Technical Assistance Facility (TAF) for the Government of Lebanon

Evaluation of the Ministry of Agriculture support to the olive sector in Lebanon

Report

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Executive Summary

The olive sector is considered as one of the main agriculture sectors in Lebanon. The olive orchards cover 62,000 hectares which is equivalent to 23% of the total Utilized Agriculture Area of Lebanon and 45% of the total area cultivated with permanent crops. The surface planted with olive trees increased by an annual compound growth rate of 1.64% over the past 10 years, adding around 8,400 Ha and making-up partly for the decline in the cultivation of other crops over the same period.

Beyond its sole economic importance, the olive growing industry in Lebanon has strategic social, economic and environmental dimensions; it constitutes hence an important socio-economic safety net in rural areas, which is particularly relevant under the economic crisis that Lebanon has been witnessing over the past 3 years and which exacerbated from October 2019 onwards.

In order to help the olive farmers overcome the problems that they are facing and that are influencing the cost of production and the production quality of olives and olive oil, the Ministry of Agriculture (MoA) and since over 10 years is supporting this sector through several programmes/schemes. In response to a project proposal submitted by MoA, the Technical Assistance Facility for the Government of Lebanon provided the expertise needed for assessing the impact of the programmes for the olive sector, the costs and benefits analysis of these programmes, and develop the Ministry's capacity in M&E.

The stated objective of the evaluation is hence to *"... help MoA in assessing the impact of the support programs on the olive sector and analyzing their realized costs towards their observed benefits. The results of this evaluation will help decision makers at the Ministry of Agriculture in reviewing their support policies and adopting the best ways to support the olive sector and ... taking the right decisions for the continuation of these programs or the proposal of new ones that will have better impact on the sector..."*

The evaluation took place along four major milestones:

- **Inception phase:** during which available secondary data was analysed and reviewed**.** The review included all available data at MoA across departments, divisions and units, but also through a comprehensive literature review as well as additional secondary data from the Lebanese Customs and the International Olive Council – IOC.
- **Field phase** during which field visits were conducted to six olive producing regions who – taken together – account for more than half of the olive growing areas in Lebanon: Hasbaya and Tyre in South Lebanon; Chouf in Mount Lebanon; Koura and Akkar in North Lebanon and Hermel in the Beqaa. During these visits the MoA Regional Centres organised focus groups bringing together a non-probability random sample of around 15-18 olive farmers to discuss MoA's support to the sector and establish a timeline and typology of this support. This was complemented by a quantitative survey conducted individually with every farmer to examine in further depth her/his opinion about MoA's support.
- **Validation and cross-fertilisation of the preliminary findings of the inception and field phases through a largely attended stakeholder's workshop** (80+ participants). During the workshop the main recommendations from the study were discussed and

validated after which participants proposed a comprehensive roadmap for the improvement of the sector (provided at the end of this summary)

- **Development of the final report** in two sections: the meta-evaluation of MoA's support to the olive sector and a detailed analysis of the results of the quantitative survey.

The interventions of MoA in support of the olive sector can be clustered into 8 categories:

i) Distribution of olive tree seedlings: this has been a standard practice since the time South Lebanon was under Israeli occupation and was sustained following the Liberation;

ii) Distribution of pesticides and traps for the control of Olive fly and other olive pests: MoA distributed 3 types of biological control devices: yellow sticky traps treated with sex pheromones which capture the olive fruit fly & a variety of other insects (whiteflies, beetles, etc..), delta pheromone traps for the control of the olive moth (*prays oleae*) and McPhail traps filled with protein hydrolyzate for the control of the olive fruit fly (*bactrocera oleae*).

iii) Distribution of Copper Oxychloride to prevent/treat peacock eye disease: the disease is particularly severe in years with high levels of precipitation and/or humid summers and becoming more and more widespread in Lebanon. The MoA distributed through its regional centres around 150 tons of Copper Oxychloride over 3 years.

iv) Distribution of mechanical harvesters: the distribution of mechanical harvesters took place in 2015 and 2016 when around 550 harvesters were purchased and distributed to farmers mainly through cooperatives, together with extension sessions concerning their use.

v) Distribution of stainless steel tanks to improve the storage conditions: this was a one-off intervention carried in 2016, where *"stainless steel containers of various sizes were purchased and distributed to farmers"* according to MoA.

vi) Participation in national and international exhibits and fairs: this has been a constant recurring activity since 2011, whereby MoA sponsors a stand and a national competition for selecting the best extra virgin olive oil produced in Lebanon at the annual hospitality fair of Lebanon (HORECA). MoA also facilitates the participation of producers in trade missions and international fairs in order to expand the potential markets for Lebanese olive oil.

vii) Establishment of a national bio-organoleptic testing laboratory: this was one of the flagship outputs of the second phase of the Olio del Libano programme, which designed the lab, procured the equipment and trained the staff, prior to devolving its management and supervision to the Agro-industry Division of MoA in June 2016.

viii) Extension and support services to olive farmer: this intervention is ongoing and part of the regular support provided by the different MoA services centrally and across its extension centres across the Lebanese territory. This support is not tied to a specific project or programme, yet it is instrumental in improving the sector, promoting Good Agricultural Practices (GAP) and assisting farmers in dealing with emerging needs.

A chronological summary of the interventions is provides in the table below:

MoA support to the olive growing sector by year and type of intervention										
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Distribution of olive tree seedlings	√	√	√		√		√	√	√	
Distribution of Copper Oxychloride to prevent/treat peacock eye disease				√		√	√			
Distribution of pesticides and traps for the control of Olive fly				√	√			√	√	√
Distribution of mechanical harvesters							√	√		
Distribution of stainless steel tanks to improve the storage conditions								√		
Participation in international and national exhibits and fairs			√	√	√	√	√		√	√
Establishment of a testing and organoleptic laboratory						√				
Extension and support services to olive farmers	√	√	√	√	√	√	√	√	√	√

Based on the consolidated financial data collected for the evaluation, the direct support from the MoA budget to the olive sector between 2009 and 2018 amounts to 14,278,000 USD or a little under 1.5 million USD/year (0.75% of the estimated yearly value of the sector). In absolute terms, this is equivalent to one out of the many medium-sized programmes targeting agriculture and/or agricultural value-chains across the country and calls for a more organic coordination between these programmes and MoA in light of the results achieved by MoA.

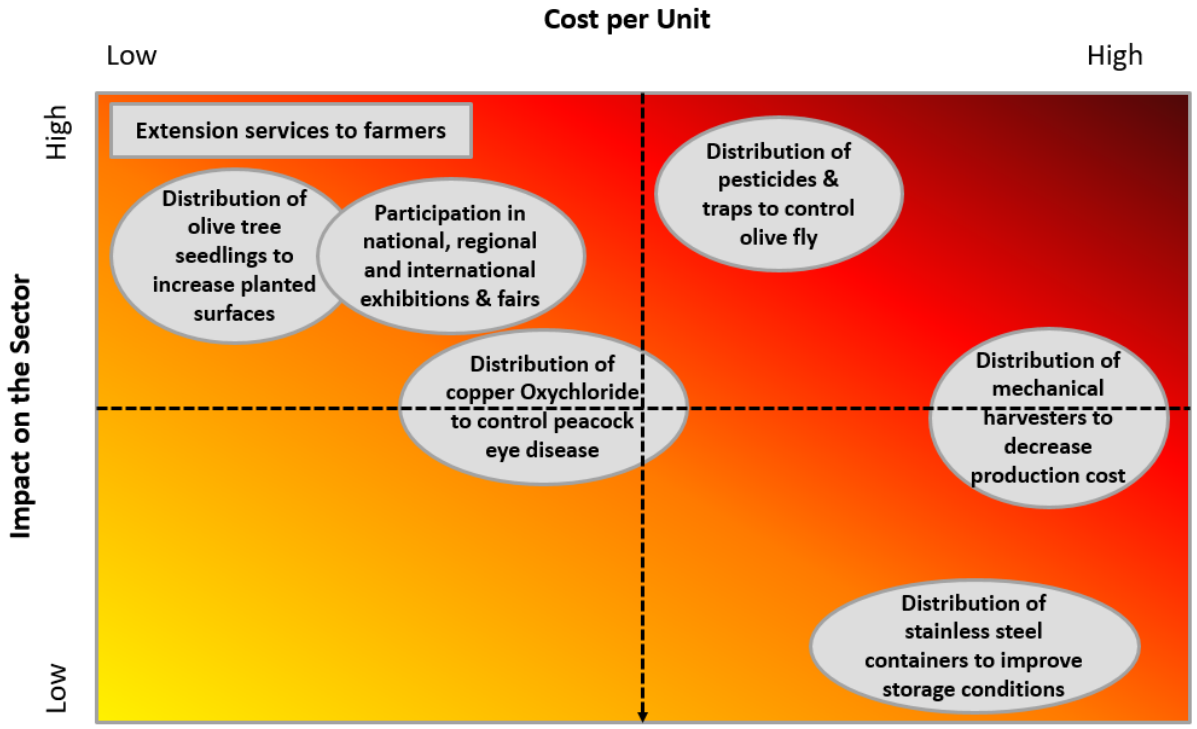
This amount excludes the regular support provided by the General Directorate for Agriculture such as extension services related to production, harvest, post-harvest, storage, and transformation of agricultural products, but also networking and marketing opportunities often co-funded by third parties. Although this budget can be considered low by absolute standards (reaching at best 1% of the total yearly value of the sector), it constitutes around 30% of the amount allocated to projects and programmes by the Ministry of Agriculture

The financial allocation of MoA's support was divided as follows: a bit less than half of the support went to the distribution of olive tree seedlings (47%), a quarter for the distribution of pesticides and traps for the control of the olive fly (25%), and the remaining amount for the distribution of mechanical harvesters (17%), distribution of copper oxychloride to prevent and treat peacock-eye disease (9%) and the other interventions described in this report (2%).

The evaluation concludes that the support of MoA to the olive sector between 2009 and 2018 is far from negligible, as it contributed – alongside different projects and programmes – to a Compound Annual Growth rate of the sector close to 5%. There are little examples or models of a similar sustained growth for Lebanese economic sectors along the same period.

However the contribution of the different support modalities to the improvement of the sector is uneven; the figure below classifies the interventions according to the Basic Efficiency Resource model along two variable: the cost per unit and the realized impact on the sector.

Classification of MoA interventions targeting the olive sector according to the Basic Efficiency Resource Model



The evaluation provides a set of 16 recommendations which should be factored into future MoA programming in support of the sector:

1. Continue the distribution programme of olive tree seedlings to farmers at the sole condition of strictly reinforcing variety authentication and pest-free certification of distributed seedlings. Otherwise it is preferable to discontinue the programme.
2. Capitalize on the win-win effect of planting olive trees in marginal rainfed lands by stressing both the economic and environmental benefits resulting from this operation, and link it to broader initiatives aiming at addressing climate change adaptation/mitigation or combating desertification to benefit from the available funding niches.
3. Conduct active Research and Development (R&D) to identify innovative ways of increasing revenue from olive farming operations and/or decreasing costs and optimizing yield, and communicate the recommendations to farmers through proactive extension (with credit facilities to encourage their implementation when feasible and possible)
4. Maintain the olive fly control programme under 3 pre-conditions:
   a) Assess the effectiveness and efficiency of the proposed products (pesticides and traps) through pilots and demonstration plots prior to their distribution to farmers, including a protocol for balancing their use for monitoring and/or treatment according to the severity of infestation.
   b) Implement a fair and transparent mechanism of distribution that allows an efficient national coverage (or regional in case of high incidence in a specific region but not at national level) with a particular focus on small farmers.

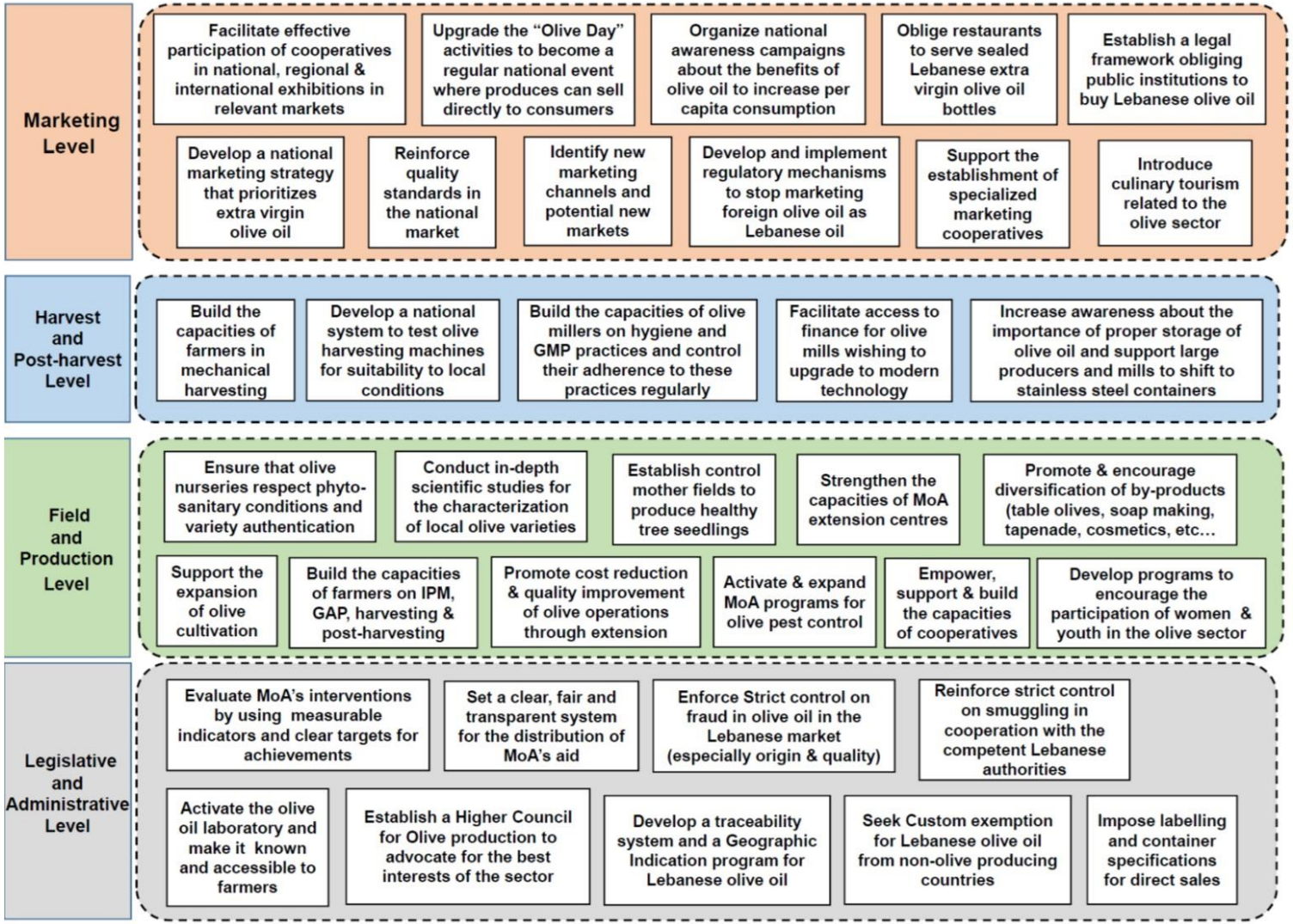
c) Ensure that adequate commercial supply of pesticides and traps is available for purchase in the local market (for medium and large-scale olive farmers)

5. Ensure through proactive extension that farmers are aware about the importance of treating their orchards preventively with Copper Oxychloride particularly in humid areas and during years with high precipitation that extend into the spring season.
6. Train farmers on modern techniques in pruning as a complement to preventive Copper Oxychloride treatment
7. Consider distributing Copper Oxychloride for small farmers as an incentive in years of high infestation.
8. Test the different brands of Copper Oxychloride that are available in the local market and issue recommendation/guidance about the most suitable brands.
9. To the maximum extent possible avoid free distribution, and make harvesters available as soft loans to medium-scale farmers (1-4 Ha) who can achieve economies of scale through their use.
10. Conduct in-depth studies to determine the mechanical harvesters that are best suited for the olive orchards in Lebanon and particularly the Soury-Baladi variety that makes two thirds of all olive orchards of the country (fruits detachment force, pruning and training form, topography, tree density, etc…)
11. Promote the use of smaller (but reliable) harvesters that are easy to transport and operate, such as battery powered harvesters; these are also cheaper and easier to maintain.
12. Discontinue the distribution of family-size stainless steel tanks due to its negligible impact on the value-chain dynamics of the sector.
13. Continue promoting best practices in post-harvesting, including the use of stainless steel containers for conserving olive oil.
14. Develop a national marketing strategy that prioritises extra-virgin olive oil according to the roadmap approved during the stakeholders' workshop to validate the findings of this evaluation. The roadmap includes a series of legislative, promotional regulatory measures, among which the participation in national and international exhibits and fairs. The participation in national and international exhibits and fairs participation will have much less impact if conducted as a standalone activity.
15. Consider funding the marketing strategy for extra-virgin olive oil by imposing a small tax on imported vegetable oil whose consumption doubled the last 10 years.
16. Ensure that the chemical laboratory within the national bio-organoleptic testing laboratory becomes functional as soon as possible by implementing the recommendations of the technical committee who reviewed its administrative setup and its human resources requirements.
17. Take the necessary steps to ensure that the panel group in charge of sensory analysis acquires IOCE certification

A broader roadmap for the development of the sector was proposed during the stakeholders workshop when the preliminary findings of the evaluation were presented, discussed and validated. This roadmap can inform MoA's future programming at production, harvesting, post-harvesting, marketing and legislative levels.

Roadmap for improving MoA's support to the olive sector

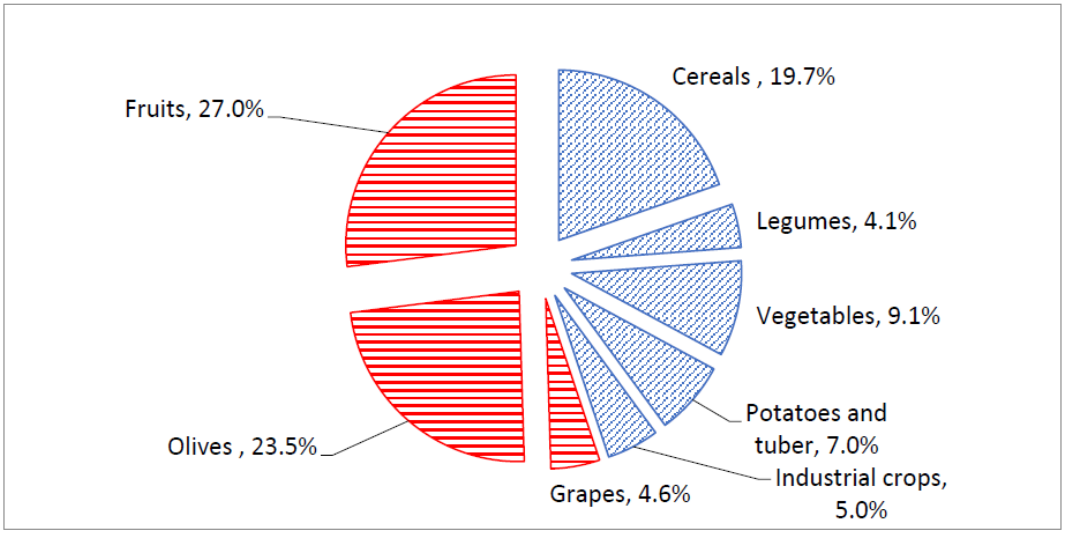
(Source: Conclusions of the Stakeholder Workshop to the validate the preliminary findings of the evaluation)



1. Introduction

The olive sector is considered as one of the main agriculture sectors in Lebanon. The olive orchards cover 62,000 hectares which is equivalent to 23% of the total Utilized Agriculture Area (UAA) of Lebanon and 45% of the total area cultivated with permanent crops. While the total UAA of Lebanon remained relatively constant at around 230,000 Ha from the year 2000 onwards, the surface planted with olive trees increased by an annual compound growth rate of 1.64% over the past 10 years, adding around 8,400 Ha and making-up partly for the decline in the cultivation of other crops over the same period.

Figure 1: Crop Distribution across the Utilized Agricultural Area in Lebanon



Source: FAO and MOA agricultural census 2010

Beyond its sole economic importance, the olive growing industry in Lebanon has strategic social, economic and environmental dimensions; around 15% of the total production is consumed directly and/or within extended family circles, particularly in the smaller holdings. Its contribution to food security and long-term resilience is hence non-negligible; The farmers' survey conducted as part of this evaluation showed that olive farming provides a complementary income to around 70% of the population in olive-growing areas including vulnerable groups such as retirees (22%), civil servants (20%), liberal/manual professions (24%) and military (3%). It constitutes hence an important socio-economic safety net in rural areas, which is particularly relevant under the economic crisis that Lebanon has been witnessing over the past 3 years and which exacerbated from October 2019 onwards.

Since olive growing is predominately rain-fed and more resilient to climate shocks than cereals or other types of trees, it has become a *de facto* tool in maintaining agricultural surfaces (and sometimes reclaiming new ones), expanding the green cover and preventing soil erosion and/or land degradation. These strategic dimensions were largely overlooked in the Lebanon Economic Vision 2030 (also known as the McKinsey report) released in November 2018 and should be factored in any plan to (re)organize the agricultural sector or the Lebanese economy at large.

2. Scope of the evaluation

In order to help the olive farmers overcome the problems that they are facing and that are influencing the cost of production and the production quality of olives and olive oil, the Ministry of Agriculture (MoA) and since over 10 years is supporting this sector through several programmes/schemes. A large amount of money is spent yearly from MoA's budget to cover the cost of these programmes with no information about the extent of their contribution to the improvement of quality of the olive fruit and the olive oil.

In response to a project proposal submitted by MoA on 26 December 2017, the Technical Assistance Facility (TAF)[1] for the Government of Lebanon provided the expertise needed for assessing the impact of the programmes for the olive sector, the costs and benefits analysis of these programmes, and develop the Ministry's capacity in M&E.

To achieve the scope, TAF deployed a Senior Expert in Monitoring and Evaluation and a Senior Expert in Agriculture and Rural Development to implement the assignment (ToRs of the experts provided in Annex 1). The experts were imbedded inside MoA and given full access to staff and data, while TAF used its best endeavors to assist the process technically and logistically.

The stated objective of the evaluation is hence to *"… help MoA in assessing the impact of the support programs on the olive sector and analyzing their realized costs towards their observed benefits. The results of this evaluation will help decision makers at the Ministry of Agriculture in reviewing their support policies and adopting the best ways to support the olive sector and … taking the right decisions for the continuation of these programs or the proposal of new ones that will have better impact on the sector…"*

To this purpose, the evaluation was requested to examine the following:

- Review the different support schemes undertaken since 10 years (2009-2018) on the olive sector;
- Develop performance indicators associated with the cost effectiveness analysis, Value for Money (VfM), and data available;
- Identify data requirements and data collection methodologies to serve the respective performance indicators;
- Perform site visits to olive growers to evaluate the impact of MoA programs;
- Undertake a cost effectiveness analysis of the impact of MoA support to the olive sector.

3. Methodological Approach & Limitations

The fact that the evaluation was requested by MoA with the explicit objective to inform future programming around the olive sector implied a **formative approach**, based on a combination of quantitative and qualitative data analysis, while acknowledging that the large time-span covered by the evaluation (2009-2018) would necessarily imply gaps in the available secondary data, which – in turn – would imply methodological adjustments to stay true to the scope of the evaluation (inform future programming) while maximizing the use of available data sets and working through realistic assumptions in case of observed data gaps.

[1] The Technical Assistance Facility for Lebanon is an EU funded project providing demand-driven technical, legal and training assistance to the Government of Lebanon in line with the priorities of the EU-Lebanon Action Plan

One of the major limitations relates to the fact that the interventions of MoA between 2009 and 2018 did not take place along a strategic intervention framework, ie a document specifying the objectives of these interventions and their inter-linkages, their anticipated inputs/outputs/outcomes/impact chain, their primary intended stakeholders/beneficiaries and the associated performance indicators at each of these levels; The interventions were rather guided by the over-arching principle *of "…increase(ing) the competitiveness of the agricultural products as one of the main targets to achieve for the improvement of the agriculture sector in Lebanon…"*. The immediate methodological implication of the absence of a strategic framework is the **difficulty of applying a standard DAC criteria approach** or reconstructing an intervention logic to assess these standards from an *ex ante* perspective in the absence of performance indicators.

This is probably why the Terms of Reference (ToRs) did not specify a preferred methodological approach apart from **cost-effectiveness analysis and Value for Money (VfM)**. Both approaches are data-heavy and depend primarily on the presence of baselines/end-lines as well as a representative amount of disaggregated data. Under its broadest interpretation, VfM embeds the "**4 E's dimensions**"[2]: ***Economy*** (getting the best value inputs), ***Efficiency*** (maximizing the outputs for a given level of inputs), ***Effectiveness*** (ensuring that the outputs deliver the desired outcome) and ***Equity*** (ensuring that benefits are distributed fairly).

The gap in data was further confirmed during the inception period, making it difficult to run empirical cost effectiveness and VfM analysis as suggested by the ToRs, since both approaches are largely dependent on exhaustive and disaggregated data sets linking inputs to activities and outputs and – when possible - their observed effect over time.

