybean meal equivalent</td>
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<td>SN</td>
<td>Société Nationale d’Investissement</td>
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<tr>
<td>TRQ</td>
<td>tariff-rate quota</td>
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<tr>
<td>UNCAM</td>
<td>Union Nationale des Cooperatives Agricoles Morocaines</td>
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<tr>
<td>URAA</td>
<td>The Uruguay Round Agreement on Agriculture</td>
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<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
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<tr>
<td>VAT</td>
<td>value-added tax</td>
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<td>WTO</td>
<td>World Trade Organization</td>
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EXECUTIVE SUMMARY

Introduction

The Moroccan oilseed sector has experienced a substantial decline since the 1990s. The decline began with the cessation of high guaranteed minimum prices in 1996, and it continued during the government’s internal market reforms and trade liberalization programmes of the 2000s. The most influential factor in the liberalization of the oilseed complex was the bilateral free trade agreement (FTA) with the United States in 2006. Although guaranteed producer prices were re-introduced in 2003, this were at a much lower level than those prices of the early 1990s.

At the same time as trade protection was lowered for most of the oilseed complex, comprehensive interventions were put in place for the politically sensitive wheat/bread value chain.

As Figure 1 reveals, these decisions have led to the sharp contraction of Morocco’s domestic oilseed production. Meanwhile, the production area of common wheat has more than doubled since the mid-1980s. Even at its late 1980s peak, however, the oilseed area only represented about 4 percent of the total acreage of cereals. Today, oilseed area is only 1 percent of the total, with the majority of this area dedicated to sunflower seeds as a foodstuff rather than for crushing for oil.
Figure 1: Oilseed area in Morocco, 1987–2011

Source: Moroccan Ministry of Agriculture and Marine Fisheries (MAMF).

Figure 1 also illustrates the historical importance of sunflower in Moroccan domestic oilseed output. The fluctuation of sunflower seed acreage explains almost all of the variation in total oilseed area from the peaks of the early 1990s to the lower levels cultivated since the late 1990s. Sunflower output is even more volatile than sunflower area, thanks to the propensity for dry years even in the relatively favourable sunflower growing regions.

The decline of the oilseed sector can be traced to a number of factors:

- Farm economics: Government intervention in the wheat sector, which provides support prices at above international equivalents and a guaranteed market, has improved the profitability of cultivating common wheat compared with sunflower. By contrast, there has been relatively little official, direct support in the sunflower sector until recently. This issue is fully explored using crop margin analysis in Chapter 2.

- Trade liberalization: The government has embarked upon a programme of significant tariff reductions and bilateral trade agreements. In combination, these twin liberalization policies have eliminated much of the tariff protection previously
available to domestic producers of oilseed meal and crude vegetable oil. Therefore, crushing margins have been squeezed in direct competition with product imports.

- Institutional support: The state-financed Compagnie Marocaine de Commercialisation des Produits Agricoles (COMAPRA) provided organizational support and transparent prices in the sunflower sector until its demise in 2007. With multiple small-scale sunflower producers in Morocco, the lack of organized collection and delivery systems and a centralized input provision have been a deterrents for many small farmers. In general, the lack of a well-structured oilseed supply chain compared with cereals translates into uncertainty for farmers marketing their crop.

The agricultural sector in Morocco has recently benefited from a renewed political commitment with the launch of the Plan Maroc Vert (PMV) in 2009. This plan sets the scene for an ambitious revival of commercial agriculture, recognizing its role as a key engine of growth and poverty reduction. While the PMV does not discriminate between any agricultural subsectors, its ambitious targets for 2020 mostly focus on export crops (citrus, fruits, vegetables and olive oil), cereals (targeting a decline in area but an increase in yields), meats and milk products.

Until 2012, the oilseed sector only had one regional project dedicated to oilseeds (in Meknes Province). This changed with the signature of a contract (contract programme) between the Government of Morocco (GoM) and the Fédération Interprofessionelle des Oléagineux (FOLEA; a professional association composed of the key oilseed supply chain actors) for the period 2013 to 2020. The full eight year programme is worth around MAD 421 million, of which 28 percent is subsidized by the government. The programme target is to reach 127 000 hectares of cultivated oilseed crop surface in Morocco: 85 000 hectares of sunflower and 42 000 hectares of canola. Moreover, the new programme aims to produce 93 000 tonnes of oilseed oil in 2020, compared with less than 10 000 tonnes in 2011.

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1 As discussed in Chapter 1 of this report, the new programme was created after the bulk of the analysis and preparation of this document took place. Therefore, it has not been analyzed in detail (also, it is too early in the implementation of the agreement to be able to extract major conclusions). Moreover, as per negotiations underway during the preparation of this report, some of the policy options presented here (namely policy options one and two) coincide with some of the directions taken by GoM in support to the sector.
The new programme includes the following key support measures:

- subsidy for acquisition of agricultural materials specifically for oilseed crop production;
- a premium on bulk selling of oilseed crop (aggregation);
- a 10 percent subsidy of storage unit investment costs;
- a minimum guaranteed price for producers between MAD 4,000 and 5,000 per tonne, which is linked to the evolution of the international market prices of canola and sunflower.

**Oilseed production**

From 1994 onwards, low margins compared with other crops (principally cereals and legumes, notably fava beans) can explain the decline of sunflower production. In addition to the general reasons listed above, sunflower crop margins declined relative to other crops because of:

- Policies favouring wheat monoculture (attractive guaranteed prices, storage and seed subsidies, technical and extension support). Iniquitous policy distortions have led to weak prices compared with cereals and fava beans, which also receive greater market price support (trade policies).

- An unsecured market. Deregulation of the oleaginous value chain was in effect from 1996, reducing sunflower producer prices. The demise of COMAPRA in 2007 removed the guaranteed market for sunflower seeds. The lack of a structured supply chain has created uncertainties for farmers in marketing their sunflower crop.

- Extensive cultivation practices that deliver low yields.

In the crop margin analysis conducted in this report, both sunflower and canola are considered as potential oilseed crops in Morocco under a variety of regional and agronomic conditions, comparing both current and improved farm technology systems.
(At present, canola is not cultivated at a commercial scale, only in trial plots).

Our analysis, based on crop averages for the past three years, suggests that:

- Moroccan domestic bread wheat prices have traded at 5 percent above the world (European Union) market equivalent;
- Moroccan domestic fava bean prices have traded at 18 percent above the world (European Union) market equivalent;
- Moroccan domestic sunflower seed prices have traded at 11 percent below the world (European Union) market equivalent.

Although these differences in percentages might appear relatively small, our analysis shows that, combined with farming practices and agricultural potential differentials, they have been enough to tip the balance away from sunflower in Moroccan arable farming. The marketing of wheat and fava beans is also much easier because legumes are sold or used on-farm for direct consumption by local livestock, whereas sunflower seeds have to be processed. Without a level playing field of prices and marketing, farmers have withdrawn from sunflower in favour of more attractive returns from other crops.

The results were potentially more promising for canola than for sunflower, although the results for canola were based on slightly lower yields than those results obtained in canola plot trials in Morocco and assumptions on prices. Compared with other rain-fed crops — such as wheat, sunflower, fava beans, barley, mixed forage and weedy fallow — canola was the most profitable in viable regions for medium- and large-scale farmers. In addition, as a technically more complex crop, canola is not a realistic option for small-scale, under-resourced producers in Morocco at present.

Despite canola’s promising initial results, there are a number of obstacles that would have to be overcome before achieving these margins on a significant commercial scale in Morocco. These obstacles include:

- delivering the same yields on a commercial scale as in field trials, especially given the technical difficulties of growing canola;
downward pressure on the local canola price if canola products have to be exported or priced at discounts to capture domestic markets;

making minor adaptations to crushing plants to process local canola;

securing local markets for canola meal in a country used to soybean meal. Some sectors, such as dairy and cattle, would be more suitable as targets for canola meal.

In contrast with canola’s technical nature, sunflower is an accessible crop for all farmers. At present, however, our analysis confirms that its margins are compromised by the iniquitous domestic policies mentioned above. As a result, sunflower’s crop margins today are rarely better than other crops’ margins such as those for fava beans, durum wheat or monoculture wheat in Morocco. And sunflower is at a disadvantage in marketing terms.

**Removing price distortions**

The crop budget analysis uses prevailing domestic crop prices (with the exception of the estimate for canola). To highlight the influence of the market distortions, we conducted the same analysis under international (rather than domestic) price conditions. The results of this analysis are presented in Figure 2. We have used margins for current practice and improved technology for medium-scale farmers in the northern region of Morocco as the consistent comparison group in the diagram. The following key results were obtained:

- According to international prices, margins are higher for both sunflower and canola but lower for the key competing crops, wheat and fava beans. This shows that domestic price support policies disadvantage oilseeds in Morocco.
• Under current practices, international price conditions over the past three years would make sunflower margins better than both fava beans and monoculture soft wheat. With the prevailing policy regime in place, sunflower performs worse than wheat and broadly similar to fava beans.

**Figure 2: Moroccan crop margin comparison with domestic and international prices (northern, medium-scale farmers and normal rainfall)**

*Source: Authors’ estimates.*

### Agronomic and economic value addition of introducing sunflower or canola in cropping systems

Even without superior margins to cereals, there exist compelling agronomic reasons for preserving the role of oilseeds in farm rotations. Crop rotation is a key management practice in farming systems. A well-planned rotation reduces diseases, pests and weeds. In addition, it provides benefits such as increasing soil fertility, improving physical and chemical soil structure and diversifying farmers’ incomes.

The introduction of oilseed crops in cereal-based cropping systems has had positive agronomic and economic impacts. Canola, which has an intensive root system, is known as a good crop for
preceding cereals. Sunflower can improve rainfall water efficiency and nutrient uptake since it uses a different crop rooting system compared with cereals. It also needs fewer inputs compared with wheat. However, canola and sunflower leave low storage water in the soil, and sunflower leaves low nitrogen levels.

In order to capture the dynamic effects of crop rotation, Figure 3 compares the average margin per annum for different farm cropping systems in Morocco, adopting both prevailing domestic prices and international prices. We present the expected value of the margins, i.e. the cropping system (three or four year rotation) margin is weighted by the historical average rainfall pattern between dry and normal years. The margins are presented for medium-sized farmers in the northern region, comparing less intensive current practices with more intensive, improved technology systems. Canola is not a realistic option under the less intensive current practices and so is included under the improved technology crop systems.

Figure 3: Moroccan crop system average margins with domestic and international prices and with average historical rainfall

Source: Authors’ estimates.
The analysis presented in Figure 3 suggests that:

- Wheat and fava bean prices are higher under prevailing domestic conditions than the international equivalent. This is why rotations focused on wheat and fava beans decline under international parity conditions.

- By contrast, in recent years domestic sunflower prices have been lower under domestic conditions than the international equivalent. Therefore, rotations with a weighting towards sunflower (wheat/wheat/sunflower) are higher under international parity conditions.

- The weakest crop systems do not include any rotational element. With the domestic price distortions currently in place, rotating sunflower or fava beans with wheat in a one-third rotation provide very similar returns under less intensive current practices. However, if international price conditions prevailed in Morocco, sunflower and wheat would be the optimal crop system by some distance.

- With more intensive practices and if domestic price distortions were removed, sunflower would be a much better rotation with wheat than fava beans. However, if canola could overcome the obstacles outlined above, it could be the most suitable rotation crop in Morocco.

An oilseed and wheat rotation would be an appropriate solution for a modern, improved farm system in Morocco. However, sunflower is currently disadvantaged by domestic policy bias towards fava beans and wheat, while canola would require concerted efforts to realize its full potential. In the short term at least, sunflower offers a familiar and technically easier way of improving rotations for many Moroccan arable producers, especially if prices of competing crops come to reflect international prices more closely. This practice need not exclude fava beans, which could also be included in the same rotation.

**Oilseed processing**

The oilseed crushing sector in Morocco has suffered greatly in recent years from the trade liberalization programme. Crushing has almost ground to a halt thanks to a potent combination of reduced domestic sunflower seed output and changes in the import policy regime for soybeans.
The total oilseed crush was 500 000 tonnes at its peak in the mid-2000s, with most from imported soybeans. In 2011, the crush was below 100 000 tonnes, with the vast majority of oilseed product demand satisfied by importing oil and meal directly rather than importing seeds and beans to crush. The 2012 crush was destined to be even lower than the 2011 figure.

Despite the problems in encouraging sunflower seed cultivation in Morocco, local sunflower crushing appears to have been profitable until very recently. Domestic crushers have benefited from two substantial forms of support:

- Tariff protection was in place on sunflower oil and meal before the trade liberalizations commenced in 2009. Since then, the oil tariff has reduced from 20 percent to 2.5 percent, and sunflower crushing margins have declined sharply, although the (far less important) meal tariff remains at 23.5 percent.

- Crushers are compensated for the spread between the minimum guaranteed domestic producer price for sunflower seed of MAD 4 000 and the prevailing world price under a formula that also accounts for marketing expenses and quality differentials. These compensation payments appear far greater than the actual difference between the cost of importing seed and the guaranteed minimum producer price. The net result is that crushers pay less for their seed than the world market equivalent, but sell their products above the world market equivalent, thanks to the tariff protection described above.

These forms of protection raised the average Moroccan sunflower crushing margins to approximately double those of sunflower seed crushers in the European Union over the last decade. This situation changed abruptly, however, with the sharp decline in the oil tariff from 2010 onwards.

The two existing sunflower crushers in Morocco suffer from aging equipment, poor capacity utilization and high-energy costs. However, as sunflower was previously crushed in addition to the much larger crush of imported soybeans, sunflower crushing at the time could be undertaken on a variable cost basis only. Fixed costs could be shared with the dominant soybean crush. Crushing sunflower provides a guaranteed supply of crude oil to the very profitable vegetable oil refining and bottling sector, even when crush margins are low. Both crushers in Morocco are integrated into vegetable oil refining and bottling.
Soybean crushing was viable with the previous tariff regime in place, but without these tariffs, this sector became unprofitable. This underlines why crushing halted in Morocco in the past two seasons. It is highly unlikely that the FTA with the United States will be abandoned, and without tariff protection the soybean crushing sector in Morocco appears threatened.

Without the soybean crush to support overall capacity utilization, sunflower crushing facilities would have to adjust their capacities to fit the reduced size of the domestic oilseed crop. Current domestic oilseed volumes are not viable for commercial crushing plants, and so the fate of the Moroccan crushing sector rests upon stimulating a larger domestic oilseed crop, in combination with more efficient, lower cost processing.

In contrast, the vegetable oil refining sector has benefited from the reduction in crude oil import tariffs, which have been eroded to 2.5 percent for sunflower oil and eliminated completely for soybean oil. The tariff on imported refined crude oils, meanwhile, has remained at 20 percent. This has resulted in a very favourable import tariff regime for refiners since 2009, with a large difference between the import prices they pay for crude oil and the price they receive for sales of refined oil.

Nonetheless, refined oil imports are set to enter a transitional phase of tariff reduction following the pattern of trade liberalization in the crushing sector. Under the terms of the FTA with the United States, Morocco’s tariffs on refined vegetable oil imports are scheduled to be reduced over a ten year period.

The Moroccan Government has confirmed that it intends to extend its liberalization programme to the refining sector next. If tariffs on refined oil were reduced to the same level as those on crude oil, the current profitability of the refining sector would change dramatically. With Moroccan refining costs estimated at USD 100 per tonne of oil, such a reform would not leave any profit for refining sunflower oil and very slim profits for refining soybean oil (USD 10 per tonne on average for the past decade).

This is not very unusual for the refining sector worldwide. While international costs are typically lower than in Morocco by around 20 percent, refining is a very competitive business characterized by low margins and high volumes. In addition, refiners tend

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2 This is a key element of the new contract programme for 2013–2020.
to refine merely to ensure a captive supply of oil for the more lucrative bottling and retail pack oils sectors. Moroccan refiners are integrated upstream into these sectors.

Moroccan refining costs are also hamstrung by high domestic energy costs, which represent around one-third of refining costs, a degree of over-manning and old machinery. Moreover, most industries around the world still employ some element of tariff protection. With investment, the Moroccan refining sector would be likely to stand on its own if it could maintain some, albeit reduced, element of tariff protection.

In both crushing and refining, the prospects for costs at the largest plants, which belong to Lesieur Cristal, have received a boost following the substantial investment of the French company, Sofiprotéol. Three improvements to processing prospects are:

- with improved capital and techniques, crushing and refining costs are likely to be reduced by at least 20 percent (to around USD 80 per tonne of oil for refining and USD 40 per tonne of seed for crushing);

- under these conditions, assuming zero tariffs on crude oil and averaging over the last ten years, refining would be profitable for soybean oil without any tariff and for refined sunflower oil as long as a tariff of at least 3 percent was retained;

- a captive flow of oil would continue to be supplied to the lucrative bottling and pack oil sector, preserving its domestic value.

For crushing, lowering costs would improve the outlook, but the fundamental problem of sourcing raw material supplies would continue. With the small domestic sunflower crop now grown largely for seeds for direct consumption as food, and soybean imports replaced by direct oil and meal imports, lower costs will only help if the crushing plants have good capital utilization with sufficient throughput of domestic oilseeds. Refining is highly likely to survive in Morocco, but it is a question of whether it will be supplied solely by imported crude oil or whether those supplies will be supplemented by domestic oilseeds crushed alongside imported soybeans.
**Consumption and trade**

The decline in Moroccan oilseed production and crushing has coincided with a boom in oilseed product consumption. Over the period from 1990 to 2011, annual oilseed meal demand expanded at a startling 10.6 percent per annum, while the rate for oil consumption increased at an impressive 3.6 percent. However, total oil demand stalled between 2005 and 2011, increasing by an annual rate of just 0.2 percent. Nonetheless, meal demand continued to charge ahead, improving at an impressive 7.5 percent per year, despite the setback of the 2008 to 2009 global recession.

With declining production and expanding demand, it is not surprising that imports of oilseed products have ballooned in recent years. Figure 4 illustrates the switch from imports of oilseeds for crushing in Morocco to the direct importation of oil and meal products with the liberalization of trade.

**Figure 4: Net imports of oilseeds, oilseed meal and vegetable oil in Morocco, 1990–2011**

![Net imports graph](image)

*Source: Ministry of Customs and Trade.*

The net result of the import programme is that the cost of the import requirement for vegetable oils is estimated at more than USD 600 million in 2011.
For the future, we expect Moroccan oil consumption to expand at a healthy pace out to 2025, with total annual growth averaging 2.6 percent. One percent of this growth is owing to the increase in population, with the rest owing to the response of demand to the good gross domestic product (GDP) prospects. The young age profile of the Moroccan population will also support growth in oil consumption as many young people will move into the working age brackets over the next decade.

If Moroccan oil production from domestic crops remains at today’s level, the whole demand expansion will be met via oil imports and the total oil import bill will climb 50 percent to USD 950 million by 2025 (measured in constant 2011 US dollar terms).

The prospects for oilseed meal demand is the underlying growth in Moroccan meat consumption, thanks to good income and population prospects, as well as the PMV’s dedication to intensifying poultry and red meat output. Moroccan meat demand is therefore expected to grow by a robust 2.5 percent per annum to 2025.

If we assume that Moroccan oilseed meal output (from domestic crops) remains stagnant at today’s level, the whole demand expansion will be met via meal imports and the total oilseed meal import bill will climb 90 percent to USD 620 million by 2025, from USD 320 million in 2011. These figures assume that meal demand is satisfied by importing meal directly rather than importing seed, which is subsequently crushed in Morocco for meal.

Combined vegetable oil and oilseed meal imports in 2011 represented just over 0.9 percent of Moroccan GDP and 26 percent of Moroccan agricultural imports. The aggregate import bill for oil and meal will climb to USD 1.57 billion in 2025. In addition, the domestic food security imperative will be undermined by the growing necessity to import protein feed for livestock consumption.

A paradox has resulted from recent initiatives. The government is intent on reducing dependence on imported cereals and meat, but has presided over a rapidly increased dependence on imported meal to feed the expansion of livestock and over a rising import bill for vegetable oil. Acknowledging this, the new 2013–2020 programme on the oilseed sector will attempt to reduce the dependence on imports (about 20 percent target of domestic sourcing in 2020 versus 2 percent or less in recent years).
Requirements for a successful Moroccan oilseed sector

Securing a viable future for the Moroccan oilseed complex will require some delicate management. If we consider oilseed production first, the primary problem is that in most situations, returns on sunflower cultivation are currently no higher than alternatives such as fava beans and common wheat; and sunflower has a marketing disadvantage. This disadvantage is because both fava beans and wheat enjoy preferential policy treatment supporting their domestic prices above the international equivalent. Sunflower seed prices, meanwhile, were below the international equivalent in recent years.

As well as benefiting the stakeholders in the oilseed sector directly, reviving oilseed output in Morocco would have a number of advantages:

• balancing food security through an increasing supply of animal feed in a context of expected growth in animal protein consumption;

• supporting better use of existing industrial capacity;

• improving the long-term sustainability of arable regions through soil nourishment, which results from crop rotation.

On the other hand, there are a number of challenges to introducing a potential supporting mechanism. The first is various market distortions. Second, the supporting scheme involves a very small number of economic actors in Morocco: two crushers and a small percentage of in-country farmers. Finally, as with any agricultural support mechanism, the support might be difficult to suspend once it is already put in place.

To overcome these challenges and encourage sunflower cultivation, the minimum guaranteed price for sunflower seeds must increase relative to its principal competing crops. We discuss the options for achieving this in the policy options section below.

For canola, the potential returns for farmers look more encouraging. Crop trials suggest that canola margins for larger commercial farmers could exceed those for wheat and fava beans. The problems for canola are introducing and developing the crop on a widespread commercial basis in a region with very little history of canola cultivation or consumption. Both yields and prices could fall short of expectations.
In the oilseed processing sector, crushing has suffered from a chronic lack of raw materials as a result of the collapse of domestic sunflower production and the erosion of soybean crush margins following trade liberalization.

If these problems of sunflower and canola production are overcome, the collapse of domestic sunflower production will reverse as production expands. Substantial sunflower and canola imports are unrealistic without any significant tariff protection on vegetable oils.

As for the erosion of soybean crush margins, it is highly unlikely that the soybean trade liberalization set out in the FTA with the United States will be reversed. Soybean crushing, therefore, is likely to remain a victim of the structural adjustment process. The future for the Moroccan crushing sector rests squarely upon the rejuvenation of domestic oilseed output.

In the oil refining sector, margins have been extremely healthy in the past two years as the reduction in crude oil tariffs has not been matched by decreases in the tariffs on refined oils. The refining sector does not, therefore, currently require any assistance to maintain its activities. Costs could be lowered by perhaps 20 percent if more modern equipment and energy strategies were employed, but margins are sufficient for this to be covered internally. With the trade liberalization process due to be extended to refining, however, lowering the cost base now would allow the refining sector to absorb the transition more successfully than the crushing sector did.

**Policy options for the Moroccan oilseed sector**

In addition to the general agroclimatic challenges of agriculture in Morocco, the current policy mix is not conducive to revival. This is the result of different types of policies that are mainly linked to trade and price regulation. In order to inform the dialogue on a potential revival of the sector in Morocco, this report introduces four policy options for consideration: (i) supporting a pilot scheme on canola cultivation, (ii) increasing the guaranteed minimum price of sunflower seed, (iii) reducing the import tax on fava beans/legume crops and (iv) including a future, interim export tax for canola.
Such measures could potentially encourage and support the development of the oilseed sector in Morocco. Still, there is a substantial level of uncertainty and difficulty in their implementation. The analyses below are therefore accompanied by a summary of each intervention’s main advantages and disadvantages.

**Pilot scheme to encourage canola cultivation**

For commercial and rotational reasons, canola represents an attractive alternative to sunflower for oilseed cultivation. This in itself merits more investigation beyond the existing trial plots. In addition, given the present situation of market failure/infant industry status, it could also warrant public intervention.

As a new crop, canola would require a support initiative for a pilot scheme to demonstrate the benefits of canola farming in a target area, potentially focusing on large farmers in the northern region (which would be best suited for early adoption). The support initiative would need to be designed in detail, but in principle it could involve a mix of different interventions, such as providing crop finance, access to seed, extension services for crop management and clear collection and marketing channels for the pilot scheme.

The support initiative would also need to cover the crushing sector because the seeds would need a market. Overall, the key argument for public intervention is that of support to an infant industry and should be temporary. Once the supply chain is properly established and the sector is completely functional, the canola product can also be extended to sell on the international market.

The scheme would require only limited government finance and should be complemented by private support from the crushing sector. In principle, the support scheme could take the form of a partnership between public and private. The scheme could also be initiated with government backing via the aggregator programme of the PMV, ideally with crushers as the aggregators in the chain. However, other aggregators with similar experience in other crops could also be allowed to enter the sector. Crushers would then purchase seed from the storage facilities of these other aggregators. This would create a competitive environment for canola domestically, improving the price negotiating position of producers.
Advantages. If adopted at a sufficiently large scale, canola cultivation could contribute to improvements in the trade balance and reduction of import dependence. Most importantly, it would also contribute to a more balanced crop rotation that Moroccan farmers would be able to adopt. Canola is also commercially sound given the potential for exports and domestic consumption combined with the agro-ecological suitability. A pilot programme with private sector involvement (given existing industry crushing capacity) could result in a moderately low financial commitment by the government.

Disadvantages. One key problem is that canola cultivation is more technically demanding (vis-à-vis wheat for example). This means that it may be difficult to upscale and, most importantly, to reach the poorer farmers with smaller holdings. Moreover, while the conversion of land to cultivate canola would result in a net gain in the long run trade balance, it would lead to a negative trade balance in the short run (one growing season). This negative impact would come mainly from the increase in the amount of wheat imported to compensate for the decline in wheat cultivation area. There would also remain substantial obstacles to overcome in developing local markets for canola meal and oil, but the nearby European Union market would provide an insatiable outlet if necessary.

Increasing the guaranteed minimum price of sunflower seed

In this analysis, the domestic sunflower seed price (MAD 4 100 per tonne) is estimated at 1.6 times the soft wheat price (MAD 2 600 per tonne). At these prices, sunflower returns per hectare are typically lower than monoculture wheat margins and broadly in line with fava bean margins. As a result, sunflower area has been contracting in recent years, especially as its institutional support for collection and marketing has declined.

However, if the guaranteed minimum price of sunflower seed were raised to 1.8 times the price of soft wheat, then sunflower returns would be greater than both fava beans and soft wheat grown after another wheat crop. The politically sensitive nature of soft wheat prices makes it highly unlikely that these prices would be reduced.

Advantages. If a considerable amount of land were converted to sunflower, in the long run (after one full crop rotation pattern: wheat/wheat/sunflower), this conversion would lead to an overall
improvement in the trade balance. The long-term fertility of arable soils in these regions would be preserved, which would increase the long-term average wheat yield for Morocco, assuming sunflower regions are well managed for nitrogen levels.

**Disadvantages.** Although the conversion of land to cultivate sunflower would result in a net gain in the long run trade balance, it would contribute negatively to the trade balance in the short run (one growing season). This negative impact comes mainly from the increase in the amount of wheat imported to compensate for the decline in wheat cultivation area.

Crushers would have to be compensated more per tonne of sunflower seed as the spread between domestic and international prices would widen by the extent of the increased minimum producer price. And the volume of sunflower seed that this compensation is paid on would likely increase as sunflower area expands. This expansion would be partially offset by a decline in the volume of wheat receiving support. Nonetheless, some of our analysis suggests that the compensation paid to crushers has been greater than that required to offset the difference between local and international price equivalents, and margins have been supported at artificially high levels. If so, there would be an argument for reducing the compensation per tonne of sunflower, especially given the economies of scale that would be derived from increased domestic sunflower output. Finally, the crusher would also have higher costs of collection because of its new role as aggregator following the disintegration of COMAPRA in this role.

To provide a numerical illustration of the net changes in trade balance from the conversion of land from wheat to sunflower, we assume that 100 000 hectares of land is converted to growing sunflower. The numerical estimates use the data for large-scale farmers in the northern region of Morocco. The introduction of cropping rotation between wheat and sunflower (wheat/wheat/sunflower) would result in approximately an additional 1.2 tonnes of sunflower and a 0.25 tonne decrease in wheat output. Overall, it produces a net positive balance. However, this can also be subject to fluctuations in yield gains and losses.
Reducing the import tax on fava beans/legume crops

Increasing the guaranteed minimum price for sunflower seed would allow sunflower to displace a variety of competing crops in the Moroccan arable mix, but with a budgetary cost of supporting sunflower prices. An alternative option would be to lower the tariffs on the main competing crops of wheat and legumes, notably fava beans. For this report, we exclude the possibility of reducing support for the highly sensitive bread wheat sector. Similarly, we have not included the option of increasing tariffs on sunflower oil and meal. This leaves the option of reducing the import tariff on legumes, notably fava beans, which was 40 percent in 2013.

Advantages. The potential area to be captured from fava beans would be smaller than the area from wheat and all other crops. In 2009, fava bean area was 180,000 hectares, chickpea area was 70,000 hectares and other legumes covered a further 120,000 hectares. If more land is converted to grow sunflower, this can reduce Morocco’s bill on vegetable oil and oilseed meal imports. Importantly, there would be no increase in the budgetary cost for sunflower support with this option, and reducing tariffs is in line with the government’s trade liberalization programme.

Disadvantages. The major disadvantage of this policy option is that this approach is contradictory to the PMV’s strategy in cereal production intensification, which includes the development of legume crops for soil nutritional quality improvements. In particular, fava beans and legume crops are important sources of human protein and animal feed in Morocco. It is expected that the domestic output of protein from pulses would decrease if land were converted to grow sunflower. On the other hand, the protein used for animal feed would be offset by an increase in sunflower meal. The beans used for human consumption would have to be replaced by other sources, and government budgetary incomes collected from the current import tariffs would be lost.

Future export tax for canola

Sunflower seed crushing would be invigorated if domestic production were increased as a result of any of these initiatives (as long as the compensation scheme for crushers is maintained in some form). In the longer term, if canola production develops on a commercial scale, some temporary measures could be adopted to ensure that production from this infant industry is processed within Morocco.
If we assume the minimum producer price and crusher compensation system is not extended from sunflower to canola, the cost of canola for Moroccan crushers would have to be lower than the recent prices of sunflower seed.

If the canola price were around MAD 450 per quintal (USD 520 per tonne), as our crop margins assume, crushing would on average be unviable, even with a lower cost base. On the other hand, our estimates for crop budgets indicate that canola margins could be as much as USD 400 or USD 500 per hectare greater than monoculture wheat or fava beans. This allows for considerably leeway in the canola price.

The two leading nations in the global sunflower sector, Ukraine and the Russian Federation, both apply taxes on the export of sunflower seeds. Export taxes typically act to lower export prices to the fob export price minus the level of the tax. This provides a strong signal to investors in the crushing sector to expand domestic crushing capacity. As a result, both producers now crush over 80 percent of their vast seed output domestically. A similar situation has resulted in the Argentine soybean sector where differential export taxes favouring local crushing have been successfully applied.

