# Olive Value Chain Analysis in the Haouz Area

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The Moroccan government is increasingly considering olive orchards as an essential component of its strategy for agricultural development and poverty alleviation. Indeed olive orchards represent 8% of cultivated areas in Morocco, 14% of total agricultural sales, and represent between 5 and 10% of agricultural employment. With 60 millions olive trees, corresponding to an area of 540,800 ha (55% of orchards area, 6% of arable land area and 5.4% of world olive production), Morocco occupies the 6th rank in the world behind Spain, Italy, Tunisia, Turkey and Portugal.

A new strategy set for agriculture called "Plan Maroc Vert" targets an increase of olive production by four 4 by 2020. It has the ambition for this sector to reach 1.2 millions ha of olive orchards and drastically improve its productivity. The Moroccan government has also given top priority for olive orchards in the Millennium Challenge Corporation (MCC) project. Morocco has already initiated in 1998 a twelve-year National Olive Plan (NOP: 1998–2010).

After 7 years of implementation, we observe that NOP has not reached all its objectives. The olive chain still has weak performances illustrated by important technical delays, low productivity rates, processing dominated by very small and traditional units (40%), and unorganized and inefficient marketing channels.

The analysis of the chain value of the olive will assist the government and the private sector in implementing the "Plan Maroc Vert" strategy for this sector. This framework is suitable for understanding and clarifying the sector's overall performance from input suppliers to the final market whether local, national, regional or global.

The framework encompasses the complete sequence of operations: starting from inputs supplies and farmer activities that take place at the farm level (production of commodity), followed by processing, then distribution and marketing of each commodity and finally an analysis at the consumer level.

"As products progressively move through the successive stages, transactions between chain actors- producers, processors, retailers, etc, - take place. Money changes hands, information is exchanged, and value is progressively added. Seen from a broader, systemic perspective, the chain concept includes also the 'rules of the game' – laws, regulations, policies and other institutional elements – as well as support services, which form the environment where all activities take place."[11]

Moreover, this particular framework allows a comprehensive categorization of the sectors and delimitation of the constraints that are inhibiting its development. So it allows identifying incentives for behavioral changes of economic agents. And so it permits to identify areas and activities with a potential for growth and poverty alleviation and to propose policies and corrective measures that government and actors of the private sector can undertake. Indeed this methodology identifies the main stakeholders involved at each stage, the leading firms, the

*11* FAO: "Guidelines for rapid appraisals of agrifood chain performance in developing countries" P.1; FAO 2007

relationships amongst relevant actors, the innovation sources and the distribution of benefits among firms for each segment of the chain as well as between each segment of the chain.

Surveys were conducted in the Al Haouz mountainous region at different segments (producers, traders, processors in both traditional and modern processing sector) of the olive chain. The results of these surveys contribute to provide necessary data to carry out the value chain analysis for this commodity. In addition, a number of interviews were conducted with development services, Al Haouz mountain project staff and experts in the field of olive chain.

## 1. Demand for Moroccan olive and olive oil demands:

The table olive and olive oil international markets have recorded an upward trend over the last ten years with an annual average growth rate of respectively of 6.5% and 3.27%. This growth is mainly attributed to the significant demand recorded in the United States and the European Union.

Moroccan olive oil exports are limited and irregular due to low production levels and relatively high domestic consumption. Over the last five years, the average volume exported amounted to 15,000 tons (2001-2007). The main destination markets are the US, Spain, and Italy. Moroccan table olive exports have amounted to 63,000 tons (average of 2002-2007).

Moroccan export potential of table olives and olive oil is highly dependent on olive production levels. The insufficiency and irregularity of this production are obstacles to developing stable market shares in the olive international markets. In addition, domestic demand is growing due to population growth and to standard living improvement.

Nevertheless, growth opportunities in table olive markets are not as high as the development openings available for the olive oil market. As a result, the world trend is to extend olive oil production more than table olives production. Thus; in the last five years world exports of table olives has reached an average of 462,000 tons, while olive oil exports records an average of 598,000 tons which is equivalent to more than 3.5 Million tons of olives.