A way to mitigate data gaps while staying true to the VfM spirit is to use a **Basic Efficiency Resource (BER) model**[3], which is particularly suited for evaluating the performance and impact of complex, multi-component programmes with numerous integrated units, to allow room for comparing the relative performance of these units against these units.

The relative perspective on performance and impact that BER offers is important within the overall context of the MoA interventions in the olive sector. As it will be discussed in subsequent chapters of this report, these interventions targeted seven different inputs across the olive value chain, in line with MoA's leitmotiv to "… increase the competitiveness of the agricultural products as one of the main targets to achieve for the improvement of the agriculture sector in Lebanon…" Yet the seven types of intervention were unevenly funded and unevenly executed over time, and without an overarching document highlighting their policy and technical rationale or their anticipated results against a pre-defined baseline. For example distribution of olive tree seedlings took place during seven out of the ten years under study and for 47% of the total budget, while the distribution of stainless steel tanks was a one-off activity with around 1% of the total budget.

[2] Based on the work of the Value for Money Learning Group, see for example the reference primer https://www.bond.org.uk/sites/default/files/resource-documents/assessing-and-managing-vfm-main-report-oct16.pdf

[3] The Basic Efficiency Resource model was developed in 2010 to evaluate some of the flagship multi-country multi-component campaigns of OXFAM. See Cugelman B. and Otero E. (2010) Basic Efficiency Resource: A framework for measuring the relative performance of multi-unit programs. Leitmtoiv and AlterSpark.

The BER approach allowed to examine **how inputs were transformed into results** (which mirrors the definition of OECD-DAC standards for efficiency) through a mix of quantitative and qualitative tools, rather than a the data-heavy examination on how costs were transformed into a benefits (or cost-benefit analysis) which relies almost exclusively on a quantitative approach. It is worth mentioning that neither VfM nor BER are stand-alone analytical methods but provide helpful evidence which can aid triangulation, while drawing on different other data sources in order to make an informed evaluative judgement. In order to mitigate the observed data gaps and accommodate for the requirements of a BER analysis, the evaluation adopted the following corrective measures:

- Use the opportunity of the field visits to run **parallel qualitative and quantitative inquiry** in order to collect first-hand primary data which can be then cross-checked and triangulated with the data available at MoA;
- Use the opportunity of the **focus groups to retrace the timeline of MoA's support** in the different regions visited by the evaluation team, and to harness the collective memory of farmers about specific interventions that were carried during the earlier years of the period under study and where little data is available;
- **Organise** (with the proactive support of MoA and TAF) **a multi-stakeholder workshop to review and validate the preliminary findings of the evaluation** which brought together representatives of farmers, cooperatives, trade unions, NGO's, private sector, municipalities in addition to MoA staff (headquarters, regional centres and LARI) as well as UN agencies;
- **Ensure that the evaluation captures fully the macro-context** in which the interventions being evaluated are taking place, and across the entire time-span covered by the evaluation (2009-2018).

4. Implementation modalities

The evaluation was implemented under the leadership of the Head of the Programmes Department and Advisor to the Minister (Dr. Magida Mcheik), the Head of the Economics Studies and Statistics Service (Ms. Amal Salibi) and the Head of the Development Projects and ProgrammesService (Ms. Lamia El Tawm), who all gave unconditional access to the available data in the Ministry and supervised the advancement of the work.

As such, the evaluation took place along **four major milestones**:

- **Inception phase:** the evaluation started on 11 April 2019 with a kick-off meeting in the presence of MoA and TAF management to review the terms of reference and agree on a workplan going forward. The inception period ran over April – May during which available secondary data was analysed and reviewed**.** The review included all available data at MoA across departments, divisions and units, but also through a comprehensive literature review (50+ documents consulted and cited at the end of this document) as well as additional secondary data from the Lebanese Customs (imports and Exports) and the International Olive Council – IOC (production, consumption and price trends).
- **Field phase** which took place in June-July 2019. During this phase (which coincided with the Holy month of Ramadan), field visits were conducted to six olive producing

regions who – taken together – account for more than half of the olive growing areas in Lebanon: Hasbaya and Tyre in South Lebanon; Chouf in Mount Lebanon; Koura and Akkar in North Lebanon and Hermel in the Beqaa.

During these visits the MoA Regional Centres organised ***focus groups*** bringing together a ***non-probability random sample***[4] of around 15-18 olive farmers to discuss MoA's support to the sector and establish a timeline and typology of this support. This was complemented by a ***quantitative survey conducted individually with every farmer*** to examine in further depth her/his opinion about MoA's support. The design of the survey is provided in Annex 2.

- **Validation and cross-fertilisation of the preliminary findings of the inception and field phases through a largely attended stakeholder's workshop** (80+ participants). During the workshop the main recommendations from the study were discussed and validated in 4 groups (field level, harvest/post-harvest level, marketing level, policies and legislation level). A report about the programme of the workshop and its main conclusions is provided in Annex 3.
- **Development of the final report** in two sections: the meta-evaluation of MoA's support to the olive sector and a detailed analysis of the results of the quantitative survey (Annex 4)

[4] The MoA Regional Centres invited a long-list of around 30 farmers to every focus group (180 farmers in total) out of whom 104 showed-up. The invitation did not ask whether invited farmers benefited from MoA's support or not.

5. Understanding the Market Dynamics of the Olive Sector (2009-2018)

The average yearly production of olives over the past 10 years has been around 160,000 tons. Although the phenomenon of alternate bearing largely affects the economic cycle of olive growing, ***production grew steadily by a Compound Annual Growth Rate close to 5 % between 2011 and 2018*** and for a total commercial value of 300 billion Lebanese pounds ($200M). This is not negligible in the context of the observed economic slowdown of Lebanon and the calls to reduce the deficit in the balance of payments by encouraging exports. There seem to be a general consensus that the national consumption of olive oil in Lebanon is around 20,000 tons or 4.5kg/person/year, although this has not yet been established through an empirical study;

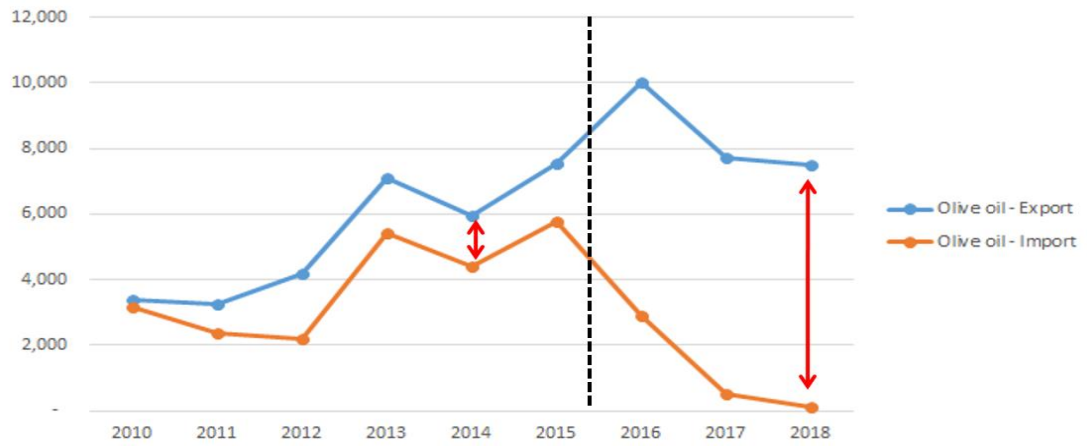
The market dynamics of olive oil in Lebanon are quite unique; the market appears to be near equilibrium in low production years, and with an average excess production of 8,000 tons in high production years. This means that as long as the production remains around 20,000 tons/year it can be absorbed by the local market, while new national or international markets are needed in high production years to absorb excess production (or compensate shortages).

The figures of the Lebanese Customs reveal that ***the Lebanese olive exports are truly global in their reach and growing steadily***. In 2010 Lebanon exported 3,238 tons of olive oil to 66 countries. In 2018, Lebanon exported more than double this amount (7,491tons) to 79 countries 58 of whom were already covered in 2010 in addition to 21 new countries. In terms of value, exports grew by an impressive yearly average of 10% between 2010 and 2018 However, the numbers reveal a quasi-identical pattern between imports and exports in many years, which suggests that imported olive oil is re-packaged and exported as Lebanese olive oil in what constitutes a major yet seldom evoked problem facing the olive sector.

For example, the graph in Figure 2 below shows that although Lebanon exported almost 6,000 tons of olive oil in 2014, the net amount exported is less than 1,700 tons after deducting imports. As mentioned earlier, imports help normalizing the market by mitigating the alternate bearing effect, as long as a clear distinction is made between locally produced (Lebanese) olive oil and imported one (Syrian, Tunisian, Jordanian, etc…).

Figure 2: Comparison between Olive Oil Imports & Exports 2010-2018 (thousand tons)

(source: Lebanese Customs)



For example, the ban on olive oil imports from third party countries that was strictly reinforced from 2017-2018 onwards should have created – in theory – a new market in excess of 7,500 tons for Lebanese olive oil. However the entire Lebanese production of 2017-2018 according to MoA was 16,767 tons while local consumption is estimated at no less than 18,000 tons; this means that either Lebanese drastically reduced their olive oil consumption in 2017-2018 (which is highly unlikely as confirmed my multiple sources), or that the surplus of previous years was used to complement the production (which is also highly unlikely according to the figures of Table 1 below) or that 7,500 tons of olive oil made it into the Lebanese market in a way that cannot be explained by econometrics alone…

Table 1: Olive Oil Balance in Lebanon 2010-2018

(Source MoA & Customs data)

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Olive Oil production (tons)	32,800	17,200	17,400	17,900	24,200	27,005	26,621	16,767
Imports (tons)	2,374	2,213	5,428	4,418	5,789	2,894	497	101
Total available	**35,174**	**19,413**	**22,828**	**22,318**	**29,989**	**29,899**	**27,118**	**16,868**
Exports	3,238	4,163	7,085	5,994	7,521	10,013	7,703	7,491
Balance	**31,936**	**15,250**	**15,743**	**16,324**	**22,468**	**19,886**	**19,415**	**9,377**
Consumption (estimated average)	18,000	17,000	17250	17,500	18,000	18,250	18,500	18,000
Net Balance	**13,936**	**(1,750)**	**(1,507)**	**(1,176)**	**4,468**	**1,636**	**915**	**(8,623)**

Over the past 10 years, the price of a "Tanakeh"[5] of olive oil (±15.5 Kgs) sold in-season directly from the farmers and/or olive mills has been fluctuating between 80-100 USD. A study done by USAID's Lebanon Industry Value Chain Development (LIVCD) programme in 2013 estimated that 27% of the production is sold through these direct and largely informal channels.

The price tends to move upwards in low production years with a solid top at 225,000 L.P (150 USD) and downwards in higher production years with a solid floor at 100,000 LP (65 USD). **Interestingly, this segment of the market and the price that consumers are ready to pay are solely dependent on the taste and preferences of buyers rather than any other form of regulation** (certificate of origin, laboratory tests, classification as extra virgin or virgin olive oil, etc…).

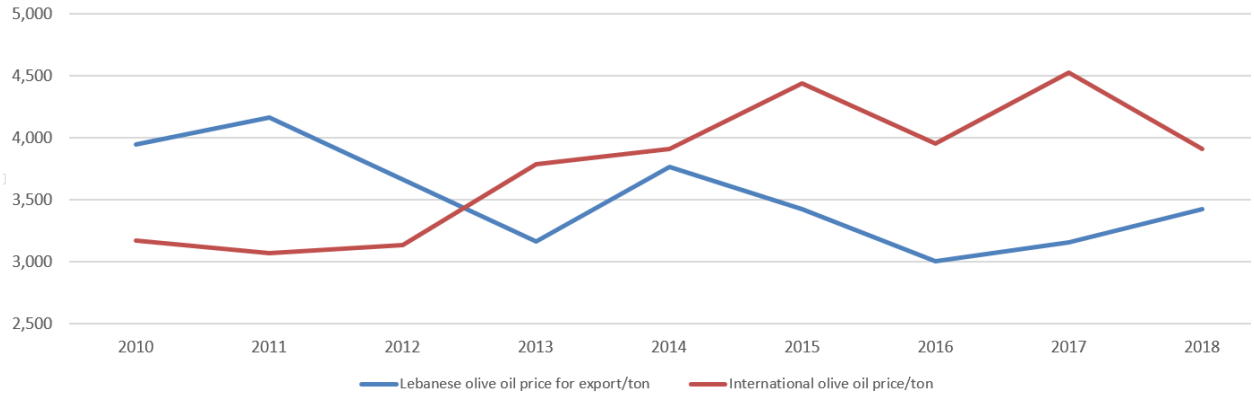
Despite this flagrant lack of regulation, the local price (roughly 6,000 USD/ton) represents a 30% premium over the average international price of extra-virgin olive oil from Italy, Greece or Spain

[5] Olive oil used to be sold in the past in tin containers (Tanakeh in Arabic) of 18 liters/16.5Kgs. Most of the bulk olive oil is currently sold in plastic containers of 16.5 liters/15.5 Kg but is still referred to as "Tanakeh"

published by the International Olive Council – IOC over the same period (3,700 – 4,500 USD). Conversely, the figures of the Lebanese customs reveal that Lebanese and/or re-packaged imported olive oil is exported at an average price of 3,075 USD in 2016-2017, which is half its price in the local market and at 25-30% discount of the international market price. **There is hence a clear advantage in nurturing, regulating and expanding the local market for olive oil, and in regulating the export market** according to seasonal production forecasts in a way that gives priority to the Lebanese olive oil for export, especially in high production years.

The remaining 73% of the production are sold as olive oil and/or table olives through larger middle-men and through the 35+ bottling companies in both local and export markets. It was quasi-impossible to get any empirical data about costs and sales of bottled olive oil in the Lebanese market since neither bottling companies nor retailers were ready to share their data. The export prices made available by the Lebanese customs show that the declared price of one ton of olive oil was higher than international market price until 2012 but has been selling at an average of 23% discount from 2015 onwards (Figure 3 below)

Figure 3: Evolution of the price/ton of Lebanese Olive Oil for export compared to international price (source: Lebanese Customs and IMF Primary Commodity price index for olive oil)



It is also interesting to note that the MoA/FAO census conducted in 2010 estimates that around 15% of the total land planted with olives is intended for home consumption, particularly in micro and small holdings, allowing around 80,000 households (olive growers and their extended families) to have access at olive oil and table olives at cost price.

Table olives remain the least explored and understood segment of the market, although most studies seem to agree that roughly 25-30% of the total olive production is dedicated to table olives and 70-75% to the production of olive oil. Table olives are often conserved in salt (for immediate consumption) or in brine (for longer-term conservation) using premium quality olives; the process is almost exclusively women-driven and represents a substantive side activity for women in olive-producing regions during the months of October-November. A kilogram of pickled table olives is sold anywhere between 4,500 and 7,500 L.P (3-5 USD) and hence at a significant premium over the olives destined for oil production. The market segmentation of table olives follows the same pattern than olive oil, with 6 major companies controlling the wholesale segment of the market and providing year-round constant supply of table olives.

The farmers' survey also revealed that almost two third of olive farmers (63%) still manufacture their own **olive oil soap**, by transforming the low quality olive oil into soap. The production is mainly intended for home use and "confidential" sales, mainly to the customers who buy their olive oil from the farmers. Less than 10 commercial soap factories still survive in Lebanon mainly in Tripoli[6], Saida and the Chouf[7].

6. Institutional and Policy Context

Olive oil production faces challenges common to the whole agricultural sector in Lebanon. These challenges revolve around the need to increase the competitiveness of agricultural production by increasing its productivity while ensuring conformity with international sanitary and phytosanitary requirements, and facilitating access to international markets.

Furthermore, agriculture in Lebanon faces significant structural problem, starting from land fragmentation, to high cost of production for small and medium scale farmers, and lack of adequate and accessible post-harvest facilities and services. The agricultural cooperative movement remains weak, with its inability to attract farmers, organize, or manage its members. This situation has hampered the ability of the agricultural sector in general and the olive sector in particular to overcome structural challenges and regional competition.

In 2010 the Lebanese Ministry of Agriculture formulated an agricultural sector development strategy for five years (2010-2014). This strategy included eight main axes of implementation aiming at increasing competitiveness of the Lebanese agricultural products and fostering agricultural sustainable development. A follow-up strategy for the years (2015–2019) was then developed by MoA. Both strategies do not include a specific olive component, but the 2015-2019 strategy has provisions under axis 2 (2.1.3) to implement development programmes for a number of value chains, and the olive sector has been a central element within these value chains, and 2.5 (increasing agricultural exports) through which the olive sector was also targeted.

Strategic axis 5 (Strengthening agricultural research and laboratories) also mentions "*… establishing a virus and fungal diseases free mother plot for Lebanese olive varieties…"* and *"… conducting research on the suitability of crops with a high market added-value that use small quantities of water: wheat, barley, citrus, olives, grapes, apples and potatoes…"* and *"conservation of genetic resources"* which focuses – among others – on indigenous olive tree cultivars. Strategic axis 6 (development of the cooperatives sector and mutual funds) is also of high relevance since the majority of olive producers in Lebanon are small holders and should come together in cooperatives to achieve economies of scale.

However MoA is not the sole institutional player, since regulations related to the olive sector (and the agro-food sector at large) are shared with several other ministries:

- The Ministry of Water and Energy is involved in defining Lebanon's water strategy, and consequently irrigation systems and related projects;

[6] http://www.dailystar.com.lb/News/Lebanon-News/2003/Sep-20/43260-tripolis-famous-soap-making-industry-still-alive-and-well.ashx
[7] http://www.orientpalms.com/Traditional-Soap-of-the-Levant

- The Ministry of Industry is in charge of the oversight of the agro-food industry (including norms and standards which are defined by the Lebanese Standards Institution (LIBNOR) who is under the tutelage of the Ministry of Industry. LIBNOR plays hence a key role in defining quality standards;
- The export and import regulations (including issues related to certification of agro-food products) are jointly under the Ministry of Economy and Trade and MoA;
- The Ministry of Environment regulates the affluent discharge of agro-food by-products (such as residues of the olive oil milling process);
- Issues related to food safety fall under the common jurisdiction of MoA, the Ministry of Health, the Ministry of Industry and the Ministry of Economy;
- Some specific cases involving subsidies or financial support schemes to farmers could also involve the Ministry of Finance…

The General Directorate for Agriculture at MoA is responsible of the following functions:

- Regulating the agricultural sector in terms of production, processing, marketing, as well as export and import trade (including agricultural products of plant and animal origin and agro-industrial food products);
- Controlling and monitoring the implementation of laws and regulations, and inspection of products of plant and animal origin, nurseries, mills. etc…
- Supporting the development of the sector;
- Providing extension services related to production, harvest, post-harvest, storage, and transformation of agricultural products;
- Planning and coordinating projects related to the sector and;
- Documentation, statistics and socio-economic research.

In addition to the General Directorate for Agriculture, three institutions are attached to MOA and play additional complementary roles:

i) The Green Plan Authority, is an executive body in charge of rural infrastructure, i.e. farm-level irrigation, rural roads, Hill lakes and reclamation of agricultural land.

ii) The Lebanese Agriculture Research Institute (LARI), in charge of operationalizing the Research and Development (R&D) policy of MoA. It also provides (paid) services to farmers for testing their products for export, but also soil and water tests, pesticide formulation and residues, etc…

iii) The General Directorate for Cooperatives is in charge of the legal and financial control over the 1,250+ cooperatives of Lebanon, more than half of whom are agricultural cooperatives. However, and despite this relatively high number of cooperatives, less than 5% of all Lebanese farmers are members of cooperatives.

7. Description of the interventions of MoA targeting the olive sector

In order to help olive farmers overcome the problems that they are facing and that are influencing the cost of production and the production quality of olives and olive oil, the Ministry of Agriculture and since over 10 years has been supporting this sector through several programmes/schemes. These interventions can be clustered along eight different categories:

7.1 Distribution of olive tree seedlings: this has been a standard practice since the time South Lebanon was still under Israeli occupation and was sustained following the liberation of the South. It has been also the most consistent type of intervention with distributions taking place every single year between 2009 and 2018 with the exception of 2012, 2014 and 2018. According to the information communicated by MoA, around 300,000 trees were purchased on yearly basis from nurseries in marginalized areas and distributed across the Lebanese territory. Initially the distributions took place through the MoA regional centres and their affiliated nurseries, but new modalities of distribution through municipalities, olive grower cooperatives and specialized NGOs were experimented from 2015 onwards to strengthen the local anchorage[8] of the process.

7.2 Distribution of pesticides and traps for the control of Olive fly and other olive pests: the promotion of biological and/or environmentally friendly pest control methods is a flagship programme of MoA and targets olives as well as other fruit trees; under this component MoA distributed 3 types of biological control devices: ***yellow sticky traps*** treated with sex pheromones which capture the olive fruit fly but also a variety of other insects (whiteflies, beetles, etc..), ***delta pheromone traps*** for the control of the olive moth (*prays oleae*) and ***McPhail traps filled with protein hydrolyzate*** for the control of the olive fruit fly (*bactrocera oleae*). Distributions took place in 2012, 2013, 2016, 2017 and 2018 and are always accompanied by extension sessions from MoA staff on the proper use of these inputs.

7.3 Distribution of Copper Oxychloride to prevent/treat peacock eye disease: the disease is particularly severe in years with high levels of precipitation and/or humid summers and becoming more and more widespread in Lebanon. The MoA distributed through its regional centres around 150 tons of Copper Oxychloride in 2012, 2014 and 2015. One hectare in infested areas should be treated with around 10kg of Copper Oxychloride per growing season. No distributions took place from 2016 onwards, despite the reported increase in the incidence of peacock eye disease in 2017 and 2018.

7.4 Distribution of mechanical harvesters: the distribution of mechanical harvesters took place in 2015 and 2016 when around 550 harvesters were purchased and distributed to farmers mainly through cooperatives, together with extension sessions concerning their use. Mechanical harvesters have the potential to reduce harvesting costs by an average of 40%, especially in the case where harvesting is done through hired labour, and where this cost category alone accounts for up to 50% of total production costs.

7.5 Distribution of stainless steel tanks to improve the storage conditions: this was a one-off intervention carried in 2016, where *"stainless steel containers of various sizes were purchased and distributed to farmers"* according to MoA. Air-tight stainless steel containers can keep the olive oil for up to 18 months without losing its sensory and chemical characteristics, allowing farmers to sell their production over longer periods of time, and represents a good mitigation strategy to the fluctuation in the income of farmers due to alternate bearing.

[8] https://www.elnashra.com/news/show/711949

7.6 Participation in national and international exhibits and fairs: this has been a constant recurring activity since 2011, whereby MoA sponsors a stand and a national competition for selecting the best extra virgin olive oil produced in Lebanon at the annual hospitality fair of Lebanon (HORECA). MoA also facilitates the participation of producers in trade missions and international fairs in order to expand the potential markets for Lebanese olive oil.

7.7 Establishment of a national bio-organoleptic testing laboratory: this was one of the flagship outputs of the second phase of the Olio del Libano programme, which designed the lab, procured the equipment and trained the staff, prior to devolving management & supervision to the Agro-industry service of MoA in June 2016. A panel group to assess the organoleptic properties of olive oil is currently in place and operational, but the chemical laboratory is idle due to the prohibition of providing paid services through the laboratory, but also the lack of essential equipment (and reagents that have meanwhile expired), human resources and legislative texts. A technical committee recently re-defined the institutional arrangements to re-activate the lab and the human resources needed in order for the lab to fulfil its mission.

7.8 Extension and support services to olive farmer: this intervention is ongoing and part of the regular support provided by the different MoA services centrally and across its 31 extension centres across the Lebanese territory. This support is not tied to a specific project or programme, yet it is instrumental in improving the sector, promoting Good Agricultural Practices (GAP) and assisting farmers in dealing with emerging needs.

A chronological summary of these interventions is provided in Table 2 below.

Table 2: MoA support to the olive growing sector by year and type of intervention

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Distribution of olive tree seedlings	√	√	√		√		√	√	√	
Distribution of Copper Oxychloride to prevent/treat peacock eye disease				√		√	√			
Distribution of pesticides and traps for the control of Olive fly				√	√			√	√	√
Distribution of mechanical harvesters							√	√		
Distribution of stainless steel tanks to improve the storage conditions								√		
Participation in international and national exhibits and fairs			√	√	√	√	√		√	√
Establishment of a testing and organoleptic laboratory						√				
Extension and support services to olive farmers	√	√	√	√	√	√	√	√	√	√

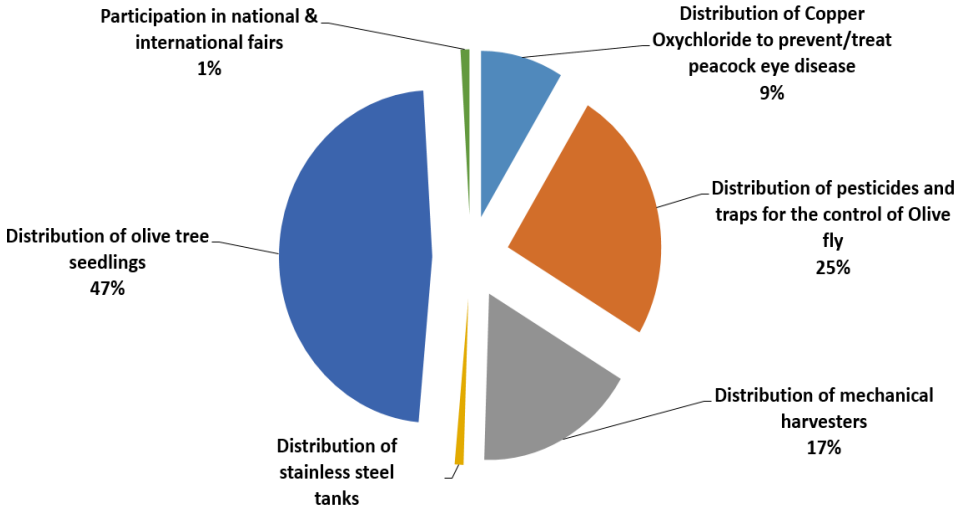
8. Evaluation Findings

Based on the consolidated financial data collected for the evaluation, the direct support from the MoA budget to the olive sector between 2009 and 2018 amounts to 14,278,000 USD or a little under 1.5 million USD/year (0.75% of the estimated yearly value of the sector). In absolute terms, this is equivalent to one out of the many medium-sized programmes targeting agriculture and/or agricultural value-chains across the country and **calls for a more organic coordination between these programmes and MoA** in light of the results achieved and which will be detailed in this section.