It is important to note that an export tax is a market distortion mechanism usually not recommended. Moreover, it is most effectively used when an exporting country would like to support the post-production phase of its agricultural sector rather than export raw agricultural materials. With the voracious European Union market for canola on its doorstep, imposing an interim 10 percent export tax on canola — similar to the successful policies imposed when Ukraine and the Russian Federation were rejuvenating their domestic oilseed output — would add further value to the agricultural sector in Morocco and allow domestic crushers to process the canola crop. Another argument against an export tax is the structure of the supply chain, which means that farmers will normally have to sell to an aggregator anyway (in this case the crusher).
Advantages. Canola would remain attractive to producers with good technology with anything up to around a 25 percent export tax (assuming the full extent of the tax is applied to local prices). Crushers would require at least an 8 percent export tax to be viable, even assuming a realistic 20 percent reduction in costs. A 10 percent export tax would therefore support margins and pay for the costs of collection without the need to pay any compensation payments to crushers (like the payments made in the sunflower sector). Domestic processing of canola would further reduce crushing costs by lowering fixed costs in the mill.

Disadvantages. Although export taxes are imposed in many countries and are generally compatible with World Trade Organization (WTO) agreements, export taxes are notoriously difficult to remove once they are in place, especially if a policy rule about their temporary nature is not credible. Moreover, instigating a domestic canola programme would require institutional support, as outlined above. A fine line will have to be drawn between lowering canola prices enough to make crushing attractive and keeping canola prices high enough to make the crop attractive to farmers. For this reason, implementing a high export tax straight away threatens to undermine the entire project.

In addition, we should remember that the canola margins presented in this report will only be achieved if good producers can achieve yields of around 2.3 tonnes per annum, which on an extensive, commercial scale has not yet been proven.
Chapter 1 - Overview of the agricultural sector in Morocco: the role of oilseeds

The Moroccan oilseed sector has experienced a substantial decline since the 1990s. During the 2000s, the GoM embarked upon an unusual hybrid policy of a general liberalization of the agricultural trade and internal market reforms in conjunction with comprehensive interventions in the politically sensitive wheat/bread value chain. As Figure 5 reveals, this combination has led to the contraction of domestic oilseed area while common wheat area has more than doubled since the mid-1980s.

Figure 5: Moroccan arable area by crop, 1984–2011

The relative decline in the area of the two major oilseed crops, sunflower and groundnuts, (although groundnuts are consumed mainly as food rather than pressed for oil) is more clearly seen in Figure 6, which expresses oilseed area as a proportion of cereal acreage. Cereals include common wheat, barley, durum wheat and maize.
This report addresses the reasons for and implications of the decline in oilseed production in Morocco and considers how the sector is likely to evolve over the next decade or so as the government pursues its stated goal of market and trade liberalization. The analysis includes:

- a review of the current policy context affecting oilseeds and proposals for the next phase of liberalization;
- an assessment of the competitiveness of oilseeds *vis-à-vis* other crops in the farmer’s cropping decision;
- an analysis of the competitiveness of the downstream elements of the oilseed value chain in Morocco, including crushing and refining;
- an evaluation of the Moroccan trade position across the oilseed complex, considering how developments in domestic consumption and production will affect future import requirements.

This chapter focuses on the role of oilseeds within agriculture in Morocco. Annex 1 supports this chapter and reviews the key trends in Moroccan agriculture more broadly.

**Figure 6: Moroccan oilseeds area as a proportion of cereal area, 1984–2011**

\[ 	ext{Source: MAMF and DSS.} \]
Agriculture in Morocco

Morocco is characterized by two types of agriculture:

- Modern agriculture is relatively intensive in irrigated zones and in non-irrigated zones where there are adequate rainfall levels. This type of agriculture accounts for approximately 20 percent of cultivated lands.

- Traditional and food crop agriculture employs extensive, dry farming techniques. This type of agriculture, which remains strictly dependent on precipitation, is localized in non-irrigated and unfavourable zones, mountainous zones and oases. This sector includes around 80 percent of the usable agricultural surface.

Table 1 highlights the division between these types of agriculture and summarizes the farm structure, showing the number of units and the total area represented by each size category. The table highlights the overwhelming number of exceptionally small farms (below three hectares in size) that account for less total area than farms in the larger size categories. Half of the total farm area is in small units of 3–20 hectares.

Table 1: Farm size structure for Moroccan agriculture

<table>
<thead>
<tr>
<th>Size of farm unit</th>
<th>Number of farm units in category</th>
<th>% of total</th>
<th>Total area in category</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 hectares</td>
<td>762 000</td>
<td>53.2</td>
<td>1 075 000</td>
<td>12.3</td>
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<tr>
<td>3–20 hectares</td>
<td>610 600</td>
<td>42.7</td>
<td>4 786 300</td>
<td>54.8</td>
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<tr>
<td>20–50 hectares</td>
<td>48 000</td>
<td>3.4</td>
<td>1 526 300</td>
<td>17.5</td>
</tr>
<tr>
<td>&gt; 50 hectares</td>
<td>11 000</td>
<td>0.8</td>
<td>1 344 600</td>
<td>15.4</td>
</tr>
<tr>
<td>Total</td>
<td>1 431 600</td>
<td>100</td>
<td>8 732 200</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: MAMF.

The agricultural sector in Morocco has recently benefited from a renewed political commitment with the launch of the PMV in 2009. This plan sets the scene for an ambitious revival of commercial agriculture, recognising its role as a key engine of growth and poverty reduction. Overall, the PMV covers up to 1 500 regional agricultural projects and has ambitious private and public sector investment targets of around MAD 10 billion (USD 1.15 billion).
annually. To place this in an agricultural perspective, the import bill for vegetable oils entering Morocco was around half of this, USD 0.6 billion in 2011, with a further USD 0.32 billion spent importing oilseed meal.

The PMV acknowledges some of the key constraints to the development of Moroccan agriculture. These constraints are also valid for the oilseed sector and include:

- the fragility of the private sector;
- land tenure problems;
- inadequate water management policies;
- misalignment of existing regulations with attempts at developing a competitive and export-oriented agriculture.

The PMV is described in more detail in Chapter 5.

**The role of oilseeds in Moroccan agriculture**

Figures 5 and 6 above highlight the decline in the role of oilseeds in Moroccan arable agriculture since the early 1990s. Figure 6 shows that oilseeds have contracted from a peak proportion of almost 4.5 percent of the total cereals area in the early 1990s to closer to 1 percent in recent years.

Figures 7, 8 and 9 take a wider view of the role of oilseeds in Morocco today by including the agricultural area dedicated to leguminous protein crops (broad beans, chickpeas, lentils, haricot beans), industrial crops (sugar beet and sugar cane), market gardening (tomatoes, potatoes, carrots, onions, etc.), plantation and fruit trees (olive, citrus, peaches, apples, pears, etc.), fallow and viniculture.

The charts adopt an average for area, output and the value of output over the past three years. In Figure 7 oilseed area is shown to be only 0.6 percent of aggregate Moroccan arable area, with fallow (typically used for forage by livestock) second only to the acreage of vast cereals (common wheat, durum, wheat barley and maize). On a weight basis (Figure 8), oilseeds represent an even smaller proportion — just 0.2 percent of Moroccan crop output. When expressed in terms of value (Figure 9), domestic oilseeds still account for less than 1 percent of the Moroccan total. On all three counts, therefore, the Moroccan domestic oilseed sector is very small.
Figure 7: Arable land use in Morocco, average 2007–2009

![Pie chart showing arable land use in Morocco](image)

Source: MAMF.

Figure 8: Arable production in Morocco, average 2007–2009

![Pie chart showing arable production in Morocco](image)

Source: MAMF.
The small size of the Moroccan oilseed sector is not especially unusual and does not mean that its decline will be terminal. In fact, the Moroccan oilseed sector was substantially larger in the late 1980s and early 1990s. Figure 10 puts the Moroccan arable situation into an international perspective. This diagram looks at the relationship between oilseed area (represented by soybeans, canola and sunflower) and cereal area (represented by wheat and barley) in a selection of significant wheat producing countries.

Source: MAMF.
It is interesting to note that, while Moroccan oilseed area is far less developed than in many leading countries, it is broadly in line with several developing countries with dry arable farming conditions. The current Moroccan situation mirrors that found in Iran and Egypt, with the 1990s Moroccan oilseed peak of nearly 4.5 percent of cereal area close to the Turkish and Kazakhstan situations. Morocco, therefore, fits broadly into a group of relatively dry countries where cereal production dominates the arable sector, but oilseeds are able to carve themselves a role in suitable local regions in rotation with cereal crops. Map 1 identifies the principal oilseed regions in Morocco, with almost all oilseed cultivation occurring within the Favorable zone shaded blue on the map.

**Figure 10: Oilseed area as a proportion of cereal area, average 2010–2012**

Source: USDA and MAMF.
Map 1: Map of Moroccan agro-ecological zones


Note: English translation of the map is as follows: Blue: favourable; Green: intermediate; Purple: Mountain; Yellow: Sahara; Beige: unfavourable south; Brown: unfavourable east.
An introduction to the oilseed sector in Morocco

The recent evolution of the oilseed complex in Morocco is summarized in Tables 2 and 3. These present the supply/demand balances for sunflower (the most important domestic crop) and soybeans (which dominate imports).

Table 2: Moroccan supply/demand balance for the soybean complex, 2005–2012

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<tbody>
<tr>
<td>Soybeans</td>
<td></td>
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<tr>
<td>- production</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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<td>- disappearance</td>
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<td>452</td>
<td>341</td>
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<td>519</td>
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<td></td>
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<tr>
<td>- production</td>
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<td>83</td>
<td>81</td>
<td>61</td>
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<td>6</td>
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<td>- consumption</td>
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<td>521</td>
<td>393</td>
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<td>12</td>
<td>7</td>
<td>8</td>
<td>27</td>
<td>6</td>
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Source: MAMF, Lesieur Cristal, Oil World.
Table 3: Moroccan supply/demand balance for sunflower complex, 2005–2012

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<td></td>
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<td>141</td>
<td>174</td>
<td>173</td>
<td>147</td>
</tr>
<tr>
<td>- exports</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sunflower oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- production</td>
<td>27</td>
<td>21</td>
<td>17</td>
<td>17</td>
<td>23</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>- consumption</td>
<td>54</td>
<td>54</td>
<td>44</td>
<td>36</td>
<td>41</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>- imports</td>
<td>24</td>
<td>24</td>
<td>33</td>
<td>25</td>
<td>20</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>- exports</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: MAMF, Lesieur Cristal, Oil World.
Figure 11: Oilseed area in Morocco, 1987–2011

Figure 11 details the supply of individual oilseeds in Morocco and displays the area cultivated for each of the major oilseed crops over the past two decades.

Source: MAMF.
Figure 12: Oilseed production in Morocco, 1987–2011

Source: MAMF.

Figure 12 moves from area to production, demonstrating how sunflower output is even more volatile than sunflower area, thanks to the propensity for dry years even in the relatively favourable sunflower regions.

The decline of the oilseed sector can be traced to a number of factors:

- Policy distortions: Government intervention in the soft/common wheat sector — which provides support prices, import controls and a guaranteed market — has improved the profitability of cultivating common wheat relative to sunflower. Moreover, protein crops such as fava beans (also known as faba beans), which compete with oilseeds as break crops in rotation with cereals, continue to enjoy price support via tariff protection. By contrast, today there is relatively little official support in the oilseed sector, with oilseed import tariffs all but eliminated.
• Trade liberalization: The GoM has embarked upon a programme of significant tariff reductions and bilateral trade agreements. The most important of these for oilseeds was the FTA signed with the United States in 2006. In combination, the twin liberalization policies have eliminated the tariff protection previously available to domestic producers of oilseed meal and crude vegetable oil. Crushing margins have, therefore, been squeezed in direct competition with product imports. As we noted above, the wheat and protein crop sectors, which compete with oilseeds for arable area, have avoided the worst of these liberalization measures.

• Institutional support: State-financed COMAPRA provided organizational support and transparent prices in the sunflower sector until its demise in 2007. Importantly, this support included organizing the collection of seed from designated points at guaranteed prices, without the involvement of middlemen and traders. With multiple, small-scale sunflower producers in Morocco, the breakdown of the organized collection and delivery system since COMAPRA’s demise, coupled with a lack of finance for input provision, has deterred many small farmers from planting oilseeds. Consequently, much of the institutional support for oilseeds was lost. The work of COMAPRA is summarized in the box below.

• The Plan Maroc Vert: While the PMV does not discriminate in principle between any agricultural subsectors, the oilseed sector seems to have received less attention than others: only one regional project has been dedicated to oilseeds (in Meknès Province). The plan’s ambitious targets for 2020 mostly focus on export crops (citrus, fruits and vegetables and olive oil), cereals (targeting a decline in area but an increase in yields) and meat and milk products. One other oilseed initiative within the PMV is the Confederation of Moroccan Agriculture and Rural Development (COMADER), Morocco’s farmers’ confederation. This initiative is currently reorganising oilseed producers in Morocco (previous oilseed regional associations, like ASPOT, do not exist anymore) and grouping them together with crushers and refiners in order to create the interprofessional links envisaged by the PMV. The latter is registered as part of a bigger national federation.
COMAPRA

COMAPRA had experience with cotton farmers when it was extended to handle the organisation of the sunflower value chain in the 1980s. COMAPRA played a role of interfacing between farmers and the industry. Collection points were set up covering rural communities that represented 15 000–20 000 hectares and using platforms and infrastructure already in place for cotton. Transportation and logistics were provided by the company.

Under its procurement programme, COMAPRA collected local sunflower seeds from producers and sold them for crushing at the prevailing international price. The difference between this world price and the fixed producer price was paid by the GoM. From 1994 to 2001, the set price ranged between MAD 3 600 and MAD 4 400 per tonne, far above world market prices.

Approximately MAD 1 billion (USD 114.8 million) was set aside for COMAPRA to purchase sunflower seeds from local producers at fixed prices, supported by state subsidy. The programme covered an estimated 15 000–20 000 hectares of Morocco’s rural communities. The amount of subsidy varied year-on-year.

Sunflower became the main COMAPRA activity. Before it was dissolved in 2007, COMAPRA both provided income support for producers and handled the relationships, on behalf of farmers, along the sunflower value chain. Two of COMAPRA’s four storage facilities were dedicated to storing oilseeds.

Importantly, COMAPRA acted as an intermediary between the middlemen and traders in the sunflower value chain. It provided collection platforms and transportation and handled logistics. In addition, extension services included the distribution of inputs and advisory services to farmers.

The programmes were successful in stimulating output, but low prices of oilseeds in the international market and the national public deficit pushed the authorities into limiting the programme by reducing the level of financial support and the mobilisation of capital to prefinance crops. Most importantly for farmers, the platforms for seed collection at fixed prices were abandoned, and sunflower farmers had to deal with middlemen, transporters and traders rather than the COMAPRA agency. This resulted in sunflower prices dropping dramatically at the farm gate, from around MAD 440 per quintal to MAD 300 per quintal. Gradually farmers, and seed companies, lost interest in the crop as the value chain logistics of collection and marketing broke down.

While domestic oilseed production in Morocco has suffered, the total value of vegetable oils consumed in Morocco has risen significantly and is estimated at close to MAD 5.5 billion a year (USD 0.7 billion) today (see Figure 13). Of this total, only about 1 percent is accounted for by the domestic sunflower sector. By contrast, Moroccan olive oil accounts for over a third of the value of oils consumed in the domestic market, thanks in part to its far higher price (averaging around three times the price of sunflower oil).
The market for oilseed products in Morocco is far from stagnant. As Figure 14 reveals, vegetable oil consumption is thriving, expanding at an average of 4 percent per annum since 2001. However, domestic sunflower oil satisfies between only 1 and 2 percent of this demand.

The imported oils indicated in Figure 14 have not necessarily been imported as oils directly — the total also includes oil volumes contained in seed imports (known as oil-in-seed). Historically, large volumes of soybeans were imported to Morocco and crushed into oil and meal products for local consumption. In more recent years, tariff changes have led to importing oil and meal directly rather than oilseeds for crushing. To circumvent these complications, the figure presents the sum of oil and oil-in-seed imports in each oil category.
We adopt the same approach for Figure 15, which presents the sum of direct meal plus meal-in-seed imports for each source. The market for oilseed meal has expanded at an even more impressive rate than vegetable oil since 2001, achieving compound annual growth of over 7 percent per annum. This is because the wealthier population is eating more meat and the feed practices are intensifying as the livestock sector modernizes.

The Moroccan oilseed sector is, therefore, characterized by a very small domestic sunflower sector, with domestic oil output underpinned by a larger and expanding olive oil sector. The majority of oil and meal consumption, however, is supplied by imported products and (formerly) imported seeds for crushing.

The reliance on imports to satisfy domestic consumption of both oil and meal means that Morocco runs up a substantial import bill on oilseed products. Figure 16 compares the import value of vegetable oils and oilseed meal with other food-related products for Morocco for 2009–2011. Oilseed products constitute a total of nearly 30 percent of all food-related imports.
**Figure 15: Moroccan oilseed meal market by volume and type of meal, 1986–2010**

![Graph showing the volume and type of oilseed meal market in Morocco from 1986 to 2010.](image)

Source: MAMF, Oil World and authors’ estimates.

**Figure 16: Cost of Morocco food-related imports, million MAD, average 2009–2011**

![Pie chart showing the cost distribution of food-related imports in Morocco.](image)

Source: MAMF, Oil World and authors’ estimates.
The processing sector

Though imported products play a substantial role in the oilseed processing sector, the sector has a far larger presence in the value of food processing output and employment than domestic oilseed production would suggest. Table 4 reveals that vegetable oils account for 16 percent of total Moroccan agricultural processing value (this total includes the refining of imported crude vegetable oils and crushing of imported oilseeds) and 9 percent of employment in the food processing value chain.

Table 4: Value of output and employment in key Moroccan agricultural processing sectors, 2010

<table>
<thead>
<tr>
<th></th>
<th>Value of production (million MAD)</th>
<th>Employees</th>
<th>% of employment total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk industry</td>
<td>9 626</td>
<td>9 602</td>
<td>25</td>
</tr>
<tr>
<td>Olive oil</td>
<td>1 435</td>
<td>987</td>
<td>3</td>
</tr>
<tr>
<td>Vegetable oils</td>
<td>6 500</td>
<td>3 417</td>
<td>9</td>
</tr>
<tr>
<td>Meat industry</td>
<td>842</td>
<td>1 896</td>
<td>5</td>
</tr>
<tr>
<td>Bakers</td>
<td>2 349</td>
<td>11 074</td>
<td>29</td>
</tr>
<tr>
<td>Cereal milling</td>
<td>11 270</td>
<td>5 831</td>
<td>15</td>
</tr>
<tr>
<td>Animal feed</td>
<td>3 972</td>
<td>2 120</td>
<td>6</td>
</tr>
<tr>
<td>Sugar processing</td>
<td>4 721</td>
<td>3 204</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>40 715</td>
<td>38 131</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: MAMF.
Chapter 2 - Oilseed production efficiency

Oilseed production in Morocco: a steady decline

A decreasing sunflower area from 1989 to 2011

The area covered by sunflower has been decreasing for the last 20 years, from 250 000 ha in the early nineties (1992 to 1993) to barely 50 000 ha in 2010 to 2011 (see Figure 17). From 1994, low margins compared with other crops (cereals, fava beans, etc.) have explained the decline of sunflower production. These low margins are due to:

- an insufficiently attractive price compared with cereals;
- an unsecured market (deregulation of the oleaginous value chain effective in 1996; since then the government does not guarantee prices through COMAPRA);
- extensive cultivation practices that do not provide high yields. Although these have increased slightly over the past 20 years (from 1.2 tonne/ha to 1.6 tonne/ha, see Figure 18) yields remain low;
- policies favouring wheat monoculture (including market protection price, storage and seed subsidies, technical and extension support).

Exceptionally, in 2009 to 2010 the area covered by sunflower increased slightly to 60 000 ha, due to 70 000 ha of wheat being flooded in the Gharb Region (in the north). To compensate losses, the Ministry of Agriculture subsidized sunflower seeds and fertilizers and agreed with Lesieur Cristal industry collection and crushing of the production (Lesieur and other processors are introduced in detail in Chapter 3). Farmers typically consider sunflower as an opportunistic crop in case of flooding or an autumn dry spell.
The current sunflower production (mainly by smallholder farmers) is orientated to the *tournesol de bouche* (edible sunflower seeds) niche market that provides more attractive prices to farmers (MAD/kg 10 to 15, equivalent to USD 1 150 to 1 725 per tonne, more than double the sunflower seed price for crushing). However, this market is limited by size and shows little sign of expanding.
The sunflower production area is concentrated in northwest Morocco (see Map 2) in the so-called bour favorable (see Map 1). Production regions in decreasing order are: (i) Gharb-Chrarda-Béni Hssen; (ii) Meknès-Tafilalet; (iii) Tangier-Tétouan; (iv) Khemisset-Rabat; (v) Fès-Boulemane; (vi) Oriental and (vii) Taza-Al Hoceima. Sunflower grown in these areas is mainly rainfed production (no specific data is available for sunflower grown with irrigation).

**Figure 19: Sunflower farm gate price, 1992–2011**

![Sunflower farm gate price, 1992–2011](source: DSS)

**Map 2: Current sunflower production area in Morocco**

![Map 2: Current sunflower production area in Morocco](source: FAO.

Note: Red solid line includes the following production regions: Tangier-Tétouan, Khemisset-Rabat and Gharb-Chrarda-Béni Hssen. Red-dotted line includes the following regions: Meknès-Tafilalet, Fès-Boulemane and Taza-Al Hoceima.)
Figure 20: Area covered by sunflower by region, 1989/90–2009/10

Source: DSS.

Figure 21: Total sunflower production by region, 1989/90–2009/10

Source: DSS.
Figure 22 highlights the steady improvement that has occurred in Moroccan sunflower yields as area has contracted to the most favoured locations. However, as Figure 22 reveals, Morocco (Average) still lags a considerable way behind other competitive international producers of sunflower in yield terms. We also include indicative yields for a dry season in Morocco (defined as a year where rainfall is less than 300 mm). Data were averaged over the last four seasons for each country.

In addition, the diagram shows what agronomists believe is possible on well-managed farms in Morocco with improved, more intensive practices, seen in normal (Morocco Normal Improved) and dry (Morocco Dry Improved) years. In the best case for some farms, Morocco might improve average yields of sunflower to around 1.6 tonnes per hectare. However, this scenario is highly unlikely to apply to the average producer in Morocco, just as the other national averages do not apply to the best producers in the competitor countries.

**Figure 22: International sunflower yield comparison, average 2008–2011**

*Source: USDA, LMC International, FAO estimates.*
In Figure 23, the same exercise for soft common wheat yields was conducted. This comparison reveals that it is not only in sunflower that Morocco lags behind its regional and global competitors. While the high Egyptian yields are explained by the intensive irrigation farming system along the Nile valley, improvements in Morocco could see the best farms generating higher yields than the averages obtained by many leading producers.

**Figure 23: International soft wheat yield comparison, average 2008–2011**

- Morocco (dry)
- Morocco (average)
- Morocco (dry improved)
- Iran
- Russian Federation
- Turkey
- Ukraine
- Canada
- USA
- Argentina
- Morocco (normal improved)
- EU
- Egypt

*Source: USDA, LMC International, FAO estimates.*

**Characterizing potential oilseed production areas in Morocco**

**Water requirements**

In order to grow, canola and sunflower crops require for their growth 400–600 mm and 300 mm of water (spring rains) respectively. According to these needs, Map 3 below identifies the potential oilseed development areas in Morocco. The red circles signify the so-called *bour favorable* area in northwest Morocco, and the blue circle represents the *intermediate bour* area in the central plain of Chaouia. However, the rain repartition throughout the year is also very important because crops need water at strategic stages of their development.
For canola (rapeseed) varieties the critical period to receive water is between October and May, and water needs are up to 450 mm. For sunflower (sown in February) the critical period is between February and May, and water needs are almost the same as canola, except that sunflower requires deeper soils to store winter rains that can be recovered by the plant at the right time.

**Map 3: Potential oilseed production area according to sunflower and canola needs**

*Source: FAO authors’ adaptation.*
Table 5 shows yield simulations for sunflower and canola according to rainfall and in optimal conditions without taking into account other limiting factors (i.e. soil texture and depth). For canola, it shows that maximum yields (up to 3 tonnes/ha) would only be achievable from 5 to 6 years over a 25 years period.

**Table 5: Rain precipitation (mm) and potential yields (tonnes/ha)**

<table>
<thead>
<tr>
<th>Rain precipitation (Oct–May) mm</th>
<th>Canola yields tonnes/ha</th>
<th>Occurrence over 25 years</th>
<th>Rain precipitation (Feb–May) mm</th>
<th>Sunflower yields tonnes/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;450</td>
<td>&gt; 3</td>
<td>6/25</td>
<td>&gt;350</td>
<td>2.5</td>
</tr>
<tr>
<td>350–450</td>
<td>2.3–3</td>
<td>7/25</td>
<td>350–300</td>
<td>1–2</td>
</tr>
<tr>
<td>250–350</td>
<td>1.6–2.2</td>
<td>7/25</td>
<td>&lt;300</td>
<td>&lt;1</td>
</tr>
<tr>
<td>&lt;250</td>
<td>1.2</td>
<td>5/25</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculations.*

*Reference taken from Sidi Silmane meteorological station.*

**Temperature requirements**

Spring canola has a high-tolerance threshold to low temperatures (until -3 °C) unlike sunflower, which has difficulties developing in temperatures below -2 °C in the cotyledon (seed-leaf) stage. In the Fès-Boulemane Region (the red dotted circle in Map 3), temperatures below -2 °C occur more than once every two years in areas with altitudes above 400 m. If sunflower is sown in mid-November, the emergence and growth of these plants will take time (because of low temperatures), and they will be sensitive to attacks by birds and to water stress during and after flowering.

**Production areas**

Typical production typologies based on areas where there is already oilseed production or areas where agro-ecological conditions are favourable to oilseed development are recommended for growing oilseeds. Three potential zones have been defined according to the adequacy of agro-ecological conditions and farming systems typologies (see Map 3): (i) northwestern Morocco (sunflower and canola), (ii) central plain area (canola) and (iii) the Doukkala irrigation system.
Other irrigation schemes could also be considered for canola introduction (i.e. in Loukkos, Tadla, Berkane, etc.), but the Doukkala irrigation system has been selected as a typical case study. Other regions of the country are not favourable to oilseed development for several reasons, such as the low level of rainfall (below 250 mm in the eastern and southern parts) and low temperatures in the mountainous regions (Rif, in the eastern and western Atlas Mountain chains).

Optimal zones for oilseeds (sunflower and canola) development are mainly in the northwest of Morocco. The area covers about two million hectares (in which 200 000 are under irrigation) and total rainfall is above 400 mm. The main crops grown are cereals (60 percent, mainly wheat), horticulture (10 percent), fruit and olive trees (12 percent), non-cultivated fallow (10 percent) and pulse, sunflower and fodder crops (8 percent).

Maximum total area covered by cereal-based farming systems is about 978 000 ha in the northwest regions (see Table 6). Estimates were done with (i) 61 to 75 percent area covered by cereal based systems and (ii) 50 percent total area covered by large (>50 ha) and medium (10–50 ha) farmers. The potential area where oilseeds could be grown is expected to be around 200 000 ha.
Table 6: Potential regions and areas for oilseed development in the northwest

<table>
<thead>
<tr>
<th>Regions</th>
<th>Total Area</th>
<th>Area covered by cereal based systems, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total (thousand ha)</td>
<td>rainfed</td>
</tr>
<tr>
<td>Tanger</td>
<td>162</td>
<td>75</td>
</tr>
<tr>
<td>Loukkous</td>
<td>256</td>
<td>105</td>
</tr>
<tr>
<td>Sidi Kacem</td>
<td>208</td>
<td>144</td>
</tr>
<tr>
<td>Gharb</td>
<td>616</td>
<td>274</td>
</tr>
<tr>
<td>Khémisset</td>
<td>781</td>
<td>366</td>
</tr>
<tr>
<td>Rabat-salé</td>
<td>154</td>
<td>61</td>
</tr>
<tr>
<td>Total North</td>
<td>2 177</td>
<td>1 025</td>
</tr>
<tr>
<td>Fès</td>
<td>190</td>
<td>136</td>
</tr>
<tr>
<td>Sefrou</td>
<td>352</td>
<td>82</td>
</tr>
<tr>
<td>Boulmene</td>
<td>1 480</td>
<td>54</td>
</tr>
<tr>
<td>Taounate</td>
<td>560</td>
<td>353</td>
</tr>
<tr>
<td>Taza</td>
<td>1 441</td>
<td>306</td>
</tr>
<tr>
<td>El Hajeb</td>
<td>222</td>
<td>125</td>
</tr>
<tr>
<td>Méknès</td>
<td>178</td>
<td>136</td>
</tr>
<tr>
<td>Ifrane</td>
<td>355</td>
<td>58</td>
</tr>
<tr>
<td>Khénifra</td>
<td>1 224</td>
<td>176</td>
</tr>
<tr>
<td>Total West</td>
<td>6 003</td>
<td>1 370</td>
</tr>
<tr>
<td>Total Northwest Regions</td>
<td>8 180</td>
<td>2 395</td>
</tr>
</tbody>
</table>

Total area of cereal-based systems covered by medium to large farms (>10 ha) 978

Source: DPA/ORMVA modified.

*Not including forests and uncultivated land.

An intermediate zone for canola development is located in the central Chaouia plain of Morocco. The Chaouia plain covers one million hectares and receives about 300 to 400 mm of rain precipitation. It is called the Moroccan breadbasket for its cereal production in normal rainfall years. However, the risk of dry spells is quite high according to rainfall records of the last 25 years. Conditions are not favorable to sunflower development but are adequate for canola introduction. The main crops grown are cereals
(75 percent) with a large share of barley (40 percent) used for small ruminants feeding, pastured fallow (15 percent), horticulture and fruit trees (4 percent) and pulse (<1 percent).

Maximum total area covered by cereal-based farming systems is about 1,008,000 ha in the southern regions (see Table 7). Estimates were done with (i) an average of 75 percent area covered by cereal based systems; (ii) 50 percent total area covered by large (>50 ha) and medium (10–50 ha) farmers; and (iii) extending the Chaouia Region to the Zaer, Doukkala and Tadla plains (rainfed agriculture). Then, the potential area that could reasonably grow canola would be around 100,000 ha³.

Table 7: Potential regions and areas for oilseed development in the Chaouia (including a part of Zaer) plain

<table>
<thead>
<tr>
<th>Regions</th>
<th>Area total (thousand ha)</th>
<th>SAU (thousand ha)</th>
<th>Area covered by cereal based systems, %</th>
<th>Area covered by cereal based systems, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rainfed</td>
<td>irrigated</td>
<td>total area*</td>
<td></td>
</tr>
<tr>
<td>Casablanca</td>
<td>114</td>
<td>63</td>
<td>5</td>
<td>68</td>
</tr>
<tr>
<td>Ben Slimane</td>
<td>257</td>
<td>129</td>
<td>5</td>
<td>134</td>
</tr>
<tr>
<td>Khouribga</td>
<td>425</td>
<td>211</td>
<td>2</td>
<td>214</td>
</tr>
<tr>
<td>Settat</td>
<td>975</td>
<td>564</td>
<td>21</td>
<td>585</td>
</tr>
<tr>
<td>El Jadida</td>
<td>161</td>
<td>116</td>
<td>11</td>
<td>127</td>
</tr>
<tr>
<td>El Jadida-Doukkala</td>
<td>523</td>
<td>324</td>
<td>104</td>
<td>428</td>
</tr>
<tr>
<td>Safi</td>
<td>728</td>
<td>554</td>
<td>8</td>
<td>562</td>
</tr>
<tr>
<td>Tadla</td>
<td>-</td>
<td>134</td>
<td>126</td>
<td>260</td>
</tr>
<tr>
<td>Azilal</td>
<td>980</td>
<td>144</td>
<td>19</td>
<td>163</td>
</tr>
<tr>
<td>Beni Mellal</td>
<td>365</td>
<td>108</td>
<td>41</td>
<td>149</td>
</tr>
<tr>
<td><strong>Total Sud</strong></td>
<td><strong>4,351</strong></td>
<td><strong>2,246</strong></td>
<td><strong>343</strong></td>
<td><strong>2,689</strong></td>
</tr>
<tr>
<td>Total area of cereal-based systems covered by medium to large farms (&gt;10 ha)</td>
<td><strong>1,008</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: DPA/ORMVA modified.
*Not including forests and uncultivated land.