Different studies on the olive sector's competitiveness showed that Morocco has a comparative advantage in both table olives and olive oil (see Azzouzi et al, 2006, Lahlou 2000, E.). The challenge for Morocco is reinforcing its competitive advantage.

For a long time, the Moroccan table olives and olive oil markets have been protected by high tariff levels (49% for both). At this tariff level, Moroccan imports of table olive and olive oil are very rare. However, Morocco has signed a Free trade agreement with different countries. The Arab free trade zone and the agreement between Morocco, Tunisia, Egypt, and Jordan allow all these countries to export all products at zero tariffs. The import of olive oil from Tunisia is becoming a threat to the national olive oil producers. Further, some Arab countries are very aggressive competitors in table olive and olive oil businesses on the regional and international level. For example, Syria has a strong deliberate policy that has lead it to almost double its olive production in 10 years. It is expected to become the fifth top exporter of olive oil in the world. In 2005, Syria exported almost 25 000 tons of olive oil. Another case is Tunisia. It is a traditional producer and exporter of olive oil. The level of its production is 4 times the Moroccan one and its exports are 10 times higher than what Morocco exports. It implemented a strategy for the 1990's and another for the first 10 years of the new millennium. Egypt is already an important player in table olive world market. It has the potential and the ambition to develop its production and exportation in this sector.

In addition to Arab countries, Moroccan producers must compete on the international level with EU producing countries (Spain, Italy and Greece) and others such as Turkey and some new entrants like South Africa and China. With the EU, Morocco is about to sign an agreement which will allow Morocco to export to the EU table olives and olive oil tariff-free in exchange of

allowing free access to the EU's olive oil exports of 3000 tons. This agreement is an opportunity for Morocco to improve its competitiveness towards its EU competitors and to increase its export towards the EU. Nevertheless, the EU has already granted the same concession to Egypt and will probably do so for Tunisia in upcoming months.

## 2. Area of Study

The project area covers 17 disadvantaged rural communes of Al-Haouz Province, situated in the two administrative circles of Amizmiz and Asni, south of Marrakech. It comprises a total area of 239 200 ha, 80% of which is occupied by State-owned forests and collective rangelands. Cropped lands cover no more than 32 600 ha (13.6%) owned by 12 000 farming units, 40% of which is traditionally irrigated. The major fruit tree crops are olives, almonds, cherries, apples, apricots, peaches and prunes.

The production system is characterized by low levels of productivity as a result of the limited use of agricultural inputs due to a lack of credit and weak technical support services. The agricultural production systems differ according to altitude and geomorphology/soils. The project zone can be divided into three zones:

- The upper valley zones (altitude higher than 1,200 m) are irrigated, based on arboriculture (walnut, apple, and cherry), barley, corn and forage crops, small-scale animal production and use of forest products (firewood). Land-use intensity is high given the reduced size of holdings (0.65 ha in ten parcels).

- In the middle valley zones (800 to 1,200 m), vegetation is diversified and agriculture is based on cereal/livestock system. The average size of holding is 1.5 Ha.

- The piedmont (800 m altitude) and plain zones are scarce in water resources and have production systems based on cereals, olives and almonds. These occasionally receive additional irrigation by controlled run-off and flood diffusion.

Crop lands cover an area of 32,623 ha, and are dominated by micro farms which represent 4.6% of total number of farms and about 26.7% of arable land area. 50% of irrigated lands are irrigated from permanent water. The other half is irrigated in some seasons or by flood water. A recent study (Ministry of Agriculture and Fisheries, 2005) conducted in the project zone revealed that olive trees occupy 65% of total orchards.

Interviews conducted with producers, extension staff, researchers and local experts; show that mountain populations have a strong agricultural tradition and a valuable local knowledge which need urgent actions to identify and to preserve. Agricultural products in this region have a good reputation derived from history and culture. The region is known for the quality of olive oil in the commune of Marigha. This affirmation is not documented but it is a strong affirmation of people who are working on the field (farmers, researchers and local traders).