This amount excludes the regular support provided by the General Directorate for Agriculture such as extension services related to production, harvest, post-harvest, storage, and transformation of agricultural products, but also networking and marketing opportunities often co-funded by third parties[9]. Although this budget can be considered low by absolute standards (reaching at best 1% of the total yearly value of the sector), it constitutes around 30% of the amount allocated to projects and programmes by the Ministry of Agriculture [10] who – in turn – has been constantly less than 1% of the total government budget.

The financial allocation of MoA's support to different interventions is summarized in Figure 4 below. A bit less than half of the support went to the distribution of olive tree seedlings (47%), a quarter for the distribution of pesticides and traps for the control of the olive fly (25%), and the remaining amount for the distribution of mechanical harvesters (17%), distribution of copper oxychloride to prevent and treat peacock-eye disease (9%) and the other interventions described in this report (2%).

Figure 4 : Distribution of MoA Interventions by Value (2009-2018)
(Source MoA)



[9] For example, MoA co-sponsored a study tour and trade mission for a delegation of olive producers to China during the period this report was being prepared (September 2019).
[10] According to the Minister of Agriculture, MoA's budget in 2017 was around 45 million USD, 40 million of whom went to salaries and only 5 million to support projects and programmes for all agricultural sectors combined. https://www.dailystar.com.lb/Business/Local/2017/Feb-17/393912-bulk-of-agriculture-budget-goes-to-salaries-minister.ashx

8.1 Distribution of olive tree seedlings

Around 47% of the total funding to support the olive sector between 2009 and 2018 was dedicated to the distribution of olive tree seedlings. According to the information communicated by MoA, around 300,000 trees were purchased on yearly basis (except 2012, 2014 and 2018) for a total value of 6,334,000 USD or an average of 3 USD/tree seedling.

Despite this seemingly large number, only 18% of the surveyed farmers reported receiving trees from MoA. However this figure should be nuanced higher (possibly towards the 25% range) because from 2015 onwards MoA carried the distributions through municipalities, cooperatives and NGOs and hence farmers could have been possibly unaware of the origin of the trees that were distributed. The farmer's survey also reveals that only 79% of the tree seedlings that were received from MoA were planted, possibly due to concerns over the quality of these seedlings. Despite these concerns, 40% of farmers who received seedlings are interested in receiving more, and 17% of all farmers rely totally on MoA distributions in order to plant new surfaces and/or replace old trees.

Assuming a survival rate of 80% and that 10% of the trees that survived were used to replace old and/or dying trees, **MoA would have contributed hence to planting around 1.2 million new olive trees** during this period, covering a total of 4,800 hectares (out of the new 8,400 hectares that were planted with olive trees over the same period). Taken from a macro perspective, this effort is remarkable: on one hand it helps increasing the green cover of Lebanon and maximises the use of marginal and often non-irrigated land while on the other hand it provides farmers with an income generating alternative to improve their livelihoods.

How MoA managed to plant 1.2 million olive trees in 10 years

- Number of trees distributed: 2,100,000
- Number of trees planted: 1,660,000 (79% of the trees received)
- Number of trees that survived after 3 years: 1,330,000 (assuming an 80% survival rate)
- Number of trees used to plant new surfaces: 1,200,000 (90% of the surviving total)
- Number of trees per hectare: 260 trees (national average established in the farmers' survey)

The environmental dimension of planting 1.2 million olive trees is significant; According to an on-going research by the IOC[11] every one litre of produced olive oil leads to the extraction of 10.65Kg of CO^2 from the atmosphere per year; the use of olive trees in combating desertification and mitigating the effects of climate change have been recently documented by a team of researchers from Portugal[12]. A ton of Carbon removed from the atmosphere is trading at 50USD/ton in the global carbon market in 2019[13]. As such, the 1.2 million trees planted over the past 10 years through MoA's efforts would hence contribute to a reduction in carbon emissions estimated at 52,000 tons/year with a face value in close to 2.7 million USD in the Carbon trade market, and could be used as a strong fundraising argument.

Apart from the environmental added-value, the other big question is around the economic added-value; in other words, what is the magnitude of financial return that a farmer who receives the olive tree seedlings distributed by MoA and invests in planting and sustaining them

[11] https://en.mercacei.com/noticia/1862/news/the-olive-trees-ability-to-absorb-co2-emissions.html
[12] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6681365/
[13] https://www.edf.org/true-cost-carbon-pollution

should expect, bearing in mind that an olive field lasts no less than 50 years and is not risk-free, especially when discounting the natural and environmental risks and uncertainties.

One way to calculate the costs and benefits of this intervention is the Net Present Value (NPV); NPV is the present value of future revenues minus the present value of future costs *relative to a discount rate*. In commercial projects, the discount rate factors-in the cost of money (interest) and the anticipated profits. ***The NPV is increasingly used in agriculture for the valuation on longer-term investments such as arboriculture and forestry***[16], and to factor non-monetary costs and benefits.

Based on the set of assumptions developed collaboratively with a group of 20 MoA staff during a training program on M&E in August 2019 (Box 2), **the NPV for planting up to one hectare of olive trees is positive only if we don't factor land and labour costs into the calculations** and at a maximum discount rate of 9.4%.

This technically means that as long as new olive trees are planted in marginal lands and used as a complementary rather than a main source of income for the farmer, then there is value in investing in an olive orchard within a timeframe of 25 years, although investing in an olive orchard lasts well beyond 25 years.

Similar studies conducted for olive farming in Europe[17] include three cost categories that are not factored into these assumptions: family labour costs, land & capital cost and depreciation**. If we factor as little as 150 USD/du (1,500 USD/ha) as family labour costs, the NPV becomes negative beyond a 2% discount rate**.

Box 2: Assumptions for the Net Present Value calculation

- # of olive trees = 25 trees/du
- Production orientation = 100% olive oil
- Labour = one farmer working manually. Labour costs not factored into calculations.
- Mechanisation and tools = Basic (portable sprayer owned by farmer, manual pruning sheer, manual plough)
- Irrigation: first 3 years until seedlings are robust enough.
- Rented services = ploughing (equipment + operator) twice per season, professional pruning every 4 years starting year 8.
- Farming type = rain-fed IPM (ploughing twice, alternate manure and chemical fertilization, handmade McPhail traps with chemical spraying upon high incidence of *bactrocera oleae*, copper oxychloride spraying 2 times per growing season)
- Land = owned and/or reclaimed by farmer with no access to irrigation. Land cost not factored into calculations
- Capital = tree seedlings provided by MoA, all other costs covered by the farmer (savings and/or soft loan)
- Economic lifetime = 25 years (but in reality it could be 60+ years)
- Full production capacity reached at year 12 (20% year 8, 40% year 9, 60% year 10, 80% year 11)
- Costs = as established in the quantitative survey at 265 USD/du[14]
- Returns = as established in the quantitative survey at 585 USD/du[15] assuming direct sales and ability to sell the entire production
- Discount rate = 10% to account for the time value of money and all risks associated with the operation (climate change, alternate bearing, incidence of pests, difficulties in marketing, etc…)
- Inflation = 2%/year ((on both costs and production)
- Formula for calculation: $NPV = \sum_{t=1}^{n} \frac{R_t}{(1+i)^t}$

[14] The national average in the study was 245 USD/du excluding packaging cost. For a production of 6.5 Tanakeh/du, we should add (3USD*6.5 tanakeh= 19.5 USD) for packaging.

[15] 6.5 tanakeh of olive oil/du @ 90USD/tanakeh

[16] http://www.fao.org/3/X8423E/X8423E10.htm

[17] https://ec.europa.eu/agriculture/rica/pdf/Olive_oil%20_report2000_2010.pdf

In other words, and for the farmers owning one hectare or less (70% of all farmers in Lebanon) olive growing is hardly feasible as an exclusive farming activity according to the assumptions set in Box 2 (which is the prevailing model in Lebanon), but relevant as a complimentary activity to other crops.

The same patterns are observed with olive farmers in Europe (mainly Spain, Italy and Greece) but the numbers are more balanced in European countries because of the subsidies paid to farmers under EU's Common Agricultural Policy (CAP). Although the CAP has undergone multiple reforms since 2008, olive farmers in Spain were still getting an average of 468 Euros/ha of subsidies in 2012[18]; more recently, the US Department of Commerce justified the imposed tariffs on Spanish table olives in October 2019 by the fact that the olive sector in Spain is estimated to be subsidized at around 20.5% of its real costs[19] under the CAP based on the calculations done by the US Department of Commerce.

A subsidy scheme has been one of the most recurring demands of olive farmers (similar to the schemes that exist for tobacco and wheat), yet it does not seem particularly feasible in Lebanon, especially in the light of the deep financial crisis hitting the country recently. Since the distribution of olive tree seedlings is an investment on the long term, increasing the NPV from establishing new olive orchards (under the assumptions and constraints set in Box 2) could follow three possible approaches:

- **Imposing a very strict quality control on the distributed seedlings** with two essential criteria to take into consideration: i) ***certification of variety*** so that farmers are reassured about the variety they are going to plant and that will accompany them for the next 25+ years, its anticipated yield, its suitability for the area etc… Only 37% of the farmers who planted the seedlings distributed by MoA reported that the seedlings matched the reported variety survey; also 12% of all olive growers reported trying new varieties in the last ten years, which indicates an appetite for diversification of production if certified varieties are available and ii) ***certification of the seedlings as free from pests***; the distribution of infected seedling could spread pests like Verticillium, Nematodes, olive knot (*Pseudomonas savastanoi*,) and others…. Almost one farmer out of two (53%) who planted the seedlings reported by MoA expressed concerns over the health and vigor of the seedlings;
- **Increasing revenue from current farming operations** by improving the assumptions set in Box 2 such as increasing tree density by 20% (currently at an average of 250 trees/ha), introducing supplemental irrigation (regions where olives are irrigated such as Tyr produce 35% more oil than the national average according to the farmers survey), targeting niche markets such as organic extra virgin olive oil and flavoured olive oil (extra virgin organic olive oil sells at a 50% premium), bottling in smaller and more appealing containers etc… Implementing these measures would require access to capital at reasonable cost and a better organisation of the value-chain actors and most particularly farmer cooperatives.
- **Reducing costs of production and optimizing the yield from current farming operations** while keeping the same assumptions set in Box 2 such as improving pest control, improving harvest and post-harvest practices (including storage conditions). **This emerges as MoA's privileged approach over the past 10 years** and will be discussed in later sections.

[18] https://www.oliveoiltimes.com/olive-oil-business/europe/olive-regions-joint-strategy-eu-subsidies/25672
[19] https://enforcement.trade.gov/download/factsheets/factsheet-spain-ripe-olives-ad-cvd-final-061218.pdf

Recommendations: **Distribution of olive tree seedlings to farmers**

1. Continue the distribution programme of olive tree seedlings to farmers at the sole condition of strictly reinforcing variety authentication and pest-free certification of distributed seedlings. Otherwise it is preferable to discontinue the programme.
2. Capitalize on the win-win effect of planting olive trees in marginal rainfed lands by stressing both the economic and environmental benefits resulting from this operation, and link it to broader initiatives aiming at addressing climate change adaptation/mitigation or combating desertification to benefit from the available funding niches.
3. Conduct active Research and Development (R&D) to identify innovative ways of increasing revenue from olive farming operations and/or decreasing costs and optimizing yield, and communicate the recommendations to farmers through proactive extension (with credit facilities to encourage their implementation when feasible and possible)

8.2 Distribution of pesticides and traps for the control of Olive fly and other pests

Around 25% of MoA's support to the olive sector between 2009 and 2018 (3.3 million USD) was dedicated to the promotion of biological and/or environmentally friendly pest control methods. Under this component MoA distributed 3 types of biological control devices: ***yellow sticky traps*** treated with sex pheromones which capture the olive fruit fly but also a variety of other insects (whiteflies, beetles, etc..), ***delta pheromone traps*** for the control of the olive moth (*prays oleae*) and ***McPhail traps filled with protein hydrolyzate*** for the control of the olive fruit fly (*bactrocera oleae*). Distributions took place in 2012, 2013, 2016, 2017 and 2018 and are always accompanied by extension sessions from MoA staff on the proper use of these inputs.

Sticky traps and delta traps are mainly used for monitoring (ie determining the incidence of specific pests in a certain agricultural holding in order to adjust chemical treatment accordingly) while the McPhail traps can also be used for monitoring but also as an "attract and kill" approach to control the incidence of *bactrocera oleae.*

According to a literature review published in the European Journal for Lipid Science and Technology (2014)[20], the olive fruit fly is the most serious insect pest affecting the olive fruits from an economic perspective. The damage caused by larvae feeding inside the fruit could lead to premature fruit falling (losses 20–80%), reducing the olive fruit weight (50–270 mg/olive fruit) and olive oil content (10–15%). It also reduces the quality of olive oil by triggering and accelerating the oxidative and hydrolytic degradation of oil inside the fruit and/or after the oil is pressed, but also the appearance of oxidation flavours in the oil as a result of micro-organism activity. According to the same review, even with conventional pesticide treatment, the damage, caused by *Bactrocera oleae* in the fruits results in about 10–30% of olive crop loss.

Based on the above, the relevance of the intervention is clearly established; on one hand the utilization of the flagship pesticide (dimethoate) used by farmers to combat *Bactrocera oleae* was banned by MoA due to its side-effects on health and hence farmers needed a credible alternative to this pesticide; on the other hand the introduction of alternative biological and

[20] https://bib.irb.hr/datoteka/709045.Dmini_et_al.-final_version.pdf

environmentally friendly pest control methods enhance both the productivity and quality of olives and olive oil while having positive repercussions on the environment which is in line with MoA's declared objective of reducing costs and promoting the marketing of agricultural produce. As a middle ground, farmers that are using these traps for monitoring purposes are using less chemical pesticides as they calibrate their use based on the monitoring results.

The cost of these methods is not negligible and hence the support of MoA is instrumental in promoting and democratizing their use. For example, the last round of distribution in 2017-2018 focused on the McPhail traps; in order for these traps to be effective as an "attract and kill" solution, every two trees should be fitted with one trap, the protein hydrolyzate should be renewed on monthly basis and the traps cleaned on regular basis as well.

The cost in the Lebanese market for McPhail traps during the 2018-2019 growing season was 2.5 USD/trap and 2 USD/litre of protein hydrolyzate, meaning that one dunum of olive trees requires around 112.5 USD/season to be treated effectively along an "attract and kill" approach at market prices. **Adding this cost to the assumptions in Box 2 would turn the NPV negative** regardless of the discount rate; this means that even without factoring the cost of land and farmers' efforts, the revenue from farming operation would be negative if the full market cost was to be paid to treat *Bactrocera oleae* biologically, unless the production is sold as extra virgin organic olive oil at a higher price premium than 90 USD/tanakeh. Farmers are hence forced to use smuggled dimethoate to treat the olive fly; some farmers also reported using an artisanal alternative that reproduces the same principle of the McPhail traps (plastic water bottle fitted with holes, filled with a mixture of ammonium sulphate fertilizer and bread yeast diluted in water).

A cost-benefit approach to the 3.3 million USD invested by MoA on this component is virtually impossible in the absence of detailed disaggregated figures (for example whether traps were used for monitoring or control, the region(s) where the traps were distributed, size of holding, etc…) as well as ex/post recording of the observed improvements in yield, especially that an essential pre-requisite for the success of this type of control is to cover the entire cultivation area in a specific region over an extended period of time which further highlights the importance of disaggregated data in the process.

The figures collected through the farmers' survey about this intervention are rather encouraging: more than half the farmers (51%) declared receiving traps, 80% were affirmative that the received quantities were sufficient for monitoring purposes and that they received proper extension advice about the use of the traps. Farmers perception about the utility of this intervention are also positive, as 59 % reported that the olives fruits were healthier after treatment, and 43 % affirmed that the quality of the produced olive oil has improved. An important proxy indicator about the perceived success of this intervention is that 68% of the farmers are willing to buy or manufacture traps if they are not provided by MoA. However farmers raised concerns during the focus groups about the quality and effectiveness of some of the products (particularly those distributed in 2016) as well as the costs if they were to apply a comprehensive attract and kill treatment.

In financial terms, a recent study financed by the EU under an SP7 research partnership estimates the nuisance of the olive fly in Europe at 600€/ha[21]. A smarter control of *bactrocera oleae*

[21] https://cordis.europa.eu/project/rcn/191351/factsheet/en

should hence lead to an improvement similar to this figure (60-70 USD/du) as long as the treatment costs are lower than the expected returns. In other words, investing 100 USD/du to get an improvement of 60USD/du is a losing operation, unless farmers are able to sell the biologically controlled olives and/or olive oil at a premium that covers both the cost of the treatment and the costs of applying it, as it is labour intensive, particularly from June onwards as olives enter into their maturity cycle.

Recommendations: **Distribution of pesticides and traps for the control of Olive fly and other pests**

4. Maintain the olive fly control programme under 3 pre-conditions:
   d) Assess the effectiveness and efficiency of the proposed products (pesticides and traps) through pilots and demonstration plots prior to their distribution to farmers, including a protocol for balancing their use for monitoring and/or treatment according to the severity of infestation.
   e) Implement a fair and transparent mechanism of distribution that allows an efficient national coverage (or regional in case of high incidence in a specific region but not at national level) with a particular focus on small farmers.
   f) Ensure that adequate commercial supply of pesticides and traps is available for purchase in the local market (for medium and large-scale olive farmers)

8.3 Distribution of Copper Oxychloride to prevent/treat peacock eye disease

Peacock eye disease is a fungus that attacks healthy olive trees and is widespread in the Mediterranean. It causes defoliation, reduced crop production, and deterioration of tree limbs sometimes leading to dieback. Severe infection can kill new wood and reduce production in the following year. Due to the complex life cycle of the disease which is organically linked to climatic variations but also the resistance of specific cultivars to the infestation[22] very few empirical studies have been conducted about its economic impact, although a 10 year meta study estimates that untreated peacock eye disease in susceptible agro-climatic zones can lead to an average loss of 20% in the production[23]

Lebanon has been witnessing an increased prevalence of peacock eye disease particularly in years with high levels of precipitation and/or humid summers. One of the most efficient solutions to treat and/or prevent peacock eye is the consistent application of copper oxychloride twice or three times during the growing cycle. One hectare in infested areas should be treated with around 10kg of copper oxychloride per growing season. The MoA distributed through its regional centres around 145.5 tons of copper oxychloride in 2012, 2014 and 2015 for a total value of value of 1.16 million USD. The peak of the distribution took place in 2012 with close to 100 tons being distributed. No distributions took place from 2016 onwards, despite the reported increase in the incidence of peacock eye disease in 2017 and 2018.

Although the last distribution took place in 2015, farmers have a generally positive perception of this intervention; around 37% of them benefited from one or more distributions, 80% agreed that

[22] http://www.scielo.br/pdf/cr/v47n6/1678-4596-cr-47-06-e20160923.pdf
[23] https://bsppjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3059.2012.02666.x

the quantity distributed by MoA was sufficient and two thirds (66%) agree that trees are healthier after its application. An important proxy indicator about success is that 74% of the farmers continued buying and applying cooper oxychloride when MoA distributions stopped.

In terms of cost/benefit the equation is straight-forward: one dunum needs 1kg of cooper oxychloride per year (at an average price of 10-12 USD/Kg and can be sprayed manually in small holdings). Assuming that 20% of the production can be lost if peacock eye is left untreated and that one dunum produces 6.5 tanakeh of olive oil (the national average established through the farmers' survey), the opportunity cost of not treating peacock eye is a loss of 1.3 tanakeh per dunum by growing season. Most farmers targeted by MoA seem to be aware of this equation during the focus groups, but also expressed dissatisfaction from the results obtained through the use of cheaper commercial brands available on the market.

Due to the increased prevalence of the disease in the past 3 years, it might be advisable to proceed with a new round of distribution and extension when possible.

Recommendations: **Distribution of Copper Oxychloride to prevent/treat peacock eye disease**

5. Ensure through proactive extension that farmers are aware about the importance of treating their orchards preventively with Copper Oxychloride particularly in humid areas and during years with high precipitation that extend into the spring season.
6. Train farmers on modern techniques in pruning as a complement to preventive Copper Oxychloride treatment
7. Consider distributing Copper Oxychloride for small farmers as an incentive in years of high infestation.
8. Test the different brands of Copper Oxychloride that are available in the local market and issue recommendation/guidance about the most suitable brands.

8.4 Distribution of mechanical harvesters

In 2015 and 2016, MoA purchased around 550 mechanical harvesters together with harvesting nets, crates and spare parts for a total amount of 2.25 million USD (around 4,000 USD/unit) and distributed them as an incentive package to olive producer cooperatives, together with extension sessions about their use. This can be considered as a significant in-kind contribution that targets small and medium farmers who otherwise cannot afford to buy these harvesters; in the meantime, mechanical harvesters have become essential tools for producing olive oil at competitive prices in Europe and around the world. Some NGOs and even municipalities have been investing in similar interventions since 2012 as well.

Demonstration plots in Lebanon by international NGOs established empirically that mechanical harvesters can lower harvesting costs by an average of 40%[24] compared to hired manual labour, reducing hence the total cost of production by more than 20% and giving a significant boost to the competitiveness of Lebanese olive oil production.

However only 12.5% of the surveyed farmers declared benefiting from the harvesters; the low percentage of beneficiaries can be explained by the fact that only 23% of the surveyed farmers

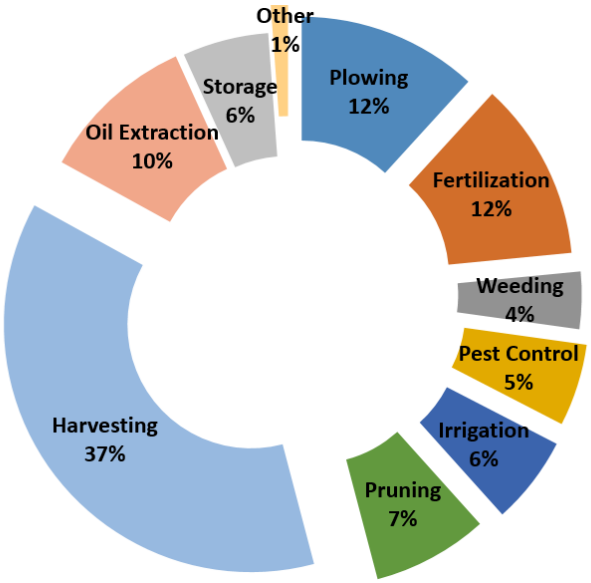
[24] https://reliefweb.int/report/lebanon/lebanon-upgrades-olive-harvesting-spur-economy

are members in cooperatives who were the primary recipients of these harvesters, especially in North Lebanon where cooperatives are virtually inexistent while the regions of Koura and Akkar account alone for 25% of the total production of olives in Lebanon.

Farmers who declared benefiting from the harvesters used them during the two seasons that followed the distribution, but slowly returned back to manual harvesting or bought their own portable harvesters (especially farmers cultivating 2 or more hectares). When asking them why they discontinued the use of harvesters, farmers evoked four main reasons: i) the MoA harvesters were cumbersome to transport, use and maintain, ii) their fork tips broke easily and were expensive to replace and not readily available in the market during the harvesting season when they are needed most, iii) the machines were poorly maintained and opportunistically used by farmers due to the low sense of collective ownership and possibly because they were provided for free and iv) harvesters provided by other programmes (Olio de Libano, LIVCD, etc…) were perceived as more efficient and user-friendly.

Figure 5: Cost of olive oil production per dunum

Source: Farmers survey



It is worth mentioning that not all harvesting machines are suitable for olive orchards in Lebanon as several factors determine the type of machine to be adopted, such as olive variety, fruits detachment force, pruning and training form, topography, and the density of trees in the orchard. Various models need to be tested and evaluated carefully prior to their adoption, especially that the mechanical harvesting technology has evolved quite significantly since MoA distributed the harvesters, with reliable portable harvesters now sold for 200-500€ compared to the prices paid by MoA back in 2015-16.

According to the farmers' survey, the harvesting costs alone account for 37% off the total costs of production (Figure 9) and could go up to 50% in other studies. Using mechanical harvesters has the potential of decreasing production costs by 17-25%.