Another area favourable for oilseed development is the Doukkala irrigation scheme located 100 km south of Casablanca in the Doukkala-Abda plain, in the El Jadida hinterland (see Map 4). The

³ If smallholder farmers were well trained, in ten years they could be involved in canola production.
irrigation scheme currently comprises two major irrigation areas measuring 61,000 ha. Potential area would cover 10,000 ha of the irrigation scheme. Water resources consist of surface water from the Oum Er-Rbia River basin and are managed by the ORMVAD (Regional Office for the Agricultural Development of Doukkala). Crops grown there include cereals (34 percent), sugar beet (22 percent), fodder crops (19 percent), market garden crops (13 percent) and vines, fruit trees and silage maize (12 percent).

Map 4: Doukkala irrigation scheme

Source: DPA/ORMVAD.

Selected farm models per zone

In the Mediterranean dry land area, rainfall remains one of the main determinants of the established cropping system. Within this agro-ecological zone, crop management differs according to farm size, farmers’ skills and the ability to adopt innovations (including investment capacity).
In terms of estimating a potential area for oilseed development, five types of cereal farms were selected. Subsistence (<3 ha) and semi-subsistence farms (3–10 ha) were not considered as they use extensive production systems and would not likely adopt new crops (other characteristics of these farming systems include: low yields owing to low technical performance, family labour orientated, unsecured land and low investment capacity). The resulting selected farms for potential oilseed development are described next and include: (i) large and medium farms in northwestern Morocco, (ii) large and medium farms in the central plain and (iii) irrigated large farms in the Doukkala scheme.

**Northwest part of Morocco (more than 400 mm rain)**

**Large intensive farms (>50 ha).** These farms are market orientated with intensive cereal production (soft and durum wheat), and 70 percent of their area dedicated to wheat. These farms are characterized by:

- being equipped with tractors and machinery such as drills, discs and combine harvesters. Some have an activity related to outsourcing services to the surrounding farms;

- land title ownership (90 percent of farmers);

- access to credit for investment;

- being well informed and intensively using inputs (improved seeds, fertilizers and pesticides);

- establishing contracts with key players in the value chain (cooperatives, registered traders, flour-milling, etc.) and using storage capacity to adjust to market price;

- reserving at least 90 percent of their land for cultivating bread wheat (wheat seeds in some cases).

It is important to note that agricultural labour costs are exceeding the reference minimum wage. The limitation in hiring cheap labour among the young population has made labour-intensive crops less attractive to large-scale farmers who are increasingly opting to use mechanized crops (mainly cereals and to some extent fava beans). In this cereal-based farming system, the current situation is one of favouring the following rotations (in descending order in terms of preference): continuous cereals for three years, clean fallow, fava beans and pulses.
Medium farms (10 to 50 ha). These farms use lower intensity production systems relative to the large ones, and farming systems are based on integration between cereals (60 percent of the area), fava beans, pulses and chickpeas. Livestock is also an important source of income. Consequently, the farmers’ strategies are relatively more orientated to crop diversification and including fodder production in rotation with cereals. This influences the technical management of the cereal crop. Overall, medium farms are characterized by:

- ownership of tools and machinery or outsourcing services mainly for land preparation and harvesting; they also occasionally pay a labour force for specific tasks (i.e. hand weeding);

- land ownership through official titles (75 percent);

- access to bank credit for investment;

- lower input usage compared to large farms (improved seeds, pesticides and fertilizers), so yields are 20 to 25 percent lower than in large farms;

- ownership of traditional storage facilities and local market focus. Part of the production is reserved for livestock (by-products, fodder, etc.). Livestock sales are a source of cash as important as grain.

Limiting production factors are the investment capacities (capital), the labour force and limited access to information and extension services. In these mixed farming systems and in the current situation, farmers usually include crops such as fava beans, chickpeas, forage and sunflower. The most common rotations are continuous cereals (soft wheat/durum wheat) and rotations with pulses, fava beans, lentils or chickpeas. Finally, sunflower is grown as a recovery or catch-up crop in the case of winter failure or heavy winter rainfall and difficulty accessing fields to grow cereals. Sunflower is usually conducted in an extensive way (local seeds, no chemicals, hoeing and hand weeding).

Central Chaouia plain of Morocco (300–400 mm rain)

Large intensive farms (>50 ha). In this area rainfall is less abundant so pest and weed pressure are not as big a concern as in the northern regions, resulting in less yield losses. The area covered by cereals is about 70 percent, and the main rotations are wheat/
wheat/clean fallow or wheat grown for two to three years successively. A very small area is dedicated to fava beans (or to chickpeas), as this crop is sensitive to drought and demands more than 350 mm water. Apart from that, these farms are similar to those large farms of the north.

Medium farms (10 to 50 ha). Farming systems are based on cereal production (70 percent of the area with 30 percent of barley) and livestock represented mainly by small ruminants (sheep) as a way to reduce risk and manage the drought stress. Consequently, medium farms’ cropping strategies are oriented towards cereal, weedy fallow or fodder production.

A key limiting production factor is capital (low investment capacity) in a high-risk environment. Fewer fertilizer and pesticides are used and mixed farming systems are widely adopted as strategies to reduce risk exposure to the likelihood of drought events. The most common rotations are wheat/wheat/weedy fallow or mixed forage and wheat/wheat/barley.

Doukkala irrigation scheme

Irrigated large farms (>15 ha). These are the most intensive farms with high production costs (linked to irrigation, inputs, tractors, etc.); therefore, they focus on higher value crops such as sugar beet (60 percent) besides wheat (30 percent) and fodder crops (mainly alfalfa and corn silage). Most are also milk producers with improved breeding cattle. They are characterized by:

- ownership of tools and machinery;
- secured land through land titles;
- access to credit for investment;
- intensive use of inputs;
- being market-orientated, establishing contracts with key players in the value chain (cooperatives, registered traders, flour-milling, etc.) and having storage capacity.

A limiting factor is the availability and management of water (including secured timely and adequate access). The most common rotation is sugar beet/wheat/fodder crop (corn silage).
Even if the farmers in this region could grow irrigated sunflower, they usually prefer vegetables (pea) and corn silage that have higher profit margins.

**Agronomic value addition of introducing sunflower or canola in the cropping systems**

Crop rotation is one of the key management practices in farming systems. A well-planned rotation reduces diseases, pests and weeds by breaking the weed cycle. In addition, it provides benefits such as increasing soil fertility, improving physical and chemical soil structure, diversifying farmers’ incomes and protecting them from price volatility through crop diversification.

The introduction of oilseed crops in cereal-based cropping systems has been shown to have positive agronomic and economic impacts. Canola, which has an intensive root system, is known as a good crop for preceding cereals. Sunflower can improve rainfall water efficiency and nutrient uptake since it uses a different crop-rooting system (compared to cereals). It also needs fewer inputs compared to wheat. However, canola and sunflower leave low storage water in the soil, and sunflower leaves a low nitrogen level, decreasing potential yields for the next culture. Farmers consider it a crop that impoverishes soils (currently late sowing and no nitrogen application), which means that a change in farmers’ mindsets might also be required.

In irrigated areas, crop rotations started focusing on sugar beet production to supply the existing sugar industry. The GoM provides attractive subsidies to sugar beet production, including partial coverage of seed costs. However, development of pest and weed resistance to pesticides and high input costs led to reduced yields. Introducing canola and sunflower crops would break soil pathogens as well as weed and insect growth cycles, which are sugar beet specific.

The feasibility of the crop-rotation system or systems recommended for a region is closely related to the profitability of the crops involved in each system. So why are oilseeds not cultivated despite their agronomic strengths? In order to address this question, the next sections look at the returns to production of oilseeds versus other crops, both individually and in crop-rotation systems.
Economic value addition of introducing sunflower or canola in the cropping systems

Margins were calculated for each of the farms described above with the following assumptions. Results are shown in Tables 7 to 12.

- Current model versus improved model: Assumptions are (i) large farms already perform well (technically and economically), therefore the proposed improved models compare oilseed crops’ gross/net margins and net returns in rotations with the other crops of the cropping system and (ii) medium farms were considered with their current cropping system and with an improved model based on the assumption that medium farms could perform as well as large farms.

- Normal rainfall year versus insufficient rainfall year: Assumptions are (i) normal year rainfall is above 400 mm on northern farms and from 300 to 400 mm on southern farms and (ii) insufficient rainfall year is equivalent to 300 mm rains on northern farms and to 250 mm rain on southern farms. Catastrophic dry years, in which yields can drop drastically, are not considered.

- Mechanized farms versus service provider: A recent FAO study (2012) on mechanization proposed standard operation costs. This analysis used updated operation costs based on the FAO study.

- Increased yields are based on improved technology: Farmers use innovations and crop intensification techniques such as genetic engineering, pesticides, soil management, appropriate materials, etc. and respect technical calendars (meaning access to capital and extension services). The proposed increased yields (see Table 7) reflect optimal agriculture conditions and do not take into account specificities related to soil texture and depth and local constraints, such as tools and input access (i.e. rotovator, precise drill, etc.).

- Wheat yields in rotations have been adjusted according to the preceding crop: Wheat yields have been (i) increased by 15 percent with clean fallow as a previous crop; (ii) lowered by 10 percent with weedy fallow as a previous crop; and (iii) lowered by 15 percent with wheat as a previous crop (monoculture).
Table 8: Current and expected yields according to the farm model and rainfall

<table>
<thead>
<tr>
<th>Crops</th>
<th>Northern large and medium farms</th>
<th>Northern medium farms</th>
<th>Irrigated farms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>current yields (kg/ha)</td>
<td>improved yields (kg/ha)</td>
<td>current yields (kg/ha)</td>
</tr>
<tr>
<td><strong>Normal rainfall &gt;400 mm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fava beans</td>
<td>1 500</td>
<td>1 800</td>
<td>–</td>
</tr>
<tr>
<td>Sunflower</td>
<td>1 200</td>
<td>1 600</td>
<td>–</td>
</tr>
<tr>
<td>Canola</td>
<td>–</td>
<td>2 300</td>
<td>–</td>
</tr>
<tr>
<td>Barley</td>
<td>–</td>
<td>–</td>
<td>2 500</td>
</tr>
<tr>
<td>Mixed forage</td>
<td>–</td>
<td>–</td>
<td>250</td>
</tr>
<tr>
<td>Weedy fallow</td>
<td>–</td>
<td>–</td>
<td>150</td>
</tr>
<tr>
<td>Wheat (soft) mono</td>
<td>2 500</td>
<td>3 000</td>
<td>2 000</td>
</tr>
<tr>
<td>Wheat (durum) mono</td>
<td>2 100</td>
<td>2 600</td>
<td>1 600</td>
</tr>
<tr>
<td>Wheat (soft) rot</td>
<td>3 000</td>
<td>4 000</td>
<td>3 000</td>
</tr>
<tr>
<td>Wheat (durum) rot</td>
<td>2 600</td>
<td>3 600</td>
<td>2 600</td>
</tr>
<tr>
<td>Sugar beet rot</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Bean rot</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Silage corn</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Insufficient rainfall ≤300 mm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fava beans</td>
<td>800</td>
<td>900</td>
<td>–</td>
</tr>
<tr>
<td>Sunflower</td>
<td>700</td>
<td>900</td>
<td>–</td>
</tr>
<tr>
<td>Canola</td>
<td>–</td>
<td>1 400</td>
<td>–</td>
</tr>
<tr>
<td>Barley rot</td>
<td>–</td>
<td>–</td>
<td>1 300</td>
</tr>
<tr>
<td>Mixed forage</td>
<td>–</td>
<td>–</td>
<td>125</td>
</tr>
<tr>
<td>Weedy fallow</td>
<td>–</td>
<td>–</td>
<td>75</td>
</tr>
<tr>
<td>Wheat (soft) mono</td>
<td>1 300</td>
<td>1 500</td>
<td>1 300</td>
</tr>
<tr>
<td>Wheat (durum) mono</td>
<td>1 100</td>
<td>1 250</td>
<td>1 100</td>
</tr>
<tr>
<td>Wheat (soft) rot</td>
<td>1 800</td>
<td>2 500</td>
<td>1 800</td>
</tr>
<tr>
<td>Wheat (durum) rot</td>
<td>1 500</td>
<td>2 000</td>
<td>1 500</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculations.*

The yield information provided in Table 8 can be put in perspective by considering how the relative yields of sunflower and its main competing crop, wheat, compare around the world. The relative
yields of these two crops are a good indicator of the natural comparative advantage present in an agronomic zone. This is because sunflower, as a rotation crop, will almost always be grown in conjunction with wheat, and the same farmers will cultivate both crops with similar capital and management available. This method is an effective way of isolating the natural yield advantage differential between the two crops.

Figure 24 presents the ratio of sunflower yields to wheat yields in a selection of leading producers.

**Figure 24: International comparison of sunflower yields as a percentage of wheat yields, average 2008–2011**

The diagram provides the following interesting insights into Moroccan production efficiency in oilseeds:

- Using current average yields, sunflower yields are relatively strong in Morocco, indicating a comparative advantage in-line with most other leading producers. However, as the sunflower area in Morocco has contracted in recent years, only the most favoured regions are being cultivated for sunflower seed, pushing up average yields. Wheat on the other hand, has expanded its territory widely. Overall, the results confirm that sunflower is well suited to low-input systems, which also
prevail in Russian Federation and much of the United States, as well as in large areas of Morocco today.

- Another factor favouring sunflower is that when floods occur in flood-prone areas lost cereals are replaced with sunflower later in the season. In normal years in these areas less sunflower is grown. Under these conditions, the yield ratio naturally favours sunflower over cereals.

- A further observation concerns the data for dry years (with less than 300 mm of precipitation). In these years, wheat yields hold up better than sunflower yields in Morocco, suggesting that risk-averse farmers may shy away from sunflower in regions of persistent drought. This preference is reflected in our choice of areas suitable for oilseed cultivation in the previous sections.

- Lastly, with better practices and sufficient rain (“Normal Improved” scenario), the relative yield performance of sunflower worsens in Morocco. This indicates that farm improvements may benefit wheat more than sunflower as the sectors intensify. This is not surprising, as wheat is generally a more input-intensive crop, as the European Union ratio confirms.

An analysis of crop margins in Morocco

One difficulty in estimating the gross margin for canola in Morocco is that there is not currently a transparent local trade in canola seed. In international markets, canola seed tends to trade broadly at parity with sunflower seed. For the purposes of this report, we have followed this convention, but have allowed for a small discount for canola seed to reflect its non-established status in Morocco.

Under this assumption, on northern and southern farms and irrigated systems, canola’s gross margins (including all services) are USD 554, USD 543 and USD 525 respectively. On large northern farms, canola’s gross margins are 17 percent lower than the best wheat’s gross margins (USD 667) (see Table 9). On large and medium southern farms, canola’s gross margins are 44 percent lower than the best wheat’s (USD 974) (see Table 11 and Table 12). Compared with other rainfed crops such as sunflower, fava beans, barley and mixed forage, canola is clearly the most profitable crop in both regions and in medium and large farms. With regards to irrigated systems, canola’s gross margins
are 54 and 57 percent lower than soft wheat’s and silage maize’s respectively, 35 and 2 percent lower than beans and sugar beets respectively, showing that irrigation input costs need higher value crops to be paid off.

**Table 9: Gross margins of northern large farms (improved systems)**

<table>
<thead>
<tr>
<th>Crops</th>
<th>Improved technology</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inputs costs (USD/ha)</td>
<td>Gross margin (USD/ha)</td>
<td>Labour &amp; services (USD/ha)</td>
<td>Gross margin (incl. all services) (USD/ha)</td>
</tr>
<tr>
<td>Normal rainfall &gt; 400 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fava beans — U</td>
<td>177</td>
<td>550</td>
<td>277</td>
<td>273</td>
</tr>
<tr>
<td>Sunflower — U</td>
<td>246</td>
<td>508</td>
<td>201</td>
<td>307</td>
</tr>
<tr>
<td>Canola — U</td>
<td>349</td>
<td>709</td>
<td>155</td>
<td>554</td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>469</td>
<td>497</td>
<td>146</td>
<td>351</td>
</tr>
<tr>
<td>Wheat (durum) mono — U</td>
<td>478</td>
<td>389</td>
<td>144</td>
<td>245</td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>469</td>
<td>819</td>
<td>152</td>
<td>667</td>
</tr>
<tr>
<td>Wheat (durum) rot — U</td>
<td>478</td>
<td>722</td>
<td>149</td>
<td>573</td>
</tr>
<tr>
<td>Insufficient rainfall ≤ 300 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fava beans — U</td>
<td>132</td>
<td>232</td>
<td>209</td>
<td>23</td>
</tr>
<tr>
<td>Sunflower — U</td>
<td>114</td>
<td>310</td>
<td>230</td>
<td>79</td>
</tr>
<tr>
<td>Canola — U</td>
<td>144</td>
<td>500</td>
<td>132</td>
<td>368</td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>212</td>
<td>271</td>
<td>133</td>
<td>138</td>
</tr>
<tr>
<td>Wheat (durum) mono — U</td>
<td>221</td>
<td>196</td>
<td>131</td>
<td>64</td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>212</td>
<td>592</td>
<td>139</td>
<td>454</td>
</tr>
<tr>
<td>Wheat (durum) rot — U</td>
<td>221</td>
<td>446</td>
<td>136</td>
<td>310</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculations.*

Sunflower’s gross margins are about USD 307 in northern improved medium-sized farms, which represent a 12 percent increase over their current margins (see Table 10). The little increase is owing to extensive farming (low inputs costs in current models) and the use of hybrids in the improved model. However, when sunflower margins are compared to other crops they show almost the same profitability: fava beans (USD 273) or wheat in monoculture (USD 351 for soft wheat, USD 245 for durum wheat). Moreover, sunflower profitability in an irrigated system is very low (USD 133) as input costs (including irrigation) are high compared to production value (see Table 13).
Table 10: Gross margins of northern medium farms (current and improved systems)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Current practice</th>
<th></th>
<th>Improved technology</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inputs costs (incl. irrigation) (USD/ha)</td>
<td>Gross margin (USD/ha)</td>
<td>Labour &amp; services (USD/ha)</td>
<td>Gross margin (incl. all services) (USD/ha)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal rainfall &gt;400 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fava beans — U</td>
<td>111</td>
<td>496</td>
<td>255</td>
<td>241</td>
</tr>
<tr>
<td>Sunflower — U</td>
<td>36</td>
<td>529</td>
<td>259</td>
<td>271</td>
</tr>
<tr>
<td>Canola — U</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>337</td>
<td>467</td>
<td>143</td>
<td>324</td>
</tr>
<tr>
<td>Wheat (durum) mono — U</td>
<td>324</td>
<td>376</td>
<td>141</td>
<td>236</td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>324</td>
<td>642</td>
<td>146</td>
<td>496</td>
</tr>
<tr>
<td>Wheat (durum) rot — U</td>
<td>324</td>
<td>543</td>
<td>144</td>
<td>399</td>
</tr>
<tr>
<td>Insufficient rainfall ≤300 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fava beans — U</td>
<td>100</td>
<td>223</td>
<td>222</td>
<td>1</td>
</tr>
<tr>
<td>Sunflower — U</td>
<td>3</td>
<td>326</td>
<td>251</td>
<td>75</td>
</tr>
<tr>
<td>Canola — U</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>192</td>
<td>227</td>
<td>127</td>
<td>100</td>
</tr>
<tr>
<td>Wheat (durum) mono — U</td>
<td>192</td>
<td>175</td>
<td>126</td>
<td>49</td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>192</td>
<td>387</td>
<td>130</td>
<td>258</td>
</tr>
<tr>
<td>Wheat (durum) rot — U</td>
<td>192</td>
<td>308</td>
<td>128</td>
<td>180</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations.
### Table 11: Gross margins of southern large farms (improved systems)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Inputs costs (incl. irrigation) (USD/ha)</th>
<th>Gross margin (USD/ha)</th>
<th>Labour &amp; services (USD/ha)</th>
<th>Gross margin (incl. all services) (USD/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal rainfall 400–300 mm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canola — U</td>
<td>344</td>
<td>713</td>
<td>171</td>
<td>543</td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>397</td>
<td>568</td>
<td>146</td>
<td>422</td>
</tr>
<tr>
<td>Wheat (hard) mono — U</td>
<td>404</td>
<td>462</td>
<td>144</td>
<td>319</td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>320</td>
<td>1 129</td>
<td>155</td>
<td>974</td>
</tr>
<tr>
<td>Wheat (hard) rot — U</td>
<td>327</td>
<td>1 007</td>
<td>152</td>
<td>855</td>
</tr>
<tr>
<td><strong>Insufficient rainfall 250 mm</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canola — U</td>
<td>121</td>
<td>385</td>
<td>148</td>
<td>237</td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>162</td>
<td>482</td>
<td>136</td>
<td>346</td>
</tr>
<tr>
<td>Wheat (hard) mono — U</td>
<td>169</td>
<td>398</td>
<td>134</td>
<td>264</td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>162</td>
<td>643</td>
<td>139</td>
<td>504</td>
</tr>
<tr>
<td>Wheat (hard) rot — U</td>
<td>154</td>
<td>546</td>
<td>136</td>
<td>410</td>
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</table>

*Source: Authors’ calculations.*
### Table 12: Gross margins of southern medium farms (current and improved systems)

<table>
<thead>
<tr>
<th>Crops</th>
<th>Current practice</th>
<th>Improved technology</th>
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<th></th>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inputs costs</td>
<td>Gross margin</td>
<td>Labour &amp; services</td>
<td>Gross margin (incl. all services)</td>
<td>Inputs costs</td>
<td>Gross margin</td>
<td>Labour &amp; services</td>
<td>Gross margin (incl. all services)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td>(USD/ha)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Normal rainfall 400–300 mm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barley — U</td>
<td>204</td>
<td>399</td>
<td>143</td>
<td>256</td>
<td>334</td>
<td>511</td>
<td>147</td>
<td>364</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Canola — U</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>349</td>
<td>709</td>
<td>171</td>
<td>538</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forage mix rot — U</td>
<td>141</td>
<td>865</td>
<td>335</td>
<td>530</td>
<td>141</td>
<td>865</td>
<td>335</td>
<td>530</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weedy fallow</td>
<td>0</td>
<td>230</td>
<td>98</td>
<td>132</td>
<td>0</td>
<td>230</td>
<td>98</td>
<td>132</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>257</td>
<td>386</td>
<td>140</td>
<td>246</td>
<td>397</td>
<td>568</td>
<td>146</td>
<td>422</td>
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</tr>
<tr>
<td>Wheat (durum) mono — U</td>
<td>257</td>
<td>276</td>
<td>138</td>
<td>138</td>
<td>404</td>
<td>462</td>
<td>144</td>
<td>319</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Wheat (soft) rot — U</td>
<td>257</td>
<td>708</td>
<td>146</td>
<td>562</td>
<td>320</td>
<td>1 129</td>
<td>155</td>
<td>974</td>
<td></td>
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<td></td>
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<tr>
<td>Wheat (durum) rot — U</td>
<td>257</td>
<td>609</td>
<td>144</td>
<td>466</td>
<td>327</td>
<td>1 007</td>
<td>152</td>
<td>855</td>
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<tr>
<td><strong>Insufficient rainfall 250 mm</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Barley — U</td>
<td>111</td>
<td>207</td>
<td>127</td>
<td>80</td>
<td>170</td>
<td>240</td>
<td>134</td>
<td>106</td>
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<td></td>
</tr>
<tr>
<td>Canola — U</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>121</td>
<td>385</td>
<td>148</td>
<td>237</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forage mix rot — U</td>
<td>141</td>
<td>362</td>
<td>213</td>
<td>149</td>
<td>68</td>
<td>334</td>
<td>185</td>
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<td>66</td>
<td>0</td>
<td>115</td>
<td>49</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat (soft) mono — U</td>
<td>148</td>
<td>270</td>
<td>127</td>
<td>143</td>
<td>162</td>
<td>482</td>
<td>136</td>
<td>346</td>
<td></td>
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<tr>
<td>Wheat (durum) mono — U</td>
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<td>219</td>
<td>126</td>
<td>93</td>
<td>169</td>
<td>398</td>
<td>134</td>
<td>264</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat (soft) rot — U</td>
<td>148</td>
<td>431</td>
<td>130</td>
<td>301</td>
<td>162</td>
<td>643</td>
<td>139</td>
<td>504</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat (durum) rot — U</td>
<td>148</td>
<td>352</td>
<td>128</td>
<td>224</td>
<td>154</td>
<td>546</td>
<td>136</td>
<td>410</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Source: Authors' calculations.*
**Table 13: Gross margins of irrigation farms (current and improved systems)**

<table>
<thead>
<tr>
<th>Crops</th>
<th>Inputs costs (incl. irrigation) (USD/ha)</th>
<th>Irrigation costs (USD/ha)</th>
<th>Gross margin (USD/ha)</th>
<th>Labour &amp; services (USD/ha)</th>
<th>Gross margin (incl. all services) (USD/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current practice</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Wheat (soft) rot — I</td>
<td>606</td>
<td>161</td>
<td>1 509</td>
<td>471</td>
<td>1 038</td>
</tr>
<tr>
<td>Sugar beet — I</td>
<td>1 472</td>
<td>451</td>
<td>1 919</td>
<td>1 517</td>
<td>402</td>
</tr>
<tr>
<td><strong>Improved technology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunflower — I</td>
<td>591</td>
<td>225</td>
<td>588</td>
<td>455</td>
<td>133</td>
</tr>
<tr>
<td>Canola — I</td>
<td>544</td>
<td>161</td>
<td>973</td>
<td>448</td>
<td>525</td>
</tr>
<tr>
<td>Wheat (soft) rot — I</td>
<td>671</td>
<td>161</td>
<td>1 593</td>
<td>461</td>
<td>1 132</td>
</tr>
<tr>
<td>Bean rot — I</td>
<td>311</td>
<td>172</td>
<td>1 758</td>
<td>952</td>
<td>806</td>
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<td>Silage corn rot — I</td>
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<td>345</td>
<td>3 633</td>
<td>2,398</td>
<td>1 235</td>
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<tr>
<td>Sugar beet — I</td>
<td>1 339</td>
<td>451</td>
<td>2 052</td>
<td>1,517</td>
<td>535</td>
</tr>
</tbody>
</table>

*Source: Authors’ calculations.*

**Economical evaluation of crop rotation systems**

Absolute returns were determined for each crop rotation system using the valid input prices of the crops involved in each one of the rotation systems and the average crop prices paid to farmers in the last year. Canola is not grown in Morocco, so the potential price to farmers is estimated according to local sunflower prices, as explained earlier (also see Table 50).

Absolute returns for the northern regions, large and medium farms and improved technology during years of normal rainfall, are as follows:

- crop rotation systems consisting of canola/wheat/wheat are more profitable compared to others, having net profits of USD 598;

- crop rotation systems consisting of wheat/canola/wheat/fava beans and wheat/wheat/sunflower provide same absolute returns (about USD 516);
• crop rotations of wheat/wheat/fava beans (about USD 504) provide slightly lower absolute returns than wheat/wheat/sunflower (USD 516);

• absolute returns of wheat/sunflower/wheat/fava beans rotations are USD 455, while wheat/wheat/clean fallow net profits are lower at USD 425;

• the less profitable rotation is the wheat monoculture with USD 298 net profits.

These results suggest that while canola introduction in crop rotations has the highest potential in term of net profits, sunflower’s advantage is also attractive compared with other already practiced rotations (i.e. with fava beans, clean fallow). Compared with wheat monoculture, sunflower is a crop of interest, allowing: (i) net profits in year \( n \); (ii) improvement of wheat net profits in year \( n + 1 \) (passing from wheat monoculture to wheat rotation); and (iii) income diversification. In addition, compared with fava beans, sunflower is easier to grow (there are less pests and diseases), and because it is sown in February, instead of October like fava beans, it spreads the rainfall risk. Fallow presents smaller margins but doesn’t require any investment (inputs), and operations are limited compared to a sunflower crop.

Introduction of canola (wheat/wheat/canola) in the current cropping systems for the southern regions, large farms and improved technology during years of normal rainfall is a good alternative to the classical rotation based on wheat/wheat/clean fallow. The net profit is USD 151 more (19 percent). Returns on wheat in monoculture remain the least profitable rotation with USD 371 — that is 53 percent lower than cereals and canola.

Even if canola profitability is obvious (USD 538), medium farms in the southern regions using current practice and improved technology in normal rainfall have to be considered linked with breeding activities and risk management (drought). Then, absolute return on mix forage rotations (USD 530) is probably still more interesting for medium farm management.

The most profitable wheat based rotations (wheat/wheat/rotation crop) for large farms with irrigation and improved technology in the southern region (Doukkala) are (in descending order) silage corn USD 1235; beans USD 806; sugar beet USD 535; canola USD 525;
and sunflower USD 133. Sugar beet based rotations (wheat/sugar beet/rotation crop) show lower net profits: silage corn USD 967, bean USD 824, wheat USD 930, canola USD 731 and sunflower USD 610.