Because of infrastructure constraints, the oil production is marketed through traditional ways with inappropriate packaging (used barrels) that devaluates quality perception. Problems in production, limits the opportunities for higher income (low level of input use, harvest conditions, olive oil production must respect some market conditions such as storage, packaging, time between harvests and crushing, etc.).

## 3. Results of the survey

**Table 1: Evolution of trees number between 1996 and 2008 (Numbers are in thousands)**

| Farm size | 1996 | 2008 | Changes in % |
|---|---|---|---|
| ≤ 60 trees | 52.1 | 84.8 | 63.0 |
| 60-250 trees | 97.8 | 117.6 | 20.3 |
| 250-500 trees | 45.0 | 55.5 | 23.4 |
| >500 trees | 57.2 | 99.8 | 74.4 |
| Total | 252.0 | 357.7 | 41.9 |

According to the survey results, the olive orchard in this zone show significant growth (41.9%) from 1996. The total number of trees soared: during the 1996-2008 periods, the number of trees augmented from 252 thousand to 359 thousand trees. This increase is more important for very small farms (+ 63.0%) and large ones (+74.4%) than for the other categories of farms. The lowest increase accrues to small farms (20.3%).

Survey results show the presence of relatively young orchards, 29.3% of olive trees in this zone have an age below 10 years. However 30.5% of the orchards are 40 years old or older. Age structure of the olive trees in this area is U shaped as illustrated by the diagram below. This age structure is the result of the investments in olive trees during the last 10 years.

### Agronomic practices

Agronomic practices are characterized by low level of input uses. 95.9% of farmers utilize manure for their olive trees. 72.9 % of farmers use manure produced within the farm. This suggests that most olive growers are also livestock farmers. Hence, livestock and olive activities are strongly integrated in the farms. Both activities are integrated in all farm categories. However, this tendency is slightly less dominant for large farms. Less than 15% of farmers use fertilizers for their olive trees. In general, this percentage increases as the farm size increases. There is no real trend in the % of fertilizer uses by farm size. The employment of chemicals used for controlling pests and diseases is very limited. Only 3.8% of farms and 8.4 of olive trees are beneficiating from chemical uses for pest control. The most significant diseases are "olive fly", "psyle", "oeil du paon", and "fumagine". They are also common to the other Moroccan regions. Moreover, pest control is not practiced at all in the smallest farms and the medium size farms. The pruning practice concerns 7.4% of farmers. It is of significant use for all farm sizes. Only 6.5% of farms with less than 60 trees are practicing pruning. Pruning olive trees is an activity which is much more frequent in large farms than in smaller ones. For middle size and large farms this rate is much higher (33.3% the first ones and 40% for the later).

**Table 2: Number of farmers in percents**

| Farm size<br>Number of trees | No manure use | Using no fertilizer at all | Using chemicals for pest control | Practicing pruning | Practicing 'Gaulage' |
|---|---|---|---|---|---|
| ≤ 60 | 3.2 | 87.1 | 0.0 | 6.5 | 87,5 |
| 60-250 | 3.3 | 80.0 | 13.3 | 3.3 | 78,6 |
| 250-500 | 16.7 | 66.7 | 0.0 | 33.3 | 100 |
| >500 | 20.0 | 80.0 | 20.0 | 40.0 | 75 |
| Total | 4.1 | 84.3 | 3.8 | 7.4 | 85,5 |

## Renting water

**Table 3: Farm frequencies in rent irrigation water (in percents)**

| Farm size Number of trees | Fall | Winter | Spring | Summer |
|---|---|---|---|---|
| ≤ 60 | 9.7 | 12.9 | 16.1 | 6.5 |
| 60-250 | 6.7 | 10.0 | 10.0 | 3.3 |
| 250-500 | 0.0 | 8.3 | 8.3 | 0.0 |
| >500 | 10.0 | 10.0 | 10.0 | 10.0 |
| Total | 8.5 | 11.9 | 14.1 | 5.4 |

In the project zone, farmers have rights over irrigation water. A market for renting water exists. In the case of olive trees, some farmers use this market to get extra hours of irrigation water.