Recommendations: **Distribution of Mechanical Harvesters**

9. To the maximum extent possible avoid free distribution, and make harvesters available as soft loans to medium-scale farmers (1-4 Ha) who can achieve economies of scale through their use.
10. Conduct in-depth studies to determine the mechanical harvesters that are best suited for the olive orchards in Lebanon and particularly the Soury-Baladi variety that makes two thirds of all olive orchards of the country (fruits detachment force, pruning and training form, topography, tree density, etc…)
11. Promote the use of smaller (but reliable) harvesters that are easy to transport and operate, such as battery powered harvesters; these are also cheaper and easier to maintain.

8.5 Distribution of stainless steel tanks to improve the storage conditions

Stainless steel is an inert material that blocks light, can be easily cleaned and shows high resistance to mechanical damage. Storing olive oil in air-tight stainless steel containers away from light and heat maintains its quality and extends its shelf-life for up to 18 months without losing its sensory and chemical characteristics. Producers can hence sell their production over a longer period of time without an alteration of its quality, especially in low-yielding years due to alternate bearing.

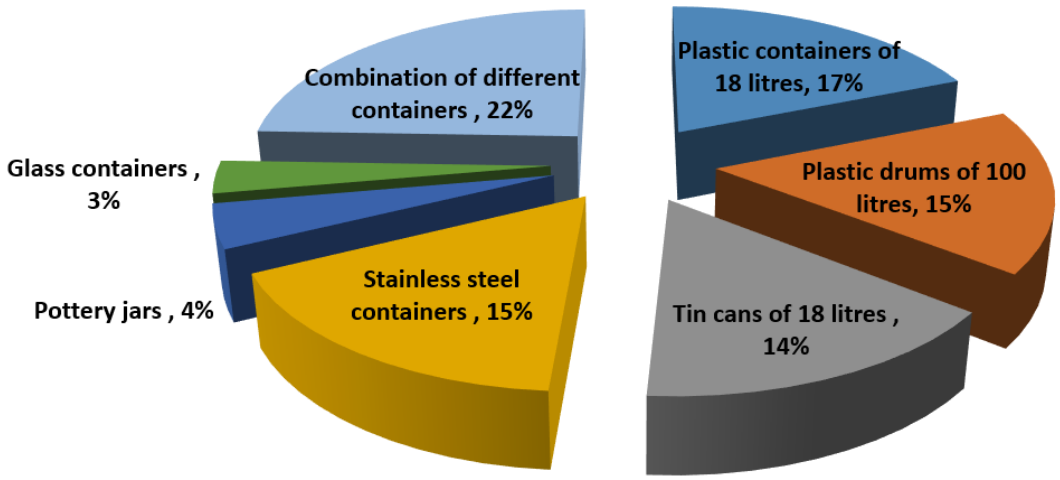
The MoA carried a one-off intervention in 2016, where *"stainless steel containers of various sizes were purchased and distributed to farmers"* according to MoA for a total amount of 70,000 USD. No further data is available about why this intervention was decided, its geographic coverage, its target groups, the size of the tanks that were purchased, the profile of beneficiaries or the regions where they were distributed.

Stainless steel tanks are typically used by medium and large olive oil producers, olive mills and olive oil trading companies in order to store bulk extra virgin olive oil and protect it from deterioration. Stainless steel tanks could be of different size, from 5 litres container to thousands litres, and are used for transportation and/or storage, with floater or nitrogen system to isolate and protect oil from oxidation.

The farmers' survey indicates that 9% of the farmers benefited from the distribution of stainless steel containers, although 15% declared using stainless steel to store their production. It is interesting also to note that almost one third of the farmers are still using plastic containers and another 14% are using tin cans.

Figure 6: How farmers store their excess production

(Source: Farmers' survey)



In order to have positive impact on the sector and especially to facilitate marketing and increase producer income, it is preferable that medium and large producers (including olive mills), benefit from stainless steel tank distribution. ***Family size tanks distribution has no impact on the development of the sector in terms of facilitating the marketing process.***

Most of the olive producers participated to the survey and own stainless steel container were not beneficiaries of the MoA's distributions, however they purchased these kind of containers from the local market with personal funding.

Recommendations: **Distribution of stainless steel tanks to improve the storage conditions**

12. Discontinue the distribution of family-size stainless steel tanks due to its negligible impact on the value-chain dynamics of the sector.
13. Continue promoting best practices in post-harvesting, including the use of stainless steel containers for conserving olive oil.

8.6 Participation in national and international exhibits and fairs

Participation in national and international fairs to promote the Lebanese olive oil is an important platform to increase the outreach and visibility of Lebanese olive oil. For example, MoA sponsored in April 2019 the 14th National Extra Virgin Olive Oil contest[25] as well as a promotional stand at the annual hospitality fair of Lebanon (HORECA). This contest is an important empowerment tool for olive oil producers; for example the winner of the 2018 edition won the Gold award at the New York International Olive Oil competition the same year[26]. Such distinctions are instrumental in raising the profile of Lebanese olive oil and expanding its outreach beyond the classical niche market of Lebanese expatriates.

The total support for this component for 2012, 2013, 2014, 2015, 2017 and 2018 was close to 40,000 USD (around 6,700 USD/year); participation in 2011 was sponsored by the Olio del Libano programme. The MoA also facilitates the participation of producers and their cooperatives in trade missions and international fairs in order to expand the potential markets for Lebanese olive oil but such participations are often sponsored by a third party entities such as the Chambers of Agriculture, Industry and Commerce, donor-funded programmes, Investment Development Authority of Lebanon – IDAL and others.

The objective from such participations is trifold: i) raise the profile of Lebanese olive oil and the olive industry at large, ii) influence the perception of consumers so that they demand (and pay the right price) of extra virgin olive oil and iii) scout for new marketing opportunities. The cost from such participations is infinitesimal compared to its declared objectives (0.2% of the total budget spent in support of the sector for the past 10 years) and should be increased significantly in order to be able to make a difference. In comparison, Europe spends millions of dollars across the six contents to promote its olive production[27]

The olive industry stakeholders proposed during the validation workshop of the findings of this study a roadmap of eleven action points which could/should be addressed in order to improve marketing. These action points are summarized in Figure 11 below, and would require an annual budget well above the current budget earmarked for communication and marketing in order to

[25] http://www.horecashow.com/en/event/horeca-lebanon-2019-National-Extra-Virgin-Olive-Oil-Contest

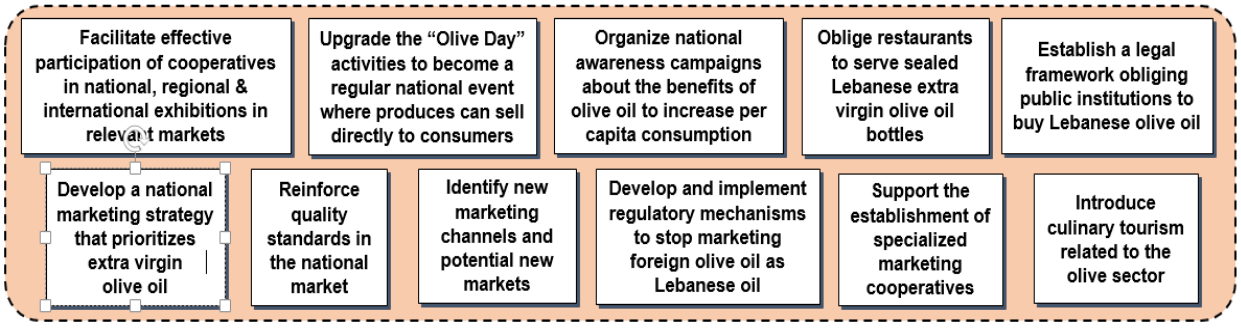
[26] http://www.hospitalitynewsmag.com/en/event/lebanese-bustan-el-zeitoun-won-the-gold-award-at-the-2018-new-york-international-olive-oil-competition/

[27] https://www.prnewswire.com/news-releases/olive-oils-from-spain-and-the-european-union-launch-olive-oil-world-tour-a-new-global-promotion-strategy-684137061.html

achieve the anticipated impact (national campaigns, marketing cooperatives, quality standards, etc…)

Figure 7: Suggestions to improve the marketing of olive oil and olive products

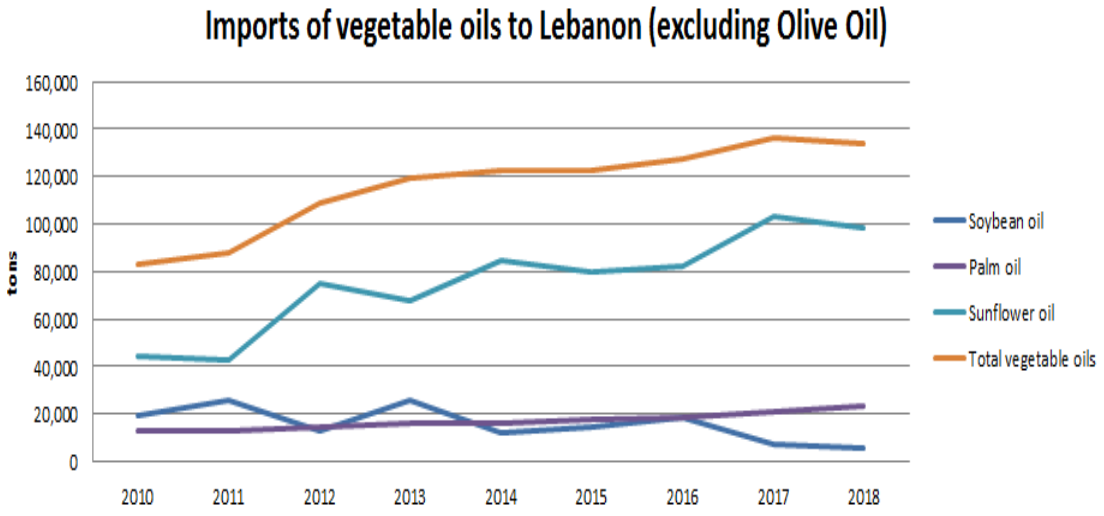
(Source: validation workshop of the preliminary findings of the evaluation)



Communicating the economic and health importance of olive oil and "democratizing" olive oil consumption in Lebanon is becoming a national necessity that transcends beyond the boundaries of the olive industry. As it can be seen in Figure 12 below, the consumption of cheaper vegetable oils has increased by 71% over the past 10 years and is gradually replacing olive oil in the Lebanese diet; Part of this increase can be attributed to the Syria crisis, although the per capita consumption of olive oil in Syria was one of the highest in the world prior to the crisis[28] but Syrians might revert to cheaper oil sources after the crisis. However well before the massive influx of Syrian refugees to Lebanon, imports of sunflower oil almost doubled between 2011 and 2012 and have been on an ascending curve since.

Figure 8: Imports of vegetable oils to Lebanon (2010 – 2018)

(Source: Lebanese customs)



[28] https://www.syrianef.org/assets/policy_papers/english/Olive-Oil-policy-paper-EN-1.pdf

Recommendations: **Participation in national and international exhibits and fairs**

14. Develop a national marketing strategy that prioritises extra-virgin olive oil according to the roadmap approved during the stakeholders' workshop to validate the findings of this evaluation. The roadmap includes a series of legislative, promotional regulatory measures, among which the participation in national and international exhibits and fairs. The participation in national and international exhibits and fairs will have much less impact if conducted as a standalone activity.
15. Consider funding the marketing strategy for extra-virgin olive oil by imposing a small tax on imported vegetable oil whose consumption doubled the last 10 years.

8.7 Establishment of a national bio-organoleptic testing laboratory

The establishment of a national bio-organoleptic testing laboratory was one of the flagship outputs of the second phase of the Olio del Libano programme. It brought-in Italian experts who helped designing the lab, procuring and installing its equipment and training the MoA staff on its use. The laboratory was initially established within the premises of MoA's pesticide analysis laboratory and equipped to carry all the necessary analyses to ensure the physical and chemical quality of the oil for export and domestic consumption. The management and supervision of the lab was then devolved to the Agro-industry service of MoA in June 2016[29]. The laboratory is idle due to the prohibition of providing paid services, but also due to the lack of essential equipment, human resources and legislative texts regulating its functioning. A technical committee recently re-defined the institutional arrangements to re-activate the lab and defined the human resources needed in order to operate it.

In parallel to the chemical laboratory a Panel Group was also created to assess organoleptic qualities of oil in accordance with international standards (sensory analysis). Unlike the chemical laboratory, the sensory analysis group is still operational thanks to the voluntary activity of 20 panellists. To be fully operational the Panel group must obtain IOC (International Oil Council) accreditation.

Recommendations: **Establishment of a national bio-organoleptic testing laboratory**

16. Ensure that the chemical laboratory within the national bio-organoleptic testing laboratory becomes functional as soon as possible by implementing the recommendations of the technical committee who reviewed its administrative setup and its human resources requirements.
17. Take the necessary steps to ensure that the panel group in charge of sensory analysis acquires IOCE certification

8.8 Extension services

Extension services are the backbone of all MoA support and an essential pre-requisite for the success of any intervention, whether this intervention targets the olive sector or any other sector.

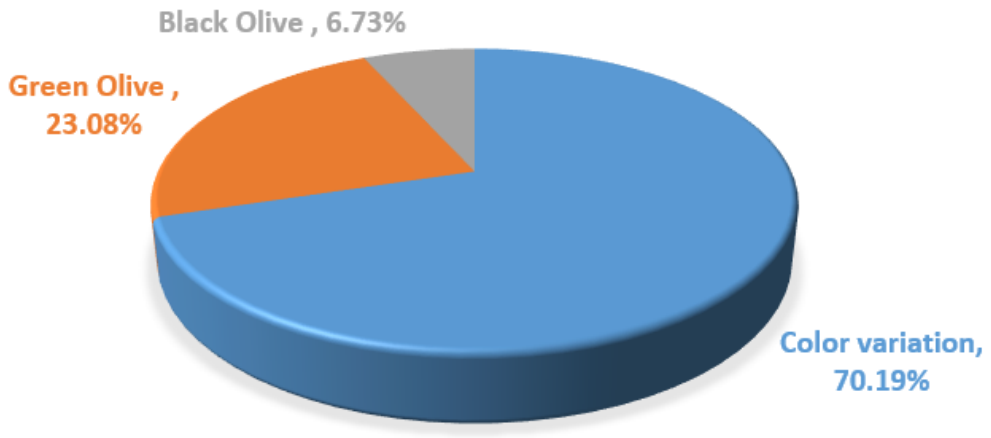
[29] http://www.agriculture.gov.lb/Arabic/NewsEvents/Pages/01062016.aspx

Although it was not possible to evaluate MoA extension activities as a standalone component since these activities target all crops and all farmers and are not specific to the olive sector *per se*, some encouraging trends were reported in the farmers survey; More than half of olive farmers (53%) that were interviewed across the six main olive growing regions of Lebanon reported that they benefited from the extension activities of MoA, and agree that the extension services helped them improve many aspects related to production, harvesting and post-harvesting (and to a lesser degree marketing)

The "maturity" of the answers during the focus groups was also another proxy indicator that the cumulative extension work done by MoA is slowly but surely paying off; all farmers appear to be aware (and convinced) that they should store the harvest in containers that allow air circulation to prevent post-harvest oxidation; they reported coordinating closely with the mills to ensure that olives are pressed within the shortest deadline possible after harvesting; when possible, they are privileging the modern and completely automated cold-press mills compared to traditional manual ones to improve hygiene standards during pressing a bottling; they advise their customers to empty the oil stored in plastic and tin containers immediately after purchase in air-tight glass containers and to store it in a dark dry place away from odors and sources of heat. Most importantly, and as shown in Figure 7 below, 23% of famers are now harvesting olives when these are still green to maximise the concentration of polyphenols and organoleptic properties.

Figure 7: Colour of olive to determine the timing of harvest

(Source: Farmers' survey)



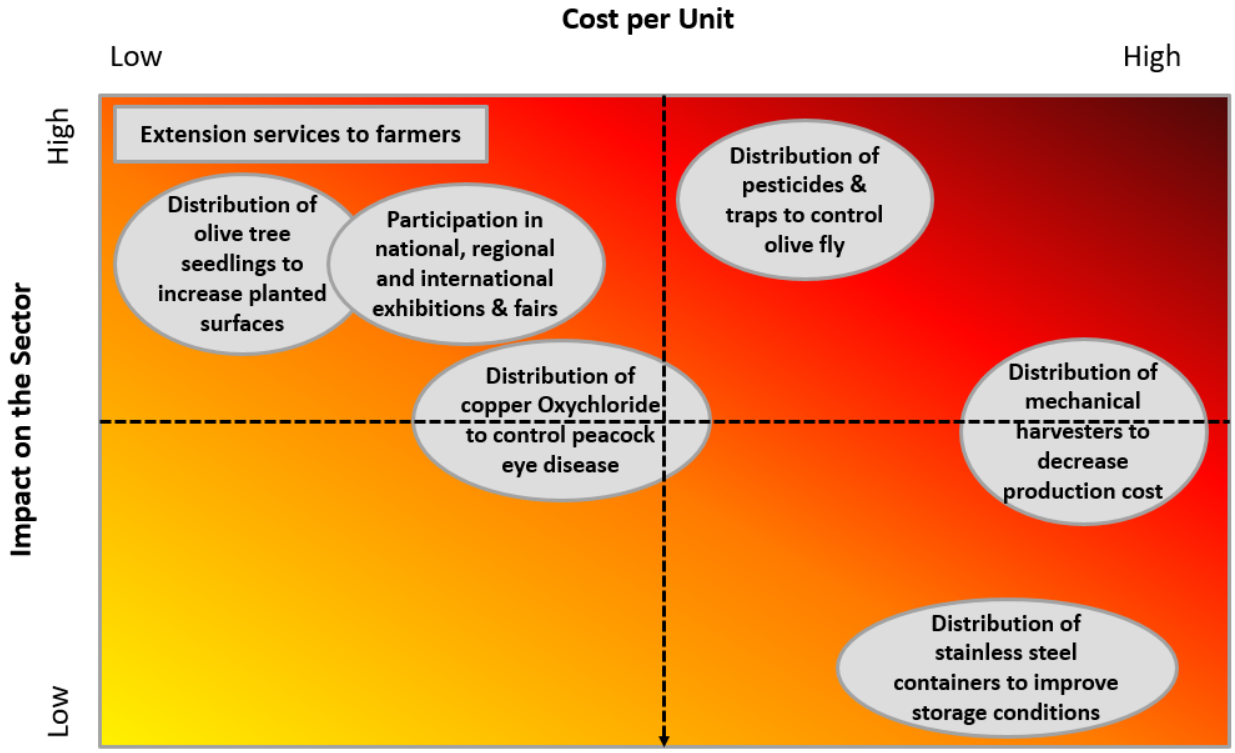
9. Conclusions

As highlighted in section 8 above (evaluation findings), **the support of MoA to the olive sector between 2009 and 2018 is far from negligible**, as it contributed – alongside different projects and programmes – to a Compound Annual Growth rate of the sector close to 5%. There are little examples or models of a similar sustained growth for Lebanese economic sectors along the same period.

The contribution of the different support modalities to the sector are uneven and have been discussed at length in the previous section; Figure 9 below classifies these interventions according to the Basic Efficiency Resource model along two variable: the cost per unit and the realized impact on the sector. For each of the two variables, interventions are plotted along a low to high gradient:

- The gradient with the highest possible realized impact at the lowest possible cost includes three interventions: the extension services to farmers comes at the very top of this gradient, because they are embedded in MoA's *modus operandi* and because they are the cement that holds the entire construct together. The distribution of olive tree seedlings also falls in this gradient as well and could be further improved by giving closer attention to the origin and quality of distributed seedlings. The participation in exhibition and fairs also falls within this gradient <u>not in its present format</u> but as a precursor for a larger and more comprehensive effort for communication, outreach and marketing of the Lebanese olive sector.

Figure 9: Classification of MoA interventions targeting the olive sector according to the Basic Efficiency Resource Model



- The distribution of copper oxychloride is at the bottom of the low cost/high impact gradient because the intervention in itself is valid and cost-effective, but it stopped abruptly in 2015 while peacock eye disease have been inflicting significant damages to the production in the past 3 years.
- The distribution of pesticides and traps for biological control falls in the high cost/high impact gradient, together with the distribution of mechanical harvesters. Both interventions are highly relevant (improving the quality of olive oil and reducing production costs) but both are beyond the reach of ordinary farmers under the current olive farming model for small holders. The design of both interventions needs to be revisited in-depth if they were to be continued in the future.
- The distribution of stainless steel containers falls in the high cost/low impact gradient, and needs to be re-direct to large farmers, producer cooperatives and olive mills.
- Unfortunately, the bio-organoleptic laboratory – despite its obvious added value – remains entangled in administrative problems and is left out from the analysis.

10. The Way Forward

Some critics to the sector qualify olive growing as an "Absentee Agriculture"[30], but the socio-economic dynamics in the country have dictated this shift; the results of this evaluation also demonstrate that in the absence of subsidy schemes along the European model or resources-heavy investments in intensive olive oil farming over large surfaces that are not readily available in Lebanon, **olive farming is serving strategic social, economic and environmental dimensions** (direct consumption, supplemental income, expanding green cover and limiting soil erosion, etc…)

No one knows a sector more than its "people"; this is why this evaluation made the effort to organize a stakeholder workshop where the "people" of the olive sector were given voice to express their needs, their concerns and their suggestions for improving the sector.

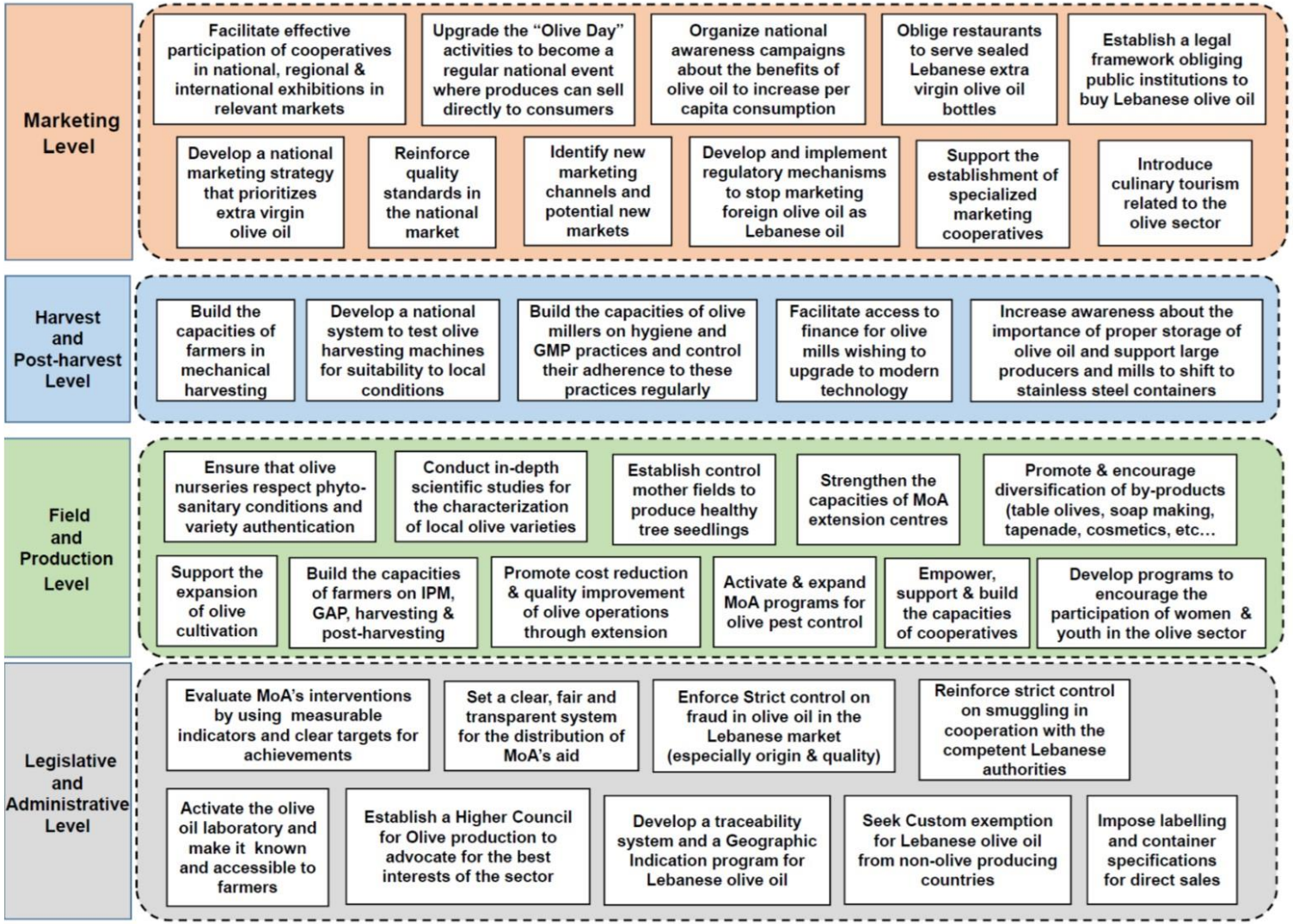
The workshop brought together 85 stakeholders representing the different industry sectors: agricultures cooperatives representatives (presidents and members), MoA staff, Unions of Cooperatives, NGOs, members of the Agricultural Engineers orders, Economic Council members, LARI representatives, olive companies, Unions of Municipalities and Municipalities, olive millers, Chambers of Agriculture, Industry and Commerce and UN agencies.