With regards to net profits, canola is clearly a profitable crop. Compared with silage maize, which is more profitable, it requires less investment in materials and operations (wrapping, silage packing, fermentation control, etc.). While sugar beet is a national priority crop, farmers are increasingly reluctant to grow it because of its high water requirement and high input prices (services, pesticides, etc.) compared with the production value. Canola could constitute a good alternative cash crop with similar advantages as a break crop in rotations. On the other hand, when sunflower is compared with other crops it does not seem attractive, with net profits 75 percent lower than canola. This confirms why sunflower is not a cash crop for intensive farms in irrigation schemes.
Table 14: Gross margins (incl. all services) of alternative rotation systems, USD/ha

<table>
<thead>
<tr>
<th>Rotation by region and farm typology</th>
<th>Gross margin (incl. all services) (USD/ha)</th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Current practice</td>
<td>Improved technology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal rainfall &gt;400 mm</td>
<td>Insufficient rainfall 300 mm</td>
<td>Normal rainfall &gt;400 mm</td>
<td>Insufficient rainfall 300 mm</td>
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<td><strong>Northern regions, large farms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat/wheat/canola</td>
<td>–</td>
<td>–</td>
<td>598</td>
<td>377</td>
<td></td>
</tr>
<tr>
<td>Wheat/canola/wheat/fava beans</td>
<td>–</td>
<td>–</td>
<td>517</td>
<td>289</td>
<td></td>
</tr>
<tr>
<td>Wheat/wheat/sunflower</td>
<td>–</td>
<td>–</td>
<td>516</td>
<td>281</td>
<td></td>
</tr>
<tr>
<td>Wheat/wheat/fava beans</td>
<td>–</td>
<td>–</td>
<td>504</td>
<td>262</td>
<td></td>
</tr>
<tr>
<td>Wheat/sunflower/wheat/fava beans</td>
<td>–</td>
<td>–</td>
<td>455</td>
<td>217</td>
<td></td>
</tr>
<tr>
<td>Wheat/wheat/clean fallow</td>
<td>–</td>
<td>–</td>
<td>425</td>
<td>254</td>
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<tr>
<td>Wheat/wheat</td>
<td>–</td>
<td>–</td>
<td>298</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td><strong>Northern regions, medium farms</strong></td>
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<tr>
<td>Wheat/wheat/canola</td>
<td>–</td>
<td>–</td>
<td>598</td>
<td>377</td>
<td></td>
</tr>
<tr>
<td>Wheat/canola/wheat/fava beans</td>
<td>–</td>
<td>–</td>
<td>517</td>
<td>291</td>
<td></td>
</tr>
<tr>
<td>Wheat/wheat/sunflower</td>
<td>389</td>
<td>171</td>
<td>516</td>
<td>273</td>
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</tr>
<tr>
<td>Wheat/wheat/fava beans</td>
<td>379</td>
<td>146</td>
<td>504</td>
<td>266</td>
<td></td>
</tr>
<tr>
<td>Wheat/sunflower/wheat/fava beans</td>
<td>352</td>
<td>129</td>
<td>455</td>
<td>213</td>
<td></td>
</tr>
<tr>
<td>Wheat/wheat/clean fallow</td>
<td>298</td>
<td>134</td>
<td>425</td>
<td>254</td>
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</tr>
<tr>
<td>Wheat/wheat</td>
<td>280</td>
<td>74</td>
<td>298</td>
<td>101</td>
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<td><strong>Southern regions, large farms</strong></td>
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<tr>
<td>Wheat/wheat/canola</td>
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<td>–</td>
<td>791</td>
<td>384</td>
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<tr>
<td>Wheat/wheat/clean fallow</td>
<td>–</td>
<td>–</td>
<td>640</td>
<td>312</td>
<td></td>
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<tr>
<td>Wheat/wheat</td>
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<td>–</td>
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<td>305</td>
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<td><strong>Southern regions, medium farms</strong></td>
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</tr>
<tr>
<td>Wheat/wheat/canola</td>
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<td>–</td>
<td>888</td>
<td>422</td>
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</tr>
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<td>Wheat/wheat/barley</td>
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<td>105</td>
<td>368</td>
<td>239</td>
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<tr>
<td>Wheat/wheat</td>
<td>192</td>
<td>118</td>
<td>331</td>
<td>108</td>
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</table>
The international competitiveness of Moroccan oilseed production

The previous section examined the place of sunflower and, potentially, canola in farming systems in Morocco. This analysis rests upon the comparative farm economics of oilseed crops measured against their principal competing crops for arable area in Morocco. However, even where it can be demonstrated that sunflower or canola represent a valuable choice for crop rotations in some Moroccan regions, this does not necessarily mean that Morocco is internationally competitive in these crops. Indeed, in many instances, it would be cheaper for Morocco to import crops rather than cultivate them domestically. This is exactly the situation that has been exposed by the removal of tariff barriers from some oilseed product imports to Morocco. Without tariff protection to support domestic prices above international price levels, sunflower production may not be able to hold its own in Morocco — particularly in competition with a wheat sector that still enjoys beneficial domestic protection.

This argument does, however, ignore the rotational benefits of cultivating an oilseed crop: this is manifested in the wheat yield, which receives a boost in the year following an oilseed or other break crop. With these observations in mind, it is worth taking a step back to compare the Moroccan oilseed sector with its international counterparts.
Figure 25 compares the average costs of producing a tonne of sunflower seed under current practice in Morocco (Normal) with a selection of international producers. In international terms, the cost of producing a tonne of output is more relevant than the costs of producing one hectare, although high yields are one of the most important drivers of production costs per tonne. We also include the sunflower costs for Morocco under current practices with dry weather (Dry) and the hypothetical costs for the same regional farms but with improved technology and practices (Normal Improved and Dry Improved).

The diagram reveals that Moroccan costs are currently high by international standards, and are about USD 70 per tonne higher than the world average. In fact, improved farm technology will not help on this competitive parameter, as costs per tonne would rise slightly after intensification (although gross margins would improve). Growing conditions are very different between these countries, with natural advantages of deep soils and storage of winter rainfall helping the leading countries lower their costs.

**Figure 25: International comparison of sunflower field production costs**

Source: Authors’ estimates.
In order to estimate the impact of local price conditions on Moroccan crop margins, the results from the previous section are compared with international price conditions. The international prices for all crops, based on northwest European Union ports, were adopted and adjusted to a Moroccan farm gate basis by allowing for the costs of sea freight and internal transportation, plus handling and marketing costs.

The results of this analysis are presented in Figure 26, using margins for current practice and improved technology for medium farms in the northern regions with normal rainfall conditions as the consistent comparison group. The results demonstrate some interesting conclusions, including:

- Under international prices, margins are higher for both sunflower and canola, but lower for the key competing crops, wheat and fava beans. This shows that domestic price support policies disadvantage oilseeds in Morocco.

- Under current practices, international price conditions over the past three years would have made sunflower margins better than both fava beans and monoculture soft wheat. With the prevailing policy regime in place, sunflower performs worse than wheat and broadly similar to fava beans. Although high international wheat prices in recent years have reduced the effective subsidy required to maintain guaranteed wheat prices, this has still been enough to tip the crop choice balance away from sunflower towards monoculture wheat cultivation. This preference combined with the tariff protection in place to support fava beans prices has greatly reduced sunflower area.

- Canola looks very attractive with improved technology, although it is unproven at a commercial scale in Morocco.

- Soft wheat would benefit from intensification and improved technology, but only in rotation. This suggests an oilseed and wheat in rotation would be the optimum solution for an improved farm system in Morocco.
Figure 26: Moroccan crop margin comparison with domestic and international prices (northern, medium farms with normal rainfall)

Source: Authors’ calculations.
Chapter 3 - Oilseed processing sector in Morocco

Outline of the oilseed processing sector

The oilseed crushing sector in Morocco is currently poised on the edge of a precipice. In the past couple of years, crushing has almost ground to a halt as a potent combination of reduced domestic sunflower seed output and changes in the import policy regime have reduced the volumes of raw materials available and lowered crushing margins.

The vegetable oil refining sector has been more robust, in part because it is still protected by a favourable import tariff regime. Nonetheless, refined oil imports are set to enter a transitional phase of tariff reduction, following the pattern of trade liberalization that occurred in the crushing sector. Under the bilateral FTA with the United States, Morocco’s tariffs on refined vegetable oils, 25 percent prior to the FTA, are being phased out over a ten year period.

The commercial crushing sector has two principal facilities:

- Lesieur Cristal is the largest operator. Lesieur is the dominant crusher of sunflower seeds in Morocco, but it also crushes large volumes of imported soybeans. The operator has two crushing lines in Casablanca, located 5 km from the port. These two lines have crush capacities of 1 200 and 700 tonnes per day, based on crushing soybeans. When crushing sunflower, this capacity is reduced to around 700 tonnes per day on the larger line. Lesieur’s ownership is shared between the French company, Sofiprotéol (41 percent), the Moroccan royal investment fund, Société Nationale d’Investissement (SNI) (22 percent), retirement and insurance funds (21 percent) and the stock exchange (around 15 percent). SNI is thought to be gradually withdrawing its ownership.

- Les Huileries du Souss Belhassan (referred to hereafter as Belhassan) has a plant inland at Ain Taoujtate, near Meknes. This company has a crush capacity of around 1 000 tonnes per day, based on crushing soybeans. Belhassan crushes almost solely imported soybeans.
This installed capacity gives a national annual crushing capacity of approximately 700 000 tonnes a year, based on soybeans. Sunflower seed and canola can also be crushed in the same plants, but volumes of these seeds are much smaller as stated in Chapter 1. Even at its peak in the early 1990s, the maximum volume of soft seeds crushed was only around 150 000 tonnes per year. Neither facility has invested in its oilseed-crushing process significantly over the last decade. As a result, machinery is ageing and energy costs are high, although labour costs are reasonably low.

For the refining of crude vegetable oils, there are six facilities with a combined aggregate capacity of close to 600 000 tonnes of oil per annum.

- Lesieur Cristal has a major refinery (and fractionation) plant attached to its oilseed crushing facility in Casablanca;
- the Belhassan group has two refineries, one in Meknes and one in Agadir;
- the Société Industrielle Oléicole is located in Fez;
- the Sociétés des Conserves is based in Meknes;
- the international food processing company Savola has a refinery in Berrechid.

The refining sector currently is overwhelmingly based on the refining of imported crude oils, as was mentioned in Chapter 1. Refining of oil from domestic oilseed crops accounts for only 1–2 percent of the total market for refined oil in Morocco today.

**Oilseed crushing**

The oilseed crushing season in Morocco was until recently based on a mix of imported soybeans supplemented by domestic sunflower seed supplies. For this reason, the two crushers listed above employ multi-seed facilities, able to switch between soft seeds (canola and sunflower seed) and soybeans with only minor adjustments. The domestic sunflower crush begins with the harvest in July and runs through to around October, depending on the volatile size of the crop. Far more important to the sector is the crushing of imported soybeans for oil and meal, which can take place year round. As Figure 27 reveals, imported soybeans
accounted for up to 90 percent of the Moroccan crush in the years before soybean imports plummeted under the FTA with the United States.

**Figure 27: Oilseed crushing volume in Morocco, 1990–2011**

![Graph showing the collapse of oilseed crushing in Morocco.](image)

*Source: Oil World.*

Figure 27 charts the collapse of oilseed crushing in Morocco. The total crush peaked at over 500,000 tonnes in 2005, only to fall to below 300,000 tonnes in 2010, and then to a paltry 90,000 tonnes in 2011. This dramatic slump was the result of two factors. First, the domestic sunflower crop has declined from a peak of 160,000 tonnes in the early 1990s to around 30,000 tonnes in recent years. Second, the government has embarked on a programme of trade liberalization. A series of bilateral trade agreements, notably with the European Union and the United States, have sharply reduced the applicable rates of many tariffs in the oilseed sector. For imported crude vegetable oils, tariffs were previously 20 percent. However, since 2008 this was lowered gradually to 2.5 percent for most oils under the liberalization programme. Following the bilateral arrangement with the United States, the tariff on American soybean oil has been reduced to zero since 2009. Although sunflower meal has retained a national...
A tariff rate of 23.5 percent, this has also been undermined by the trade arrangement with the United States as American soy meal can now enter Morocco with a 0 percent tariff.

The effect of these steep tariff reductions has been to increase the attractiveness of importing soybean oil and meal directly at the expense of importing soybeans for crushing. In combination with the reduced availability of domestic sunflower, oilseed crushing has now almost ground to a halt in Morocco. Figure 28 highlights the rate at which oilseed imports to Morocco have collapsed in the past few years, after a steep rise as livestock demand for meal grew. Figure 29 confirms the simultaneous substitution by imports of soybean meal.

**Figure 28: Moroccan oilseed imports, 1990–2011**

Source: Oil World.
Oilseed crushing margins

The difficulties experienced by the Moroccan crushing sector in the past couple of years relate to the decline in domestic sunflower output and an erosion of soybean crushing margins. Nevertheless, the precise margins derived by crushers are commercially sensitive and were not made available for the research of this report.

With this constraint in mind, we can be sure of one thing: the crushing sector in Morocco is barely operating; therefore, we can be confident that it has been a victim of the process of structural adjustment following the government’s market and trade liberalization initiatives. In the course of researching this report, industry participants confirmed this decline. In order to prepare an assessment of the indicative margins available to oilseed crushers in Morocco, we made a number of assumptions about seed and product prices. We set these out below.

To begin with, we calculated gross crushing margins by deducting the cost of raw materials (seed or beans) from the revenue of the products of one tonne of seeds (see the box below).

---

**Figure 29: Moroccan oilseed meal imports, 1990–2011**

Source: Oil World.
Crush margin per tonne of seed/beans =

\[
\text{(price of oil per tonne} \times \% \text{ oil extraction rate from tonne of seed/beans) + (price of meal per tonne} \times \% \text{ meal extraction rate from tonne of seed/beans) - price of seed/beans per tonne}
\]

As an example of this approach, Figure 30 presents the soybean crushing margin for the United States (based in Illinois) and the European Union (based at the European Union’s northwest ports). The volatility of the monthly spot margins is smoothed by presenting three months’ moving averages. The diagram also includes the average margin over the period for each series.

**Figure 30: International soybean crushing margins, 2000–2012**

Figure 30 reveals that crushing soybeans at origin in the United States yields average margins of USD 33 per tonne of beans over the last decade or so. It also shows that at destinations in the European Union, which, like Morocco, relies on soybean imports for crushing, margins are typically lower, averaging closer to USD 25 per tonne of beans.

Figure 31 considers sunflower seed crushing in the European Union. Unlike soybeans, the European Union processes largely domestic sunflower seed supplies rather than relying on imports.
Margins are slightly higher for sunflower seed crushing in the European Union than for soybeans, averaging USD 34 per tonne of seed over the period. This is very close to the American soybean crushing margin and is not a surprise, as crushing margins in the longer term tend to settle at a level that covers full costs in the sector.

**Figure 31: International (European Union) sunflower crushing margins, 2000–2012**

![Sunflower Crushing Margins Chart]

*Source: Authors’ calculations.*

We should remember that these margins (and those included for Morocco in this report) are based on spot prices, and they will not be the actual margins earned by individual crushers. Crushers will each use hedging and forward-purchasing strategies to improve on this indicative performance.

Moreover, in Morocco in particular, crush margins have been supported by a succession of government interventions. These have been necessary because Moroccan producer prices for sunflowers are not set solely by market forces. Sunflower producers have received a price fixed by the state under various mechanisms: firstly under COMAPRA and since 2000 a price fixed at a minimum of MAD 4 000 per tonne. The text box below details the pricing system put in place for producers in 2000s. Because
the producer price for sunflower seeds is often fixed at a level above world market prices, processors have been compensated by the difference between the supported domestic price and the cost of importing world market sunflower seeds.

**Compensation system for local sunflower seeds**

The sunflower seed sector was liberalized in November 2000. The liberalization process provided the following provisions:

- a lowering of the import duty to 2.5 percent on oilseeds;
- the fixing of import duties on imported refined oils and cakes at 25 percent;
- maintaining the producer price of sunflower seeds at a minimum of MAD 4 000 per tonne;
- supporting compensation to processors equal to the difference between the price paid to producers and the cost of imported seed.

This compensatory payment is limited exclusively to local sunflower seed collected for crushing (excluding, therefore, sunflower seeds for direct consumption).

**Calculation for compensation payment**

The compensation amount is calculated based on the average quotation of the month of June on the Rotterdam market and the price paid to producers, according to the following formula (w[1]):

\[ PP - (1-PN/100) \times RC \times PLC + M \]

If the world price equivalent at a crushing plant in Casablanca is greater than MAD 4 000 per tonne, the compensation is not justified and the price paid to producers is the subject of negotiation between the crusher and producer representatives. The evolution of compensation amounts from 2003 to 2010 is presented in Table 15.

Prices were negotiated directly between producers and crushers when high prices in the world market exceeded MAD 4 000 on a Moroccan equivalent basis in the pricing formula. Until 2007, COMAPRA was responsible for seed collection and for dispersing
the subsidy to producers. COMAPRA received a margin of MAD 400 per tonne for these services (M in the formula above). Due to higher world prices and the withdrawal of COMAPRA from this activity, for the 2008/2009 season the collection of sunflower seeds was performed by Union Nationale des Cooperatives Agricoles Morocaines (UNCAM) and in the 2009/2010 season by the Group Crédit Agricole du Maroc (CAM) intervention agency, also with a margin of MAD 400 per tonne. For compensatory payments, the Office Nationale Interprofessionelle des Céréales et Légumineuses channelled financial support for this operation.

Table 15: Compensation system for crushers for local sunflower seed purchases, 2003–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunflower seeds collected for crushing (thousand tonnes)</td>
<td>55.6</td>
<td>35.0</td>
<td>18.2</td>
<td>8.3</td>
<td>13.0</td>
<td>23.7</td>
<td>26.1</td>
</tr>
<tr>
<td>Compensation amount per unit (MAD per tonne)</td>
<td>1954</td>
<td>1850</td>
<td>1959</td>
<td>1933</td>
<td>1195</td>
<td>1338</td>
<td>889</td>
</tr>
<tr>
<td>Total grant (million MAD)</td>
<td>108.2</td>
<td>64.7</td>
<td>35.6</td>
<td>16</td>
<td>15.5</td>
<td>31.7</td>
<td>23.2</td>
</tr>
<tr>
<td>Total grant (million USD)</td>
<td>11.3</td>
<td>7.3</td>
<td>4.0</td>
<td>1.8</td>
<td>1.9</td>
<td>4.1</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: MAMF

Table 15 reveals that the budgetary expenditure on the compensation scheme ranged from MAD 16 million (USD 1.8 million) to MAD 108 million (USD 11.3 million). Recent payments have been reduced as world market prices for sunflower seed have increased, taking them close to and at times above the minimum price of MAD 4 000 per tonne. In 2008 and again in 2011 (and presumably in 2012 as well), world prices on an adjusted Casablanca basis were in fact greater than MAD 4 000 per tonne, and no compensation was paid. In these years, the price was negotiated between the crushers and producers directly.
Figure 32 presents two pieces of information:

- The official Moroccan sunflower seed producer price since 1993 is represented by the blue line in the diagram. As we see, since 2000, the price has had a fixed floor at MAD 4 000 per tonne, with higher prices prevailing when world market conditions allowed.

- Our calculation of the average annual import parity price of sunflower seed — using Rotterdam prices adjusted to a Casablanca basis by applying freight, import tariffs and an adjustment for the lower average oil content of Moroccan seeds — is the green line.

It is interesting to note that the guaranteed domestic producer price (the blue line) was consistently greater than the calculated world market equivalent (the import parity price, the green line) until 2008, but was below the world market price in 2008 and 2011 (and presumably again in 2012, although local prices have not been made available for this period). In these years, when import parity equivalent prices exceeded MAD 4 000, sunflower seed prices were negotiated directly between crushers and producers and no seed compensation payments were made to crushers.

**Figure 32: Moroccan producer sunflower seed price vs. indicative import parity sunflower seed price, 1993–2011**

Source: Lesieur Cristal, MAMF and authors’ calculations.
In all years except 2008 and 2011, the guaranteed Moroccan producer price was higher than the world market price equivalent, even after applying the relevant import tariffs and freight to the price of imported seeds. This helps explain why a compensation formula was applied for crushers: as the Moroccan prices of sunflower oil and meal were linked to world market prices, the crushing margin would be squeezed when world oil and meal prices were relatively low, as the Moroccan sunflower seed price cannot fall below its floor of MAD 4 000 per tonne. In a free market, the seed price would fall to reflect the decline in the price of its products.

As described in the text box above, to offset this, the government has compensated crushers by subsidising the difference between the guaranteed producer sunflower seed price and a calculated sunflower seed price specifically for crushers (based on the costs of importing sunflower seeds from the world market). The actual calculation is also in the box above. Table 15 details the compensation per tonne paid to crushers from MAMF sources. This payment represents the difference between the compensated price calculated with the price formula above and the guaranteed producer price in Figure 32.

By deducting the compensation payment received by crushers from the producer price, we can derive the indicative price actually paid by sunflower crushers for sunflower seed in Morocco. This is represented by the yellow line in Figure 32.

By comparing the yellow and green lines in Figure 32, we see that the level of compensation paid to crushers for sunflower seed appears to have been greater in many years than was required purely to compensate for the difference between import parity prices and producer prices (i.e., the yellow line is persistently below the green line). All of this additional compensation would feed directly into sunflower crushing margins, providing a windfall that supports margins at a level above where they would be in a freely operating market.

Nonetheless, as we do not know the actual price which crushers pay for their sunflower seed, we have to estimate indicative Moroccan margins. We do this on three bases:

- First, using the import parity equivalent prices of sunflower seed from Figure 32 (the green line) and the import parity
prices of meal and oil, we allow for freight from the European Union in calculating import parity prices for sunflower oil and meal. We also allow for the lower average oil content typically extracted from Moroccan sunflower seed. The green line therefore estimates Moroccan crushing margins, applying the actual prevailing effective tariff rates of 20 percent on oil and 23.5 percent on sunflower meal until 2009, with 2.5 percent thereafter on sunflower oil.

- Second, we recalculate these figures by assuming the tariffs for oil and meal imports are set at zero. The blue line therefore estimates Moroccan sunflower crush margins in a completely liberalized system without any import tariffs throughout the whole period.

- Third, we calculate margins of the yellow line by using the calculated compensated price that crushers appear to have paid for seed (the yellow line). This calculation also uses the actual tariffs from the period, as in the first point on this list.

Figure 33 presents these three estimates of indicative Moroccan sunflower seed crushing margins. The dotted lines indicate the average levels of the crush margins over the period.

Figure 33: Indicative Moroccan sunflower seed crushing margins, 1993–2011

Source: Authors’ calculations.
Figure 33 prompts the following observations:

- By comparing the green line with the blue line, we observe that the indicative sunflower crush margins achieved in Morocco are far higher than would be the case without any tariff protection. Before the trade liberalizations, sunflower crushing averaged USD 70 per tonne more with tariff protection than without. This gap has narrowed as the tariff on sunflower oil has declined to 2.5 percent since 2009, although the margin is still supported by the continued tariff protection on sunflower meal.

- With the compensated sunflower seed price and tariff protection in place (the yellow line), sunflower crushing in Morocco was very attractive, with margins far exceeding those available to European Union crushers in the same period (see Figure 31).

- In fact, even without the compensated seed price, crushing margins were very healthy in Morocco under the previous tariff regime. This is shown by the green line, which averages USD 75 per tonne over the period (still double the European Union equivalent margin on sunflower crushing). However, after the sunflower oil tariff was reduced to 2.5 percent, the margin would have collapsed to zero in 2011 without the benefit of the compensated seed payment.

- The level of the compensation payments appear in excess of what was required merely to lower sunflower seed prices to import parity and to deliver a typical international crushing margin. This is confirmed by the yellow line in the diagram, which is the margin that domestic crushers would have earned using the compensated seed price and the prevailing tariff structure for the period.

- As the blue line illustrates, the Moroccan sunflower crushing sector does require a degree of support to operate. Without compensated seed prices or tariff protection on oil or meal, the margin barely averages above zero, far in excess of variable operating costs (see the next section).

A previous benefit for crushers in Morocco has been that crushing sunflower formerly represented only a fraction of their total capacity. As we show below, margins on soybean crushing were good over the same period. In addition, both crushing companies
refine and bottle their own production. The lucrative refining, bottling and retail oil sectors — especially for the premium-priced sunflower oil — provide persuasive reasons on their own to secure supplies of crude sunflower oil from the domestic crop whenever it is available. Being involved in the producer supply chain and providing an outlet for Moroccan farmers may also be a strategic move to increase the lobbying power of vegetable oil producers with the government in policy formation. In addition, crushers are also able to apply sophisticated hedging and purchasing strategies that may improve margins above the indicative levels of our calculations.

Figure 34 presents margins of crushing of soybeans in Morocco, which was the most important activity overall for processors. This diagram was calculated along the same lines as Figure 33, with the soybean price also an import parity price (the Moroccan domestic supply of soybeans is negligible). Again, we contrast the situation for margins and tariffs in place to 2009 with the situation without any effective tariffs following the bilateral trade arrangement with the United States.

**Figure 34: Moroccan soybean crushing margins without tariffs and with actual tariffs, 1993–2011**

Source: Authors’ calculations.
The highlights of Figure 34 include:

- With the previous tariffs in place, soybean margins were also strong (averaging over USD 70 per tonne of beans crushed) and were maintained far above international equivalents (see the European Union’s and United States’ margins above).

- This situation changed dramatically after 2009, with margins being eroded to close to zero as the oil and meal tariffs were removed under the terms of the FTA made with the United States. This explains why crushing has all but halted in Morocco in the past two years. Soybean crushing has been unable to compete with direct imports of soybean meal and oil.

- Even without any tariffs (the blue line), crush margins would have been positive over the period as a whole. However, this average level is below the estimated costs of crushing, as indicated in the next section.

**Oilseed crushing costs**

For the cross-country comparison of oilseed crushing costs, this document relies on LMC International estimates. LMC produces internationally respected estimates of the costs of producing and crushing oilseeds around the world. In this section, we draw upon these estimates and compare them with the estimated costs of crushing sunflower seed and soybeans in Morocco.

LMC employs an engineering costs methodology, which means each element of the production process — labour, chemicals, energy, capital, etc. — is considered by multiplying the volume used in each process by the price per unit in the country in question. This method has the great merit of producing internationally comparable costs. This avoids the problem that costs will be assessed differently in each country under different accounting procedures. Our estimates for Morocco are derived using this methodology.

Figures 35 and 36 present our estimates for average Moroccan crushing costs for sunflower and soybeans respectively. Each diagram places Morocco within an international framework, with all costs calculated for each country under the same, consistent methodology. The costs are divided into fixed and variable costs of production, to indicate the break-even level at which a plant can
be run in the short term to cover variable costs. In the longer term, however, fixed costs, such as depreciation, have to be met.

**Figure 35: Global comparison of sunflower seed crushing costs**

![Figure 35: Global comparison of sunflower seed crushing costs](image)

*Source: Authors’ calculations.*

**Figure 36: Global comparison of soybean crushing costs**

![Figure 36: Global comparison of soybean crushing costs](image)

*Source: Authors’ calculations.*
Figures 35 and 36 highlight a few issues confronting crushers in Morocco. At close to USD 50 per tonne of seed or beans crushed, Moroccan costs are towards the upper end of our international comparison group. In the case of sunflower, even the high-cost crushers of Ukraine and the Russian Federation have several state-of-the-art, modern facilities that now achieve costs much lower than in Morocco. The higher average in these two countries is pushed up by the presence of many old, almost obsolete facilities left from Soviet days and are now crushing very small volumes of the local crop. Second, both crushers in Morocco suffer in particular from relatively obsolete equipment, poor capacity utilization and high-energy costs. At Lesieur for example, a large amount of equipment has not been updated over the past decade.

When compared with the estimated crushing margins from the previous section, we see that soybean crushing was viable with the previous tariff regime in place, but without these tariffs the sector becomes unprofitable. This underlines why crushing has halted in Morocco in the past two seasons, as soybean crushing has become unviable and domestic sunflower seed supplies have collapsed.

In summary, soybean crushing in Morocco has recently had to compete with meal and oil imported directly from the world market. Following the trade liberalization, soybean crushing has declined sharply in Morocco and has been shown to be uncompetitive internationally without some form of policy support.

Sunflower crushing, meanwhile, has withered away as the domestic crop has shrunk. The lack of raw materials notwithstanding, subsidies to crushers in the form of compensation payments have offset the erosion of margins as sunflower oil tariffs have been largely removed.

It has proved more attractive recently for the vegetable oil sector to simply import crude oil and refine this for the domestic bottled oil market.
**Vegetable oil refining**

There are currently six vegetable oil refining plants in Morocco. These plants refine imported crude oils and, in the case of Lesieur Cristal and Belhassan, are also able to refine oils from their crushing plants.

The key to understanding the refining sector in Morocco is embedded in the policy environment: the process of trade liberalization has reduced import tariffs on most oilseed meal and crude oil to close to zero (sunflower meal being an exception); the tariff on imported refined vegetable oils remains — for the time being — at 20 percent.

With crude oil tariffs levied at 0 percent on American soybean oil and 2.5 percent on other imported oils, the tariff on refined oils has provided a windfall to Moroccan refiners.

Figure 37 illustrates this benefit. The diagram was prepared with the assumptions that:

- Moroccan crude sunflower oil tariffs are set at 2.5 percent throughout the featured period;
- Moroccan refined sunflower oil tariffs are set at 20 percent throughout the period;
- crude sunflower oil is imported from the European Union, with allowances for freight costs;
- refined oil prices are calculated as import parity prices, assuming imports from the European Union (actual refined sunflower oil prices in Morocco were not made available for this report);
- spot international sunflower refining margins from the United States (based in Minnesota).
Figure 37 confirms the windfall available to Moroccan refiners from the current policy regime. With a 2.5 percent tariff in place on crude sunflower oil but a 20 percent tariff levied on refined oil, the Moroccan refining margin averages USD 300 per tonne of oil more than the comparable United States refining margin over the same period. (We should remember, however, that this is for illustrative purposes only — the lower crude oil tariff has only been in place for the past two seasons). With domestic refining costs estimated at USD 100 per tonne of oil, Moroccan margins of USD 400–500 in the past couple of years will have generated substantial profits for sunflower oil refiners. With further margins also available downstream in bottling and retail sales, sunflower oil refiners in Morocco have been well placed to benefit from recent distortions in the domestic policy environment.
Figure 38 provides a similar analysis for soybean oil refining margins in Morocco. Moroccan soybean oil refining margins are almost as high as sunflower oil refining margins with the strong policy support in place. However, as international margins are somewhat higher for soybean oil (based in Illinois), the gap between the two — though still substantial — is less pronounced.

**Figure 38: Moroccan soybean oil refining margins, 2003–2011**

High margins currently available to vegetable oil refiners in Morocco are a result of two sorts of protection:

- **Natural (freight) protection:** Most refineries around the world are located at destination markets where the market is large enough to support the output from a domestic refinery. Refineries are typically located here rather than near oil supplies because refined oil is more difficult to handle and transport and tends to deteriorate over time (and over long journeys). Freight for crude oil is therefore cheaper, and this confers an element of natural or freight advantage to destination refineries.
- Tariff protection: A second element of support for margins is found where tariffs levied on imported raw materials (crude oil) are lower than those levied upon the finished product (refined oil). The scale of this tariff protection is determined by the gap between these import tariffs.

In the case of Morocco, both of these elements of support are available for domestic refiners. We term the total of these two elements effective protection for an industry. Figure 39 identifies the magnitude of the effective protection for the Moroccan refining sector, assuming the current tariff regime was in place over the entire period. For soybean oil, the average effective protection over the period was USD 220 per tonne of oil, with sunflower oil enjoying a higher level averaging USD 300 per tonne of oil.

Figure 39: Effective protection for Moroccan refining sector, 2003–2011

Source: Authors’ calculations.

Note: 20 percent refined oil tariff and 2.5 percent crude oil tariff applied throughout.

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4 Again, we should emphasize that this is for illustrative purposes, as the large differential has only been in place for two years. Nonetheless, the effective protection in the past two years has in fact been greater than these period averages. Of this total effective protection, all but around USD 20 is accounted for by tariff protection.
Figures 40 and 41 emphasize the differential import tariffs as a source of support for domestic refiners. These figures illustrate the situation for Moroccan refiners over the same period without any tariff differential applied. The domestic and international margins converge, with only the USD 20 of freight protection now separating the Moroccan refining margin from the international margin.