Depending on the season, the renting market is more or less dynamic. During the summer time only 5.4% of olive farms succeed in renting irrigation water, while in spring the rates are at their highest (14.1%). Obviously during the summer, irrigation water is scarce relatively to olive farming needs. Moreover, there is no clear distinction between farm sizes with regards to renting practices of irrigation water.

**Table 4: Hired and family labor by farm sizes (in Percents)**

| Farm size Number of trees | Family labor | Hired labor | Total |
|---|---|---|---|
| ≤ 60 | 47.9 | 52.1 | 100.0 |
| 60-250 | 37.5 | 62.5 | 100.0 |
| 250-500 | 21.6 | 78.4 | 100.0 |
| >500 | 17.7 | 82.3 | 100.0 |
| Total | 36.8 | 63.2 | 100.0 |

Almost two thirds of labor used in producing olives at the farm level is hired labor. Even very small farmers are hiring more than fifty percent of the required labor. But as expected, small farmers use, in percents, more family labor than the other categories of farms. The percent of hired labor increases with farm size.

## Production and yields

The overall olive production of the project zone is less than four thousands metric tons. The average yield by productive tree is 14.4 kg/tree. Despite the fact that 79.1% of the olive orchards in this area are irrigated, the yield is much lower than the potential yield for standard irrigated olive orchards. Moreover, there is very little relative difference in yields by farm size. The very small ones have the highest average yields and the small ones the smallest. There is a large room for improvement especially for medium and large farms.

**Olive production cost (at farm gate)**

The cost of olive production at the farm level is on average 2.29 DH/Kg. This cost decreases as farm size increases. The range of cost is very wide; it varies from 1.75 DH/KG for large farm to 2.39 DH/Kg for the very small farms. This means that there is room for improvement in the future. The cost includes all costs relative to labor (Family and hired labor) and all inputs used in the production process. It includes of course harvest cost, but it does not include return to land, capital or water rights.

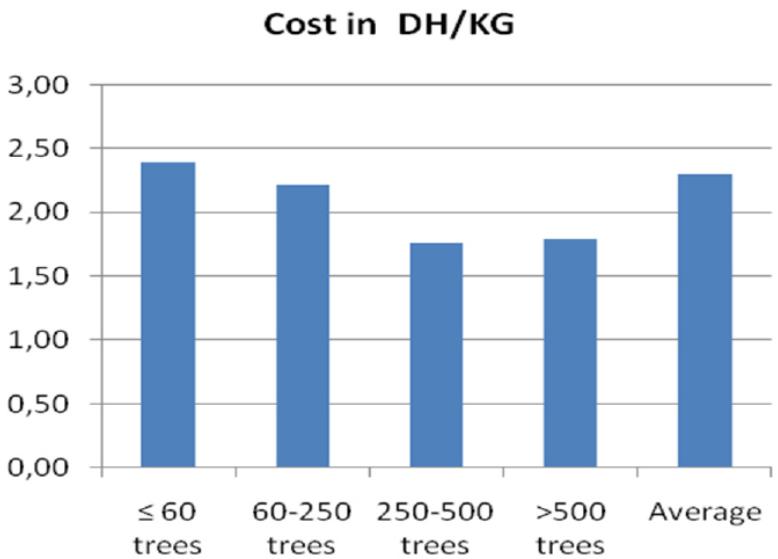


**Table 5: Structure of production costs in %**

| Farm sizes | ≤ 60 trees | 60-250 trees | 250-500 trees | >500 trees | All farms |
|---|---|---|---|---|---|
| Pruning | 4,5 | 5,7 | 8,4 | 7,2 | 5,3 |
| Plowing | 23,5 | 22,7 | 22,2 | 17,2 | 21,2 |
| Manure | 4,2 | 2,7 | 2,2 | 0,5 | 3,2 |
| Fertilizers | 2,1 | 2,8 | 5,1 | 5,8 | 2,7 |
| pest control | 0,5 | 7,9 | 0,4 | 20,2 | 10,1 |
| Irrigation | 6,4 | 12,1 | 10 | 12,2 | 8,9 |
| Harvesting | 58,7 | 46,2 | 51,7 | 36,9 | 48,6 |
| Total | 100 | 100 | 100 | 100 | 100 |