Their collective wisdom led to the roadmap presented in Figure 14 below, which draws the general contours of what a national program targeting the olive sector should ideally look like; some of the suggestions are highly needed and should be implemented as soon as possible while others are more of a wish-list; but taken together, these suggestions have the potential to shape the next 10 years of MoA's interventions for the olive sector.

[30] https://www.iai.it/sites/default/files/medreset_wp_22.pdf

Figure 14: Roadmap for improving MoA's support to the olive sector

(Source: Conclusions of the Stakeholder Workshop to the validate the preliminary findings of the evaluation)



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Annex 1

Project Document

Programme: Technical Assistance Facility (TAF) for the Government of Lebanon

Project*:* Evaluation of the Ministry of Agriculture support to the olive sector in Lebanon

Ministry of Agriculture

January 2019

Contents

1. Summary of the Project

Project Title	Evaluation of the Ministry of Agriculture support to the olive sector in Lebanon
Project Number	TAF#13
Beneficiary	Ministry of Agriculture (MoA)
Expected duration	March 1, 2019 – October 31, 2019 (8 months)
Total Estimated Man/Days	Senior Experts: 90 (Senior Expert in Monitoring and Evaluation and Senior Expert in Agriculture and Rural Development)
Incidentals Budget	EUR 6,000
Objectives of the Project	Overall Objective: Contribute to the modernization, stabilization, and good governance of the public administration resulting to better services to citizens. Specific Objective: Improve the quality and competitiveness of Lebanese olive products through adequate policy and support provided by the Ministry of Agriculture.
Results of Project	Result 1: Decision and policy-making processes have been improved towards being more efficient and well-informed.
Expected Intermediate Results (IRs)	IR 1.1: Government policy reviewed following fact-based Monitoring and Evaluation (M&E) of support programmes to the olive sector in Lebanon IR 1.2: Capacity of the Ministry of Agriculture in Monitoring and Evaluation of its support programmes to the agricultural sectors is enhanced
Contacts	Focal Point: Majida Mcheik, Head of Development Dept. at MoA, T: +961 327 0289, MMcheik.agriculture.gov.lb Peter Salloum, Crown Agents, +961 326 1968, peter.salloum@crownagents.co.uk

2. Background

Since the end of the civil war in 1990, Lebanon has been continuously subject to internal and external pressures and destabilization factors; including the ongoing presence of Palestinian refugee camps, outbreaks of conflict with Israel, politically-sponsored internal violence and terrorist attacks, all now further complicated by the risks related to the spill-over from the conflict in Syria. The weak government institutions made the adoption and implementation of key Government policies difficult and restrict the scope for longer-term reform.

To ensure the stated objectives, purposes and expected results of this Technical Assistance Facility (TAF), the programme engaged 86 line ministries and Government agencies to understand the necessary strategies and processes that will better enable them to identify and consolidate their priority needs. The TAF programme supported them to distil the long list of recognized needs and capacity deficiencies and focus their demand-driven analysis using a simplified modality for submitting project proposals. Most importantly, it will continuously support them to take ownership and direction of the opportunity to implement a coordinated range of initiatives to strengthen public administration and governance, in order to sustain resilience and reinforce stability in Lebanon.

In response to a call for proposals issued on October 31, 2017, the TAF's Steering Committee during a meeting held on 15 February 2018 - after reviewing rigorously 41 projects submitted before the set deadline - selected 16 projects for implementation in the upcoming period at 14 ministries and government agencies and 2 autonomous public institutions.

3. Intervention Rationale

The olive sector is considered as one of the main agriculture sectors in Lebanon. The olive orchards cover an area of 62,000 hectares which is equivalent to 45 % of the total area cultivated with permanent crops and 23% of the total utilized agriculture area (UAA). The total yearly production of olives is around 160 thousand tons with a total value of 300 billion Lebanese pounds ($200M).

In order to help the olive farmers overcome the problems that they are facing and that are influencing the cost of production and the production quality of olives and olive oil; the Ministry of Agriculture and since over 10 years is supporting this sector through several programmes/schemes. These programmes/schemes include the protection of olive fruits from pests and diseases through the distribution of copper oxychloride to farmers in the framework of the national control of peacock eye disease and the improvement of the production quality through the introduction of new technologies i.e. purchase and distribution of harvesting machines.

A large amount of money is then spent yearly from the budget of the Ministry of Agriculture to cover the cost of the mentioned programmes with no information of the extent of their contribution to the improvement of quality of the olive fruit and the olive oil.

In response to a project proposal submitted by the Ministry of Agriculture on 26 December 2017, the Technical Assistance Facility for the Government of Lebanon will provide the expertise needed for assessing the impact of the programmes for the olive sector, the costs and benefits analysis of these programmes, and develop the Ministry's capacity in M&E. The results of this evaluation will help decision makers at the Ministry of Agriculture reviewing their policy to adopt the best ways to support the olive sector.

4. Scope of the Project

In line with its strategic plans 2010 - 2014 and 2015 - 2019, the Ministry of Agriculture has defined "increasing the competitiveness of the agricultural products" as one of the main goals to achieve for the improvement of the agriculture sector in Lebanon. In order to achieve this goal, the Ministry will continue baring her responsibility in supporting farmers in Lebanon including the olive farmers and improving the quality of the production of olives and olive oils.

The "Evaluation of the Ministry of Agriculture support to the olive sector in Lebanon" project will help the ministry taking the right future decisions for the continuation of these programmes or the proposal of new ones that will have better impact on the sector and Value for Money(VfM). The project will also build the M&E capacities of the Ministry of Agriculture staff and increase its capabilities in monitoring the implementation of its strategy and operational plans, programmes and projects.

The aim of this project is to review, evaluate and analyze the impact of the support programmes taking into consideration the amounts of money spent on a yearly basis in comparison to the quality and quantity improvement achieved at the olive sector level. To achieve the set objectives, the TAF Programme will conduct the following activities in close coordination with the Ministry of Agriculture:

- Develop performance indicators associated with the cost effectiveness analysis and evaluation.
- Identify data requirements and data collection methodologies to serve the respective performance indicators.
- Gather the available information on the different support programmes undertaken since 10 years for the olive sector.
- Through site visits of olive growers, evaluate the impact of the MoA-funded programmes.
- Undertake a cost effectiveness analysis of the impact of MoA's support to the olive sector in Lebanon.
- Five-day training workshops for MoA staff in the field of Monitoring and Evaluation to strengthen the capacities of MoA's selected staff in applying and implementing M&E methods and tools, survey and participatory method using innovative approaches.
- Review the Monitoring and Evaluation system for MoA Strategy for the years 2015 – 2019, including the olive sector, based on internationally-recognized best practices that identifies

inter-alia the management structure, existing data, core information needs and reporting requirements within the scope of their internal activities
• M&E report including policy recommendations for the olive sector.

To achieve the scope, TAF will deploy two senior experts – Senior Expert in Monitoring and Evaluation and Senior Expert in Agriculture and Rural Development - to implement the project. The Senior Experts will be imbedded inside MoA and have full access to staff and data and the TAF will use its best endeavors to assist the process by identifying key support staff and provision of key information and logistics. In this context, the Senior Expert in Agriculture and Rural Development will assist the Monitoring and Evaluation Expert in gathering the required information for reviewing the support programmes adopted since 10 years, and collecting the required data for the cost effectiveness analysis.

5. Objective and Expected Results

Under the TAF's overall Programme objective "Contribute to the modernization, stabilization, and good governance of the public administration resulting to better services to citizens", the planned intervention will help decision makers at the Ministry of Agriculture reviewing their support policy to the olive sector.

The specific objective of this project is: "Improve the quality and competitiveness of Lebanese olive products through adequate policy and support provided by the Ministry of Agriculture".

Within the TAF's programme result area "Decision and policy-making processes have been improved towards being more efficient and well-informed", two intermediate results the project is expecting to achieve:

IR 1.1: Government policy reviewed following fact-based Monitoring and Evaluation (M&E) of support programmes to the olive sector in Lebanon.
IR 1.2: Capacity of the Ministry of Agriculture in Monitoring and Evaluation of its support programmes to the agricultural sectors is enhanced.

For the set indicators and the monitoring and evaluation plan; please refer to ANNEX 1: Logical Framework and Monitoring Plan.

6. Monitoring, Evaluation, and Reporting

Monitoring
Crown Agents will be primarily responsible for the overall management of this project, oversight and coordination, including its regular progress monitoring and reporting. The implementation of activities and progress towards results will be systematically monitored by the Team Leader.

Evaluation

The Team Leader will undergo a final evaluation, which will be completed no later than one month after the end of the project, to draw overall conclusions on the impact and the findings will be used to inform the EU Delegation, OMSAR, and the Steering Committee.

Reporting
Crown Agents will provide the stakeholders on a monthly basis with a progress updates as well as with a final report no later than one month after the end of the project.

7. Duration of the Project, Resources, and Workplan

The duration of the project is from March 1, 2019 to October 31, 2019 (8 months).

For more details on the resources and timeline, please refer to ANNEX 1: Logical Framework and Monitoring Plan.

8. Communication and Visibility

A Communication and Visibility plan, in line with the provisions of the EU Visibility Guidelines, has been prepared during the Inception Phase of the programme, to reflect Crown Agents commitment to the European Union.

Crown Agents will create and maximize visibility opportunities at all stages of the implementation of the project, while clarifying the target audiences and activities planned in order to highlight the positive impact.

The audiences under this project are the staff of the Ministry of Agriculture, selected olive farmers, and the Lebanese society. CA will ensure that direct beneficiaries and the media are made aware that the programme is EU-funded.

When used, the EU Identity will be presented in a size and prominence equivalent to or greater than Crown Agent's logo, and that of OMSAR and the Ministry of Agriculture. This practice covers all reports prepared under this project as well as publications, press release, and any other visibility materials.

List of Annexes

ANNEX 1: Logical Framework and Monitoring Plan

Annex 2- Proceedings from the Validation Workshop

Participatory workshop to discuss the preliminary findings and recommendations of the national study to evaluate the Ministry of Agriculture's interventions to support the olive sector in Lebanon and formulate strategic and operational recommendations for the next phase

Date: August 20, 2019

Place: Golden Tulip Hotel, Jinah – Beirut

Program:

Welcome speech and introduction to the work of "the Lebanese Government Technical Support Unit funded by the European Union"	Dr. Peter Salloum, Project Manager
Speech of HE Dr. Hassan Al-LaKiss, Minister of Agriculture, Government of Lebanon	Dr. Majida Mecheik, Head of Projects and Studies Department, Minister Advisor
Preliminary findings and recommendations of the study: technical aspects	Engineer Hussein Hoteit, expert in olive production
Preliminary findings and recommendations of the study: Evaluation of Ministry of Agriculture interventions	Engineer Ziad Moussa, Evaluation Specialist
Discussion	
Coffee breaks	
Discussion in working groups to develop practical recommendations for the Ministry of Agriculture to activate support for the olive sector	Engineer Hussein Hoteit, expert in olive production Engineer Ziad Moussa, Evaluation Specialist
Recommendations	
Lunch	

Participants:

Agricultures cooperatives representatives (presidents and members): 35

MoA employees: 15

Unions of cooperatives representatives: 7

NGOs representatives: 6

Agricultural Engineers: 5

Economic Council members: 4

LARI representatives: 4

Olive companies: 3

Unions of Municipalities and Municipalities: 3

Olive Millers: 1

Chambers of commerce, industry and agriculture: 1

UN Agency (UNIDO): 1

Total Participants: 85

Initial Recommendations and proposed amendments

1. **Recommendations at field level**

Working to improve production and reduce the costs through:

Initial Recommendations	Proposed amendment by Participants
1.1 Support the expansion of olive cultivation, especially in marginal lands, which has economic, social and environmental benefits;	
1.2 Build the capacity of olive producers in IPM, GAP, Harvesting and post-harvesting good practices, modern extraction technologies, management and accounting;	1.2 Build the capacity of olive producers in IPM, GAP, Harvesting and post-harvesting good practices, modern extraction technologies, olive oil quality, management and accounting;
1.3 Adopt pluralistic and innovative agricultural extension programs targeting all stakeholders, each one according to his competence, focusing on cost reduction, production improvement in terms of quantity and quality;	
1.4 Support agriculture cooperatives by raising their capacities at various levels and improve the services that can be provide to farmers such as mechanization, marketing …;	The priority is for cooperatives as beneficiaries of Ministry of Agriculture interventions
1.5 Support the creation of specialized cooperatives or union of cooperatives, in terms of olive production or olive products marketing;	
	Create olive and olive oil high council similar to wine sector;
1.6 Activate MoA's programs aiming to control olive pests, and supplying pest control materials environmentally friendly;	
1.7 Provide special attention to table olive and derivate, olive oil soap and by-products management; 1.8 Encourage the active participation of women and youth in the management of the sector in order to maintain and ensure sustainability, by facilitating their enrolment in the production and marketing process through the introduction of profitable and attractive innovative practices and technologies such as GAP, organic production, soap production, table olive processing, marketing and E-commerce…;	And organic farming

1.9 Support and emphasize olive nurseries sector organization in terms of Phyto-sanitary control and varieties authentication in addition to good production practices (production of e certified seedlings) and creation of controlled mothers' fields in the concerned regions;	
1.10 Conduct complete scientific studies to evaluate local olive varieties (characterization of the local varieties), especially the groups of varieties called Soury/Balady;	Studying the possibility of introducing new olive varieties characterized by pest resistance with good production in terms of quantity and quality
1.11 Examine the primary investment options, priorities, and procedures needed to address specific weaknesses within existing agricultural extension.	
1.12 Strengthen the role of MoA's Agriculture Centers present in different olive producing regions in extension, technical assistance and materials distributions.	
1.3 Launch projects at regional level with clear objectives, clear expected results and time-bound to find specific solutions to the identified problems of the olive oil sector (Pest control, olive varieties to be adopted, expanding olive plantation, low productivity, low oil yield, …);	

2. Recommendations at Harvesting and post-harvest levels, (olive oil extraction and storage levels)

In order to produce extra virgin olive oil and conserve its quality:

Initial Recommendations	Proposed amendment by Participants
2.1 Build the technical capacity of olive growers in terms of Harvesting and post harvesting practices with focus on olive mechanical harvesting;	
2.2 Develop system to test the various harvesting machine models before distribution;	
2.3 Provide harvesting machine to the cooperatives, which in turn rents it to small/medium farmers. Follow-up these cooperatives to ensure the good use of these machines;	
2.4 Activate MoA's program for the control of olive mills, emphasizing on hygiene and GMP;	Strict application of laws, good production practices and hygiene conditions in mills, and up to the closure of mills in violation of the laws and rules;
	2.5 Build the technical capacity of olive millers in terms of olive quality, GMP, Hygiene, modern technologies and by product management;
2.6 Facilitate access to finance for mills who wish to upgrade to modern technology and improve infrastructure, abandoning the traditional presses;	
2.7 Supporting switching to good means and conditions for proper storage through awareness, guidance and facilitating access to finance.	
2.8 In case of stainless steel tanks distribution, the potential beneficiaries should be the medium/large olive oil producers, cooperatives and the olive mills, depending on their needs and storage capacities.	

2. Recommendations at marketing level

In order to identify new marketing channels and organize the internal informal markets as it is crucial for small/ medium producers, olive mills and cooperatives, trough:

Initial Recommendations	Proposed amendment by Participants
3.1 Develop national olive oil marketing strategies based on the production of extra virgin olive oil, application of clear regulation in the local markets, identify new marketing channels and potential international markets;	
3.2 tighten border control to prevent the entry of smuggled olive oil from neighboring countries;	
3.3 Develop and implement legal mechanisms to limit the marketing of foreign olive oil as Lebanese olive oil in the national and international markets: - impose traceability; - impose labeling requirements with regards to origin and olive oil quality; - develop regulations regarding geographical denomination.	
3.4 Build the capacities of olive oil producers and cooperatives on best production practices and marketing requirements;	
3.5 Support and emphasize the creation of specialized marketing cooperatives that could aggregate small and medium producers, with the aim purpose to facilitate olive products marketing and increase Lebanese product selling in the internal and external markets;	
3.6 Facilitate effective participation of cooperatives in relevant local, regional and international exhibitions, directly or through MoA participation. This participation to this kind of exhibitions should be based on clear objectives, focusing on international markets that the Lebanese olive oil is actually exported (GCC, USA, …) or new potential markets where Lebanese olive oil could be able to penetrate;	

3.7 Convert the ceremony “Olive Day” to become an annual activity with the targets of consumers awareness, in addition to facilitate direct selling, in different regions of Lebanon;	
3.8 Special attention for other olive products in order to facilitate the marketing, such as table olive, olive tapenade, aromatized olive oil, and finally olive oil soap which has been developing in Lebanon in recent years and needs support to improve its marketing;	
3.9 Special effort aims at increasing olive oil consumption per capita at national level, through promotional programs aimed at highlighting the health and therapeutic benefits of olive oil and its importance in cooking instead of other vegetable oils;	
	3.10 Organize awareness campaigns through the media to inform the consumer about the quality of extra virgin olive oil and encourage its consumption;
	3.11 Introduce the Lebanese Extra Virgin Olive Oil in the tourism sector (Culinary tourism) through coordination with the Ministry of Tourism, Restaurant Owners Association and Artisanal Shops;
	Oblige restaurants to use sealed and labeled glass bottles of extra virgin olive oil to be placed on the table, just like the European Union countries that have legally imposed with the intention of consumer protection.
	Establish a legal framework that requires to all public institutions, security and military forces that consume olive oil in large quantities to buy Lebanese olive oil only and make sure its source.

3. Recommendation at legislative and administrative level

In order to develop cooperatives activities and protect olive and olive oil local production:

Initial Recommendations	Proposed amendment by Participants
4.1 Emphasize on strict control of fraud at all levels, especially with regard to origin and quality of olive oil;	Coordinate with the Customs Department and the Consumer Protection Department to combat fraud at all levels, especially with regard to origin and quality of olive oil. in addition, combating smuggling of olive oil and tracking it in the local markets to prevent its sale as Lebanese oil;
4.2 Emphasize on strict control of smuggling of olive oil and tracking it in the local markets to prevent its sale as Lebanese oil;	
	Conclude trade exchange agreements with non-olive producing countries to obtain customs exemption for olive oil.
4.3 Develop traceability system, field register framework and geographical indications programs;	
	Review the olive oil Norms issued by LIBNOR and make it mandatory.
4.4 Empower, support and build cooperatives' capacities to mitigate structural, financial and regulation problems that are facing, allowing to play its roles of reducing cost of production, aggregating product and creating linkages farmers/traders;	
4.5 Organize the olive oil direct sales process (informal market), especially regarding labelling (a label on each container) and bind the use of appropriate container for oil, preventing what is harmful;	
4.6 Setting up a clear and applicable distribution mechanism that ensure reaching the target farmers in the selected regions and in sufficient quantity;	
4.7 Develop a system to collect feedbacks from fields, monitor results and evaluate MoA interventions.	4.7 Develop a system to safeguard and archive information related to MOA interventions and a system to collect feedbacks from fields, monitor results and evaluate these interventions. Develop measurable indicators to evaluate these interventions;
4.8 Activate and develop the olive oil laboratory and introduce farmers to the services that can be provided.	Prepare a decree or law proposal to amend the management and operation system in order to ensure sustainability.

Annex 3

Technical Assistance Facility (TAF) for the Government of Lebanon
Evaluation of the Ministry of Agriculture support to the olive sector in Lebanon

Report

Technical findings of the survey to assess MoA support scheme to the olive sector in Lebanon

Funded By

Funded by the European Union

Implemented by

CROWN AGENTS

In partnership with:

OMSAR

This document has been developed by Crown Agent, as part of the “Technical Assistance Facility (TAF) for the Government of Lebanon - Evaluation of the Ministry of Agriculture support to the olive sector in Lebanon” in partnership with Ministry of Agriculture in Lebanon.

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of Crown Agent and it’s implementing partners and do not necessarily reflect the views of the EU.

Prepared by Eng. Hussein Hoteit
Senior Expert in Agriculture and Rural Development

Beirut, Lebanon – August 2019

Table of content

List of Acronyms

MoA	Ministry of Agriculture
TAF	Technical Assistance Facility
FAO	Food and Agriculture Organization of United Nation
IOC	International Olive Council
IDAL	Investment Development Authority in Lebanon
LARI	Lebanese Agriculture research institute
GMP	Good Manufacturing Practices
IPM	Integrated Pest Management
GAP	Good Agricultural Practices
Ha	Hectare

1. BACKGROUND

The agriculture sector in Lebanon is considered one of the important sectors at national economy level as well social, environmental and food security levels. The total number of agricultural holdings in Lebanon is estimated at 170,000. More than 67% of these farmers are olive growers. The number of olive growers reach 103.000 (MoA, 2018). These olive growers are widespread from the North (Akkar, Zogharta and Koura) till the South (Tyre and Hasbay-Marjeoun), and recently in region usually unknown for olive cultivation as Baallbeck and Hermel.

The cultivated land in Lebanon cover 273,000 Ha (27 % of the total land area) of which 62,048 Ha dedicated to olive cultivation (MoA, 2018), or 23 % of the total cultivated land. Olive area has increased in the past ten years by a compound annual growth rate of 1.64% from 53,620 Ha in 2010 to 62,048 Ha in 2018.

The olive Fruits production ranges between 70,000 tons (low production years) and 190,000 tons (high production years). 30% of olive fruits are dedicated for table olive processing at industrial level but also at farmers families' level (homemade table olive for families consumption and for direct selling). The other 70% take its way to the mills for the oil extraction.

Lebanon has about 544 olive mills distributed throughout its regions ((MoE, 2010. from IDAL Factsheet 2017), most of these mills are still traditional (about 85%) with low technology and hygiene conditions. It was noted that most of the olive mills established in the recent years, by private sector or development projects, were modern and follow the hygiene rules and Good Manufacturing Practices (GMP). While the traditional olive mills (Press), which have a high cost in terms of maintenance and labor and low productivity in terms of quantity and quality are gradually moving towards closure. They are still "kept alive" by the constant demand from traditional olive growers who misguidedly believe that the quality of the oil, produced by these traditional mills, is better.

The oil yield range from 18 to 25% of the total olives weight dedicated for oil. In 2017.

Table 1: Olives and oil production (MoA, 2016 – 2018)

Production	Season 2016-2017	Season 2017-2018
Olives for oil production (tons)	133.627*	84.232*
Table olives (tons)	14.871	15.285
Total olive fruits (tons)	148.498	99.518
Olive oil (tons)	26.621	16.767

*This variation in production is attributed to the alternate bearing.

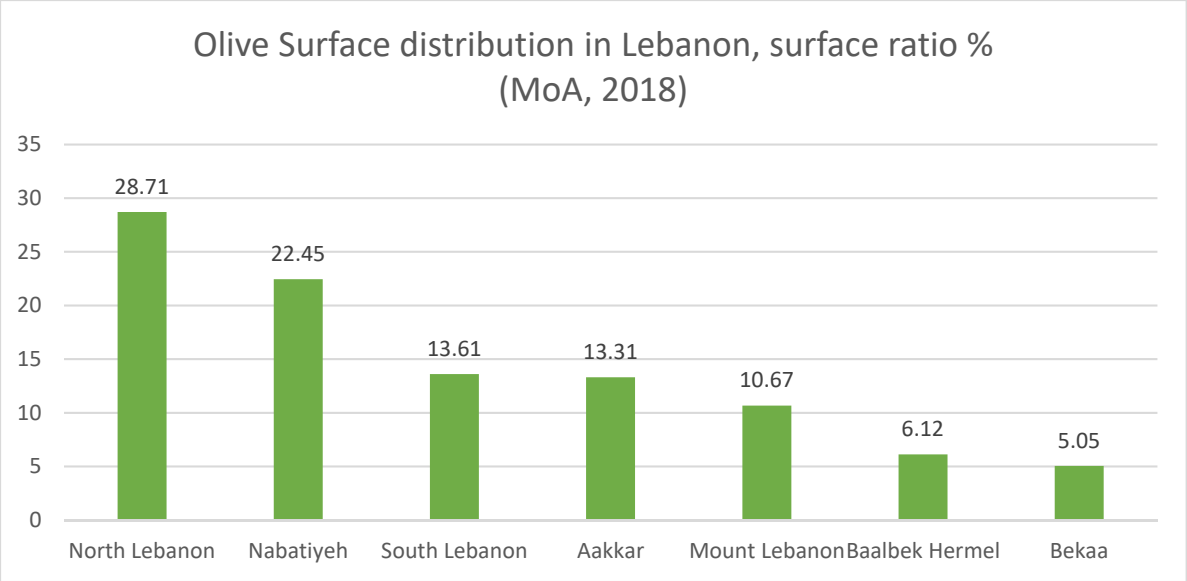
The estimated consumption of olive oil in Lebanon is 20,000 tons/year. Regarding annual consumption per capita in Lebanon, IOC data shows that the olive oil annual consumption per capita is around 4.5 Kg/year which is considered low respecting the other Mediterranean olive

oil producers' countries as Greece (16.3 Kg/year), Spain (10.4 kg/year) an Italy (9.2 kg/year). While the annual Table olive consumption per capita in Lebanon is 5 kg/year.