The Moroccan Government has announced that it intends to extend its liberalization programme to the refining sector next, which is an obligation of the FTA with the United States. If tariffs on refined oil were reduced to the same level as those on crude oil, the situation would approximate that shown in Figures 40 and 41. With Moroccan refining costs estimated at USD 100 per tonne of oil, this would not leave any profit for refining sunflower oil and very slim profits on soybean oil refining (USD 10 per tonne on average for the past decade).

**Figure 40: Moroccan sunflower oil refining margins without tariffs, 2003–2011**

Source: Authors’ calculations.
Figure 41: Moroccan soybean oil refining margins without tariffs, 2003–2011

Slim profits are in fact not very unusual for the refining sector worldwide, as we can see from the international margins in the figures. While international costs are typically lower than in Morocco by around 20 percent, refining is a very competitive business characterized by low margins and high volumes.

In addition, refiners tend to refine merely to ensure a captive supply of oil for the more lucrative bottling and retail pack oils sectors. Moroccan refining costs are also hamstrung by high domestic energy costs, which represent around a third of refining costs, and a degree of over-manning and older machinery. Moreover, most industries around the world still employ some element of tariff protection on refining. With investment, the Moroccan refining sector would be likely to stand on its own two feet, presumably with a small but reduced element of tariff protection underpinning margins.

Source: Authors’ calculations.
Chapter 4 - Consumption and trade

This chapter moves away from the supply issues examined in Chapters 2 and 3 to an analysis of the consumption position for edible oil and meal in Morocco. We present data describing the current demand situation and provide forecasts for consumption out to 2025. We then draw upon the supply information provided in previous chapters to identify the trade balance for Morocco, considering the net import requirement for the oilseed complex in the country.

A summary of current consumption and trade in the Moroccan oilseed complex

Figures 28 and 29 highlight the composition of oilseed and oilseed meal imports, while Figure 42 summarizes Morocco’s trade stance across the oilseed complex. The categories are all presented as net imports (i.e. imports minus exports), although the only export sales of any magnitude are of olive oil and some fish meal.

Figure 42: Net imports of oilseeds, oilseed meal and vegetable oil in Morocco, 1990–2011

The figure reveals the rapid turnaround in the Moroccan trade position over the past five years:

- prior to 2005, oilseed imports (largely of soybeans, as described in Chapter 3, supplemented by sunflower seed) for crushing in Morocco satisfied the bulk of meal demand;

- direct imports of vegetable oil, again predominantly soybean oil, complemented the supply of oil imported as oil-in-seed;

- from 2006, as tariff reductions (and in particular the 2006 FTA with the United States) began to take hold, the trade balance between oilseeds and oilseed meal reversed dramatically. Oilseed imports plummeted, to be replaced by the direct importation of oilseed meal. Meanwhile, oil imports continued at previous levels, with very little growth.

With declining oilseed imports for domestic crushing and a flattening out of direct vegetable oil imports, oil consumption in Morocco has stagnated in recent years. This contrasts with the situation for meal, where demand has climbed aggressively. Figure 43 confirms this situation, comparing growth in oilseed meal offtake with that for vegetable oil. We aggregate all sources of oilseed meal and oil for the figures, including olive oil. The comparative compound annual growth rate (CAGR) trends for oil and meal in Morocco are:

- over the entire period, from 1990 to 2011, annual meal demand expanded at a startling 10.6 percent per annum, while the rate for oil consumption increased at impressive 3.6 percent per year;

- however, total oil demand stalled between 2005 and 2011, increasing by an annual rate of just 0.2 percent. Nonetheless, meal demand continued to charge ahead, improving at an impressive 7.5 percent a year, despite the setback of the 2008–2009 global recession.
Oil demand appears to have stalled as a result of two principal factors. First, prices have been exceptionally high during the past five years. In a market with a large population in low income brackets, vegetable oil demand has shown itself to be sensitive to price rises.

Second, a more difficult factor to quantify is the impact of undeclared imports of vegetable oil, largely from Algeria. Algerian domestic vegetable prices are capped at USD 1 000 per tonne, with the government subsidising consumers at prices above this level. With recent Moroccan domestic prices well above this level, there has been a strong incentive for traders to purchase edible oil in Algeria and sell it across the border in Morocco. At wholesale, a five litre bottle of oil trades at around MAD 50 in Algeria but at MAD 85 in Morocco. The oil is not declared at customs to avoid the 2.5 percent vegetable oil tariff. These undeclared sales are not part of the figures presented above, and so the total underestimates actual consumption.
Vegetable oil consumption and trade

Figure 44 disaggregates the import total into oil by type, revealing the overwhelming dominance of soybean oil. In fact, in 2011 to 2012, Morocco was the eighth largest importer of soybean oil in the world. It is also interesting that canola oil imports fell away completely after a strong period in the mid-1990s. Chapter 1 revealed that the only other significant supplier of domestic oil demand is Moroccan olive oil, while domestic sunflower production accounts for only around 1–2 percent of total oil consumption.

Figure 44: Moroccan vegetable oil imports, 1990–2011

Source: Oil World.
The cost of the import requirement for vegetable oils is displayed in Figure 45. The diagram presents import costs in real (inflation-adjusted) terms, on a constant 2011 US dollar basis. Soybean oil represents around 85 percent of the import bill in most years. The total cost of oil imports exceeded USD 600 million in 2011.

**Figure 45: Estimated cost of Moroccan vegetable oil imports, 1990–2011**

Source: Authors’ calculations.

Note: cost calculated in real 2011 USD.
Exports from the Moroccan oilseed complex are negligible for both oilseeds and oilseed meal, but Figure 46 illustrates the emerging role of olive oil as the leading export oil crop. Volumes are relatively low across the board, with only olive oil exports demonstrating prospects of expansion — though the prospects for olive oil are outside the scope of this report.

**Figure 46: Moroccan vegetable oil exports, 1990–2011**

Source: *Oil World.*
Figure 47 breaks down the total edible oil and oilseed meal consumed from Figure 43 into constituent oils. The diagram once again highlights the overall dominance of soybean oil, which retails at lower prices than sunflower oil in Morocco. We should also recognize the increasing role of olive oil. Olive now accounts for between 15 percent and 20 percent of local offtake. Olive oil is relatively expensive, but current world market conditions have narrowed its premium against other oils considerably. This has increased its contribution in the Moroccan oil arena along with its increased local production. Expanding Moroccan olive oil production has stimulated its output locally, helping to narrow its price differential against other oils.

**Figure 47: Moroccan vegetable oil consumption, 1990–2011**

Source: Oil World.

**Forecasting vegetable oil consumption**

When forecasting vegetable oil demand, it is important to recognize the close substitutability between individual oils. This substitutability means oil demand should be analyzed as an aggregate and that end-users can switch between available oils as they adapt to the changing market conditions governing each type of oil. In this analysis, therefore, we forecast aggregate oil demand as opposed to individual oil demand. At a national level,
the exact composition of demand each year will be determined by oil availability, cultural preferences and relative oil prices at any given time.

In Morocco, there are no current plans to implement a biodiesel programme, and the principal industrial use of oil in the country is a small amount of soap manufacturing from imported palm oil at refining and fractionation plants. This use is incorporated into our palm oil consumption figures in the figures above and is rolled into our aggregate demand projections.

Our analysis for oil consumption for Morocco draws on detailed empirical comparisons from around the world. This method relies upon estimates of long-run oil demand and income elasticities in conjunction with estimates for national income and population growth. This approach allows us to measure the response of per capita demand to changes in per capita income.

**Forecasting methodology**

The two major dynamics underpinning vegetable oil consumption are income per capita and population. Such dynamics result in a correlation characterized by a propensity to increase consumption as income grows. Consequently, rapidly growing economies and populations feed directly into expanding vegetable oil demand.

The analysis shows a strong relationship between oil consumption and changes in income for many developing economies. This relationship corresponds to Bennett’s Law, which states that the share of calories from starchy staples declines as one’s income increases. An implication of Bennett’s Law is that as one becomes richer, the consumption of oil and meat will increase. These relationships allow us to provide a projection of the growth of per capita food oil consumption as personal income increases. In the ideal setting, if data for a long period of time would become available, income elasticities of demand for food oil could be estimated for Morocco. For Morocco, we have a relatively short run of data on consumption, plotted in Figure 48.

The diagram indicates that demand per capita progressed quickly as incomes increased, but that recent high prices have stalled this progress. As prices adjust and economies recover, however, we expect Morocco to continue to expand its consumption of oil per capita. Today, Moroccan demand per person remains at levels similar to China, where growth is still strong, and Morocco
remains some way behind other countries that have reached saturation in oil consumption. Nonetheless, it is unlikely that growth of Moroccan consumption in the future will match growth in the past as consumption slows beyond a certain level (as has happened in China). From the projected estimate, we place Morocco in the group of middle-income countries with respect to food oil consumption. (See Annex 2 for a more detailed forecasting methodology and explanation.)

Figure 48: Morocco’s per capita food oil consumption vs. real per capita GDP, 1980–2011

Source: Authors’ calculations.

Vegetable oil consumption to 2025

Table 16 reveals our forecasts for GDP per capita in Morocco, and places these forecasts in context for a sample of leading consuming and producing nations around the world. Table 17 summarizes our population growth projections for the same countries. These projections are applicable also for our oilseed meal and meat consumption forecasts for Morocco examined later in this chapter.

The results of our food demand forecasts for oils for each of our featured countries out to 2025 are presented in Table 18. Please note that these estimates cover all edible vegetable oils, including minor oils, but exclude animal fat consumption.
Table 16: Projections of real GDP per capita, thousand USD, 2005–2025

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Source: International Monetary Fund (IMF).

Table 17: Population projections, millions, 2005–2025

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Source: International Foundation for Science (IFS).
Table 18: Total food demand for vegetable oils, million tonnes, 2005–2025

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Source: Derived from LMC forecasts.

Table 18 illustrates that Moroccan oil consumption will expand at a healthy pace out to 2025, with total annual growth averaging 2.6 percent. One percent of this growth is due to the increase in population, with the rest due to the response of demand to the excellent GDP growth prospects. The young age profile of the Moroccan population will also support growth in oil consumption as many young people move into the working age brackets over the next decade.
The forecasts in Table 18 generate the per capita consumption figures presented in Figure 49, measured in kilograms per person. The diagram compares the food consumption in Morocco for 2012 with the forecast for 2025 against a range of other consumers. The countries are ranked according to current demand.

The diagram reflects the slowing down of demand at higher income levels, illustrated by the similar oil consumption per capita in 2025 compared with today. Morocco today sits at around the world average consumption per capita.

**Figure 49: Oil consumption per capita for selected markets, 2012–2025**

![Diagram showing oil consumption per capita for selected markets, 2012–2025.](image)

*Source: Authors’ calculations.*

**Cost of Moroccan vegetable oil imports to 2025**

If we assume that Moroccan domestic vegetable oil output (from local crops) expands at the same rate as consumption over the featured forecast period, then the import bill for vegetable oils will also increase at the same rate as consumption over the next decade or so. If prices remain at today’s levels, in real terms, to 2025, then in these circumstances the total cost of vegetable oil imports will climb 44 percent from its 2011 level to reach over USD 910 million by 2025 (from USD 633 million in 2011, which...
was around 0.6 percent of 2011 Moroccan GDP). This method also assumes that oil demand is satisfied by importing oil directly rather than seed, which is subsequently crushed in Morocco for oil. Our crushing analysis in Chapter 3 suggests that, if oilseeds were imported, the costs would in fact be a little higher than importing oil directly.

If, however, Moroccan oil production from domestic crops remains at today’s level and the whole demand expansion has to be met via oil imports, imports will rise faster and the total oil import bill will climb 50 percent to USD 950 million by 2025. The difference is relatively small because of the very small proportion of oil consumption that is currently satisfied from domestic oil crops. As a proportion of expected GDP, this 2025 estimate would be 0.45 percent of 2025 GDP, which is lower than today’s payment of 0.6 percent of GDP.

**Oilseed meal consumption and trade**

The value of meal varies widely between oilseed crops, and its role is particularly important in the soybean sector. Soybean meal typically provides the greater part of returns to the soybean farmer (rather than the vegetable oil portion of the bean), while for sunflower the meal usually provides less than 15 percent of product revenue. In addition, soybean is close to 80 percent meal; it has a low oil content compared with other oilseeds. Soybean, therefore, dominates the global oilseed meal sector by volume, and the same is true in Morocco. Soybeans are also higher in protein content than most other oilseed meals, and so soybean meal is even more vital for meal production when expressed on a protein equivalent basis.

Figure 50 looks at the current situation for oilseed meal consumption in Morocco and shows the dominance of soybean meal, with 70 percent of the market, supplemented by sunflower meal. To place this in some perspective, in 2011 to 2012 Morocco was the 22nd largest importer of soybean meal worldwide. Figure 51 displays how rapidly aggregate meal imports have increased recently, while Figure 29 in Chapter 3 highlights both the majority of imports in the sunflower total and the precipitous recent rise in direct imports of meal.
Steep tariff reductions have increased the attractiveness of importing soybean meal directly at the expense of importing soybeans for crushing. The cost of the import requirement for oilseed meal is displayed in Figure 51. The diagram captures the rapid escalation in direct meal imports, replacing the former imports of oilseeds for crushing. Costs are presented in real (inflation-adjusted) terms, on a constant 2011 United States dollar basis. Soybean meal represents around 85 percent of the import bill today. The total cost of meal imports exceeded USD 320 million in 2011.

The cost of importing meal directly has climbed so steeply partly because meal imports have displaced seed and bean imports for crushing. Figure 52 presents the mirror image of Figure 51 by showing the cost of oilseed imports. However, the meal increase is also in part owing to the swift underlying expansion in total consumption, shown in Figure 50.
Figure 51: Estimated cost of Moroccan oilseed meal imports, 1990–2011

Source: Authors’ calculations.
Note: Calculations made in real 2011 USD.

Figure 52: Estimated cost of Moroccan oilseed imports, 1990–2011

Source: Authors’ calculations.
Note: Calculations made in real 2011 USD.
Forecasting future consumption in the oilseed meal sector

To understand the future direction of the oilseed meal sector in Morocco, it is crucial to first understand the meat/livestock sector. (See Annex 2 for a detailed explanation of this link and the methodology used.)

The following observations on the Moroccan livestock sector can be made:

- Good economic growth in Morocco, underpinned by population expansion averaging 1 percent per annum, has already stimulated a rapid increase in meat consumption since the turn of the century (see Annex 4 for more details).

- The selective measures and incentives designed to stimulate an improved livestock sector in Morocco through the PMV is accelerating the output of meat in Morocco. More intensive livestock rearing has the secondary effect of intensifying meal consumption as more animals are raised in lots rather than grazing solely on pasture, i.e., more tonnes of meal are being used to produce each tonne of meat as the sector develops.

- The underlying growth in Moroccan meat consumption — thanks to good income and population prospects and accelerated by the PMV’s dedication to intensifying poultry and red meat output — generates a robust growth rate of 2.5 percent per annum for Moroccan meat demand to 2025.

- Since 2009, subsidies have been given to import young beef and dairy calves and chicks to increase the Moroccan breeding stock. Eighty percent of dairy and beef cattle are produced on farms that produce fewer than five cows a year. There are fewer than ten farms in the country with 5 000 or more head of cattle. However, even small livestock farmers buy in feed and combine this with forage.

Once meat demand has been ascertained, this data can be used to determine how much meal is needed to meet this meat consumption.

In terms of future meal consumption, we assume that the meal incorporation rates (the tonnes of oilseed meal consumed to produce one tonne of meat) of the livestock industries in highly developed economies will have risen in line with past trends.
For Morocco, we assume their incorporation rate will grow more rapidly under the PMV (there is already evidence from the past three years to suggest this) to converge towards current incorporation rates in the United States by 2020. We assume that meal incorporation will then remain at these levels for the five years out to 2025.

Finally, in order to assess meal demand, the various types of oilseed meal must be converted into a soybean meal equivalent. Then soybean meal can be used as a common denominator for protein meal demand forecasts. Such a methodology is applicable because livestock’s demand for meal is largely for its protein as opposed to the specific meals themselves. Protein content is unique to each type of oilseed meal. For example, HiPro soybean meal typically contains 48 percent protein content, whereas canola meal contains 39 percent protein and provides only 80 percent of the protein content of soybean meal.

**Oilseed meal demand forecasts for Morocco to 2025**

Table 19 presents our forecasts for Moroccan oilseed meal demand to 2025, alongside our comparison countries. The table reveals the intensification of oilseed meal consumption in Morocco, as the rate of growth in meal demand is forecast to increase faster than the rate of growth for meat consumption.

**Table 19: Oilseed meal consumption, million tonnes, soybean equivalent basis, 2005–2025**

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<td>1.46</td>
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<td>3.7</td>
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</table>

*Source: Authors’ calculations.*
Cost of Moroccan oilseed meal imports to 2025

If we assume that Moroccan domestic oilseed meal output (from local crops) expands at the same rate as consumption over the featured forecast period, then the import bill for oilseed meal will also increase at the same rate as consumption over the next decade or so. If prices remain at today’s levels, in real terms, to 2025, then the total cost of oilseed meal imports will climb 67 percent from its 2011 level to reach USD 540 million by 2025 (from USD 320 million in 2011). This method assumes that meal demand is satisfied by importing meal directly rather than importing seed, which is subsequently crushed in Morocco for meal.

If, however, Moroccan meal production from domestic crops remains stagnant at today’s level, and the whole demand expansion has to be met via meal imports, imports will rise faster and the total oil import bill will climb 90 percent to USD 620 million by 2025. This would represent about 0.3 percent of the 2025 GDP forecast for Morocco.
Chapter 5 - The policy environment for Moroccan agriculture

Chapter 1 introduced the agricultural sector in Morocco and described the decreasing role played by oilseeds within it. The role of policy, and in particular a recent focus on trade liberalization, has been at the forefront of the oilseed complex’s troubles. This chapter describes the agricultural policies that have shaped the oilseed sector in the past two decades. (See Annex 3 for a more detailed assessment of Moroccan agricultural policy.)

Free trade agreements

Morocco has recently granted expanded trade access bilaterally. There are agricultural aspects of the European Union and the United States FTAs with Morocco, two countries that now account for upwards of two-thirds of the value of Morocco’s agricultural imports, including processed agricultural products. These FTAs have substantially reduced the protection provided to Moroccan domestic production.

European Union-Morocco FTA

Although Morocco is a net importer of agricultural products, it is a net exporter of agricultural products to the European Union in terms of value. The two-way nature of agricultural trade between the European Union and Morocco and coupled with the sheer size of that trade arguably make the European Union-Morocco FTA the most important of Morocco’s bilateral trade agreements, particularly for agricultural products, although not for the oilseed sector. Between 40 and 50 percent of the value of Moroccan agricultural imports have come from the European Union in the last few years. Meanwhile, the European Union is the destination for about 75 percent of the value of Moroccan agricultural products.

Morocco’s FTA with the European Union was signed in 1996 and entered into force in 2000; its original goal was to create a free trade zone between the two jurisdictions by 2012. For the European Union, this agreement improved access to the Moroccan cereal grains market. For Morocco, it increased access to the European Union market for a range of horticultural products. This
bilateral trade agreement has since been expanded, first in 2003 and again in 2012.

The most recent development in the European Union-Morocco FTA were negotiations in February 2012, when the European Parliament voted in favour of further liberalization in the trade of agricultural and fishery products. Under this latest iteration of the FTA, the European Union would immediately reduce or remove 55 percent of tariffs on Moroccan agricultural and fisheries products (up from 33 percent). In return, Morocco would immediately liberalize 45 percent of agricultural imports from the European Union, increasing to 70 percent over a ten year transition period.

Key provisions of the agreement include an increase in the Moroccan tomato quota to 285 000 tonnes and gains for other Moroccan products including strawberries, zucchini, cucumbers and garlic — a provision that led to denouncements by Spanish horticultural producers. Additional market access for European products would apply to processed dairy products, oilseeds and cereals, with the exception of common and durum wheat, which would remain at previously agreed upon levels.

**United States-Morocco FTA**

The United States-Morocco FTA went into agreement on January 1 2006, eliminating duties on more than 95 percent of all goods and services traded between the two countries, including many agricultural products. In 2005, before the agreement went into effect, the United States exported USD 175 million worth of agricultural product to Morocco. By 2011, with the help of the FTA, the United States had increased its exports of agricultural products to just under a billion dollars, making the United States the second largest exporter of agricultural products to Morocco, behind the European Union.

This agreement has been of paramount importance to the Moroccan oilseed sector. The United States’ exports of agricultural products to Morocco have been heavily weighted towards oilseeds, a reflection of the FTA’s favourable treatment of oilseeds. In 2011, 60 percent of the value of the United States’ agricultural exports to Morocco was oilseeds and oilseed products. This percentage together with cereals (23 percent), animal products (8 percent) and cotton (6 percent), constitute 99 percent of all agricultural products that the United States ships to Morocco.
For oilseeds, the United States-Morocco FTA immediately eliminated:

- the 2.5 percent tariff on soybeans used for seed or for crushing;
- the 2.5 percent tariff on all crude vegetable oils.

Morocco’s tariff on soybeans for processing other than crushing is 22.5 percent, and its tariffs on other oils like sunflower and canola remain as high as 37 percent.

The other key elements of the agreement were phased in more slowly. Prior to the agreement, Morocco’s tariff on soymeal was 25 percent. With the FTA, Morocco agreed to reduce it by half in 2007 and phase it out entirely by 2013. Finally, Morocco’s tariffs on refined vegetable oils, 25 percent prior to the FTA, are being phased out over a ten year period.

Under the agreement, Morocco immediately eliminated tariffs on sorghum and oats and is phasing out the tariff for feed barley over a 15 year period. It was also agreed that Moroccan tariffs on rice would be phased out over a five- or ten year period, depending on the product. Morocco’s tariffs on corn were eliminated over a five year period. Reflecting the sensitive nature of the wheat sector, durum wheat and common wheat were treated separately under the FTA. For durum wheat, the United States was provided an initial quota of 250 000 tonnes, increasing 10 000 tonnes annually thereafter. The tariff for durum was to be set at 25 percent below the applied most favoured nation (MFN) rate during the first five years of the agreement, and then eliminated entirely over a ten year period. The preferential rate is not available to American exporters in June and July when the Moroccan local crop is harvested.

Figure 53 highlights the enormous gains in United States oilseed and oilseed product exports since the FTA was initiated in 2006.
The agreement regarding the United States’ access to Morocco’s market for common wheat is complex, and it is similar to that of the European Union in that market access is influenced by local production. Currently, the United States’ market access for common wheat is in a phase-up period that will mature in 2016. At that point, the United States will be granted preferential access to the Moroccan market for up to 1.06 million tonnes of wheat provided local production is less than 2.1 million tonnes. This is the same concession provided under the European Union-Morocco agreement. In years where Moroccan production exceeds 2.1 million tonnes, the United States’ quota will be phased back to 400 000 tonnes of access in a 3 million tonne crop. Because Morocco typically adjusts its MFN tariff rate for bread wheat, the preferential rate for the United States is determined by a formula as a share of that value, rather than a set percentage. If Morocco’s applied MFN tariff is 135 percent then the United States rate is set at 83.7 percent and is adjusted downward with any decrease in the MFN rate.
The FTA established an initial tariff-rate quota (TRQ) for high quality beef of 4,000 tonnes, increasing 4 percent annually thereafter. The in-quota tariff was eliminated over a five year period, and the over-quota tariff is being eliminated over an 18 year period. The initial quota for standard-quality beef was set at 2,000 tonnes, increasing 2 percent annually thereafter with over-quota tariffs remaining in place.

The United States-Morocco FTA immediately reduced tariffs on most poultry products from 124 percent to 60 percent then gradually reduced the tariffs to zero over a ten year period. The over-quota tariff for poultry products is being phased out over a 25 year period, during which time the United States quota is being gradually increased. Lastly, the agreement includes safeguards against increasing tariffs if imports of poultry from the United States break through specific thresholds. Regarding dairy, the agreement phases out tariffs on cheese over a ten year period and phases out tariffs on powdered milk over a 15 year period.

The agreement also immediately eliminated Moroccan tariffs on cotton, which now account for about 3 percent of the value of Moroccan imports of the United States’ agricultural products.

**Oilseed policy**

*Figure 54: Moroccan oilseed production and imports, 1960–2012*

*Source: Oil World, USDA, authors’ calculations.*
Oilseeds are conspicuous in Moroccan agriculture for their relative lack of governmental support at the farm level. This has not always been the case, however. Rather, the Moroccan oilseeds sector has become more exposed to global supply and demand fundamentals over the course of WTO and FTA negotiations even as supports for other commodities in Morocco have remained in place. As a result, oilseeds in general, specifically sunflower seeds, have become a relatively less attractive option for growers. Total oilseed production, which peaked at 170,000 tonnes in 1990, has declined to around 30,000 tonnes today, with perhaps half of this destined for direct food consumption as seeds. Oilseed imports, meanwhile, increased from 10,000 to 20,000 tonnes in the early 1990s to an average of 375,000 tonnes over the last decade, with the bulk being soybeans imported from the United States.

Through the 1980s and early 1990s, Moroccan production of sunflower seed thrived in a highly regulated system under which growers delivered their seed for crushing to the parastatal COMAPRA at a price fixed by the state, guaranteeing growers both a remunerative price and a market for their product. COMAPRA would, in turn, sell the product to the few crushers in the country.

While COMAPRA existed, growers received a major disincentive to produce sunflower seed in 1996 when, under the context of the General Agreement on Tariffs and Trade (GATT), the previously guaranteed price of USD 515 per tonne was eliminated and growers’ prices fell to USD 415 per tonne over the course of the year. Between 1996 and 2003, sunflower seed, like other oilseeds in Morocco, received no minimum support. As a result, production fell from 110,000 tonnes in 1996/97 to fewer than 20,000 tonnes in 2002. With domestic production quickly falling, local demand was met increasingly with supplies of European Union canola (from a recently ratified FTA) as well as imports of sunflower from Eastern European producers and soybean from the United States, both of which were made possible by reducing the applied tariff at that time.

Between 2000 and 2006 domestic oilseed production in Morocco encountered a new set of challenges stemming from market liberalization. Under FTA and WTO commitments, Morocco reduced or eliminated its tariffs on oilseeds and crude vegetable oil, shifting the emphasis from domestic production to oilseed imports.
In 2003, as part of a flawed effort to reinvigorate domestic production, the government began setting the price paid to sunflower producers at MAD 4 000 per tonne (USD 460). The MAD 4 000 per tonne support price has remained in effect since then, even as prices for inputs and competing crops have increased. While this helped initially to bring the production of sunflower seed for crushing back from the brink of disappearing, it has been insufficient to bring production back to anywhere near peak levels. Under this policy, crushers were compensated for the spread between the domestic price of MAD 4 000 and the prevailing world price under a formula that also accounted for marketing expenses and quality differentials.

During the 2007/08 crop year, world prices for sunflower exceeded the domestic support level. In this environment, COMAPRA was relegated to the sidelines with prices being negotiated directly between crushers and producers. From 2008 to 2010, when world prices once again fell below support levels, triggering the MAD 4 000 support, the UNCAM and CAM collected and marketed sunflower seed. In 2010 to 2012, with the return of high prices, producers were once again negotiating contract details directly with crushers.

**Le Plan Maroc Vert and the outlook for Moroccan agriculture**

The national agricultural strategy in Morocco must deal with several limitations, including:

- insufficient investment;
- insufficient organization;
- insufficient management and supervision;
- limited water resources;
- excessive parcelling of property and a small number of titles;
- dominance of cereal crops.

The PMV has adopted, as a model of success, public investment (both directly and to leverage private investment in different forms including matching grants) and industry organization (normally through incentives for creating sub-sector organizations that represent producers and processors) as key drivers to build its strategy.
The plan puts forward two major pillars, or areas of focus. The first pillar is to accelerate the development of higher value-added and high-productivity agriculture. The second pillar is to support small-scale producers, thereby alleviating poverty in rural and peri-urban areas.

Although the PMV is still in its infancy, it does offer a specific strategy as to how the two pillars of the strategy will be achieved. According to the MAMF, agricultural production has increased by 38 percent since the launch in 2008 of the PMV. Within the policy reforms of agriculture under the PMV, “agriculture has achieved during the 2007 to 2010 period an added value of MAD 20 billion (USD 2.3 billion), or 20 percent of the objective” of the plan.

The PMV is built on the principal of aggregation as a tool for the development of the agricultural sector; its implementation requires the creation of win-win partnerships between the upstream of production and the downstream of the commercial and/or industrial phase. Namely, the plan calls for the establishment of aggregators that a capital intensive, value-adding processing operation (the aggregator) will head and that committed small-scale holders (amalgamated farmers) will provide the raw materials for. The idea behind this approach is that aggregators would be able to access a large land base without raising capital and a committed pool of growers and agricultural raw materials would benefit from accessing final markets more easily.

For their part, the aggregators benefit from aggregation: the securing of supply via more significant volumes of production; the development of their commercial capacities in order to conquer larger national and international markets; the extension of their upstream perimeter in the face of limited agricultural property, thus liberating funds for productive investments; the optimization of logistical costs between the production and the final market, thus avoiding the necessity of depending on a number of intermediate actors and the excessive erosion of profit margins. Amalgamated farmers would have access to a reliable market and more modern technologies and easier access to funding. Lastly, the Moroccan Government hopes to benefit by having the aggregator take the lead role in supplying agricultural inputs and coaching small-scale producers with the promise of grants, favourable financing and access to valuable land and water resources.
Additionally, the programme seeks to exploit Morocco’s comparative advantages in agricultural production. This — coupled with the importance placed on value-added production such as meat, fruits and vegetables — implies that under the programme oilseeds would be less of a priority than olives, fruits and vegetables, along with upstream activities such as pressing, in the case of olives, wine production in the case of grapes, and canning or bottling in the case of fruits and vegetables. To take the PMV past the planning stages the government is hoping to attract MAD 10 million (USD 1.15 million) per year in mostly private investment.
Chapter 6 - Conclusions and recommendations

Agriculture plays a pivotal role in the Moroccan economy. Although the overall economy has modernized and agriculture has seen its share of GDP decline (from 24 percent in 1965 to 14 percent in 2011), agriculture is still vital for rural employment and agricultural output accounts for a significant share of household expenditure for a large proportion of the population.

The relatively small domestic agriculture sector means that agricultural products are a large component of total imports for Morocco. Raw and processed agricultural products have accounted for roughly 10 percent of all imports by value over the last few years. This places Morocco 15th on a World Bank list of 157 major countries according to this indicator.

Within the small domestic agriculture sector, oilseed cultivation plays an extremely minor role. Oilseed area represents only 0.6 percent of total Moroccan arable area, and the vast cereals acreage dominates. In terms of value, domestic oilseeds account for less than 1 percent of the Moroccan total agricultural output.

Oilseed area, which is mostly sunflower, has declined sharply in the past two decades, but even at its late 1980s peak, the oilseed area represented only 4 percent or so of cereals’ total acreage (it is just 1 percent today, with the majority of this now dedicated to the direct consumption of sunflower seeds as a foodstuff rather than for crushing for oil).