Since all farms are producing in rather extensive ways, harvesting represents the highest share of production costs. This share is more important for the very small farms than for the others. The second important cost is plowing costs. The latter is mostly used for the crop under the trees. For all cost ranges, labor represents more than 99% of total olive cost of production. Indeed, water is free and the other inputs are rarely used. Moreover, family labor constitutes on average more than fifty percent of total olive production cost.

Production cost varies between 0.55 and 3.5 DH/kg. The cost distribution shows that almost 83% of the cost is below 2.5 DH. Costs above 3.5 DH/Kg represent only 8.5% of all costs.

**Production destination**

To overcome the lack of labor force, market risks, and transaction cost due to logistical problems, the productions of 9.3% of trees are sold on the trees. All very small farms harvest themselves their production. They harvest themselves their trees as part of a strategy to maximize value added within their household. 10 % of large farms sell their production on the trees.

**Table 6: Production uses**

| Farm size<br>Number of trees | % of production sold | Olives for crushing in % | Total |
|---|---|---|---|
| <= 60 | 9.6 | 90.3 | 99.9 |
| 60-250 | 7.8 | 92.2 | 100.0 |
| 250-500 | 22.6 | 77.4 | 100.0 |
| >500 | 28.1 | 71.9 | 100.0 |
| Total | 15.0 | 84.9 | 99.9 |

Farmers either sell their olive production or process it to produce oil. The results show that 15% of total farmer production is sold to traders; whereas 85% is transformed by farmers to producing oil. This part is even higher for small (92.2%) and very small farmers (90.3%). In this case, they hire local processor services to transform their olives on olive oil. Selling oil instead of olives is a strategy preferred by farmers because it enables them to store olive and sell it at the appropriate time depending on price fluctuation or their need for cash.

**Olive trade**

Our survey and interview results from traders in the region reveal that all olive traders have an agricultural activity either as primary or as a secondary economic activity. We can distinguish two main categories of olive traders.

1. Farmers that, during the harvesting season, carry out trading activities. They have a competitive advantage over outsider traders as they have the experience and knowledge to assess the production levels of the orchards. Furthermore, their proximity to the production zone and their networking at the local level gives them a clear advantage. They represent 55% of all olive traders in the area.

2. Traders who have farming as a secondary activity are generally living in the area or originate from the area. They use their regional network and connections as well as their knowledge of olive production in this zone. They represent 45% of olive traders in the project zone.

This interconnection between farming and olive trading activities is the results of multiple factors: the low level of olive quantities traded in the area; the high level of transaction costs for outsiders due to the difficulties of collecting information on the production levels and accessing the production zones. Only 587.6 tons of total fresh olives are bought, this represents 15.3% of the total production of the area. The portion bought by traders having farming as their main activity is of 44.1%.

**Olive oil processing**

These traditional processing units have a relatively small capacity for olive processing. They are very suitable for small farmers who use their services for transforming their olives into oil in exchange for a financial retribution (proximity to small farmers, suitability for crushing very small quantities of olives, service charge is lower than of the semi modern crushers). However,

they have long queuing delay (15 to 20 days compared to 3 days) and Very low hygienic standards. The result is lower olive oil quality. According to the survey results (production destinations), semi-modern units crush 2,571 tons of olives per year but only 553 tons (21.5%) of olives are coming from the project zone.

Processor margins are 0.225 DH/Kg for semi modern mills and 0.118 DH/Kg for Maâsras. The net margin of Maâsras is lower than the one of semi modern units by 47.5%. This indicates that semi modern units are more competitive and probably the maâsras have no choice but to modernize or to disappear.