The olive cultivation is mainly concentrated in North 28.71%, followed by Nabatiyeh 22.45%, South 13.61%, Akkar 13.31$, Mount Lebanon 10.67, and a small percentage in Baalbeck-Hermel 6.12% and Bekaa 5% (MoA, 2018).

Table 2: Olive area in Lebanon (MoA, 2018)

Region	Olive area (Ha)	Surface Ratio %
Baabda	214	0.34
Metn	106	0.17
Chouf	4305	6.94
Aaley	994	1.60
Kesrouan	326	0.53
Jbeyl	675	1.09
Mount Lebanon	**6620**	10.67
Aakkar	8259	13.31
Tripoli / Minyé-Deniyeh	2495	4.02
Koura	7670	12.36
Zgharta	5191	8.37
Batroun	2157	3.48
Bcharré	303	0.49
North Lebanon	17816	28.71
Zahlé	698	1.12
West Bekaa	1345	2.17
Rachaya	1092	1.76
Bekaa	3135	5.05
Baalbek	2600	4.19
Hermel	1198	1.93
Baalbek Hermel	3798	6.12
Saida	2436	3.93
Sour	5020	8.09
Jezzine	990	1.60
South Lebanon	**8446.00**	13.61
Nabatiyeh	2950	4.75
bent Jbeyl	2649	4.27
Marjayoun	2485	4.00
Hasbaya	5890	9.49
Nabatiyeh	13927	22.45
Total Lebanon (Ha)	62048	100.00



The main olive varieties planted are the local ones, like Souri, Balabdi, Airouni, Telyani, Samakmaki, and few foreign varieties like Nabaly (Syrian) and Italian varieties (Frantoio, Leccino,…).and Spanish variety (Arbaquina,…), Recently introduced.

In Lebanon, the olive oil sector is considered to be a family business, and its market is different from the other crops'. Most of the small/medium growers' are marketed their products directly to the consumers (Informal Market). Lebanese consumers rely heavily on the friend/family and contact network when choosing where to purchase olive oil. Only occasionally they purchase olive oil through supermarkets. Olive oil is unlike other food product that can be purchased from any source, great weight is given to ensuring the vendor is trustworthy. The majority of Lebanese consumers select the source of their olive oil very carefully. Lebanese purchase olive oil in plastic gallons or tins (weight from 14.5 till 16.4 Kg, called Tanakeh), and give very little consideration to whether the containers are labeled or not. Consumers rely on their organoleptic evaluation (sight, taste, and smell) for olive oil. The majority of consumers buy olive oil yearly.

Olive oil is priced at 100,000-225,000 LBP/tanakeh (67-150 $/Tanakeh), depending on the high or low production season and region. Olive oil is considered to be an expensive product.

In 2017 olive oil exports reached 7,703 tons and increased 9.03% during the period 2014-2017 (IDAL). There are significant export opportunities for high quality olive oil. Lebanese olive oil exports are mainly destined to the Gulf and North America. More specifically, 26.3% of total exports or the equivalent of 2,635 tons are exported to the Saudi Arabia Kingdome, and 1,351 tons to the United States of America or 13.5% of the total.

A significant share of high quality olive oil being exported could allow a de-saturation of the local market, and thus a significant return to both exporting and non-exporting farmers and cooperatives. Nonetheless, in order to penetrate such market in a significant manner a significant effort to improve competitiveness need to be made at all level of the value chain. However,

Lebanese olive oil is exported predominantly for sale in ethnic markets, where consumers, especially the Lebanese diaspora, will support a price premium for oil that is (or is perceived to be) from Lebanon.

Olive and olive oil in Lebanon is mostly a family run and seasonal business. It provides a significant proportion of household family activity and income in rural areas. Olive production is of great importance in terms of food security for the families of olive farmers, as these families represent the first and largest consumer of oil and olives produced by them. Consumption per capita of these families nearly doubles in comparison with national figures.

The olive sector have been identified by several studies as a sector with high socio economic importance, high opportunities and potential for upgrade and improvement. However, olive oil production faces challenges common to the whole agricultural sector in Lebanon. As laid out in the MoA's strategy (2015-2019), these challenges revolve around the need to increase the competitiveness of agricultural production by increasing its productivity while ensuring conformity with international sanitary and phytosanitary requirements, and facilitating access to international markets.

Furthermore, agriculture in Lebanon faces significant structural problem, starting from land fragmentation, to high cost of production for small and medium scale farmers, and lack of adequate and accessible post-harvest facilities and services. Moreover, the agricultural cooperative movement remains weak, with its inability to attract farmers, organize, or manage its members. This situation has hampered the ability of the agricultural sector to overcome structural challenges and regional competition.

2. OBJECTIVE

In order to help the olive farmers overcome the problems that they are facing and that are influencing the cost of production and the production quality of olives and olive oil, the Ministry of Agriculture, and since many years, is supporting this sector through several programs/schemes which include the following:

- protection of olive fruits from pests and diseases through the distribution of Copper oxychloride (Fungicide, especially for the treatment of olive peacock eye disease) to farmers in the framework of the "National control of peacock eye disease program";
- distribution of monitoring and control materials for olive fly and other insects;
- distribution of olive seedlings;
- improvement of the production quality through the introduction of new technologies i.e. purchase and distribution of harvesting machines;
- distribution of stainless steel tanks for oil conservation.
- extension and technical assistance programs;
- promotion and marketing activities (Olive day, HORECA, Ardi, Souk Al Tayeb, participation to national and international exhibitions);
- establishment of the national olive oil laboratory (2014).

A considerable amount of money is then spent yearly from the budget of the Ministry of Agriculture to cover the cost of the mentioned programs with no information of the extent of their contribution to the improvement of quality of the olive fruits and the olive oil.

To ensure the stated objectives, purposes and expected results of this Technical Assistance Facility to the Government of Lebanon, this report will help the Ministry of Agriculture in assessing the impact of the support programs on the sector and the costs towards benefits analysis of these programs. The results of this evaluation will help decision makers at the MoA level reviewing their support policy and adopting the best ways to support the olive sector.

In line with its strategic plans 2010-2014 and 2015-2019, the Ministry of Agriculture has defined increasing the competitiveness of the agricultural products as one of the main targets to achieve for the improvement of the agriculture sector in Lebanon. In order to achieve this objective, the Ministry will continue baring her responsibility in supporting farmers in Lebanon including the olive farmers and improving the quality of the production of olives and olive oils. The evaluation of the existing support programs will help the ministry taking the right decisions for the continuation of these programs or the proposal of new ones that will have better impact on the sector.
In this context, this report gather and analyse the information collected during a survey done for reviewing the support programs adopted since 10 years, and collecting the required data for the cost effectiveness analysis.

3. METHODOLOGY

In order to assess the impacts of MoA supporting interventions for the olive oil sector in the past 10 years, field visits were necessary to the olive producing regions. 6 regions were selected to be considered as pilot regions for the survey, these region represent the main olive production areas in Lebanon:

- Hasbaya and Tyre in South Lebanon;
- Chouf in Mount Lebanon;
- Koura and Akkar in North Lebanon;
- Hermel in Bekaa.

The criteria for selection was mainly the area of olive cultivation in every region. Consequently, these regions are considered the most important in Lebanon. In the specific case of Hermel, the region was chosen since it could be in the future one of the important olive growing area, due to the fast expansion of olive cultivation in the last ten years, the potential in terms of uncultivated land availability, accessibility to irrigation water, and climate conditions that prevent the spread of olives pests. The previous experiences within Olio del Libano project showed that in Hermel there is a high potentiality for producing extra virgin olive oil.

In these selected areas, and in collaboration with MoA centers, it was invited to a discussion groups and then interviewed groups of olive producers who may or may have not benefited from MoA's support, in order to reflect on MoA's performance.

A questionnaire template have been prepared, divided in ٦ sections:

1. Farmers general information;
2. Olive orchard information;
3. Olive production information;
4. Marketing information;
5. Information about farmer benefiting from MoA intervention;
6. Evaluation of farmers for Ministry of Agriculture interventions in the olive sector in terms of importance, effectiveness and need.

Field visits were done to the 6 selected regions with the main target to organize focus groups and interview olive producers in order to fill questionnaires and collect data. These field visits and focus groups were done by the Agriculture and Rural Development expert and the Monitoring and Evaluation expert, the focus groups were organized and done in strict collaboration with the Heads of Agriculture Centre in each region while in Hermel it was organized in collaboration with Regional Union of Cooperatives in Baalbeck-Hereml. These focus groups were done separately to respect the local characteristics of each region. The olive production practices and difficulties faced by the farmers were discussed. Then individually, each farmer present was interviewed and an individual questionnaire filled.

Statistically speaking, the interviewed sample represents broadly the individual characteristics for every region which – taken together – account for around 52% of all olive-producing regions of Lebanon. The conclusions in the report are drawn from both the triangulation of the results of the focus group discussions and the analysis of the results of the questionnaires.

Further field visits were done by Agriculture and Rural Development expert to the selected regions in order to meet additional olive producers, fill more questionnaires and also to meet and interview the Heads of MoA Agriculture Centre, since they are on the front lines and on direct contact with olive producers.

After completion of the field work, the data has been analyzed using Excel, to reach results required to evaluate the impacts of MoA support programs on the sector and the costs towards benefits analysis of these programs. In addition, to develop recommendations to help decision makers at the Ministry of Agriculture level reviewing their support policy and adopting the best ways to support the olive sector.

A validation workshop also was organized before drafting the final recommendations. This participatory workshop aimed to discuss the preliminary findings and recommendations of the national study to evaluate the Ministry of Agriculture's interventions to support the olive sector in Lebanon and formulate strategic and operational recommendations for the next phase. 85 stakeholders participated to this workshop. 2 presentations regarding preliminary findings and recommendations of the study at technical and evaluation aspects have been delivered. 4 discussion groups were formed to discuss and amend the preliminary recommendation at 4 levels which are field, harvesting and post harvesting, marketing and legislative and administrative levels.

4. SURVEY TECHNICAL FINDINGS

4.1 Farmers General Information

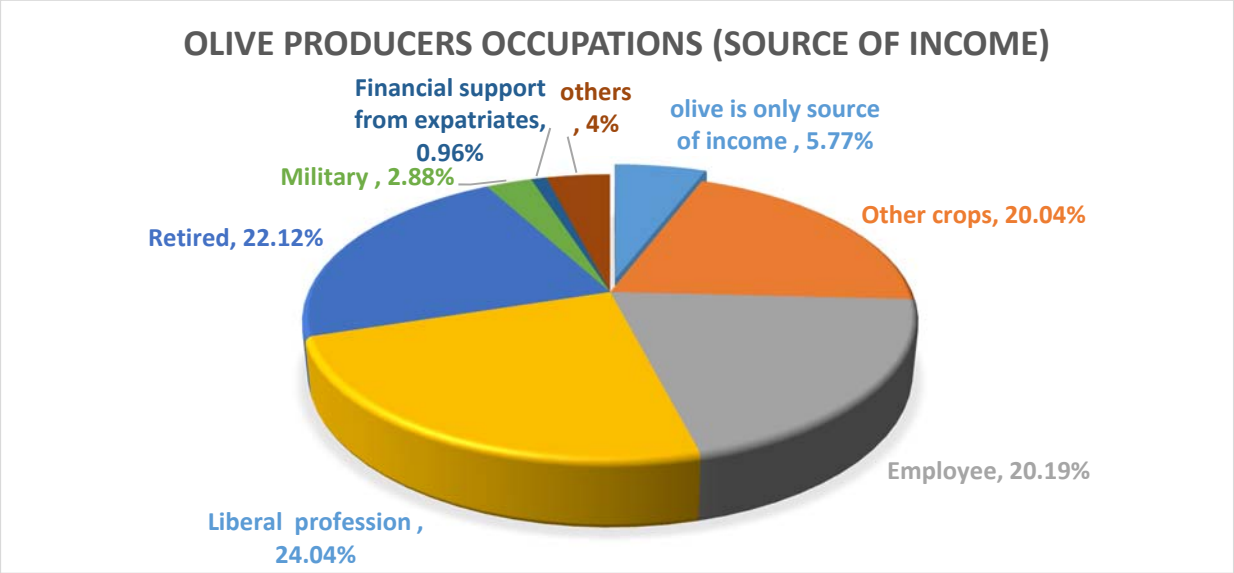
The total number of questionnaires filled was 104 (104 olive producers meet and interviewed). Some questionnaires were canceled, either due to lack of information or the figures provided by the producers were insufficient or inaccurate.

Table 3: Interviewed olive producers by region (Casa)

	District	Region (Casa)	Number of Questionnaire
1	North Lebanon	Koura	10
2		Akkar	21
3	South Lebanon	Tyre (Sour)	18
4		Hasbaya	22
5	Mount Lebanon	Chouf	18
6	Bekaa (Baalbeck – Hermel)	Hereml	15
		Total:	104

Only 5% of the interviewees were females; This indicates that – despite the major role women play in harvesting and processing, still not active or ineffective in the management of olive sector, even though they processing – they are still largely under-represented in decisions related to production and management. The questionnaires confirm that olive production is an aging profession since the average age of interviewees was around 57 years.

The results also confirm by-and-large the decline of olive growing as a major source of livelihood, since only 6% of the interviewees declared that olive production is their only source of income. This figure has declined in recent years, which indicates the seriousness of the problems plaguing the sector and the decline in the profits of farmers from olive production, which led them to diversify crops or carry out other business.



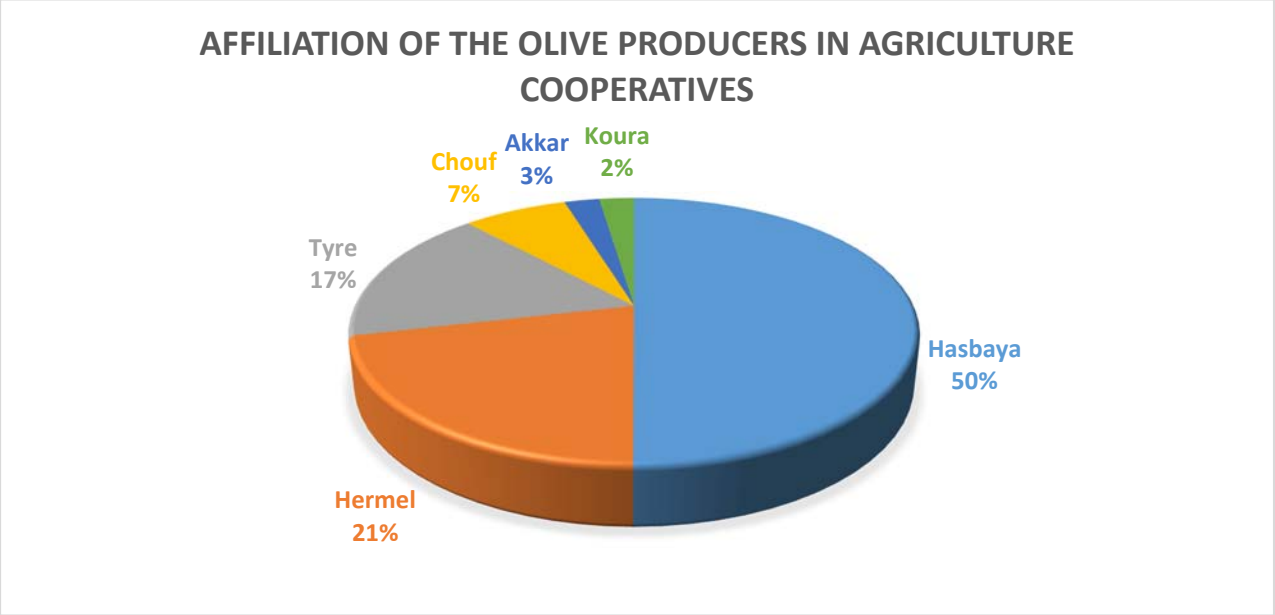
About 40 % of olive producers declared to be members in agricultural cooperatives. This figure may be inaccurate since farmers who respond to calls to meetings are usually active farmers at all levels, including membership in cooperatives. It was noted that their level of satisfaction with their cooperatives activities is medium. They declared that cooperatives activities are limited to the following (by importance):

1. Extension;
2. Distribution of products for pest control and Pesticides;
3. Olive harvesting service.

In terms of expectations from their cooperatives, respondents gave marketing the highest priority.

1. Marketing;
2. Products for pest control and Pesticides supply;
3. Provision of equipment and harvesting services.

The rate of affiliation to cooperatives varies from region to region. In some region, this percentage is very low as in the North (Koura and Akkar). The farmers in these areas were not satisfied with the work of the cooperatives. Thus, the real role of the cooperatives is not clear to them, but more than that, it is distorted.



Recommendations:

- Encourage the active participation of women and youth in the management of the sector in order to maintain and ensure sustainability, by facilitating their enrolment in the production and marketing process through the introduction of profitable and attractive

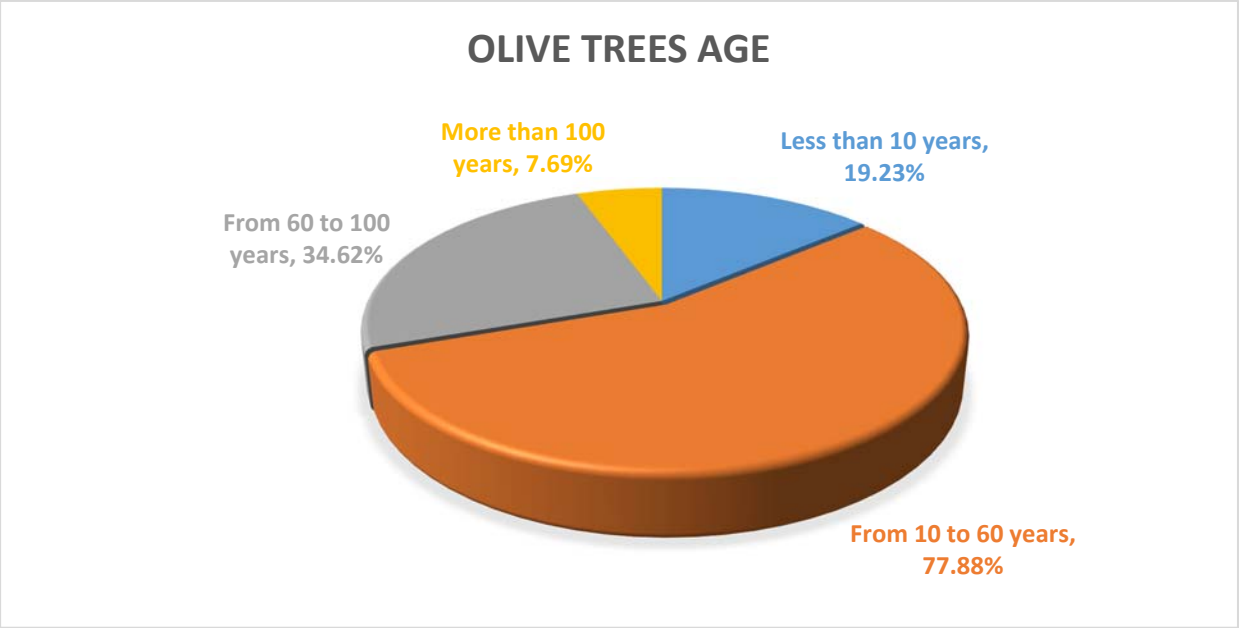
innovative practices and technologies such as GAP, organic production, olive oil soap production, table olive processing, marketing and E-commerce…

- Develop and strengthen agriculture cooperative activities in terms of legislations, management, services and infrastructures.
- Promote awareness and cooperative culture among farmers and encourage their affiliation to the local cooperatives by supporting the activities of these cooperatives as well as strengthening its role at various levels. One of the most important weaknesses of the Lebanese olive oil sector is the land defragmentation, so the development of cooperative activities is the way to mitigate the consequences of this defect.
- Support the creation of specialized cooperatives in terms of olive production or olive products marketing especially in under-represented areas (North Lebanon and Akkar);

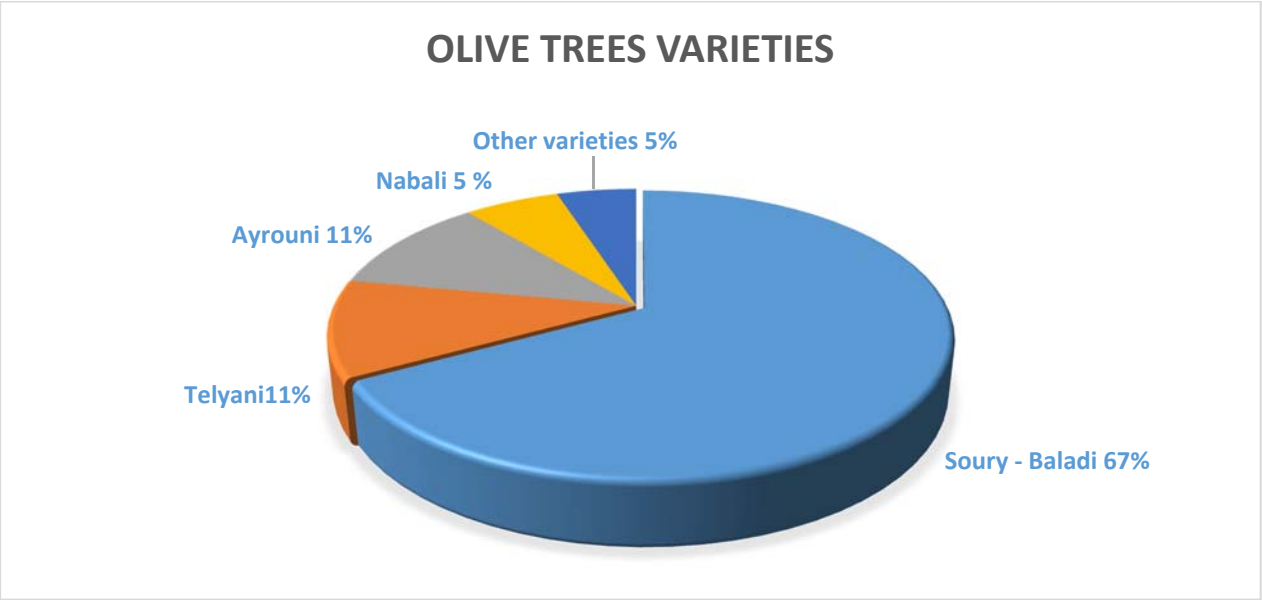
4.2 Olive orchard information

The average area of olive orchards owned by interviewed olive producers was 2 Ha or 20 donums (1 donum = 1000 m^2). Only about 3 % are organic farming certificated, while the majority follow the conventional farming. About 81 % of these orchards are rain fed. The reason why the irrigated orchards percentage is high (19 %) in comparison with the national irrigated land figure (8 %) was caused by the inclusion of Hermel region to the survey, where all olive orchards in this region are irrigated.

It is also noted that orchards are heterogeneous in terms of age of trees, about 20 % of the trees have less than 10 years and only 8% are old trees and have more than 100 years. So most of the olive trees are adults and in full production. This figure can be translated with expected growth in olive production in the future.



In addition, 41% of the interviewees declared that they have planted new olive trees in the last ten years. 11 % got the olive seedlings directly from MoA or indirectly through Cooperatives and Association.

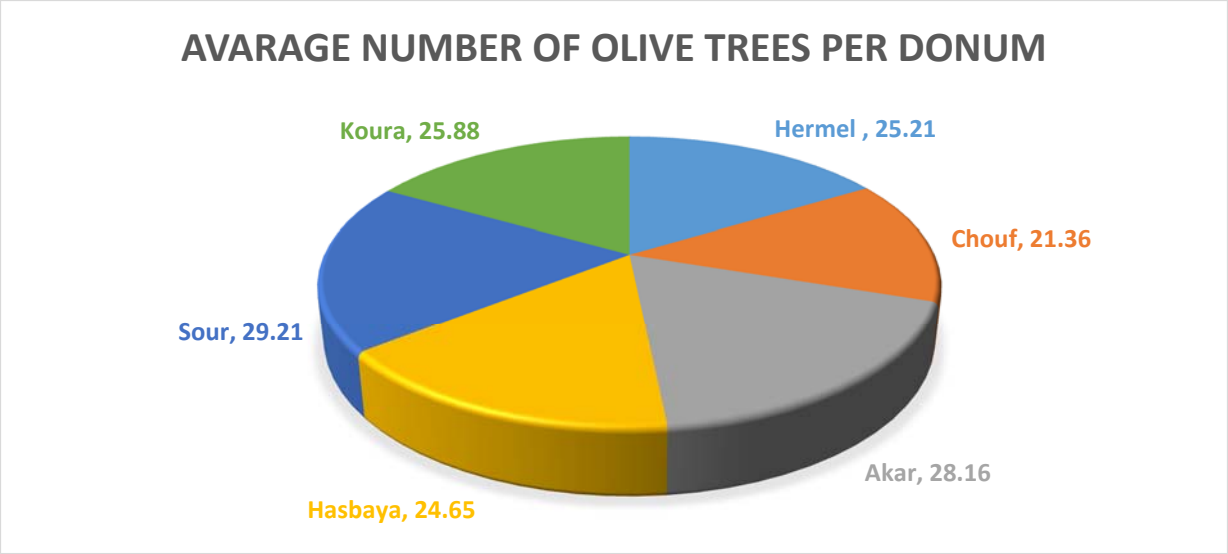


It is also noted that the dominant variety was the Soury-Baladi groups of varieties, about 67 %. While the Telyani and Aayrouni 11 % for each, 6 % Nabali and only 5 % for other Varieties.