Several reasons have been proposed for the decline of oilseed production in Morocco. Foremost among these is the iniquitous policy regime. Cereals and protein rotation crops are currently favoured with more generous policy support, which has sidelined oilseed production for the majority of farmers. This factor has been compounded in recent years by the collapse of visible institutional support for the oilseed sector following the decline of the COMAPRA agency (COMAPRA assisted with crop collection, pre-finance and marketing). Within the general picture of decline, there is also a notable pattern of annual volatility in oilseed area. Spring oilseed area expands temporarily when winter cereal crops fail because of flooding and other natural hazards.
There are three research elements that we hope will bring together the results and implications of the report:

• first, we summarize some of the key results of the analysis, focusing on oilseed consumption, production and processing;

• second, we consider the principal policy distortions that have led to the decline of oilseed cultivation and crushing;

• last, we propose a series of policy options and their implications for the future direction of the Moroccan oilseed sector.

**Consumption of oilseed products**

Apart from the relatively small sector of sunflower seeds and soybeans consumed directly as food, oilseeds are largely grown for the products they contain: vegetable oil and oilseed meal for animal feed. Despite the contraction of the domestic oilseed area, consumption of both vegetable oil and oilseed meal has expanded strongly in Morocco:

• from 1990 to 2011, annual meal demand increased at a startling 10.6 percent per annum, spurred on by government programmes to stimulate the domestic livestock sector;

• the annual growth rate for vegetable oil was an impressive 3.6 percent per year.

This observation is typical for an emerging economy as both oil and meat (which uses oilseed meal as a feedstuff) are highly responsive to changes in income. This contrasts with the situation for wheat; put simply, as people increase their disposable income, they tend to consume more meat and oil, but beyond a certain level they do not consume much more bread.

With reduced local output, increased demand has been satisfied by imports:

• the cost of the import requirement for vegetable oils is estimated at more than USD 600 million in 2011;

• oilseed meal imports cost USD 320 million in 2011;
• combined, these two items represented just over 0.9 percent of Moroccan GDP and 26 percent of Moroccan agricultural imports in 2011.

As oil and meal demand are highly responsive to income growth, especially with a young and growing population, the proportion of total agricultural imports accounted for by oilseed products will continue to increase in the future. Our calculations suggest that the total oil import bill will climb 50 percent to USD 950 million by 2025 (measured in constant 2011 US dollar terms) and meal imports will rise 90 percent to USD 620 million by 2025.

A paradox has resulted. Though the government is intent on reducing dependence on imported cereals and meat, it has instead presided over a rapidly increased dependence on imported meal to feed livestock and a rising import bill for vegetable oil. This has recently been reversed somewhat with the signing of a contract programme between the government and the FOLEA.

**Oilseed production**

Oilseed — principally sunflower — cultivation has declined since around 1994. A major factor in the contraction of sunflower area has been the relatively weak price and policy support available for sunflower when compared with the principle alternative crops. These alternatives are dominated by cereals (with the majority of area now sown with common wheat) and legumes (principally beans and peas) favoured over oilseeds as rotation crops.

A primary reason for the decline in sunflower area has been the role of government intervention — or more precisely, a lack of government intervention in oilseeds compared with alternative arable crops. Whereas cereals, notably bread wheat, receive price support, guaranteed markets and trade protection from government policies, the guaranteed sunflower seed price for producers has remained unchanged since 2003 at MAD 4 000 per tonne. Although producers have been free to negotiate prices above this level when international prices have been high in recent years, processors have not passed on the full extent of

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5 As discussed earlier, the new programme to relaunch the oilseed sector is still in its infancy and has not been fully taken into consideration in this analysis.

6 This may change with the implementation of the new programme that establishes a range for the minimum guaranteed sunflower price between MAD 4 000 and 5 000 depending on international prices.
the increase in world prices to Moroccan growers. Sunflower has, therefore, fallen further behind its competing crops recently.

As well as strong support for cereal prices, fava beans — a realistic alternative to oilseeds as a break crop in farm rotations — retain their domestic price support via tariff barriers. Tariffs on imported beans were 50 percent in 2000, 49 percent in 2006 and 40 percent in 2013. By contrast, the tariff on sunflower seed is only 2.5 percent.

Our analysis suggests that, based on averages for the past three crop years:

• Moroccan domestic bread wheat prices have traded at 5 percent above the world (European Union) market equivalent;

• Moroccan domestic fava bean prices have traded at 18 percent above the world (European Union) market equivalent;

• Moroccan domestic sunflower seed prices have traded at 11 percent below the world (European Union) market equivalent.

Although these differences might appear to be relatively small, our analysis shows that they have been enough to tip the balance away from sunflower in Moroccan arable farming. Without a level playing field in terms of prices and marketing, farmers have withdrawn from sunflower in favour of more attractive returns from other crops.

The crop margin analysis conducted in this report considers that sunflower and canola are potential oilseed crops in Morocco under a variety of regional and agronomic conditions, applying both current and improved farm technology systems. (At present, canola is not cultivated at a commercial scale, only in trial plots).

The results were potentially more promising for canola than for sunflower, although it is good to remember that the results for canola are based on plot trials and assumptions on prices. Although canola margins were lower than rotation wheat, canola is the most profitable crop in northern and southern regions when compared with other rainfed crops such as sunflower, monoculture wheat, fava beans, barley and mixed forage. As a technical crop, canola is not a realistic option for small-scale, under-resourced producers.
Despite the promising trial results, canola would have to overcome a number of obstacles before achieving these margins on a significant commercial scale in Morocco. These obstacles include:

- There are numerous examples worldwide of crop trials that have achieved promising yields, only to find that these yields are not attained on average by local farmers under commercial conditions. Crop trials enjoy dedicated assistance from technical experts, tend to be well financed and apply optimum inputs. Introducing a new crop commercially involves inexperienced farmers who are often not well financed and more discriminating with input use.

- We have assumed that local canola prices will be priced at similar differentials to the international prices observed for sunflower. There is no guarantee this will be the case, as canola oil and meal are not as well known in Morocco as sunflower products and will have to capture market share from unaccustomed consumers. If canola products have to be exported or priced at discounts to capture domestic markets, this will place downward pressure on the local canola price.

- Crushers will have to make some minor adaptations to their plants to process local canola. This may place temporary downward pressure on local canola prices as crushers seek to offset these costs.

By contrast, with canola’s more technical nature, sunflower is a more accessible crop for all farmers. At present, however, our analysis confirms that its margins are compromised of the set of domestic policies outlined above, among others. As a result, sunflower’s crop margins are today rarely significantly better than other competing crops such as fava beans, durum wheat or monoculture wheat in Morocco.

**Removing price distortions**

The crop budget analysis outlined above uses prevailing domestic crop prices (with the exception of the estimate for canola). To highlight the influence of market distortions, the same analysis was conducted under international (rather than domestic) price conditions. Under international prices:
• Margins were higher for sunflower and canola than under local price conditions, but lower for all the competing crops. This confirms that domestic price support policies disadvantage oilseeds in Morocco.

• Under current practices, international price conditions would make sunflower margins better than both fava beans and monoculture wheat. Currently, sunflower performs worse than wheat and broadly similar to fava beans.

• Subject to the commercialization obstacles described above, canola looks like a potentially attractive crop with local and international prices for larger farmers with good technology.

The benefits of arable rotations

The benefits of arable rotations are apparent in the analysis conducted for this report, particularly with improved technology and input intensification. Wheat productivity — a policy objective under the PMV — would benefit from the yield “kick” provided to first wheat following a break crop. There are several potential alternatives available as break crops in rotations for Moroccan arable farmers, including sunflower, canola and proteins such as fava beans. There is also the option of leaving land fallow.

Figure 55 compares the average margin per annum for different farm cropping systems in Morocco, adopting prevailing domestic and international prices. Expected margins are weighted by the historical average rainfall pattern between dry and normal years. The margins are presented for medium-sized farmers in the northern regions, comparing less intensive current practices and more intensive improved technology systems. Canola is not a realistic option under the less intensive current practices and so is included only in the “improved technology” crop systems half of the diagram.
The analysis presented in Figure 55 suggests that:

- Wheat and fava bean prices are higher under prevailing domestic conditions than they would be under the international equivalent. This is why rotations focused on wheat and fava bean rotations decline under international parity conditions.

- By contrast, domestic sunflower prices have been lower under domestic conditions in recent years than the international equivalent. Therefore, rotations with a weighting toward sunflower (wheat/wheat/sunflower) are higher under international parity conditions.
• The weakest crop systems do not include any rotational element. With the domestic price distortions currently in place, rotating sunflower or fava beans with wheat in a one-third rotation provides very similar returns under less intensive current practices. However, if international price conditions prevailed in Morocco, sunflower and wheat would be the optimal crop system by some distance.

• With more intensive practices, sunflower would also be a much better rotation with wheat than fava beans if domestic price distortions were removed. However, if canola could overcome the obstacles outlined above, it could potentially be the most suitable rotation crop in Morocco.

An oilseed and wheat in rotation would therefore be an appropriate alternative for a modern, improved farm system in Morocco. However, sunflower is currently disadvantaged by domestic policy bias towards fava beans and wheat, while canola would require concerted efforts to realize its full potential. In the short term at least, sunflower offers a familiar and technically easier way of improving rotations for many Moroccan arable producers, especially if prices of competing crops come to reflect international prices more closely. This practice need not exclude fava beans, which could also be included in the same rotation.

Oilseed processing

The oilseed crushing sector in Morocco has suffered greatly in recent years from the trade liberalization programme. Crushing has almost ground to a halt thanks to a potent combination of reduced domestic sunflower seed output and changes in the import policy regime for soybeans.

The total oilseed crush was 500 000 tonnes at its peak in the mid-2000s, mostly from imported soybeans. In 2011, the crush was below 100 000 tonnes, with the vast majority of oilseed product demand satisfied by importing oil and meal directly rather than importing seeds and beans to crush. The 2012 crush was destined to be even lower than the 2011 figure.

Despite the problems in encouraging sunflower seed cultivation in Morocco, local sunflower crushing appears to have been profitable until very recently. Domestic crushers have benefitted from two substantial forms of support:
• Tariff protection was in place on sunflower oil and meal before the trade liberalizations commenced in 2009. Since then, the oil tariff has reduced from 20 percent to 2.5 percent, and sunflower crushing margins have declined sharply, although the (far less important) meal tariff remains at 23.5 percent.

• Crushers are also compensated for the spread between the minimum guaranteed domestic producer price for sunflower seed of MAD 4 000 and the prevailing world price under a formula that also accounts for marketing expenses and quality differentials. The compensation payments made under this system appear far greater than the actual difference between the cost of importing seed and the guaranteed minimum producer price. The net result is that crushers have paid less for their seed than the world market equivalent but have been able to sell their products at above the world market equivalent, thanks to tariff protection.

These forms of protection raised average Moroccan sunflower crushing margins to approximately double those of sunflower seed crushers in the European Union over the last decade. This situation changed abruptly, however, with the sharp decline of the oil tariff in 2010.

In terms of costs, sunflower crushers in Morocco suffer from some ageing equipment, poor capacity utilization and high-energy costs. However, as sunflower could previously be crushed in addition to the much larger crush for imported soybeans, sunflower crushing could be undertaken on a variable cost basis only. Fixed costs could be shared with the dominant soybean crush. Crushing sunflower also provides a guaranteed supply of crude oil to the very profitable vegetable oil refining and bottling sector, even when crush margins are low. Both crushers in Morocco are integrated into vegetable oil refining and bottling.

Soybean crushing was viable with the previous tariff regime in place, but without these tariffs it becomes unprofitable. This lack of profit underlines why crushing has halted in Morocco in the past two seasons. It is highly unlikely that the FTA with the United States will be abandoned, and without tariff protection the soybean-crushing sector in Morocco appears to be a victim of the structural adjustment process.

Without the soybean crush to support overall capacity utilization, sunflower crushing facilities would have to adjust their capacities
to more closely fit the size of the domestic oilseed crop. Current domestic oilseed volumes are not viable for commercial crushing plants, and so the fate of the Moroccan crushing sector rests upon stimulating a larger domestic oilseed crop.

By way of contrast, the vegetable oil refining sector has been a major beneficiary of the reduction in crude oil import tariffs. Tariffs on crude oil imports have been eroded to 2.5 percent for sunflower oil and eliminated completely for soybean oil, but the tariff on imported refined oils has remained at 20 percent. This has resulted in a very favourable import tariff regime for refiners since 2009, with a large wedge between the import parity prices they pay for crude oil and the import parity price they receive for sales of refined oil.

Nonetheless, refined oil imports are set to enter a transitional phase of tariff reduction, following the pattern of trade liberalization that has occurred in the crushing sector. Under the terms of the FTA with the United States, Morocco’s tariffs on refined vegetable oil imports are scheduled to be reduced over a ten year period.

The Moroccan Government has confirmed that it intends to extend its liberalization programme to the refining sector next. If tariffs on refined oil were reduced to the same level as those on crude oil, the current profitability of the refining sector would change dramatically. With Moroccan refining costs estimated at USD 100 per tonne of oil, such a reform would not leave any profit for refining sunflower oil and very slim profits on soybean oil refining (USD 10 per tonne on average for the past decade).

This is in fact not very unusual for the refining sector worldwide. While international costs are typically lower than in Morocco by around 20 percent, refining is a very competitive business characterized by low margins and high volumes. In addition, refiners tend to refine merely to ensure a captive supply of oil for the more lucrative bottling and retail pack oil sectors. Moroccan refiners are integrated upstream into these sectors.

Moroccan refining costs are also hamstrung by high domestic energy costs (which represent around one third of refining costs), a degree of over-manning and older machinery. Moreover, most industries around the world still employ some element of tariff protection. With investment, the Moroccan refining sector would be likely to stand on its own two feet if it could maintain some element of tariff protection.
In both crushing and refining, the prospects for costs at the largest plants, which belong to Lesieur Cristal, have received a boost following the substantial investment of the French company, Sofiprotéol. This could improve processing prospects:

- with improved capital and techniques in Morocco, crushing and refining costs are likely to be reduced by at least 20 percent (to around USD 80 per tonne of oil for refining and USD 40 per tonne of seed for crushing);

- under these conditions, assuming zero tariffs on crude oil and averaging over the last ten years, refining of soybean oil would be profitable without any tariff and of sunflower oil as long as a tariff of at least 3 percent were retained;

- this would also continue to supply a captive flow of oil to the lucrative bottling and pack oil sector, preserving domestic value in that sector too.

For crushing, lowering costs would improve the outlook, but the fundamental problem of sourcing raw material supplies would continue. With the small domestic sunflower crop now grown largely for seeds for direct consumption, and soybean imports replaced by direct oil and meal imports, lower costs will only help if the crushing plants have good capital utilization, with sufficient throughput of domestic oilseeds. Refining is highly likely to survive in Morocco, but the question will be whether it will be supplied solely by imported crude oil or whether those supplies will be supplemented by domestic oilseeds to be crushed alongside imported soybeans. This leads to the prospects for growing an oilseed crop in Morocco.

**Prospects for production and processing of oilseeds in Morocco**

Our crop margin analysis suggests that, under current market conditions, sunflower for crushing generates broadly similar margins as fava beans and wheat grown as a monoculture crop. However, the competing wheat and fava bean crops enjoy price support from domestic policies. If these distortions were removed and prices for all crops were reverted more closely to international levels, sunflower would enjoy far better prospects.

Moreover, the sustainability and yield (and therefore returns) of the wheat crop are improved considerably when grown in rotation with
a break crop. Fallow and protein crops (fava beans and chickpeas) perform this role in non-irrigated parts of Morocco at present. But our analysis indicates that overall farm profitability would benefit considerably from including an oilseed in rotations for farmers with good technology and input levels (as sunflower would require nitrogen applications and good water management).

Canola is not yet an established alternative for commercial farmers in Morocco, and its successful introduction and development would require concerted institutional resources and support. If resources and support were forthcoming — sufficient seed distribution, extension services for crop management and attention to crop collection and marketing — canola offers the potential for an oilseed crop to be cultivated eventually on up to perhaps 100,000 hectares of suitable arable land. Combined with sunflower — if suitable support were assured — canola could provide perhaps 200,000 tonnes of oilseeds for crushing in Morocco.

However, there are many unknowns to be conquered in developing an unfamiliar crop in new territory, and sunflower offers a more accessible and immediate solution to the problems of monoculture grain cultivation, growing oil and meal consumption and associated national food security considerations. A rejuvenation of sunflower cultivation would require rebalancing the support programmes and distortions that currently favour grain and protein crop cultivation.

With the capital injection and know-how provided by the Sofiprotéol investment at Lesieur, it is reasonable to expect that a sizeable domestic oilseed crop will be processed at the existing facilities, following some rationalization. As a result of the tariff liberalization programme, it is unlikely that these plants will crush significant volumes of imported soybeans in the future. Processing capacity would, therefore, have to adjust to fit the domestic oilseed supply. The chances of obtaining significant imports of canola and/or sunflower to boost throughput are limited, as the European Union deficit swallows up most seeds in the region and the Black Sea producers use export taxes to promote the export of products rather than seeds.
Policy challenges in promoting the domestic oilseed sector

Securing a viable future for the Moroccan oilseed complex will require some delicate management. The task of rejuvenation is made all the more difficult by the current policy mix in Morocco, which includes:

- Liberalization: On the one hand, Morocco has embarked upon a substantial programme of trade and market liberalizations that have profoundly affected the oilseed sector.

- Intervention: On the other hand, some sectors (such as wheat) continue to enjoy substantial policy support.

Any reforms initiated to encourage oilseed production and processing will have to take these factors into consideration. Recently the approved government programme has attempted to relaunch the sector: it seeks to stimulate production and processing through additional support targeting, specifically the oilseed value chain. This approach has been chosen to avoid removing support from other competing subsectors (such as wheat).

Given Morocco’s agro-climatic conditions, which could favour other agricultural subsectors such as olives, the underlying motivation in any policy to promote the oilseed subsector is linked to food security concerns, namely the issue of access to oilseeds and dependence on imports. The policy analysis and recommendations in this report, therefore, take as starting point the government’s overall commitment to supporting the oilseed subsector (and reducing import dependence) while maintaining a certain level of domestic sourcing for key commodities such as wheat.

Production

Considering oilseed production first, the primary problem is that returns on sunflower cultivation in most situations are currently lower than returns on the alternatives such as fava beans and common wheat. These alternative crops have easier marketing channels than sunflower, especially as fava beans can be used directly in local livestock markets whereas sunflower requires processing. Also, both fava beans and wheat enjoy preferential policy treatment that supports their domestic prices above the international equivalent. Sunflower seed prices, meanwhile, have been below the international equivalent in recent years.
To rectify this situation and encourage sunflower cultivation, the minimum guaranteed price for sunflower seeds would have to be increased relative to its principal competing crops.

For canola, the potential returns for farmers look more encouraging. Crop trials suggest that canola margins for larger commercial farmers could exceed those margins for wheat and fava beans. The problems for canola are introducing and developing the crop on a widespread commercial basis in a region with very little history of cultivating it or consuming its products. Both yields and prices could fall short of expectations. See the final section for options to overcome these obstacles.

**Processing**

In the oilseed processing sector, crushing has suffered from a chronic lack of raw materials as a result of the collapse of domestic sunflower production and the erosion of soybean crush margins following trade liberalization.

If the sunflower and canola problems set out above are overcome, this will reverse the effect of the first lack. Substantial sunflower and canola imports are unrealistic without any significant tariff protection on vegetable oils.

As for the second problem, it is highly unlikely that the soybean trade liberalization set out in the FTA with the United States will be reversed. Soybean crushing, therefore, is likely to remain a victim of the structural adjustment process. The future for the Moroccan crushing sector rests squarely upon the rejuvenation of domestic oilseed output.

In the oil refining sector, margins have been extremely healthy in the past two years as the reduction in crude oil tariffs have not been matched by decreases in the tariffs on refined oils. This has driven a wedge between the costs of crude oil raw materials and the tariff-inclusive price of refined oils. However, these margins would be earned by refiners only if retail prices were able to bear the full import tariff. In a price sensitive market, which also suffers from cheap imports from Algeria, downward pressure has been a feature of refined oil prices. Actual prices of refined oils were not made available for this study.
The refining sector does not, therefore, currently require any assistance to maintain its activities. Costs could be lowered by perhaps 20 percent if more modern equipment and energy strategies were employed, but margins are sufficient for this to be covered internally. With the trade liberalization process due to be extended to refining, however, lowering the cost base now would allow the refining sector to absorb the transition more successfully than the crushing sector has done. With 20 percent lower costs, soybean crushing could remain profitable without any tariff protection, while sunflower refining would require a 3 percent tariff to remain viable (albeit with both at much reduced profitability compared with today).

**Policy options for the Moroccan oilseed sector**

As well as benefiting the stakeholders in the oilseed sector directly, reviving oilseed output in Morocco would have the considerable merit of reducing the national import bill for agricultural products and improving the long-term sustainability of arable regions.

Combined, oilseed meal and vegetable oil represented just over 26 percent of Moroccan agricultural imports in 2011. As oil and meal demand are highly responsive to income growth, especially with a young and growing population, the proportion of total agricultural imports accounted for by oilseed products will continue to increase in the future. Our calculations suggest that the total oil import bill will climb 50 percent to USD 950 million by 2025 (measured in constant 2011 US dollar terms) while meal imports will rise 90 percent to USD 620 million by 2025.

Any efforts to revive domestic production of oilseeds will offset part of this substantial import bill. Any costs incurred in supporting the sector should therefore be weighed in these terms.

Moreover, benefits can be derived from including rotation crops in areas where soft wheat is currently grown as a monoculture. In some regions, pulses such as chick peas and fava beans perform this role, but in large parts of the country no rotation at all is practised other than occasional fallow periods. Wheat productivity would benefit by approximately 0.5 to 1.0 tonnes per hectare by following an oilseed crop, compared with wheat following wheat. For sunflower, this would require nitrogen applications and good water management. The imperative for cash means many farmers currently ignore the long-term implications of adopting
unsustainable cropping practices. Sustainable rotations will help to preserve the long-term fertility of arable regions and reduce the costs of fertilizer that would have to be applied to maintain the soil fertility without sensible rotations.

In the following pages are a selection of policy options that would encourage and support the development of a flourishing oilseed sector in Morocco. These options recognize the requirements for a successful sector set out in the previous section. For each option, advantages and disadvantages are discussed.

**Pilot scheme to encourage canola cultivation**

For commercial and rotational reasons, canola represents an interesting alternative for oilseed cultivation. This merits more investigation beyond the trial plots existing at present.

As a new crop, growing canola will require a support initiative for a pilot scheme to demonstrate the benefits of canola farming in a target area, focusing on large farms in the northern regions. Financial support should cover crop finance, access to seed, extension services for crop management and clear collection and marketing channels for the pilot scheme.

The support initiative to be introduced also needs to cover to crushing sector due to the need of a market. Subsequently, once the supply chain is properly established and the sector is completely functional, the canola product can also be extended to sell on the international market.

The scheme would require limited government finance and should be complemented by private support from the crushing sector. The scheme should be initiated with government backing via the aggregator programme of the PMV, ideally with crushers as the aggregators in the chain. However, other aggregators with similar experience in other crops could also be allowed to enter the sector. Crushers would then purchase seed from the storage facilities of these other aggregators. This would create a competitive environment for canola domestically, improving the price negotiating position of producers.

There would remain substantial obstacles to overcome in developing local markets for canola meal and oil. But the nearby European Union market would provide an important outlet if necessary, albeit at reduced farm gate prices.
Increasing the guaranteed minimum price of sunflower seed

In the gross margin analysis undertaken for this report, the domestic sunflower seed price (MAD 4 100 per tonne) is estimated at 1.6 times the soft wheat price (MAD 2 600 per tonne). Moreover, while the domestic sunflower seed price is lower than the international price equivalent, the soft wheat price is higher than the international equivalent. At these relative prices, with wheat supported by tariffs and guaranteed prices, sunflower returns per hectare are similar to fava beans or monoculture wheat returns per hectare. Both fava beans and wheat are easier to market than sunflower, and as a result, sunflower area has been contracting in recent years.

However, if the guaranteed minimum price of sunflower seed was raised to 1.8 times the price of soft wheat, then sunflower returns would be greater than both fava beans and soft wheat grown after another wheat crop in many situations:

- For the northern regions, medium scale farms with normal rainfall, the sunflower crop margin per hectare is currently estimated at USD 271 under current practices, after costing all services. By contrast, fava bean margins are USD 241, and second or third wheat (wheat after wheat) margins are USD 324 per hectare.

- Wheat prices (MAD 4 680 per tonne) and the other prices would remain the same and sunflower seed margins would increase to USD 351 per hectare under current practices. Thus, the sunflower crop margin would become greater than the principal competing crops. This would stimulate the area of sunflower under cultivation.

An alternative to this method would be to lower the guaranteed farm gate price of soft wheat to around MAD 2 300 per tonne, with sunflower seed prices remaining at MAD 4 100 per tonne (so the sunflower seed price remains at 1.8 times the wheat price). This method would also stimulate sunflower plantings in favour of second and third wheat, but would not lead to sunflower displacing fava beans or other non-wheat crops. Nonetheless, we have excluded this method from our considerations. The politically sensitive nature of soft wheat prices makes it highly unlikely that its price would be reduced.
The advantages of increasing the guaranteed minimum price of sunflower seed to a fixed multiple of 1.8 times the soft wheat price would include:

- The conversion of land to cultivate sunflower instead of wheat would result in an overall improvement to Morocco’s trade balance in the long run (in a wheat/wheat/sunflower rotation pattern).

- Domestic food security would also be improved as the reliance on imported oil and meal would be reduced to the volumes stated above.

- The long-term fertility of arable soils would be preserved where sunflower is included in rotations at the expense of second or third wheat. This should increase the long-term average wheat yield for Morocco, assuming good farming practices are adopted for fertilizer applications.

The disadvantages of increasing the guaranteed minimum price of sunflower seed to a fixed multiple of 1.8 times the soft wheat price would include:

- In the short term (one growing season), this policy option would lead to a negative impact on Morocco’s trade balance.

- An increased sunflower support price would raise budgetary costs in two ways. First, crushers would have to be compensated more per tonne of sunflower seed, as the spread between domestic and international prices would widen by the extent of the increased minimum producer price. Second, the volume of sunflower seed that this compensation is paid is likely to increase as sunflower area expands.

Reducing the import tax on fava beans/legume crops

The first policy option discussed above would allow sunflower to displace a variety of competing crops in the Moroccan arable mix but with a budgetary cost in supporting sunflower prices. An alternative option would be to lower the tariffs on the main competing crops of wheat and legumes, notably fava beans. For this report, we exclude the possibility of reducing support for the highly sensitive bread wheat sector. Similarly, we have not included the option of increasing tariffs on sunflower oil and meal, which also runs counter to the government’s recent liberalizations.
Nonetheless, this leaves the option of reducing the import tariff on legumes, notably fava beans, which is 40 percent in 2013.

The advantages of reducing fava bean tariffs would include:

- The potential area to be captured from fava beans would be reduced compared with wheat and all other crops as the available area is much smaller. Domestic food security would also be improved as the reliance on imported oil and meal would be reduced to the volumes stated above.

- There would be no increase in the budgetary cost for sunflower support.

- Reducing tariffs is in line with the government’s trade liberalization programme.

Switching from one rotation crop to another, however, will not substantially improve the long-term fertility of arable soils or raise wheat yields.

The disadvantages of decreasing the fava bean tariff would include:

- This policy option contradicts the PMV’s main objective of intensifying cereal production and ensuring soil nutrition quality (as fava bean is an important diversification crop). In particular, this policy could lead to a decrease in domestic self-sufficiency for this crop.

- The domestic output of protein from pulses would decrease if land were converted to grow sunflower. On the other hand, the protein used for animal feed would be offset by an increase in sunflower meal.

- Government incomes collected from tariffs on fava bean would be lost.

**Future export tax for canola**

A successful crushing sector would underpin oilseed production and vice versa. At present, sunflower crushing in Morocco suffers from a shortage of a domestic crop, while soybean crushing prospects are bleak under the terms of the United States bilateral FTA. Sunflower seed crushing would be invigorated if domestic production were increased as a result of any of the initiatives.
described here (as long as the compensation scheme for crushers is maintained in some form). In the longer term, if canola production develops on a commercial scale, some temporary measures could be adopted to ensure that production from this infant industry is processed within Morocco.

The cost of canola for Moroccan crushers would have to be lower than the recent prices of sunflower seed (which on average generate negative crush margins without any tariff protection), assuming its products are sold for similar prices as sunflower oil and meal, which may be difficult as canola is relatively unknown in Morocco. If the canola price were at around MAD 450 per quintal (USD 520 per tonne), as our crop margins assume, crushing would on average be unviable, even with a lower cost base. On the other hand, our estimates for crop budgets indicate that canola margins could be as much as USD 400 or USD 500 per hectare greater than monoculture wheat or fava beans. This allows for considerable leeway in the canola price.

Domestic canola prices will need to be lower than the world market equivalent to give crushers positive margins. However, if this were achieved solely via negotiation, there would be nothing to prevent canola growers and traders exporting canola to the voracious European Union market to take advantage of higher international prices. If this happened, it would jeopardize the domestic crushing potential of canola.

Export taxes lower the domestic prices of exportable crops. Imposing an interim export tax on canola — similar to the successful policies imposed when Ukraine and the Russian Federation were rejuvenating their domestic oilseed output — would add further value to the agricultural sector in Morocco and allow domestic crushers to process the canola crop.

The two leading nations in the global sunflower sector, Ukraine and the Russian Federation, both apply taxes on the export of sunflower seeds. At present, Ukraine’s tax rate is 10 percent while that in the Russian Federation is set at 17 percent. Export taxes typically act to lower export prices to the fob export price minus the level of the tax. As neither country applies taxes to the export of sunflower oil and meal products, the reduction of raw material prices to below export parity levels widens the crushing margin available to domestic seed processors. This provides a strong signal to investors in the crushing sector to expand domestic crushing capacity. Export taxes in both countries have
been in place now for a decade or so and have led to the rapid
development of many internationally competitive crushing facilities.
As a result, both producers now crush over 80 percent of their
vast seed output domestically. A similar situation has resulted in
the huge Argentine soybean sector, where differential export taxes
 favouring local crushing have been successfully applied. In fact, in
Ukraine in particular, the stimulus to crushing capacity has been
so successful that it has outstripped domestic production, and the
effect of the export tax has been reduced as domestic processors
compete aggressively for local sunflower seed supplies.

It is important to note that an export tax is a market distortion
mechanism usually not recommended. Moreover, it is most
effectively used when an exporting country would like to support
the post-production phase of its agricultural sector rather than
export raw agricultural materials. However, this is not the case for
Morocco. Instead, this export tax would act as a subsidy to oilseed
 crushers, which would create a greater incentive for them to
operate more feasibly than the current supporting mechanism.

The advantages of introducing a temporary 10 percent export tax
on canola would include:

- According to the crop margins in this report, canola should
  remain attractive to local producers if a 10 percent export tax
  were imposed. This would support crushing margins without
  the need for any compensation payments to crushers (like the
  payments made in in the sunflower sector).

- The tax would add value to Morocco’s agricultural sector and
  would help reduce the domestic vegetable oil and oilseed meal
deficit.

- The domestic market familiarity with canola products could be
developed.

- Domestic processing of canola would further reduce crushing
costs by lowering fixed costs in the mill.

- In fact, canola prices could fall by 33 percent and still deliver
  a higher margin per hectare than monoculture wheat or fava
  beans on the high technology large farms where it is targeted.
Disadvantages associated with introducing an export tax include:

- Export taxes are notoriously difficult to remove once they are in place. The Russian Federation and Ukraine have persisted to remove the tax for over ten years, but it has only been reduced as a condition of WTO entry.