**Distribution of revenues along the value chain**

When farmers sell their olive on the market their revenues (including the revenues from family labor) per Kg of olives is 3.91 DH. When they sell on the trees, this revenue is only 2.54 DH/ Kg. The difference is quite important: 1.37 DH/kg. This difference include family labor which would have been employed in harvesting had the production been harvested by the farmer himself. Are traders making profit by buying olives on the trees? In fact trader margin is 0.21 DH/Kg (only 3.7% of selling price) when he bought olives from the local market. This low margin reflects the highly competitive olive markets as many traders are operating in this market.

When trader is buying olives on the trees, its margin is 1.18 DH/kg of olives. This high margin reflects of courses financial cost and costs associated with price and yield risk. It reflects probably also some profit du incomplete financial market and the lack for small to have collaterals.

**Table 7: Olive value chain in DH/Kg**

| | Harvested by farmers | Sold on the tree |
|---|---|---|
| Inputs | 0,3 | |
| Total Hired Labor | 0,99 | |
| Hired labor for harvesting | 0,56 | |
| Total Family labor | 1 | |
| Family labor for harvesting | 0,56 | |
| Total | 2,29 | |
| Acquiring cost | | 3,27 |
| Guarding cost | | 0,23 |
| harvesting cost | | 0,74 |
| sorting cost | 0,03 | 0,03 |
| Transportation cost from the field to the local market | 0,07 | 0,07 |
| Losses in equivalent | 0,03 | 0,03 |
| Trader cost at local market | | 4,37 |
| Farmer sale price | 5,34 | |
| Farmer revenue including family labor | 3,91 | 2,54 |
| Transportation cost from the souk to the final destination | 0,05 | 0,05 |
| Trader sale price | 5,6 | 5,6 |
| Trader margin | 0,21 | 1,18 |
| Difference | 0,97 | |

## Conclusions

A successful growth and poverty alleviation policy needs to focus on labor intensive industries where poverty is concentrated. As olive production is labors intensive and mainly owned by small farmers, its development is a crucial element in poverty alleviation. Moreover, Morocco has a comparative advantage in this sector. Morocco has the provision of labor and land and its climate is suitable for olive orchards. The industry is dominated by small and medium size farms and therefore, any strategy for developing olive chain needs to focus on SMEs (Small and Medium Enterprises) in order to make the overall capacity of this sector globally competitive. If this comparative advantage is transformed into a competitive advantage, Morocco will be able to make the "Plan oléicole National" a success story in alleviating poverty and increasing agricultural GDP. To do so, it is necessary to make this chain more competitive at all stages and to ensure that the benefits are spread to all levels of the chain especially to small and medium farmers. The strategy for developing the olive sector in the Al Haouz zone needs actions to be taken at the national level and the local level. Indeed, there are both national and local level dynamics which impacts Al Haouz zone and both need to be strengthened.

Most olives are harvested by 'gaulage' (about 85%) in the study areas. The introduction of olive harvesting machine in the area by IFAD project is a success. Their use can be boosted by the introducing more of them and subsidizing their acquisition by farmers within the framework of FDA;

Most olives are produced without using any fertilizers or chemicals. These productions are in fact organic products. However they are not certified as such. Moreover olive oil of Marigha is well known in the Marrakech area as having particular qualities. Olives of this area can benefit from the growing demand in Europe for organic olive oil and for products with geographic indication. Certification of organic and geographic indications of olive oil and table olives need to be developed at affordable cost for small farmers.

Analysis shows that the margins of traders are not too high, indicating degree of market efficiency. But still some farmers sell their olive production to traders on the trees where traders harvest and market the product. In this practice, traders take risk. However traders make some profit, about 1 DH per kilogram or 1000 DH per ton. This amount is a sizeable some for small holders in the marginal areas, and they can retain that if there a marketing system that suits their special needs is developed and supported with human capacity development.

The traditional processing units (Maasra) play an important role for small farmers because they are located closely to their olive plantations. However they are producing low quality olive oil with at lower extraction rate. For Moroccan olive oil to be competitive at home and abroad, it is critical to set a program aiming at replacing or shutting down some of the traditional processing units. In this regards, government subsidy for building and equipping small processing olive oil units will be a condition for keeping small farmers in the olive oil business;

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