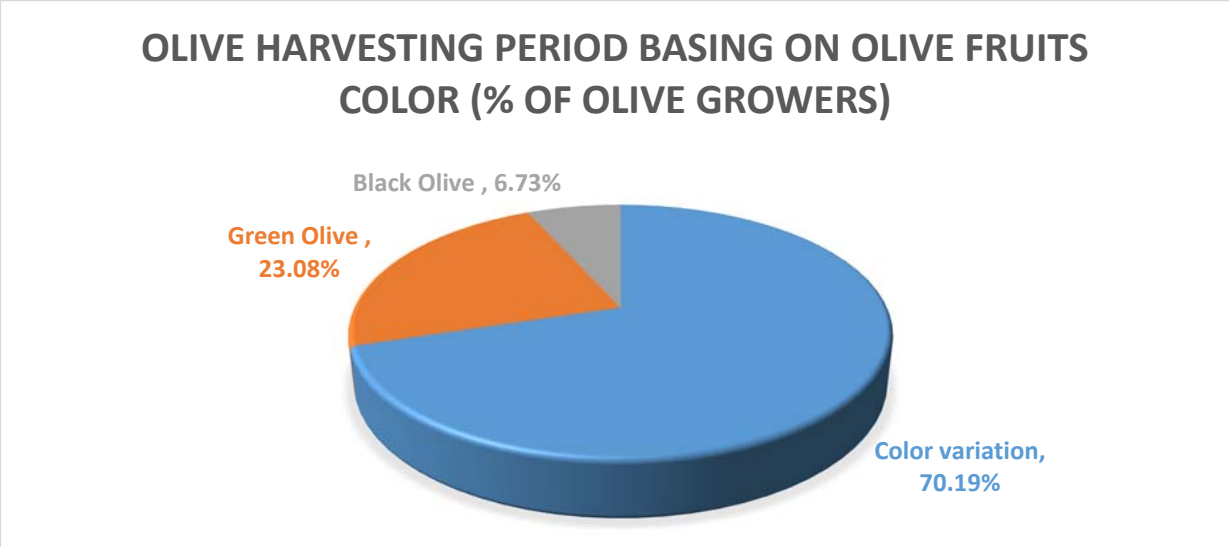
These figures showed that the Lebanese olive growers planted in the past and continue to plant the Soury-Baladi group of varieties.

Interesting to note that around 12% of farmers tried new varieties of olive trees, but most of them were unsatisfied with the results. Therefore, studying the characteristics of the local varieties called by the olive growers Soury-Baladi are urgent as well as organizing and supporting technically the local nurseries in order to produce healthy seedlings (pests free) and conform to the declared variety.

The average number of trees per donum (1 Hectare = 10 d0num) at national level is 25.75, while at selected regions the average can be noted in the graphic below.

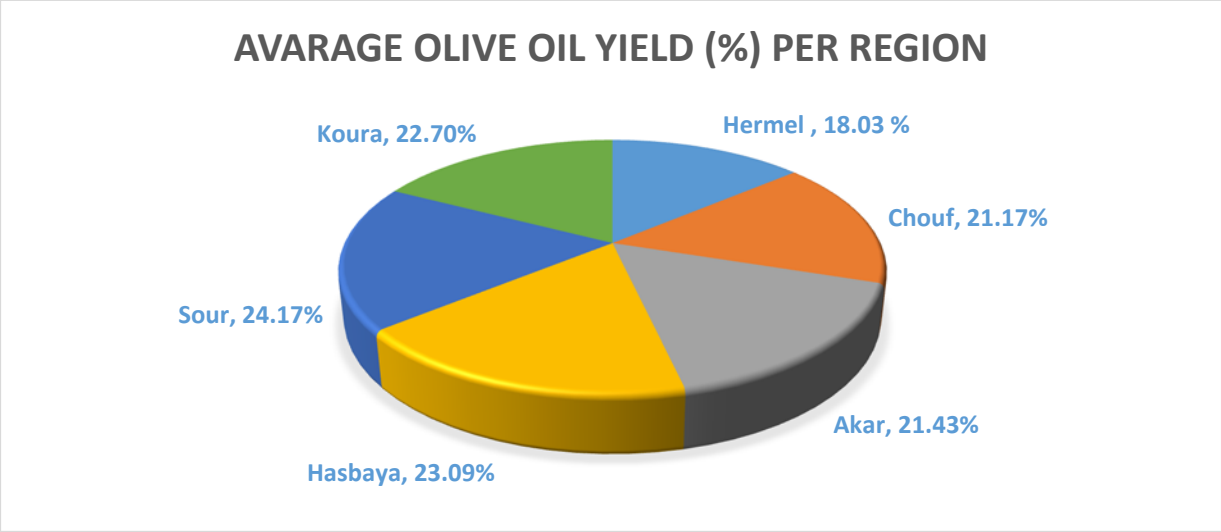


During the interviews, there were noted some changes in the agricultural practices adopted by the farmers towards improving the quality of olive oil. This is certainly due to the role of agricultural extension, which was active in the last ten years, carried out by MoA, NGOs and several development projects. For example, most of farmers give up waiting until the olive fruits become black to harvest, this would give low quality oil and low shelf life. Most farmers 70% now declared that they harvest olives when they start coloring (color variation from green to black) or when the fruit is still green 23%. This early harvesting help greatly to produce extra virgin olive oil rich in polyphenols and anti-oxidants.



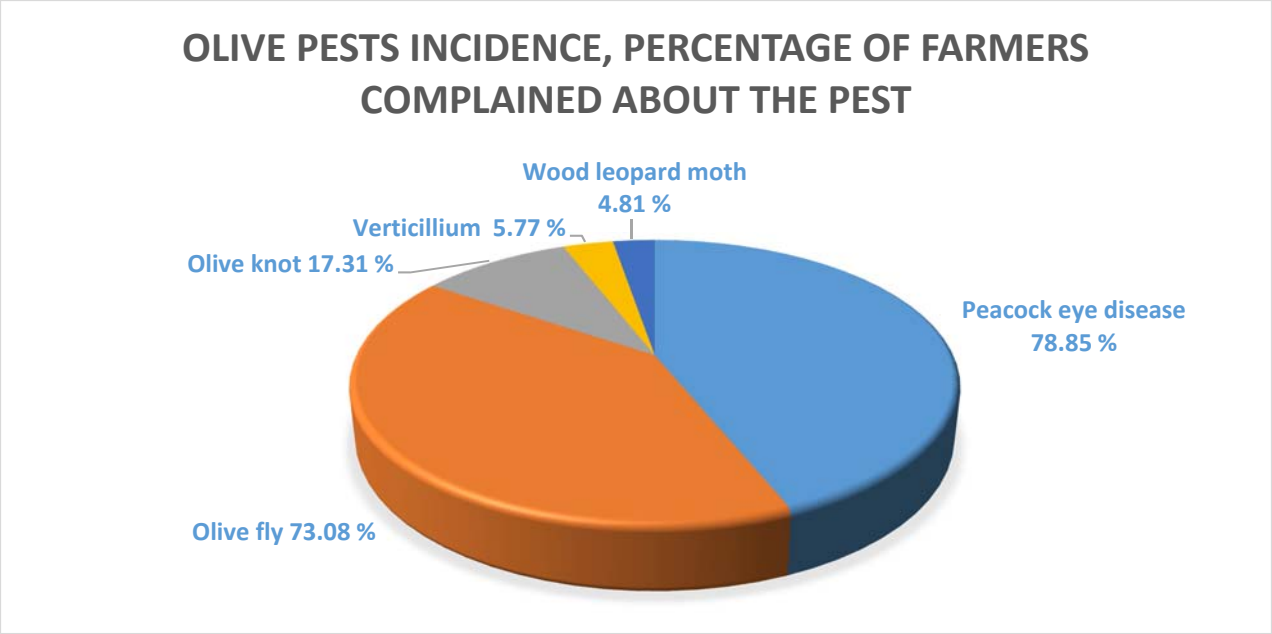
The average olive oil yield was 21.84 % and it is considered high in comparison with other producers' country. As shown in the graphic below, this figure varies from one region to another.

Tyre region represents the highest average yield, as the dominant variety is Soury, well known for it is high content in oil. While Hermel is the lowest. This reduction in the average yield in Hermel might be due to environmental and climatic factors especially high temperature in summer and soil type, or adopted varieties which most of it are imported varieties (Nabli and other Syrian varieties), or the agricultural practices such as fertilization and irrigation.



As for the pests spread in the olive groves, and according to the olive growers involved in the survey, olive fly (*Bactrocera oleae*) and peacock eye disease (*Spilocaea oleaginea*) ranked first. Almost all farmers complained of these two pests, about 75 % of interviewed. Moreover, in the regions where olive fly were absent previously (as in Hermel), farmers complained about the emergence of this insect in the last past years, especially when delay harvesting. This might be due to climate change or increased humidity in the area by the construction of a lake dam. Hermel region has great potentiality for producing organic olive and olive oil. In fact, there is currently a great effort to introduce organic farming in a formal manner by issuing organic certifications for 10 olive growers, trough HASAD Project activities and Regional Union of Cooperative in Baalbeck-Hereml. However, the emergence of the olive fly will require from these farmers to adopt additional biological control measures that may not have been planned or taken into account during the development of this project.

The interviewed olive growers were also asked about other pests. The results was as shown in the graphic below. Knowing that these figures may not be accurate for Verticillium disease or other pests, as farmers could be unaware of the symptoms of these diseases. The figure worthy to highlight is regarding olive knot disease (*Pseudomonas savastanoi*), where the number of farmers who complained about this disease was about 17% and become higher in Koura and Akkar regions.



Recommendations:

- Support olive and olive oil organic producers, since its positive effects on increasing farmers' incomes, penetrate new marketing channels and protecting the environment. This support could be trough provision of equipment, Bio pesticides and pest control materials, and the most important is to support and facilitate the establishment of new certification body;
- Conducting complete scientific studies to evaluate the local olive varieties, especially the groups of varieties called Soury/Balady, to define their full characteristic; morphological, phenological, bio-agronomic features, tolerance to pests, tolerance to rigid climatic condition, and oil quantity and quality. This characterization of the local varieties is of great importance for the future of this sector, especially to establish healthy and productive orchards, as well as to reduce the damages of existing pests and diseases.
- Supporting the local olive nurseries to develop their work by establishing mother fields that could provide safe and secured source of propagation materials in the areas where these nurseries are located, organizing their production and creating a mechanism for issuing certificates of pest free and variety conform. This helps to reduce the spread of pests that may be transmitted by seedlings. (Olio del Libano III project is currently implementing a project with the aim of completing the establishment of a mother field in Nabatieh region).
- Activating the extension program of the Ministry of Agriculture by providing financial and human resources and adopting modern and sophisticated extension tools, able of attracting farmers' attention and persuading them to adopt modern methods of production. The main objective is to reduce the costs, increase production quantity and improve quality.

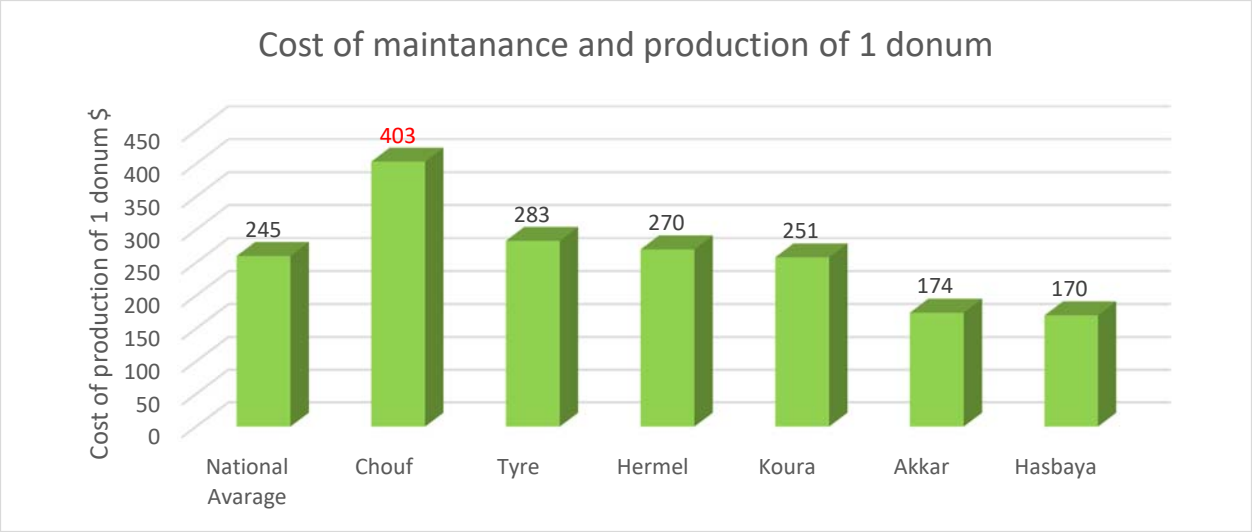
- Investigate the reason for the reduction in the oil yield in Hermel region, and determine the causes, whether by the cultivar or environmental factors or agricultural practices and finding solutions to raise this yield.
- Activate MoA's programs aiming to control the main olive pests, especially the program to control peacock eye disease and the program to control olive fly. Ensuring the continuity of these programs and coverage of all areas of olive cultivation is of great benefit, as these pests cause significant damage most of the years, and therefore the MoA's irregular and incomplete interventions may not reach the desired results.
- Give special attention to infectious bacterial and fungal diseases, which are still limited, but in the affected areas, these diseases are causing great damage to the olive groves, such as Verticillium and olive knot. As for the very serious disease called "olive quick decline syndrome" which cannot be cured or eradicated (caused by the bacteria *Xylella fastidiosa*, one of the most dangerous plant bacteria worldwide, causing the death of olive trees, with huge economic impact for olive sector and environment), raising awareness among farmers, activating monitoring measures at the border and inside the country is very important and cannot be tolerated.

4.3 Olive production information

Through the questionnaire, information has been tried to collect regarding the direct impact of MoA interventions on increasing farmers' production or reducing the cost of production. But in general, the interviewees were not able to give accurate answers. The reason is that most farmers do not have any accounting system, and even a minimum records keeping. The answers to questions such as "how much savings?" or "how much improvement in production?" were not easy to answer by the respondents.

However, it is well noted and from official figures at the Ministry of Agriculture that the area of olive cultivation as well as olive production, have increased in the last ten years. The quality has also improved significantly, and this is what emerged during the competitions, which were organized at the national level as In HORECA – Best Lebanese Extra Virgin Olive Oil competition, at the regional level or the results of Lebanese olive oil participation in international competitions. This rise in production and improvement in quality is certainly the result of the concerted efforts of MoA, local and international NGOs and Development Agencies, as well as the private sector.

One of the key figures in determining the cost/benefit analysis of olive production is the cost of maintenance and production of 1 donum (0.1 Hectare) in the different regions and at national level obviously, for the cost of production, the farmer is subconsciously inclined to increase costs in order to make a point that olive farming leads to very little (not to say negative) returns. In order to mitigate this bias, the productions costs were debated and established during the focus groups discussions by the largest possible cohort of farmers and later validated during the individual interviews.

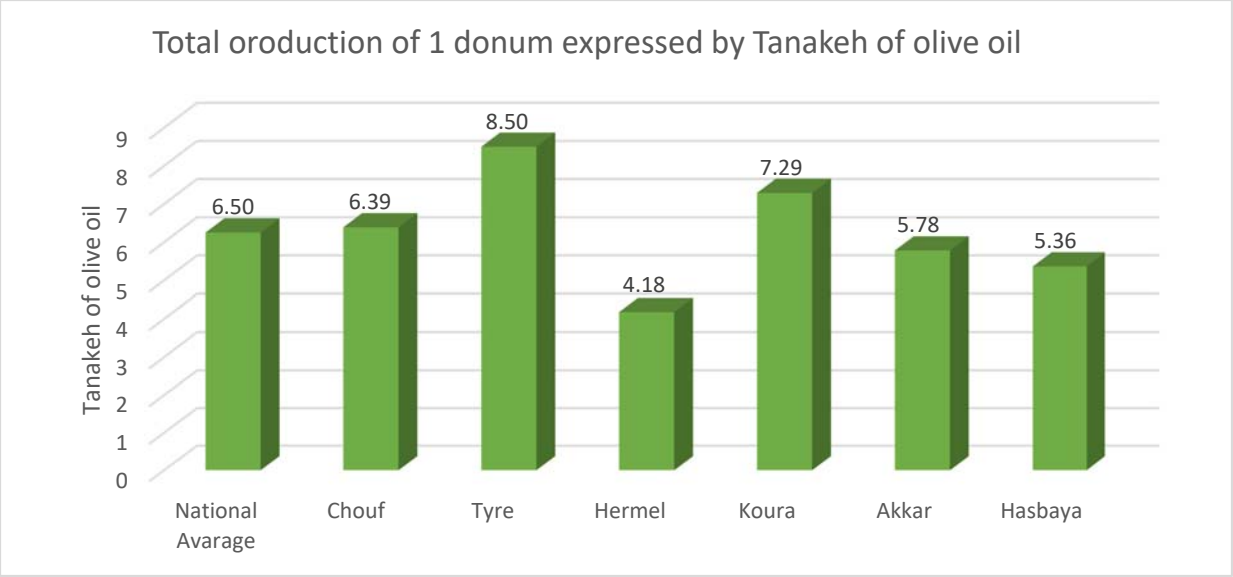


The figures shown in the graph above indicate that the average national cost of maintenance and production of 1 donum (mean average of the six selected pilot regions) is 260 $ and goes down to 245$ if we weight by the percentage of olive trees in every region compared to the total surface of olive plantations in Lebanon. We also get to the almost the same figure (243$) if we remove the highest and lowest 10 answers in the survey.

Wide disparities exist within the six regions. For example, the cost of production in Chouf is 55% higher than the national average, while three areas (Tyre, Hermel and Koura) are close to this national average. On the other hand, Akkar and Hasbaya are 33% below the national average, which might be due to the lower cost of labor in these areas, but also to the fact that olive growers rely less on paid labor in the production process.

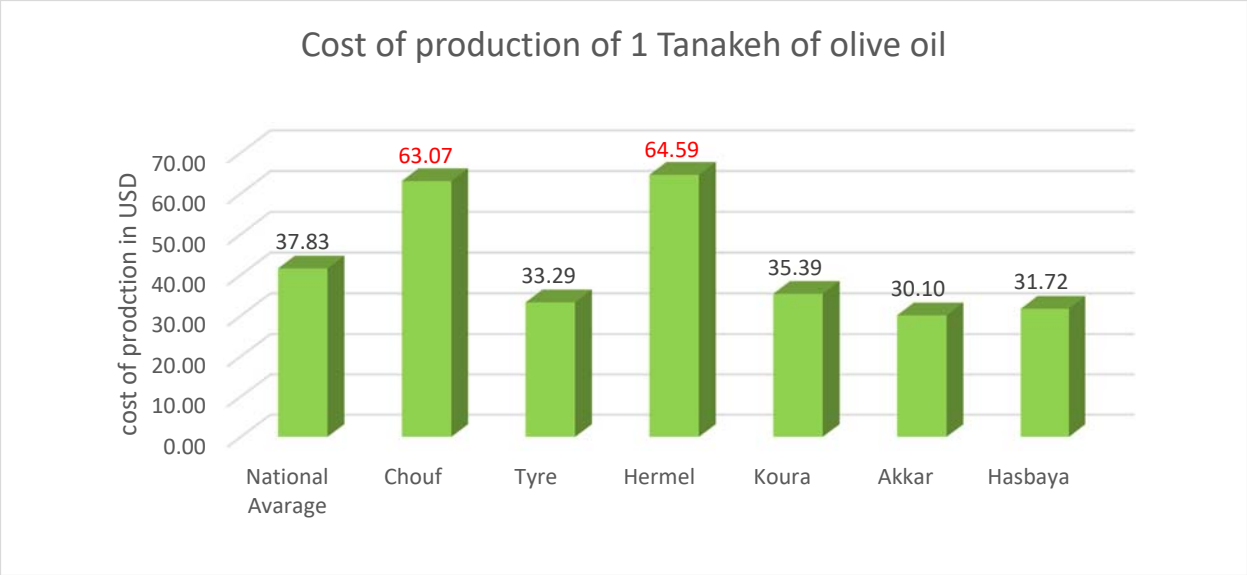
The explanation for the high cost in Chouf could be the exaggerated estimation costs by farmers, or the lack of cheap foreign labor in the region or the topography of the region dominated by terraces, and possibly a combination of both.

The second important figure that was reached through the survey was the total quantity of production per donum (0.1 Ha) expressed in Tanakeh (1 Tanakeh = 15-16 Kg) of olive oil, at national and regional level. This unit (Tanakeh/1 dunum) was used as it is adopted widely by farmers and different actors as well as easy to use.



As illustrated by the figures shown in the graph above, Tyre region is the highest in olive oil production per dunum, while Hermel recorded the lowest production quantity. A possible explanation for the high yields in Tyr is the widespread cultivation of the Soury variety, which is well-known for its high oil content, and the appropriate climate and soil for olive cultivation. In Hermel, the low quantity is not due to the young age of the trees, but to the low content of olive fruits in oil (low yield). This is what prompts the farmers to wait until the late months of the season and the over maturity of the olive fruits so the oil yield improves. Consequently, this leads to a dramatic reduction in the quality of the oil. The reason for this decline might be the adopted agricultural practices (especially irrigation and fertilization), adopted olive varieties, environmental factors such as climate and soil or all these factors combined.

The previous two figures, the cost of maintenance and production of 1 dunum and the total quantity of production of 1 dunum, leads easily to the extraction of an important figure which represent a source of controversy among the different actors in the olive oil sector which is the cost of production of 1 Tanakeh. Additionally this figure helps determine the oil price of selling and facilitate marketing process.



The average of the cost of production of 1 Tanakeh (15-16 kg of olive oil) is 37.83 USD. The figures of the 2 regions Hermel and Chouf that are far from the average might be due to the imbalance in the previous figures.

While the national family consumption rate of olive oil is 1-1.5 Tanakeh annually, the results of the survey showed that the annual rate consumption of the families producing olive oil is quite high and can reach up to 8 Tanakeh per year. This rise may be due to the fact that married children are still considered members of the parent family. However, it is assured that the olive producer families' consume at least 4 tanks per year.

The survey also showed that the average family table olive production rate is 75 kg per family. This quantity is for self-consumption as well for direct sales, which increases the families' income from olive production especially for women, which are involved in the preparation of this product.

The olive oil soap processing (transformation of the low quality olive oil into soap) is also of great importance to producers' families. The results of the survey showed that 63% of interviewees are making soap for family consumption and direct sales.

Recommendation:

- Build the capacity of olive producers and agricultural cooperatives in IPM, GAP, Harvesting and post-harvesting good practices, and modern extraction technologies;
- Encouraging olive producers to adopt these modern practices and technologies by providing incentives;
- Reducing the cost of production should be one of the main objective of the future extension programs;
- Activating MoA program for the control of olive mills, emphasizing on hygiene and GMP;

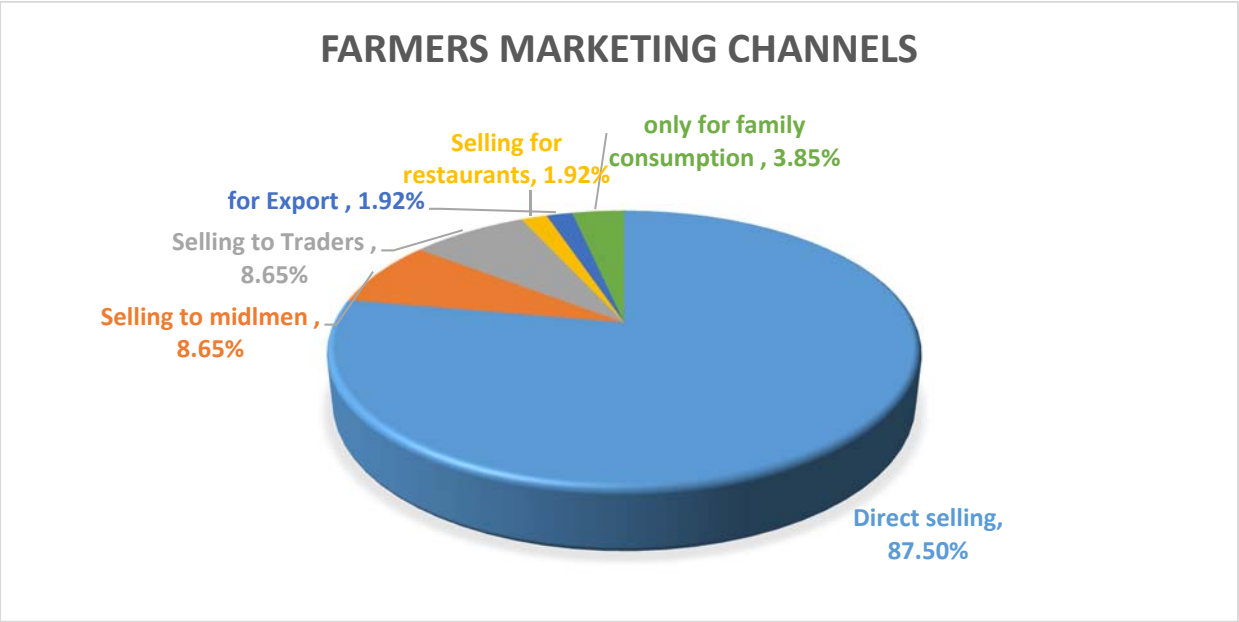
- Facilitate access to finance for mills who wish to upgrade abandoning the traditional presses and replacing with modern olive continuous extraction lines. The modern technologies is well known for the high extraction capacity;
- Build the capacity of producers in accounting and management using simple and easy to use accounting program (Software);
- Strengthen the role of MoA Agriculture Centers present in different region of olive production (In total 32 centers all around Lebanon) in extension and technical assistance for olive producers;
- Launch projects at regional level with clear objectives, clear expected results and time-bound to find specific solutions to the identified problems of the olive oil sector;
- Special effort aims at increasing olive oil consumption per capita at national level, through promotional programs dedicated at highlighting the health and therapeutic benefits of olive oil and its importance in cooking instead of other vegetable oils. Every increase by 1kg in the per capita leads to a 5,000 tons increase of consumption at national level, which – in turn – is enough to absorb all the excess production in the markets.