- Instigating a domestic canola programme will require institutional support. Crop finance, seed distribution, extension and collection services could be provided by crushers, with government backing, as part of the PMV’s aggregator initiative.

The danger of these initiatives is that a fine line will have to be drawn between, on the one hand, lowering canola prices enough to make crushing attractive and, on the other hand, keeping canola prices high enough to make the crop attractive to farmers. For this reason, implementing a high export tax straight away carries the threat of undermining the entire project.

In addition, we should remember that the canola margins presented in this report would only be achieved if good producers can achieve yields of around 2.5 tonnes per annum. Unlike other crops in this study, whether this can be achieved on an extensive, commercial scale is not yet proven.
Annex 1 - Overview of the agricultural sector in Morocco

This Annex supports Chapter 1.

The importance of agriculture in the Moroccan economy

Agriculture plays a pivotal role in the Moroccan economy. Although the overall economy has modernized and agriculture has seen its share of GDP decline, it is still vital for national employment, and agricultural output accounts for a significant share of household expenditure for a large proportion of the population. Moreover, when benchmarked against other countries, raw agricultural products as a percent of total imports are relatively high for Morocco.

- In 1965, agriculture made up 23.4 percent of the Moroccan GDP, a value that had fallen to 13.6 percent by 2011 (Figure 56).

- During this same time frame, the absolute value of agricultural GDP, measured in constant 2010 US dollar terms, increased from USD 0.7 billion to USD 13.7 billion.

- Within Morocco, agricultural production is concentrated in the north and northwest of the country, within the valleys irrigated by runoff from the Atlas Mountains. The region with the highest agricultural GDP is Marrakech-Tensift-El Haouz where it exceeded USD 2.5 billion in 2010. This is followed Meknes-Talifalet and Gharb-Chrarda-Beni-Hssen, each with agricultural GDP just below USD 1.5 billion. Agricultural production in the south of Morocco and in the Western Sahara, by contrast, is negligible (Figure 57).
Figure 56: Agriculture as a share of Moroccan GDP, 1965–2010


Figure 57: Importance of agriculture in the Moroccan economy by region

Source: MAMF.
Agriculture in Morocco still makes up a relatively large share of GDP when benchmarked against other countries. Figure 58 shows that out of 185 countries, Morocco ranks 54th in terms of agriculture’s share of economic output.

**Figure 58: Agriculture as a share of Moroccan GDP in the global context, average 2008–2010**

*Source: World Bank.*
Although agriculture’s share of the Moroccan economy has decreased, the value of agricultural exports has increased. However, as a proportion of total exports, agriculture’s share has declined over time.

- Raw agricultural products as a share of total exports fell from 6 percent in 1962 to 1 percent in 2011 (see Figure 59);
- during this time, the absolute value of Moroccan exports increased from USD 24 million to USD 355 million, expressed in constant 2010 US dollar terms;
- out of 160 countries analyzed by the World Bank, Morocco ranks 77th in terms of raw agricultural exports as a share of total exports (see Figure 60).

**Figure 59: Raw agricultural products as a share of total exports, 1962–2010**

*Source: World Bank.*
Figure 60: Agriculture as a share of exports in the global context, average 2008–2010

Imports of raw agricultural products show the same trends: the value of imports has increased, but agriculture’s share of total imports has declined as the overall economy has developed. This progression is typical of an emerging economy’s evolution. Nonetheless, we have to remember that this excludes imports of processed products, such as vegetable oils.

- In the early 1960s, Moroccan imports of raw agricultural products averaged around 6 percent of total imports, a figure that has fallen to roughly 2 percent in recent years, equivalent to about USD 750 million (see Figure 61).

- As is the case for exports, raw agricultural imports are used because it is the only readily available data that captures the importance of agricultural trade in a consistent manner across all countries. However, when processed agricultural products are included, like starches, sugar, flours, meals and vegetable oils, then it captures a far greater share of imports. Figure 62 illustrates this by going back to 1993 and observing that when processed products are included in agricultural products, they have accounted for roughly 10 percent of all imports over the last several years.

- Finally, raw agricultural products as a percentage of total imports are relatively high for Morocco. As illustrated in Figure 63, Morocco ranks 15th of 157 countries according to this metric.
Figure 61: Raw agricultural products as a share of total imports, 1962–2010


Figure 62: Raw and processed agricultural products as a share of total imports, 1993–2009

Source: Moroccan Ministry of Industry, Trade, Investment and Digital Economy.
Figure 63: Agriculture as a share of imports, average 2008–2010

Table 20: Impact of agriculture on the Moroccan economy

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Total GDP (billions)</td>
<td>46.91</td>
<td>65.64</td>
<td>75.23</td>
<td>88.88</td>
<td>90.91</td>
<td>90.80</td>
</tr>
<tr>
<td>GDP value-added agriculture</td>
<td>6.72</td>
<td>9.95</td>
<td>9.15</td>
<td>11.70</td>
<td>13.29</td>
<td>12.57</td>
</tr>
<tr>
<td>Value-added agriculture as % of GDP</td>
<td>14.3</td>
<td>15.2</td>
<td>12.2</td>
<td>13.2</td>
<td>14.6</td>
<td>13.8</td>
</tr>
<tr>
<td>Value of exports of raw agricultural products (billions)</td>
<td>0.16</td>
<td>0.25</td>
<td>0.31</td>
<td>0.20</td>
<td>0.28</td>
<td>0.36</td>
</tr>
<tr>
<td>as a share of total exports (%)</td>
<td>1.2</td>
<td>1.1</td>
<td>1.1</td>
<td>0.6</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Value of imports of raw agricultural products (billions)</td>
<td>0.44</td>
<td>0.72</td>
<td>0.96</td>
<td>0.85</td>
<td>0.66</td>
<td>0.71</td>
</tr>
<tr>
<td>as a share of total imports (%)</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>1.9</td>
<td>1.8</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: World Bank, authors’ calculations.
Note: calculations done in constant 2010 US dollars.
The share of Moroccans employed in agriculture has fallen subtly in recent years as agriculture has modernized and become a smaller share of the overall economy. Nevertheless, agriculture remains an important employer for the country, especially when viewed in the broader global context.

- In 2011, approximately 40 percent of Moroccans were employed in agriculture. With a total workforce of 11.6 million in 2011, this equates to approximately 4.6 million Moroccans working in agriculture (see Figure 64).

- The employment impact of agriculture in Morocco is high by international standards. Of 116 countries, Morocco ranks 12th in terms of the share of the population employed in agriculture (see Figure 65).

**Figure 64: Employment impact of agriculture in Morocco, 1999–2011**

Figure 65: Employment impact of agriculture in Morocco in the global context, average 2008–2010

The processing sector

The substantial role played by imported products means that the oilseed processing sector has a far larger presence in the value of food processing output and employment than domestic oilseed production would suggest. Figure 66 reveals that vegetable oils account for 16 percent of total Moroccan agricultural processing value (this total includes the refining of imported crude vegetable oils and crushing of imported oilseeds).

**Figure 66: Percentage of output from key Moroccan agricultural processing sectors**

Source: MAMF.
Forecasting vegetable oil consumption in Morocco

As a first step when forecasting vegetable oil demand, it is important to recognize the close substitutability between individual oils. This substitutability means oil demand should be analyzed as an aggregate and that end-users can switch at the margin between available oils as they adapt to the changing market conditions governing each type of oil. In this analysis, therefore, we forecast aggregate oil demand as opposed to individual oil demand. At a national level, the exact composition of demand each year will be determined by oil availability, cultural preferences and relative oil prices at any given time.

In Morocco, there are no current plans to implement a biodiesel programme, and the principal industrial use of oil in the country is a small amount of soap manufacturing from imported palm oil at refining and fractionation plants. This use is incorporated into our palm oil consumption figures in the figures below and is rolled into our aggregate demand projections.

Our analysis for oil consumption for Morocco draws on detailed empirical comparisons from around the world. This method relies upon estimates of long-run oil demand income elasticities, in conjunction with estimates for national income and population growth. This approach allows us to measure the response of per capita demand to changes in per capita income.

Forecasting methodology

The two major dynamics underpinning vegetable oil consumption are income per capita and population. Such dynamics result in a correlation characterized by a propensity to increase consumption as income grows. Consequently, rapidly growing economies and populations feed directly into expanding vegetable oil demand.

The methodology employed in our forecasts of food oil consumption to 2025 can be outlined in the following steps:
• providing a projection of changes in food oil consumption and changes in income for Morocco and other countries (this analysis is based on past data regarding income and demand per capita for a wide range of countries using Food and Agriculture Policy Research Institute (FAPRI) estimates where appropriate and allowing for the slowing of demand as incomes rise);

• applying IFS estimates to calculate population each year to 2025;

• employing IMF growth rates to derive national income per capita each year to 2025;

• deriving annual oil consumption per capita by applying the rate of change in oil consumption over change in income to the growth in income per annum;

• multiplying oil consumption per capita by the total population to project the overall consumption of vegetable oils for each year to 2025.

Our analysis shows a strong relationship between oil consumption and changes in income. The empirical strength of this relationship is illustrated for the two developing economies of India (see Figure 67) and China (see Figure 68) in the following figures. These figures plot the per capita food oil demand and per capita GDP each year as a series of points.
Figure 67: India — per capita food oil consumption vs. real per capita GDP, 1980–2012

Source: Authors’ calculations.

Figure 68: China — per capita food oil consumption vs. real per capita GDP, 1980–2012

Source: Authors’ calculations.
These relationships — based on very long runs of data — allow us to project the change in per capita food oil consumption as countries mature economically. We then adopt the most appropriate income elasticity for the future for a country, in combination with estimates of income and population growth. For Morocco, we have a relatively short run of data on consumption, plotted in Figure 69.

The diagram indicates that oil demand per capita progressed quickly as incomes increased, but that recent high prices have stalled this progress. As prices adjust and economies recover, however, we expect Morocco to continue to expand its consumption of oil per capita. Today, Moroccan demand per person remains at levels similar to China, where growth is still strong, and some way behind other countries that have reached saturation in oil consumption. Nonetheless, it is unlikely that growth of Moroccan consumption in the future will match growth in the past, as consumption slows beyond a certain level (as we see for China in Figure 68). From the projected estimate, we place Morocco in the group with middle-income countries with respect to food oil consumption.

**Figure 69: Morocco — per capita food oil consumption vs. real per capita GDP, 1980–2011**

Source: Authors’ calculations.
Forecasting future consumption in the oilseed meal sector in Morocco

To understand the future direction of the oilseed meal sector in Morocco, it is crucial to first understand the meat/livestock sector.

**Deriving demand for oilseed meal**

Demand for oilseed meal is determined by a number of key dynamics. These considerations are listed below with our methodology for forecasting future oilseed meal demand:

- Overwhelmingly, meal is a derived demand as it is sought as livestock feed in order to produce meat. Forecasts of meal consumption should, therefore, be determined in turn by forecasts of meat demand.

- In Morocco, Islamic practice dictates that pig demand is negligible. Therefore, the core of our analysis remains the forecasts for the production and demand for poultry products. This is combined with the outlook for the cattle, sheep and goat meat sectors. Poultry is by far the fastest growing livestock sector and is almost all produced in intensive units using compound feeds.

- Income and population are the leading determinants of aggregate meat demand, as for vegetable oils. Thus, we derive our forecasts of meat demand as a function of income and population growth to 2025. Using typical feed conversion ratios per tonne of meat (itself translated from live weight slaughter figures) and the typical meal content of feed rations for each livestock category, we determine the meal demand via the demand for meat.

- The response of meat consumption to changes in income is measured by income elasticities. The income elasticities used in our meat-forecasting model are drawn from meat demand elasticities estimated by us, the United States Department of Agriculture (USDA) and FAPRI.

- The meal incorporation rate is lower in Morocco and other developing countries than in developed markets such as the United States and European Union. This rate indicates less intensity in livestock feeding on traditional farms. However, incorporation rates have risen as the production processes for meat are modernized. Modernization has received particular
attention under the PMV, and substantial progress has been made in livestock production (and meal demand) in Morocco, as is demonstrated by Figure 52. We allow for the continued modernization of the livestock sector through to 2025.

The relationship between meat demand and income

Figure 70 highlights the relationship between meat demand and income levels of Morocco compared with a number of other countries. We plot poultry and red meat — as the primary consumers of oilseed meal in Morocco — consumption against 2011 GDP per capita.

The diagram reveals the close relationship between income per person and average meat consumption. Worldwide, as income rises, meat consumption increases per capita. After incomes reach an average of around USD 15 000 per person, meat demand growth per capita begins to level off. There are however cultural differences concerning whether countries lie above or below the expected consumption for their level of income. Meat consumption in Morocco is positioned just about exactly where the trend line would expect it to be according to their level of income.

Figure 70: Poultry and red meat demand per capita vs. GDP per capita, 2011

Source: IMF and authors’ calculations.
Given this correlation between income and meat consumption, we must consider the outlook for GDP per capita to 2025 when forecasting meal demand. Table 16 forecasts income while population growth estimates were plotted in Table 17. These tables form the basis for our forecasts of meat and meal demand.

The next step in our forecast of meal demand is to estimate exactly how meat demand responds to changes in income per capita. We do this by calculating an income elasticity of demand (IED) for Morocco, based on our experiences from many other countries, and applying these numbers to estimates of GDP per capita growth to 2025.

Calculation for change in per capita meat consumption in Morocco

% change in meat demand per capita = (% change in income per capita x IED)

where

IED = % change in meat demand / % change in income

Applying this percentage of change to the existing meat demand and multiplying by the forecast population gives forecasts of total demand for meat for each year to 2025.

Table 21 presents the results of this analysis and combines poultry and red meat demand out to 2025 for Morocco and our comparison groups of featured consuming countries.

Table 21: Poultry and red meat consumption in Morocco, 2005–2025, million tonnes of meat, carcass weight equivalent

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</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>8.8</td>
<td>12.0</td>
<td>13.0</td>
<td>14.0</td>
<td>15.3</td>
<td>16.3</td>
<td>1.7</td>
</tr>
<tr>
<td>China</td>
<td>55.2</td>
<td>63.6</td>
<td>65.6</td>
<td>72.6</td>
<td>83.6</td>
<td>91.5</td>
<td>2.6</td>
</tr>
<tr>
<td>EU</td>
<td>30.6</td>
<td>31.7</td>
<td>31.6</td>
<td>31.6</td>
<td>33.1</td>
<td>34.6</td>
<td>0.7</td>
</tr>
<tr>
<td>India</td>
<td>1.9</td>
<td>2.6</td>
<td>3.2</td>
<td>3.6</td>
<td>4.3</td>
<td>4.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>4.4</td>
<td>5.9</td>
<td>6.3</td>
<td>6.8</td>
<td>7.5</td>
<td>8.0</td>
<td>1.8</td>
</tr>
<tr>
<td>US</td>
<td>24.3</td>
<td>24.4</td>
<td>24.0</td>
<td>25.2</td>
<td>27.4</td>
<td>29.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Morocco</td>
<td>0.8</td>
<td>1.0</td>
<td>1.1</td>
<td>1.2</td>
<td>1.4</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations.
The following are our observations on the Moroccan livestock sector:

- Good economic growth in Morocco, underpinned by population expansion averaging 1 percent per annum, has already stimulated a rapid increase in meat consumption since the turn of the century (see Figure 71 for poultry). We examine the livestock sector in Morocco in detail in Annex 4.

- The selective measures and incentives designed to stimulate an improved livestock sector in Morocco through the PMV are accelerating the output of meat in Morocco. More intensive livestock rearing has the secondary effect of intensifying meal consumption as more animals are raised in lots rather than grazing solely on pasture, i.e. more tonnes of meal are being used to produce each tonne of meat as the sector develops.

- The underlying growth in Moroccan meat consumption — thanks to good income and population prospects and accelerated by the PMV’s dedication to intensifying poultry and red meat output — generates a robust growth rate of 2.5 percent per annum for Moroccan meat demand to 2025.

Since 2009, subsidies have been given to import young beef, dairy calves and chicks to increase the Moroccan breeding stock. Eighty percent of dairy and beef cattle are produced on farms that produce less than five cows a year. There are less than ten farms in the country with 5,000 or more head of cattle. However, even small livestock farmers buy in feed and combine this with forage.
Figure 71: Moroccan production and imports of poultry meat, 2001/02–2009/10

Figure 72: Poultry plus red meat demand per capita for selected markets, 2012 and 2025

Source: MAMF and Moroccan Ministry of Industry, Trade, Investment and Digital Economy.

Source: Authors’ calculations.
Oilseed meal demand — derived from meat demand

Once meat demand has been ascertained, this data can be used to determine how much meal is needed to meet this meat consumption.

In terms of future meal consumption, we assume that the meal incorporation rates (the tonnes of oilseed meal consumed to produce one tonne of meat) of the livestock industries in highly developed economies will have risen in line with past trends. For Morocco, we assume its incorporation rate will grow more rapidly under the PMV (there is already evidence from the past three years to suggest this) to converge towards current American incorporation rates by 2020. We assume that meal incorporation will then remain at these levels for the five years out to 2025.

Finally, in order to assess meal demand, the various types of oilseed meal need to be converted into a soybean meal equivalent. In this manner we can then employ soybean meal as a common denominator for protein meal demand forecasts. Such a methodology is applicable because livestock demand for meal is largely for the protein in the meal as opposed to the specific meals themselves. Protein content is unique to each type of oilseed meal. For example, HiPro soybean meal typically contains 48 percent protein content, whereas canola meal contains 39 percent protein and canola meal provides only 80 percent of the protein content of soybean meal. We outline our conversion rates for the leading sources of oilseed meal in Table 21, which converts all meal requirements for use in our forecasts to 48 percent SBE.

Table 22: Protein content and soybean meal equivalent of leading oilseed meals

<table>
<thead>
<tr>
<th>Meal</th>
<th>Typical protein content, %</th>
<th>SBE 48% equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean</td>
<td>48</td>
<td>100</td>
</tr>
<tr>
<td>Canola</td>
<td>39</td>
<td>80</td>
</tr>
<tr>
<td>Sunflower</td>
<td>36</td>
<td>75</td>
</tr>
<tr>
<td>Palm kernel</td>
<td>18</td>
<td>38</td>
</tr>
<tr>
<td>Copra</td>
<td>18</td>
<td>38</td>
</tr>
<tr>
<td>Cottonseed</td>
<td>38</td>
<td>79</td>
</tr>
<tr>
<td>Groundnut</td>
<td>45</td>
<td>94</td>
</tr>
<tr>
<td>Corn gluten</td>
<td>60</td>
<td>125</td>
</tr>
</tbody>
</table>

Source: LMC International.
Before we turn to our forecast for meal demand out to 2025, it is useful to reinforce some important methodological issues, such as the correlations between income, meal consumption and feed intensity ratios.

**The correlation between income and meal consumption**

There is a correlation between income per capita and meal consumption. In turn, this relationship is derived from rising demand from meat as incomes increase. We have chosen to illustrate two contrasting examples of this analysis, i.e. China and Brazil. Figures 73 and 74 plot real GDP per capita against per capita meal consumption in each country.

The close relationship between meal consumption and income changes are apparent in each diagram. The Brazilian example reflects the country’s unusually high level of meat demand per capita even when income was low. This requires high meal usage to feed this livestock. The rise in Brazil’s meat consumption can be attributed to increasing demand from a growing population that has higher disposable incomes, with even the poorest sections of society able to purchase and consume poultry and cattle meat.

**Figure 73: Chinese per capita meal consumption vs. real GDP, 1980–2012**

Source: IMF and authors’ calculations.
Figure 74: Brazilian per capita meal consumption vs. real GDP, 1980–2012

Source: IMF and authors’ calculations.

Feedstock intensity ratios

The feed intensity ratio gives us an idea of the farming practices employed to rear livestock in any particular country and is usually determined by the extent to which a country is developed economically. We examine poultry below as it is more dependent on meal as a source of protein than ruminants, such as cattle. Please note that the consumption of meal is defined as the aggregate demand for soybean, canola and sunflower meal converted into their SBE, as discussed above.
Figure 75 plots the feed intensity ratio for poultry in Thailand between 1990 and 2012. The feed intensity ratio is defined as the total tonnes of meal consumed to produce one tonne of meat. The amount of oilseed meal fed to chickens, per tonne of meat produced, increased steadily between 1990 and 2007; however, since 2007, Thailand’s feed intensity ratio has remained constant, at three tonnes of meal for one tonne of meat. This flattening out of growth in meal consumption suggests that the animal has reached a limit whereby further meal is no longer translated into increased meat production. These levels of consumption are referred to as “constant feed intensity ratios” and are indicative of a mature market. Such markets are characteristically industrialized with intensive farming methods.

**Figure 75: Feed intensity ratio for chickens in Thailand, 1990–2012**

Source: Authors’ calculations.
In China, as Figure 76 illustrates, the feed intensity ratio for poultry and pig production has been increasing since 1990, and currently it is estimated to be at just over one tonne of meal per tonne of meat produced. A lower value reveals that the industry is still developing and livestock production is not fully intensive. Accordingly, there is scope for strong growth in such a market in the coming decade, and this growth has been incorporated into our analysis and forecast for Morocco, which displays similar characteristics at present.

**Figure 76: Feed intensity ratio for poultry and pigs in China, 1990–2012**

Source: Authors’ calculations.
Annex 3 - The policy environment for Moroccan agriculture

This Annex supports Chapter 5. Some of the information from Chapter 5 is repeated in order to provide a single source reference document on policy in this Annex. The portions most relevant to the oilseed sector today are reproduced in Chapter 5.

Historical context for Moroccan agricultural policy

We begin by providing some background on Moroccan agricultural policy, emphasising its interventionist leanings in the 1980s and the high level of protection conferred to domestic producers in the early 1990s. Beginning with the GATT in 1994, Moroccan policy has gradually become more liberalized. Recent FTAs with the United States and the European Union have gone a long way towards opening up Morocco to world markets. Today, Moroccan agriculture is far more market oriented than it was 20 years ago; however, domestic wheat producers, particularly for bread wheat, continue to receive strong protection from world market conditions. Furthermore, Moroccan farmers of all crops still receive subsidies on a range of inputs, while some commodities (with wheat again receiving special consideration) receive additional subsidies on storage and pricing.

Moroccan agricultural policies prior to the mid-1980s

In the mid-1980s, before the beginning of agricultural trade reform, the Moroccan agricultural sector was characterized by having one of the highest levels of state intervention in the world. At that time, government involvement influenced the prices of agricultural inputs, production decisions (particularly in irrigated areas), marketing and international trade of agricultural products.

The pipeline from field to market for bread wheat and flour was particularly sensitive to state direction. For example, the ONICL managed all imports of wheat, while the Office de Commercialisation et Exportation (OCE) managed all exports. Meanwhile, the government also dominated the supply chain; it delivered wheat to industrial flour mills, issued licenses to traders and owned storage facilities and the fleet involved in wheat transport (or the Office Nationale de Transport, ONT) (Tyner & Arndt, 1997).
Morocco also put a policy in place that dictates production decisions in the country’s irrigated areas through its Offices Regionale de Mise en Valeur Agricole (ORMVAs). While Morocco has made reforms elsewhere, much of the intervention in the cereal grain market and production decisions in irrigated areas remains.

Other interventionist policies of the 1980s included a near monopoly on the supply of agricultural inputs by parastatals. Furthermore, the government set the pricing for most agricultural commodities, storage costs and processing margins. High prices for domestic producers were supported by variable levies, which created a disconnect between agricultural prices in Morocco and those on the world market. Finally, numerous producer and consumer subsidies were required to keep prices at acceptable levels for all parties. All told, in the early 1980s these subsidies were estimated to account for USD 3.5 billion in annual government spending, about 15 percent of the total budget. Despite the government intervention in the sector, subsidies to producers at the time were not exceptionally high.

**Agricultural Sector Adjustment Loans**

Between 1985 and 1987, Morocco was granted two Agricultural Sector Adjustment Loans (ASAL):

- Under the first ASAL, Morocco eliminated fertilizer subsidies while liberalizing some marketing and protection systems for agricultural commodities. Although the government agreed to eliminate the subsidy on irrigation, it remains in place to this day.

- Under the second ASAL, Morocco agreed to privatize veterinary services and to a number of other domestic market and trade liberalization measures. Among the more substantive changes under ASAL2 was a shift away from import licenses to border protection for all but commodities considered sensitive. Additionally, beginning with ASAL2, ONICL began its transformation from a state-owned trading agency into a monitoring agency for cereals.

While ASAL1 and ASAL2 began to unravel the complicated web of policy, subsidies, parastatal monopolies and the generally high level of government intervention, a result of these reforms was a higher level of domestic price supports, depicted in Table 23.
Between 1980 to 1983 and 1990 to 1993 the protection of agricultural commodities in Morocco increased significantly, up 43 percent for bread wheat, 76 percent for durum wheat, 54 percent for sunflower seed and holding steady at already high levels for meat and poultry. Table 24 presents the applied and bound tariff rates following the Uruguay round of trade reforms.

**Table 23: Border price vs. domestic price ratios for select agricultural commodities in Morocco**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Common wheat</td>
<td>1.36</td>
<td>1.95</td>
<td>1.43</td>
</tr>
<tr>
<td>Durum wheat</td>
<td>1.36</td>
<td>2.40</td>
<td>1.34</td>
</tr>
<tr>
<td>Barley</td>
<td>1.78</td>
<td>2.50</td>
<td>1.79</td>
</tr>
<tr>
<td>Corn</td>
<td>1.05</td>
<td>2.01</td>
<td>1.64</td>
</tr>
<tr>
<td>Sunflower</td>
<td>1.31</td>
<td>2.00</td>
<td>2.93</td>
</tr>
<tr>
<td>Beef</td>
<td>2.24</td>
<td>2.30</td>
<td>2.07</td>
</tr>
<tr>
<td>Chicken</td>
<td>2.30</td>
<td>2.32</td>
<td>0.84</td>
</tr>
</tbody>
</table>

*Source: FAO, MAMF and Moroccan Ministry of Industry, Trade, Investment and Digital Economy.*
Table 24: Moroccan MFN tariffs on agricultural products before and after the URAA

<table>
<thead>
<tr>
<th></th>
<th>PRE-URAA</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bound tariff</td>
<td>Applied tariffs</td>
</tr>
<tr>
<td></td>
<td>max. AV duty</td>
<td>avg. of AV duties</td>
</tr>
<tr>
<td>Grains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durum wheat</td>
<td>224.0</td>
<td>75.4</td>
</tr>
<tr>
<td>Wheat</td>
<td>190.0</td>
<td>62.2</td>
</tr>
<tr>
<td>Barley</td>
<td>149.5</td>
<td>26.6</td>
</tr>
<tr>
<td>Corn</td>
<td>160.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Rice (husked)</td>
<td>233.5</td>
<td>99.2</td>
</tr>
<tr>
<td>Oilseeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>146.5</td>
<td>16.3</td>
</tr>
<tr>
<td>Sunflower</td>
<td>183.5</td>
<td>26.0</td>
</tr>
<tr>
<td>Canola/rape</td>
<td>192.5</td>
<td>26.2</td>
</tr>
<tr>
<td>Palm nuts &amp; kernels</td>
<td>45.0</td>
<td>22.5</td>
</tr>
<tr>
<td>Cottonseed</td>
<td>166.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Ground nuts (in shell)</td>
<td>77.5</td>
<td>54.2</td>
</tr>
<tr>
<td>Oilseed meals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>169.0</td>
<td>75.5</td>
</tr>
<tr>
<td>Other</td>
<td>169.0</td>
<td>119.6</td>
</tr>
<tr>
<td>Edible oils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crude soybean oil</td>
<td>283.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Refined soybean oil</td>
<td>311.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Crude sunflower oil</td>
<td>283.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Refined sunflower oil</td>
<td>311.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Crude canola/rape oil</td>
<td>283.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Refined canola/rape oil</td>
<td>311.0</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>PRE-URAA 2011</td>
<td>2011</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>Bound tariff</td>
<td>Applied tariffs</td>
</tr>
<tr>
<td></td>
<td>max. AV duty</td>
<td>avg. of AV duties</td>
</tr>
<tr>
<td>Crude cottonseed oil</td>
<td>283.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Refined cottonseed oil</td>
<td>311.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Crude groundnut oil</td>
<td>283.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Refined groundnut oil</td>
<td>311.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Virgin olive oil</td>
<td>45.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Olive oil</td>
<td>45.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw sugar</td>
<td>221.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Refined sugar</td>
<td>221.0</td>
<td>49.7</td>
</tr>
<tr>
<td>Livestock products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td>315.0</td>
<td>254.0</td>
</tr>
<tr>
<td>Lamb</td>
<td>380.0</td>
<td>304.0</td>
</tr>
<tr>
<td>Chicken</td>
<td>132.5</td>
<td>116.0</td>
</tr>
<tr>
<td>Sheep</td>
<td>380.0</td>
<td>304.0</td>
</tr>
<tr>
<td>Goats</td>
<td>380.0</td>
<td>304.0</td>
</tr>
<tr>
<td>Hogs</td>
<td>45.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Milk</td>
<td>115.0</td>
<td>102.0</td>
</tr>
</tbody>
</table>

Source: WTO.

**Morocco under the Global Agreement on Agriculture, Tariffs and Trade**

Under the GATT, Morocco made some reforms by way of eliminating support prices for producers and price controls for consumers on a handful of commodities. Between 1995 and 1996, for example, support prices of USD 480 per tonne for canola and USD 433 per tonne for soybeans were eliminated. In 1996,
Morocco also eliminated the support price of USD 515 per tonne for sunflower seed; however, this was reinstated at a comparable rate in 2003.

Morocco emerged as a leader among developing countries under the Uruguay Round of the GATT negotiations, making commitments to cap tariff ceilings on many products. However, Morocco set their tariff commitments at or below their bound tariffs but above tariffs that were actually applied. Thus, the GATT, while reducing the bound tariff ceiling for a host of products, had very little impact in terms of expanding market access to foreign agricultural producers.

**Free Trade Agreements**

While the GATT was ineffectual in expanding access to the Moroccan agricultural market, Morocco has more recently granted such access on a bilateral basis. There are agricultural aspects of the European Union and United States FTAs with Morocco. These two countries account for upwards of two-thirds of the value of Morocco's agricultural imports, including processed agricultural products. These FTAs have also substantially reduced the protection provided to Moroccan domestic production. In Table 24 above, the border/domestic price ratio for most agricultural commodities is lower today than it was in the 1990s. Sunflower is a notable exception, thanks to the remaining tariff on sunflower seed meal. However, this tariff is rendered ineffective by the zero tariff applied to United States soybean meal.

**European Union-Morocco FTA**

Although Morocco is a net importer of agricultural products, it is a net exporter of agricultural products to the European Union in terms of value. The two-way nature of agricultural trade between the European Union and Morocco and coupled with the sheer size of that trade arguably make the European Union-Morocco FTA the most important of Morocco's bilateral trade agreements, particularly for agricultural products, although not for the oilseed sector. Between 40 and 50 percent of the value of Moroccan agricultural imports have come from the European Union in the last few years. Meanwhile, the European Union is the destination for about 75 percent of the value of Moroccan agricultural products, as shown in the table below.
Table 25: European Union exports of agricultural products to Morocco and the world

<table>
<thead>
<tr>
<th>Year</th>
<th>Exports to Morocco</th>
<th>Exports to world (excl. intra-EU)</th>
<th>Morocco</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>agricultural products</td>
<td>share of total exports</td>
<td>agricultural products</td>
</tr>
<tr>
<td>2007</td>
<td>1 228.1 million EUR</td>
<td>9.9 %</td>
<td>80 069.0 million EUR</td>
</tr>
<tr>
<td>2009</td>
<td>1 102.5 million EUR</td>
<td>9.2 %</td>
<td>798 005.0 million EUR</td>
</tr>
<tr>
<td>2011</td>
<td>1 680.0 million EUR</td>
<td>11.1 %</td>
<td>114 248.0 million EUR</td>
</tr>
</tbody>
</table>

Source: Eurostat.

Table 26: European Union imports of agricultural products from Morocco and the world

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports from Morocco</th>
<th>Imports from world (excl. intra-EU)</th>
<th>Morocco</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>agricultural products</td>
<td>share of total imports</td>
<td>agricultural products</td>
</tr>
<tr>
<td>2007</td>
<td>2 069.5 million EUR</td>
<td>25.6 %</td>
<td>109 698.1 million EUR</td>
</tr>
<tr>
<td>2009</td>
<td>1 928.6 million EUR</td>
<td>29.4 %</td>
<td>101 226.1 million EUR</td>
</tr>
<tr>
<td>2011</td>
<td>2 042.0 million EUR</td>
<td>23.5 %</td>
<td>133 557.5 million EUR</td>
</tr>
</tbody>
</table>

Source: Eurostat.

Morocco’s FTA with the European Union was signed in 1996 and entered into force in 2000; its original goal was to create a free trade zone between the two jurisdictions by 2012. For the European Union, this agreement improved access to the Moroccan cereal grains market. For Morocco, it increased access to the European Union market for a range of horticultural products. This bilateral trade agreement has since been expanded, first in 2003 and again in 2012.

Under the 2003 agreement, 96 percent of Morocco’s exports to the European Union received preferential access to the European market. In return, 62 percent of the European Union’s exports to Morocco were granted preferences, with lower duties granted.
on a wide range of raw and manufactured food products. For its part, Morocco gained an increased TRQ for tomato exports to the European Union, a sensitive concession for the countries of southern Europe. Building on the 2000 agreement, which increased Morocco’s tomato quota from 150 000 to 175 000, the 2003 agreement increased the quota to 220 000 tonnes in 2006/07 and beyond.

Under the 2000 agreement, the European Union was provided a quota of 456 000 tonnes, at a duty of 144 percent, for bread wheat to the Moroccan market. Although the European Union had regularly been exporting over 2 000 000 tonnes annually to the Moroccan market, none of this trade had been taking place under the quota, since Morocco’s prevailing duty had been lower than the preferential duty granted to the European Union.

Under the 2003 agreement, the European Union’s quota allocation for bread wheat was increased to 1.06 million tonnes, with the tariff reduced to 135 percent. Additionally, the agreement stipulated that if Morocco revised its non-preferential tariffs downward (to meet local need) the European Union tariff would also be revised downward in order to maintain preferential access. Under the system, importers made bids for more competitively priced, preferential European Union wheat through the Moroccan cereals office. This process was similar to that in place for ONICL imports of wheat destined for subsidized flour of low-income consumers.

In exchange for its preferential access to bread wheat, the European Union agreed to quota reductions if local production was strong – above 2.1 million tonnes.

In the ten years leading up to 2003, during which the European Union had no effective preferential access for bread wheat, the share of imports from the European Union averaged 60 percent. Since 2003 agreement improved the European Union’s preferential access to Morocco’s market for bread wheat, it has become even more dominant in Morocco’s import market, increasing its share to 73 percent.

The most recent development in the European Union-Morocco FTA negotiations came in February 2012 when the European parliament voted in favour of further liberalization in the trade of agricultural and fishery products. Under this latest iteration of the FTA, the European Union would immediately reduce or remove
55 percent of tariffs on Moroccan agricultural and fisheries products (up from 33 percent). In return, Morocco would immediately liberalize 45 percent of agricultural imports from the European Union, increasing to 70 percent over a ten year transition period.

Key provisions of the agreement include an increase in the Moroccan tomato quota to 285,000 tonnes and gains for other Moroccan products, including strawberries, zucchini, cucumbers and garlic — a provision that led to denouncements by Spanish horticultural producers. Additional market access for European products would apply to processed dairy products, oilseeds and cereals, with the exception of common and durum wheat, which would remain at previously agreed upon levels.

**Figure 77: European Union’s share of Moroccan wheat imports, 1994–2010**

![Graph showing European share of Moroccan wheat imports, 1994–2010](image)

- **Source:** Eurostat and Moroccan Ministry of Industry, Trade, Investment and Digital Economy.

**United States-Morocco FTA.** The United States-Morocco FTA went into agreement on January 1, 2006, eliminating duties on more than 95 percent of all goods and services traded between the two countries, including many agricultural products. In 2005, before the agreement went into effect, the United States exported...
USD 175 million worth of agricultural product to Morocco. By 2011, with the help of the FTA, the United States had increased its exports of agricultural products to just under a billion dollars, making the United States the second largest exporter of agricultural products to Morocco, behind the European Union.

This agreement has been of paramount importance to the Moroccan oilseed sector. The United States’ exports of agricultural products to Morocco have been heavily weighted towards oilseeds, a reflection of the FTA’s favourable treatment of oilseeds. In 2011, 60 percent of the value of the United States’ agricultural exports to Morocco was oilseeds and oilseed products. This percentage, together with cereals (23 percent), animal products (8 percent) and cotton (6 percent), constitute 99 percent of all agricultural products that the United States ships to Morocco.

For oilseeds, the United States-Morocco FTA immediately eliminated:

- the 2.5 percent tariff on soybeans used for seed or for crushing;
- the 2.5 percent tariff on all crude vegetable oils.

Morocco’s tariff on soybeans for processing other than crushing is 22.5 percent and its tariffs on other oils like sunflower and canola remain as high as 37 percent.

Prior to the agreement, Morocco’s tariff on soymeal was 25 percent. With the FTA, Morocco agreed to reduce it by half in 2007 and phase it out entirely by 2013. Finally, Morocco’s tariffs on refined vegetable oils, 25 percent prior to the FTA, are being phased out over a ten year period.

Under the agreement, Morocco immediately eliminated tariffs on sorghum and oats and is phasing out the tariff for feed barley over a 15 year period. It was also agreed that Moroccan tariffs on rice would be phased out over a five or ten year period depending on the product. Morocco’s tariffs on corn were eliminated over a five year period. Reflecting the sensitive nature of the wheat sector, durum wheat and common wheat were treated separately under the FTA. For durum wheat, the United States was provided an initial quota of 250 000 tonnes, increasing 10 000 tonnes annually thereafter. The tariff for durum was to be set at 25 percent below
the applied MFN rate during the first five years of the agreement, and then eliminated entirely over a ten year period. The preferential rate is not available to American exporters in June and July, when the Moroccan local crop is harvested.

Figure 78 highlights the enormous gains in USDA oilseed and oilseed product exports since the FTA was initiated in 2006.

**Figure 78: United States’ exports of agricultural products to Morocco, 1993–2011**

Source: USDA and Moroccan Ministry of Industry, Trade, Investment and Digital Economy.

The agreement regarding United States’ access to Morocco’s market for common wheat is complex, and it is similar to that of the European Union in that market access is influenced by local production. Currently, the United States’ market access for common wheat is in a phase-up period that will mature in 2016. At that point, the United States will be granted preferential access to the Moroccan market for up to 1.06 million tonnes of wheat provided local production is less than 2.1 million tonnes. This is the same concession provided under the European Union-Morocco agreement. In years where Moroccan production exceeds 2.1 million tonnes, the United States’ quota will be phased back to 400 000 tonnes of access in a 3 million tonne crop. Because
Morocco typically adjusts its MFN tariff rate for bread wheat, the preferential rate for the United States is determined by a formula as a share of that value, rather than a set percentage. If Morocco’s applied MFN tariff is 135 percent then the United States rate is set at 83.7 percent and is adjusted downward with any decrease in the MFN rate.

The FTA established an initial TRQ for high quality beef of 4,000 tonnes, increasing 4 percent annually thereafter. The in-quota tariff was eliminated over a five year period, and the over-quota tariff is being eliminated over an 18 year period. The initial quota for standard-quality beef was set at 2,000 tonnes, increasing 2 percent annually thereafter with over-quota tariffs remaining in place.

The United States-Morocco FTA immediately reduced tariffs on most poultry products from 124 percent to 60 percent then gradually reduced the tariffs to zero over a ten year period. The over-quota tariff for poultry products is being phased out over a 25 year period, during which time the United States quota is being gradually increased. Lastly, the agreement includes safeguards against increasing tariffs if imports of poultry from the United States break through specific thresholds. Regarding dairy, the agreement phases out tariffs on cheese over a ten year period and phases out tariffs on powdered milk over a 15 year period.

The agreement also immediately eliminated Moroccan tariffs on cotton, which now account for about 3 percent of the value of Moroccan imports of the United States’ agricultural products.

**Current focus of agricultural policy in Morocco**

So far, our discussion of Moroccan agricultural policy has focused primarily on agricultural trade. Where domestic policies have been addressed, it has mostly been in the context of supports that were eliminated or domestic agricultural markets that have been liberalized. While the Moroccan Government has made great strides in making its agricultural sector more market oriented, like any country, Morocco maintains an agricultural policy that attempts to balance the needs of food security and reasonable prices for consumers with a secure market and remunerative prices for producers — all while trying to capture value and exploit comparative advantage.
Below, the current state of agricultural policy in Morocco is discussed by focusing on several prominent policy themes, namely:

- agricultural land laws and taxation;
- irrigation;
- cereals;
- sugar, fruit and vegetables.

We then discuss the policy surrounding oilseeds, which have fallen by the wayside in Moroccan agricultural policy over the last twenty years, leaving the oilseed sector with relatively few policy tools remaining today. We conclude with a discussion of Morocco’s Plan Maroc Vert, which delineates Morocco’s strategy for agriculture going forward.

**Figure 79: Moroccan land ownership**

Private land is registered under two systems: the Melk system is deed-based and legislated under Islamic law; the Torrens system is title based and designed to make land ownership more difficult to challenge.
Agricultural land laws and taxation

Of the roughly 1.5 million Moroccan agricultural holdings, small units predominate, with 70 percent of holdings smaller than 5 hectares. Within Morocco, the numerous forms of land tenure (see Figure 79) and the registration of less than 40 percent of cultivable area make it difficult to develop land for agricultural purposes, to transfer ownership or to access credit. Foreigners, prohibited from buying land outright, are permitted to take out 99 year leases on agricultural land. However, the byzantine land ownership structure in Morocco discourages this practice to some extent and limits foreign investment in the sector. The Moroccan Government recognizes these problems and has attempted to remedy the situation through the distribution of state-owned land, proposed legislation on land registration and proposals to permit agricultural land ownership by foreign enterprises.

The Moroccan agricultural sector receives several special tax exemptions, a reflection of its importance in the broader economy and as a source of employment. First, approximately 90 percent of the smallest farmers in Morocco are exempted from paying tax. The larger, better capitalized farms that are not exempt pay a tax on virtual income calculated on the basis of the production capacity of the land, which takes into account soil quality, irrigation and local climatic conditions. The crop grown also factors into the virtual income calculation, thereby providing the government another means of influencing planting decisions. Agricultural inputs like seed, fertilizer, pesticides, etc. are exempted from value-added tax (VAT). The VAT for downstream projects ranges from totally exempt for flour, milk, sugar, olive oil, dates or any products sold raw or fresh to 7 percent for rice, oilseeds, processed milk, processed fish and animal feed to 14 percent for coffee, tea, dietary fat and juice. By comparison, the prevailing VAT in Morocco is 20 percent.

Irrigation

Morocco has a long history of supporting the development of its irrigation infrastructure. As a French colony, initial emphasis was on cereal production based on the French Government’s belief that Morocco could resume the role it played in antiquity as “the granary of Rome”. However, Moroccan modern wheat yields were low and the country’s output could not compete in the global market. Ultimately, France abandoned the cereal support measures.
In the early 1950s, the California model of fruit production under modern irrigation techniques was introduced with a fair degree of success. With this shift in emphasis, the area planted with citrus expanded from 1,600 hectares in 1930 to 42,000 hectares in 1955 (Kydd & Thoyer). During this same time, tomato exports grew seven fold. In addition to being profitable, the shift to horticultural crop production in Morocco was also politically palatable to the French, given that Moroccan products were harvested at different times of the year and thus did not compete directly with those grown in France. Because of the success the French had under this model, they launched an ambitious programme in Morocco to increase irrigated farmland to one million hectares by the end of the century. But the Second World War derailed progress towards this objective.

The legacy of France’s colonial policy was dualistic agriculture, which contrasted a new breed of high input, high intensity and often irrigated settler agriculture with traditional farming practices characterized by little use of purchased inputs, low yields and high exposure to climate risk.

After independence in 1956, the Moroccan Government continued emphasizing the importance of developing its irrigation infrastructure. The dam policy (politique des barrages) was launched in 1968, reaffirming the French goal of reaching one million hectares under irrigation. From 1968 to 1975, over 40 percent of government spending was devoted to capital investment in large-scale irrigation.

Today, irrigation remains a critical area of focus for the MAMF and consumes a considerable share of its budget. At present, according to the Ministry’s data, 15 percent of Morocco’s cultivable area is irrigated (versus 12 percent in 2002) — an area amounting to 1.46 million hectares. Irrigated area contributes 99 percent of total sugar beet production, 82 percent of all vegetable crops, 100 percent of citrus production, 75 percent of fodder production and provides the basis for 75 percent of milk production. Although it only occupies 15 percent of cultivated land, irrigated land averages 45 percent of value added in agriculture and 75 percent of agricultural exports. During years of drought, irrigated area can account for as much as 70 percent of value added in agriculture.

The annual budget for the MAMF reflects the importance of irrigation in the agricultural sector. In 2009, for example, the total budget of the ministry was MAD 4 billion (USD 0.46 billion). Line items explicitly for irrigation accounted for 40 percent of this total,
equivalent to MAD 1.6 billion or USD 180 million. In reality though, the amount spent on irrigation in Morocco could be as much as 50 percent higher than this.

**Figure 80: Moroccan agricultural budget, 2009**

![Pie chart showing budget allocations]

*Source: MAMF.*

*Note: total budget was MAD 4.05 billion.*

The Fonds de Développement Agricole (FDA), established in 1986, is the single largest line item in Morocco’s agricultural budget. Its objective is to promote private investment in the agricultural sector and prioritize (this is done through targeted subsidies) the activities that allow a better exploitation of the national agricultural potential. Within the FDA, funds are split amongst various initiatives ranging from irrigation to equipment purchases to specific initiatives in fruit, vegetable, sugar and livestock farming. Irrigation, however, receives prime billing with separate programmes for general agriculture and for aggregators as defined by the PMV. Table 27 provides a description of the cost sharing measures currently offered by the government for developing the irrigation capabilities on individually titled farms. While we do not delineate them here, subsidies in place for developing the irrigation capabilities of smallholders, collectives or amalgamators are more generous than those provided to individual growers.
Table 27: Moroccan FDA irrigation subsidies for individually titled farms

<table>
<thead>
<tr>
<th>Operation</th>
<th>Subsidy rate (% of cost)</th>
<th>Ceiling on subsidy (dinars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation and casing of low-volume wells (puits)</td>
<td>100</td>
<td>1 100 DH per meter in depth</td>
</tr>
<tr>
<td>Excavation and casing of high-volume wells (forrages)</td>
<td>100</td>
<td>2 000 DH per meter in depth</td>
</tr>
<tr>
<td>Supply and installation of pumping equipment</td>
<td>100</td>
<td>4 000 DH per KW of installed power</td>
</tr>
<tr>
<td>Construction of water storage ponds</td>
<td>100</td>
<td>35 DH/m³ of capacity</td>
</tr>
<tr>
<td>Supply and installation of control station, filtration and fertigation equipment</td>
<td>100</td>
<td>5 600 DH per irrigated hectare</td>
</tr>
<tr>
<td>Supply and installation of supply lines</td>
<td>100</td>
<td>9 600 DH per irrigated hectare</td>
</tr>
<tr>
<td>Supply and installation of irrigation pipes and distribution systems</td>
<td>100</td>
<td>13 600 DH per irrigated hectare</td>
</tr>
</tbody>
</table>

Source: MAMF.

Cereals

Morocco has made many concessions over the last 20 years, opening up its markets and reducing supports for some sectors, oilseeds chief among them. However, Morocco treats cereals generally and wheat specifically as sensitive commodities and continues to provide many supports in that market for producers and consumers alike.

Morocco supports wheat producers in a number of ways. First, Morocco has maintained higher tariffs on wheat than any other raw agricultural product. Even for the United States, with its favoured trade status, wheat tariffs can be as high as 83.7 percent. Although Morocco’s baseline wheat tariffs are high for most countries, albeit less so for the United States and the European Union, Morocco uses a variable levy system to allow for additional imports depending on the level of domestic production. In September 2010, in response to high prices, the
GoM suspended tariffs entirely and instituted an import subsidy scheme whereby the government covered the spread between an importer’s costs, and the government set the wheat price. The subsidy reached as high as MAD 865 per tonne in January 2011 (USD 99 per tonne).

When in place, levies collected under the system traditionally went to the FDA, which was used to provide supports for domestic producers. However, as the size of wheat tariffs fell (as world prices increased), so too has its contribution to the FDA, meaning the balance must be covered by other sources of revenue. Nevertheless, the Moroccan Government still provides direct support to wheat producers in a number of ways. A current initiative encourages farmers to use certified seed by subsidising 40 to 60 percent of the cost, with the government setting aside USD 28 million to do so. Other measures to support grain production, like subsidies ranging from 30 to 70 percent of the purchase cost for farm machinery purchases and irrigation equipment, are available to all farmers, regardless of crop produced. Irrigation water is also subsidized as are some agronomic services, like soil testing.

The Moroccan Government has also launched a revised crop insurance programme as part of a larger scheme to enhance production security in the country. Under this programme, the government will subsidize between 50 and 90 percent of a farmer’s insurance premium. About half a million hectares are expected to be enrolled in this programme for 2012–2013, with the goal to increase that to one million hectares by 2015.

The producer prices of durum wheat, barley and maize have been liberalized and are determined according to market conditions. However, most common wheat production has been subject to a support price fixed at MAD 260 per quintal (USD 320 per tonne in 2011) since the 1994/1995 farm year. Common wheat that is afforded this guarantee is delivered to ONICL recognized utilization centres and is destined for so-called national flour. Apart from this marketing channel, which is also considered the official channel, the producer price for wheat is subject to market supply and demand. Because of these supports, Moroccan wheat prices have been more stable and considerably higher than global wheat prices (see Figure 81).
As mentioned earlier, the role of the Moroccan Government in marketing cereals has been reduced since the mid-1980s when it controlled all aspects of trade, storage and transportation. That said, ONICL still plays a decisive role in the cereals sector, particularly wheat, by way of monitoring the market, allocating quotas amongst processors and covering storage. ONICL grants cooperatives and cereal traders a warehousing and management premium for wheat fixed at MAD 2 per quintal per fortnight in addition to a resale premium of MAD 8.80 per quintal, which helps to standardize the profitability of the sector. ONICL covers part of these costs by charging a tax of MAD 1.9 per quintal for wheat and MAD 0.8 per quintal for other grains at the industry processing level. Finally, the Moroccan Government supports wheat marketing and value-added activities by subsidising the construction of grain storage facilities at the rate of up to MAD 150 per tonne (USD 17 per tonne).

Per capita income in Morocco averages around USD 3,100 per year. Given that domestic wheat prices are well above world market levels, the Moroccan Government subsidizes the production of one million tonnes of national wheat flour, which translates into about 1.2 million tonnes of wheat. The quota for national flour is fulfilled through a bidding process among millers. The subsidy on national flour in Morocco varies but has been reported to be around MAD 2,300 per tonne (USD 264) in recent years.

Aside from the government’s great expense of the national flour programme, it is reported to be fertile ground for fraudulent practices and inefficiencies. Namely, it has been reported that the grains used for the national flour programme are of inferior quality, helping millers milk extra profit from a government bureaucracy that may be unaware of the finer points of milling and flour quality. Furthermore, although the government sets national flour prices, the pressure of excess demand is said to lead to price increases of up to 35 percent. And although national flour is meant to help make food more affordable, there is no mechanism that prevents wealthy Moroccans from buying this flour at its subsidized price.
**Sugar, fruits and vegetables**

The sugar crop (beet and cane), vegetable and fruit production policy in Morocco illustrates the importance of the ORMVAs in the broader framework of Moroccan agricultural policy. Generally speaking, the ORMVAs oversee agricultural operations in some of Morocco’s largest irrigation schemes. While ORMVAs are beneficial to those farmers operating within their boundaries, like supplying them with inputs, they also dictate what these growers can produce with the purported aim of maximising the economic impact of Morocco’s irrigated agricultural area. Both sugar and fruit growers within the ORMVAs are required to follow set-cropping patterns, not only to ostensibly optimize the management of water, but also to sufficiently supply value-added activities like sugar mills or fruit and vegetable canning facilities with raw material. In the past, ORMVAs have been known to cut off water supply to growers who ignore cropping instructions.

*Source: MAMF, Lesieur and authors’ calculations.*

**Figure 81: Moroccan and world prices for soft wheat, 1991/92–2009/10**

![Graph showing Moroccan and world prices for soft wheat, 1991/92–2009/10](image)
Sugar crop production is concentrated across five ORMVAs (Gharb, Loukkos, Doukkalas, Tadla and Moulouya). Domestic production supplies about 30 percent of Morocco’s needs, and the remainder is imported. The tariff for raw sugar is 35 percent. Growers receive a guaranteed pan-territorial price fixed by the MAMF. For beet, this price increased from MAD 365 to MAD 410 per tonne in 2011 to 2012, and for cane the price increased from MAD 235 to MAD 260 per tonne. At the consumer level the price of sugar is also subsidized at a level below production costs with the aim of keeping costs around MAD 4.36 per kg. Generally speaking, the controlled producer and consumer prices have been insufficient to cover the costs of processing. Thus, a stabilization fund, La Caisse de Compensation, makes payments which are designed to compensate processors for the inadequacy of the margins allowed by official prices. Refineries are granted a flat-rate subsidy of MAD 2 000 per tonne, and sugar mills and factories are subsidized at different levels on the basis of their production costs plus a fixed profit rate.

Fruit and vegetable production is also emphasized under the ORMVA system. Additionally, fruit and vegetable products are key agricultural exports for Morocco and receive export subsidies. There are also subsidies available for the construction of fruit and vegetable packing units.
Annex 4 - The Moroccan livestock sector

The Moroccan livestock sector accounts for 45 percent of the GDP and just over half of the employment generated by the Moroccan agricultural sector as a whole. For the most part, livestock operations in Morocco can be characterized as non-intensive, with the main exception being poultry operations, which are modernized and efficient.

Between 2007 and 2010, Morocco produced on average 183,000 tonnes of beef, 129,000 tonnes of sheep meat, 21,000 tonnes of goat meat, 513,000 tonnes of poultry, 3.9 billion eggs and 1.8 million tonnes of milk. Morocco averaged USD 273 million dollars of imports of livestock products over the last three years with the most important products being processed dairy products (cheese, yoghurt and butter), followed by powdered milk and then beef. Imports of other livestock products are small and represent a small share of total consumption, particularly when compared to other countries in North Africa.

Economic impact

The Moroccan livestock sector constitutes a major component of its agricultural activity.

- In 2011, livestock generated USD 6 billion of economic activity in Morocco, making up 44 percent of all economic activity in the agricultural sector and about 6 percent of the total economic activity of the country (see Figure 82).
The poultry sector, which includes the production of layers, broilers and eggs, is the largest livestock sector in Morocco in terms of economic impact, at USD 2.6 billion.

Poultry is followed closely by the red meat sector, an amalgamation used in Morocco that includes beef cattle, goat, sheep and camel production, which generates USD 2.5 billion of economic activity in Morocco.

Dairy is the smallest of Morocco’s livestock sectors, generating USD 1 billion in economic activity. Dairy in Morocco captures only milk production from cattle. Although a considerable amount of milk is produced from goats in Morocco, no data is recorded for this activity.

Cattle, sheep and goat production constitute a disproportionately large share of the employment generated by the Moroccan livestock sector. This is because these operations are often characterized as being low-intensity grazing operations. Collectively they account for 1.8 million jobs, 76 percent of the people employed in the livestock sector.

Poultry, by contrast, employs relatively few people. Just 4 percent of individuals working in agriculture. This low rate of
employment relative to its higher impact on GDP is a reflection, in part, of the industry being more intensive and modernized.

- It is estimated that between 2.3 and 2.6 million combined people work in the Moroccan livestock sector. This means that livestock accounts for roughly half of the number of jobs generated in Moroccan agriculture (see Figure 83).

**Figure 83: Employment impact of the Moroccan livestock sector, thousands of jobs**

![Employment Impact of the Moroccan Livestock Sector](image)

*Source: MAMF.*

**Domestic livestock holdings**

Moroccan livestock operations are characterized as being small in size.

- The last farm survey in Morocco was done in 1996, and at that time the average Moroccan livestock operation was around 5 hectares. Although small, this represented a sizable increase over the average farm size of the mid-1970s, when the survey was done previously (see Figure 84).

- In the mid-1970s, an estimated 450,000 livestock operations were landless. Today that number has fallen to around 60,000 operations.
Although the total area devoted to livestock in Morocco has fallen over time, the number of animals in the country has steadily increased (see Figure 85).

This is especially true for sheep, which have increased in number from 12 million head in the mid-1970s to 18 million head today. The number of goats in Morocco increased from 4.3 million head in the mid-1970s to 5.6 million head in the mid-1990s. Since then, however, goat numbers have shown little growth. As an arid country with little pasture, Morocco isn’t well suited for cattle production. As scarce water resources have been directed elsewhere, cattle numbers in Morocco have fallen, from 3.2 million head in the mid-1970s to about 2.8 million head today.
Figure 85: Moroccan herd size, 1973/74–2009/10

Source: MAMF.
Between 2007 and 2010, the annual cull of animals for red meat production in Morocco averaged 820,000 head of cattle, 2.75 million sheep and 1.4 million goats. Red meat slaughtering and packaging is spread across 675 rural slaughtering operations (tueries) and 179 of the more modernized municipal slaughterhouses (abattoirs).

There are no statistics available on the number of birds slaughtered annually for poultry in Morocco. However, Morocco produced 510,000 tonnes of poultry domestically over the three year time frame. Assuming each bird supplies 4.5 pounds of meat this would amount to roughly 250 million birds killed and processed annually in Morocco. In addition to processing birds, the poultry sector also produces 3.9 billion eggs per year. Infrastructure in place supporting the poultry sector includes:

- 40 feed-compounding facilities;
- 47 broiler hatcheries;
- 4 layer hatcheries;
• 23 poultry slaughterhouses;
• 25 cutting and processing units;
• 5 cutting and freezing units.

Sizing up the dairy herd in a country like Morocco is difficult because many cattle are dual purpose, for meat and dairy. As a result, like poultry, there are few statistics kept on dairy cattle in Morocco. However, based on total milk production of 1.9 billion litres annually and assuming production of 2 500 kg per cow per year, we estimate a total of 750 000 milking dairy cows in the country. The Moroccan dairy sector is supported by 1 070 milk collection centres and 82 dairy plants, 70 of which are in the private sector.

**Regional production of livestock products**

Like other aspects of Moroccan agriculture, Moroccan livestock production is concentrated in the north of the country, where the bulk of Moroccans live and where water resources are more abundant. Figure 87 through 91 present 2010 estimates of livestock products (meat and dairy) on a regional basis as well as production goals for 2020 under the PMV.

• 50 percent of Moroccan beef is produced in four regions, Tangier-Tétouan, Tadla-Azilal, Chaouia-Ouardigha and Doukkala-Abda. Tangier-Tétouan, the northernmost region of the country, is the largest producer, accounting for 18 percent of the total (see Figure 87).

• 50 percent of Moroccan goat and sheep meat is also produced in four regions. L'Oriental, the northeastern most region, accounts for 14 percent of that production (see Figure 88).

• Chaouia-Ouardigha is the largest producer of poultry, with 92.5 thousand tonnes, 19 percent of the country’s total in 2010. Notably, this region is also a leading producer of mutton and beef and is well situated to supply the population centres of Rabat and Casablanca (see Figure 89).

• Morocco keeps statistics on camel meat production in the south of the country and in the disputed Western Sahara. It is estimated that 2 500 tons of camel meat are consumed in Western Sahara annually (see Figure 90).
Moroccan dairy production is centred south of Casablanca, in the regions of Doukkala-Abda and Marrakech, which together make up about one-third of the total (see Figure 91).

Figure 87: Regional production of beef, 2010

Source: MAMF
**Figure 88: Regional production of sheep and goat meat, 2010**

Source: MAMF.

**Figure 89: Regional production of poultry meat**

Source: MAMF.
Figure 90: Regional production of camel meat

Source: MAMF.

Figure 91: Regional dairy production

Source: MAMF.
Imports

Moroccan imports of livestock products surged beginning in 2006, the year when the United States-Morocco FTA went into effect.

- Between 1993 and 2005, Moroccan imports of dairy products and eggs averaged 83 million US dollars per year. Since 2006, the value of these imports has more than doubled, to nearly USD 200 million per year on average (see Figure 92).

- Among dairy products, the biggest gains have been seen in processed products, like butter, cheese and yoghurt, which benefitted from reduced tariffs first under the FTA with the European Union and then under the FTA with the United States.

- The increase in Moroccan meat imports in recent years has been even more dramatic. Between 1993 and 2005, the value of meat imports averaged USD 7.7 million annually. Since 2005, the average has increased to USD 30 million. Ninety-three percent of the value of Moroccan meat imports is in beef (see Figure 93).

Figure 92: Moroccan imports of dairy products and eggs, 1993–2010

Source: Moroccan Ministry of Industry, Trade, Investment and Digital Economy.
Supply of livestock products

In Figures 94 to 98, we put Moroccan imports of livestock products in perspective by comparing them with local production. All data are from the Moroccan Ministry of Industry, Trade, Investment and Digital Economy, DSS and MAMF.

As a share of total consumption, beef imports make up the greatest share of total supply amongst all livestock products. Morocco produced 183 000 tonnes of beef annually on average between 2007/08–2009/10. During this same timeframe they imported on average 260 000 tonnes, or about 60 percent of total supply (Figure 95).

Imports of dairy products, which include processed products like butter, cheese and yoghurt, are also important in terms of Morocco’s total supply of animal products. Between 2006/07 and 2008/09 Morocco averaged 1.8 million tonnes of milk production per year. During this same time frame, they imported on average one million tonnes per year of milk equivalent, or 36 percent of the total (Figure 94). Imports of goat meat, sheep meat and white meat by contrast are small in comparison to domestic consumption (Figures 96, 97 and 98).
Figure 94: Domestic production and imports of milk (milk equivalent), 2001/02–2007/08

Figure 95: Domestic production and imports of beef, 2001/02–2009/10

Figure 96: Domestic production and imports of sheep meat, 2001/02–2009/10

Figure 97: Domestic production and imports of goat meat, 2001/02–2009/10

Figure 98: Domestic production and imports of white meat, 2001/02–2009/10