4.4 Marketing information

Marketing is the most important weakness of the olive oil sector in Lebanon. Marketing is considered the main problem according to the olive producers participating in this survey, and was ranked the first that farmers asked to be supported by MoA and all the actors in this sector.

The main reasons for this lack of success in finding effective solutions so far, and developing the marketing process of olive oil are the following weaknesses:

- The high cost of production and low productivity of olive orchards, which drives the producers to raise the prices of oil selling in retail and wholesale. This sale prices is significantly higher than the international price of olive oil and the prices of neighboring countries. The price of Lebanese oil is double the price of Syrian oil. Lebanon's high cost as well as low yield of olive production has negative consequences for its competitiveness in international markets and recently in the national one;
- The high competition of the imported or the smuggled products in the internal and external market through different channels. It is directly sold through interpersonal sales channels as Lebanese product, or sold through local small retailers, trade shops and restaurants. In some cases, It is also exported as Lebanese oil mixed with local oil or not, and sold for the Lebanese diaspora;
- The quality of olive oil and conformity with the norms. There are several reasons for producing non-conforming olive oil, or sometimes producing extra virgin olive oil whose quality deteriorates with time.There are several steps that compromise the quality of the final product but also reduce overall orchard productivity such as pests control, harvesting and post harvesting practices, traditional extraction technology and low hygiene level in the olive mills, as well as bad storage (inappropriate containers or environment conditions of storage

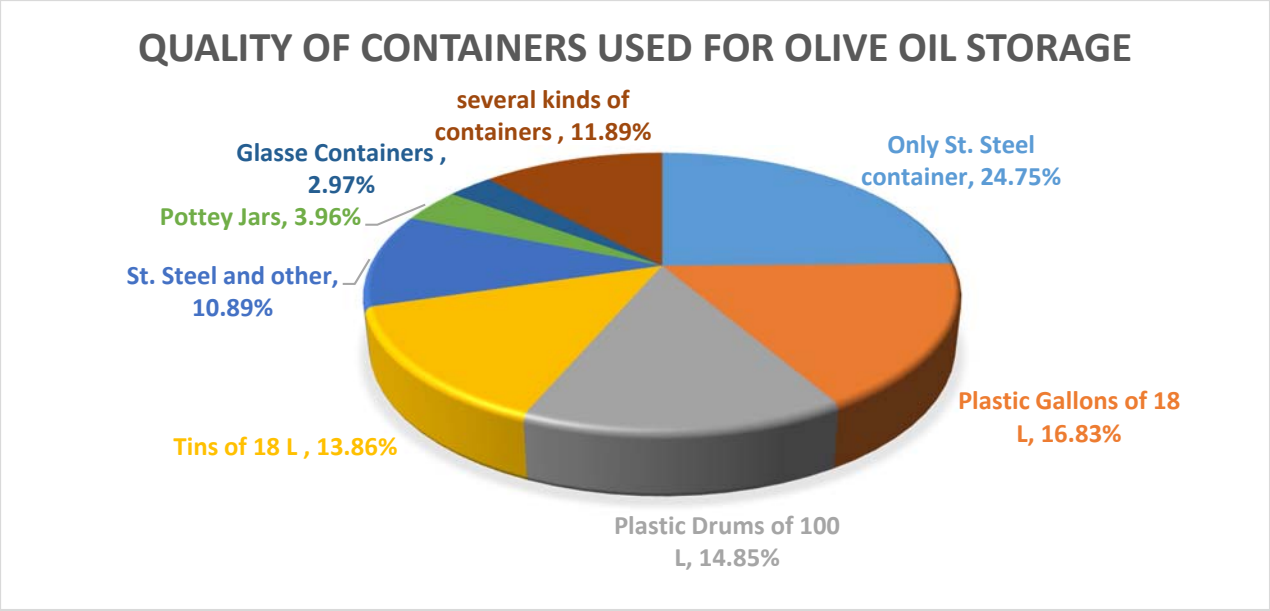


The results of the survey showed that most of the farmers, especially the small and medium which are the majority, rely on the informal market (87.50 %) selling directly to consumers. Only the large producers sell the oil to middlemen, traders or for export. In the past years the informal local market has become saturated with locally produced olive oil and the smuggled one. With the economic crisis, the families are led to save even in the quantity of oil or the prices.

The marketing of the produce takes an average of 6 months from extracting the oil until selling the total production. This period may increase or decrease depending on the alternate season and if the year is abundant production or not.

Storage is another problem, despite the improvements that were made during the last 10 years, specifically the quality of the containers in which the oil is stored and the storage conditions. The poor storage conditions is responsible for the deterioration of the quality of the extra virgin olive oil over time, so farmers have to sell the olive oil at lower prices.

From the survey results, it is noted that about 25 % of the interviewed producers are aware about the good storage conditions, so they rely only on stainless steel containers to conserve the oil quality. Another 11 % are aware about the importance of stainless steel for conservation but cannot afford it, so they rely on containers from other material. This awareness and improvement in the post-harvest practices, are the result of extension activities in the last 10 years that have raised this figure from almost zero to 36% of producers that are convinced on using stainless steel containers.



Despite some interventions by the Ministry of Agriculture to facilitate the marketing, such as participation in some international exhibitions or organization of "Olive Day" in some region in the last years, the results of these activities did not reach the farmers. So, none of them announced that he participated or benefited from this type of activities. Participation in these activities may be has been limited to agricultural cooperatives and local traders.

Recommendations:

- Develop national olive oil marketing strategies based on the production of high quality olive oil, application of clear regulation in local markets, identify marketing channels and the potential international markets;
- Emphasize border control to prevent entry of smuggled olive oil from neighboring countries;
- Develop and implement a practical and legal mechanism to limit the marketing of foreign oil as Lebanese olive oil in the national and international markets;
- Impose traceability and labeling requirements with regards to origin and olive oil quality and classification;
- Develop regulations regarding geographical denomination or protection of olive oil product;
- Build the capacities of olive oil producers on best production practices. olive oil quality and marketing requirements;
- Empower, support and build cooperatives' capacities to mitigate structural, financial and regulation problems that are facing, allowing to play its roles of reducing cost of production, aggregating product and creating linkages farmers/traders;

- Support the creation of specialized marketing cooperatives that could aggregate small and medium producers, with the aim purpose to facilitate olive products marketing and increase Lebanese product selling in the internal and external markets;
- Facilitate effective participation of cooperatives in relevant local, regional and international exhibitions, directly or through MoA participation. MoA participation to this kind of exhibition should be based on clear objectives, focusing on international markets that the Lebanese olive oil is actually exported (GCC, USA, …) or new potential markets where Lebanese olive oil could be able to penetrate;
- Facilitate to cooperatives the direct selling in the local markets, through the adaptation of the already known "Olive Day" organized by MoA in the last years in different regions. In order to increase the direct sale channels for olive producers in the local market, these ceremonial events could be converted to annual exhibitions and direct sale of olives products, organizing it in several cities of the country including the capital.

4.5 Information about benefit of olive producer from MoA interventions

In the past 10 years, the Ministry of Agriculture has completed several interventions to support the olive sector across Lebanon. This support began many years ago and continues until now but intermittently. However, the dimensions of this intervention varies from year to year depending on the available financial resources and administrative process facilitation. This support has not always been from the MoA's budget, but in some years it has been through donor-funded projects. In the questionnaires, the interviewees were asked about 9 interventions of MoA in support to the olive oil sectors:

4.5.1 Copper oxychloride (Jenzara) distribution for the treatment of peacock eye disease and other fungus and bacterial disease.

Peacock eye disease

Spilocaea oleaginea is a fungal plant pathogen, also known as olive leaf spot. This disease commonly affects the leaves of olive trees causing defoliation. The disease affects trees throughout the growing season and can cause significant losses in crop. The disease causes blemishes on the fruit, delays ripening, and reduces the yield of oil. In severe cases, defoliation and twig death can occur, and the disease can have long-term health effects on the trees.

The most common management approach is to spray the foliage with a copper compound after the fruit has been harvested in the fall and again in the late winter if the environment is extremely wet. In case of high infestation a third treatment must be done in September.

Peacock eyes disease symptoms

Copper oxychloride represents a high need for olive cultivation and other crops. MoA used to purchase and distribute this product for farmers, municipalities and cooperatives every year. This intervention has stopped since 2016 for administrative issues. While the fungal disease infestations, especially peacock eye disease, have increased in recent years and threaten production in some areas.

The use of this fungicide annually and for several times (2 to 3 time per year) could be translate into a marked increase in production, more healthy olive trees and lower costs of production.

The survey showed that only 37 % of the olive producers have been benefited from Copper oxychloride distribution in the last 10 years. 26 % depend on MoA distribution and if not, they are not ready to buy this product from the market. 66 % of who received the Copper oxychloride noted that olive trees were healthier after treatment. 79 % of who received Copper compound used all the quantity received and 80 % declared that quantity distributed was sufficient.

There is no possibility of determining whether the entire distributed quantity is used for olive cultivation. This Copper compound could be used for other crops, but in general it is counted as support to the olive sector.

Recommendations:

- Maintain the peacock eye disease control program and strengthen with financial and human resources. Focus on areas with high humidity where this disease causes serious damages.
- Purchase the Copper oxchloride each year and distribute to olive producers after setting up a clear and applicable distribution mechanism that ensure reaching the eligible farmers in selected regions and in sufficient quantity for all.
- Support training programs on olive tree pruning as this practice, when it is done properly, reduce the damages caused by peacock eye disease.
- Develop a system to collect feedbacks form fields, monitor results and evaluate intervention.

4.5.2 Pesticide and traps for the control of Olive fly (*Bactrocera oleae*)

Olive fly (*Bactrocera oleae*)

Olive fly is a species of fruit fly. It is a phytophagous species, whose larvae feed on the fruit of olive trees, hence the common name. It is considered a serious pest in the cultivation of olives. Within a year, generally three to five generations occur. The development cycle is closely linked to environmental conditions, in particular the climate and the state of the olives in addition to varieties. Knowing these parameters, together with the monitoring of the population, is needed to implement effective pest management programs.

The damages caused by the olive fruit fly are of two types quantitative and qualitative:

From a quantitative point of view, the damage is caused by larvae of second and especially third stages, by the removal of the significant proportion of the pulp which as a consequence results in reduction in the yield of olives. Part of the production is also lost due to premature falling of the attacked fruit. In table olives, however, the damage extends to the sterile punctures, which cause the variation in production.

A qualitative aspect to be considered is the significant deterioration in the quality of the oil extracted from olives with a high percentage of attacks by larvae of the third stage. The oil obtained from infected olives has a high acidity level and a lower shelf life as it has a higher peroxide value.

Adult olive fly

Olive fly larva inside olive

Infested olive fruits

MoA used to distribute for several years different environmentally friendly products used for monitoring and control of olive fly, include traps of various types, pheromones, attractive materials, and attract and kills pesticides.

These means of pest control, will be of great importance in the future as Lebanon has banned the largely used pesticide (Dimethoate) for olive fly control. Thus, the Lebanese market is missing an effective chemical pesticide against olive fly.

One of the main conditions, for successful pest control, using these products is that the treatment covers a large olive cultivation area. Therefore, in order to ensure the success of the control process, the quantity of distributed product should be sufficient for the entire season and for a large area of olive cultivation.

About 51 % of the interviewed producers declared to receive this kind of product. This figure is relatively high, may be due to the fact that MoA is currently distributing attract and kill pesticide for olive fly during the same period of the survey.

The effect of these substances was considerable, as 59 % of the interviewed producers reported that the olives fruits were healthy after treatment, and 43 % sad that the quality of the produced olive oil has been improved. 81 % received training on how to use these products. About third of the farmers (32 %) depend totally on MoA distribution and 80 % sad that they received quantity was sufficient.

Recommendations:

- Activate the Olive fly control program and strengthen it with financial and human resources.
- Purchase Traps/pheromones/attractive materials/ attract and kill pesticides each year and distribute to farmers after setting up a clear and applicable distribution mechanism that ensure reaching the eligible farmers in all regions and in sufficient quantity for all.
- Develop system for the monitoring and evaluation of the distributed traps, pheromones, attractive materials, and attract and kills pesticides. Trough creation of demonstration plots to test these products pre-distribution, and collect farmers' feedback post-distribution, in order to avoid the usage of useless and ineffective products and the loss of funds allocated to support the olive sector.

4.5.3 Distribution of live Harvester machine

The major reason for the use of mechanical olive harvester is the high cost of manual harvesting, the most expensive cost in olive production (About 35 – 50 % of the total cost of production). The olive sector is losing slowly but surely the advantage of "family business" and relying more and more on hired labor at higher cost. The adoption of mechanical means of harvesting is the best solution to reduce the cost of production, protect the trees from damages, consequently saving on money and on time.

Not all olive harvester are suitable for olive orchards in Lebanon. Several factors determine the type of machine to be adopted, such as olive variety, fruits detachment force, pruning and training form, the size of the tree orchard, orchard topography, and the density of trees in the orchard. In order to get the proper and useful machine, there is an urgent need to test the various models before be adopted.

Farmer wants machines easy to transport, easy to operate, able to drop the largest amount of fruits without damaging the tree and finally low cost of maintenance. Experts and farmers who actually used these machines over several seasons agreed that the savings in the cost of harvesting is not less than 35 %.

When coming to olive harvester Machines distributed by MoA, the figures were not encouraging, either in terms of the low number of beneficiaries or in the inability of farmers to give accurate figures. It was not possible to determine the reason for the decline in the number of

beneficiaries. Is it due to the shortage in the availability of these machines or because farmers are not convinced of the feasibility of these machines.

Only 12.5 % declared to benefit from harvesting machines. After checking this figure, it was found that most of the beneficiaries (84 %) are members of agricultural cooperatives. 50 % of these beneficiaries are from Hasbaya, 25 % from Chouf, 16 % are from Hermel 16% and only 8 % from Sour.

The saving on term of cost reduction was 35 %. While 55 % are not ready or able to buy these machine and rely totally on MoA distribution.

Recommendations:

- Build the technical capacity of olive growers in terms of harvesting and post harvesting practices (Training sessions, mechanical harvesting demonstration sessions, training on maintenance and operation of these harvester machine…). Encourage and motivate farmers to adopt mechanization for olive harvesting;
- Support small/medium farmers to reduce the cost of production through providing harvesting machine to the cooperatives, which in turn rents them to farmers.
- Develop system to test the various harvesting machine models before adopting them. The system has to take in consideration in particular farmers and expert feedback;
- Follow-up cooperatives which benefit from harvester distribution to ensure the good use and operation of these machines;
- Develop clear and applicable distribution mechanism that also identify the target group of harvesting machines distribution with the preference to be the well managed agricultural cooperatives, able to proper manage the renting and maintenance of these machines. Consequently the number of beneficiaries will increase, distributed machines reach a larger number of beneficiaries and to be sure that these machines will not finish under the stairs or in the forgotten dusty warehouses.

4.5.4 Distribution of stainless steel tanks for olive oil storage

Storing olive oil in an air-tight stainless steel container away from light and heat maintains its quality and could last up to 18 months without losing its sensory and chemical characteristics. The proper conservation of olive oil maintains its quality, improves the profitability for the producer who can sell the production over a longer period of time without an alteration of its quality, especially in low-yielding years due to alternate bearing.

Stainless steel is an inert material that blocks light, can be easily cleaned and shows high resistance to mechanical damage. Stainless steel tanks are used by medium and large olive oil producers, olive mills and olive oil trading companies in order to store bulk extra virgin olive oil and protect it from deterioration. Stainless steel tanks could be of different size, from 5 liters container to thousands liters, and are used for transportation and/or storage, with floater or nitrogen system to isolate and protect oil from oxidation.

In order to have positive impact on the sector and especially to facilitate marketing and increase producer income, it is preferable that medium and large producers (including olive mills), benefit from stainless steel tank distribution. Family size tanks distribution has no impact on the development of the sector in terms of facilitating the marketing process.

Most of the olive producers participated to the survey and own stainless steel container were not beneficiaries of the MoA's distributions, however they purchased these kind of containers from the local market with personal funding. Only 9 % declared that they benefited from MoA distribution of stainless steel containers. It is also noted that ٤٢ % are not ready to buy stainless steel containers at their own expense, and are waiting MoA's distributions that can be done in the future.

Family size containers

Stainless steel containers for olive oil storage – medium size

Stainless steel containers for olive oil storage – Large size

Recommendations:

- The beneficiaries of the Stainless steel tanks distribution should be the medium/large olive oil producers, cooperatives and the olive mills, if they store the oil for long time, and not distribution of small size containers for household use;
- In case of distribution, should be preceded by assessing the needs of each farmer/cooperative/olive mill, in terms of quantity of oil stored (storage capacity).

4.5.5. Distribution of olive seedling

Since the time of South Lebanon occupation, the Ministry of Agriculture used to purchase olive seedlings from nurseries in Nabatieh region and distribute it to municipalities, local associations, cooperatives or directly to farmers in all Lebanese regions. This programs aimed to support olive seedling producers (olive nurseries) and support olive growers to extend their olive plantation. Every year until 2017, MoA used to distribute about 250.000 olive seedlings purchased from the MoA's budget. In addition, private nurseries produce tens of thousands of olive seedlings every year, directly purchased and planted by farmers, which might explain how the total olive surface increased from 53.620 Ha in 2010 to 62.042 Ha in 2018 in Lebanon.

There are some blames about the quality of these seedlings, especially for lack of certification for the variety and pest free. Administrative constrains stopped these distribution process in

2017. The Ministry of Agriculture was urged to accelerate the establishment of olive mother's trees field, a project that has been in process since 2011, In order to provide healthy propagation materials for local nurseries.

There is an urgent need to organize the olive nurseries sector and to guide nurseries to the best agricultural practices for the production of healthy and certified seedlings. Otherwise distribution of infected seedling could spread pests like Verticillium, Nematodes, olive knot (*Pseudomonas savastanoi*,) and others….

There is no doubt that these distributions have had a significant impact on increasing the area of olive in Lebanon. But the figures were not so encouraging, only 18 % declared that they had obtained these seedlings in the last 10 years. The reason may be that the farmers obtained this seedling through local bodies rather than directly from MoA and therefore was unaware of the real source of the seedlings.

Those who announced that they had obtained these seedling said that 14 % of their own olive area was planted by MoA distributes seedlings.

As for seedling quality and conformity with the declared variety, the figures declining on this subject. 42 % announced that the seedling were healthy. This figure is reduced to 37 % when they are asked if the reel variety match the declared variety.

79 % planted all the seedling received, and 40 % still needs more, while 17 % are still waiting MoA distributions to plant more olive trees.

Recommendations:

- The olive sector is in dire need of a project that organizes olive nurseries in terms of Phyto-sanitary control and varieties authentication in addition to good production practices. The project should reach the point that nurseries produce only certified seedlings. This is essential for the successful establishment of healthy and productive orchards in the future and to reduce the spread of pests and diseases.
- Instead of distributing large quantities of seedlings, which many farmers are waiting for, move to a smaller quantity but with higher quality, with emphasis on healthy seedlings and compliance with the declared varieties.
- Develop clear distribution mechanism, giving priority to those farmers who wish to plant 2 Dunums and above. Therefore, this intervention come to be of economic value and helps increase the area of olive at the national level.

4.5.6 Extension and technical assistance

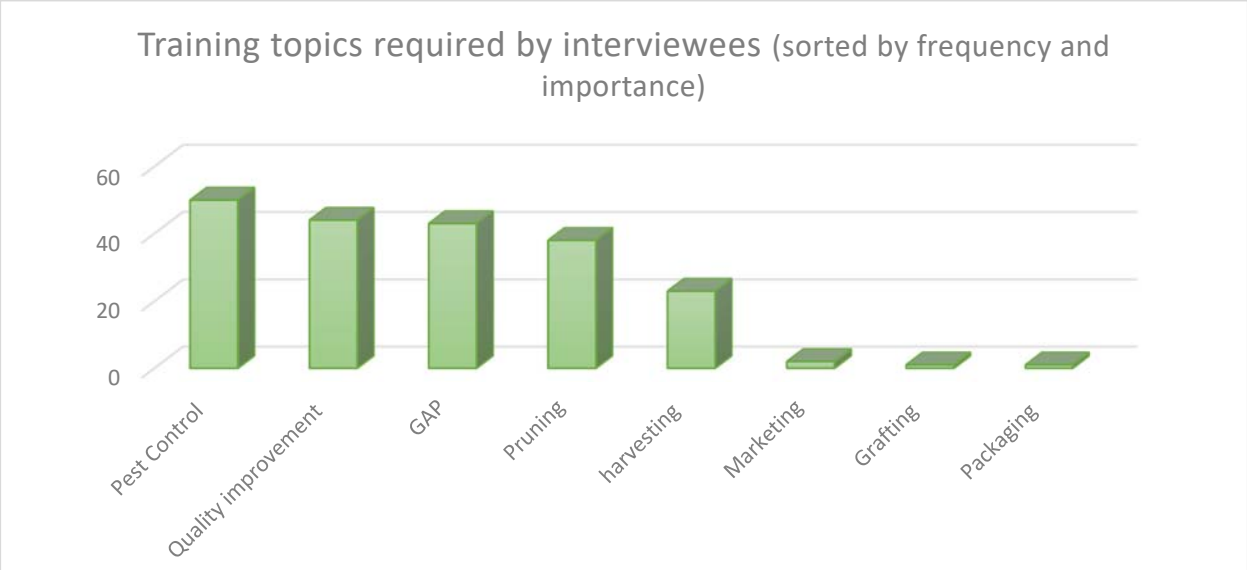
There is no doubt that the great efforts exerted by MoA, Lebanese and international NGOs, International Agencies and United Nations Organizations helped olive producers to improve olive production in terms of quantity and quality. However, the country's economic conditions, the difficulties in the sector and the low incomes of farmers have prevented some of them from

applying good production practices despite their knowledge. Of course, other farmers apply these practices and get a better result.

It was not possible to evaluate MoA extension activities and separate its impacts from the activities of other actors. This is logical, since MoA has undertaken its own activities, as well as in partnership with many NGOs or Development Agencies in the past 10 years. Consequently, it is possible that some figures are inaccurate because sometimes the farmer may not know or forgot who the interface that was doing this activity is.

Thus, 53 % of farmers declared that they benefited from the MoA extension activities. When it came to evaluate the improvement in olive production in terms of quantity and quality, most of the respondents were not able to give accurate information regarding the quantity. However, everyone stressed that the quantity and quality were increased as the result of extension and technical assistance.

63 % still need more extension and this figure is of high importance for MoA strategy for the development of the sector. As for the subjects required, the answers were clear, so the interviewees accurately identified what they need.



Recommendations:

- Strengthening and expanding pluralistic and innovative agricultural extension programs targeting all stakeholders active in the olive sector. Each one according to his competence, focusing on cost reduction, production improvement in terms of quantity and quality;
- Adopting demand-driven extension programs. The extension programs has to consider the collective issues and not only individual concerns (adopt collective-oriented extension strategy);

- Use non formal extension approaches that attract and persuade farmers and transferring smoothly new agricultural practices and technologies;
- Training farmers to use sustainable natural resource management practices;
- Examines the primary investment options, priorities, and procedures needed to address specific weaknesses within existing agricultural extension.

4.5.7 National olive oil laboratory

In 2014, and through "Olio del Libano II" activities, projects funded by the Italian Cooperation and implemented by CIHEAM-IAMB, the national laboratory for olive oil was inaugurate. This project rehabilitated the building, fully equipped, and trained the staff in Lebanon and Italy.

The national olive oil laboratory includes a complete chemical laboratory as well as a tasting room to host the Panel Test (olive oil sensorial evaluation committee), which began its training in 1998 by ICU (Italian NGO) and has not become official and accredited yet.

This stumbling and delay in the launch of laboratory services have been evident in the responses of the producers interviewed. When they have been asked about the services of the MoA's olive oil Laboratory, only 5 % declared that they had benefited from the services of this laboratory, however some of them was confused between MoA's laboratory and LARI's laboratories (Lebanese Agriculture Research Institute).

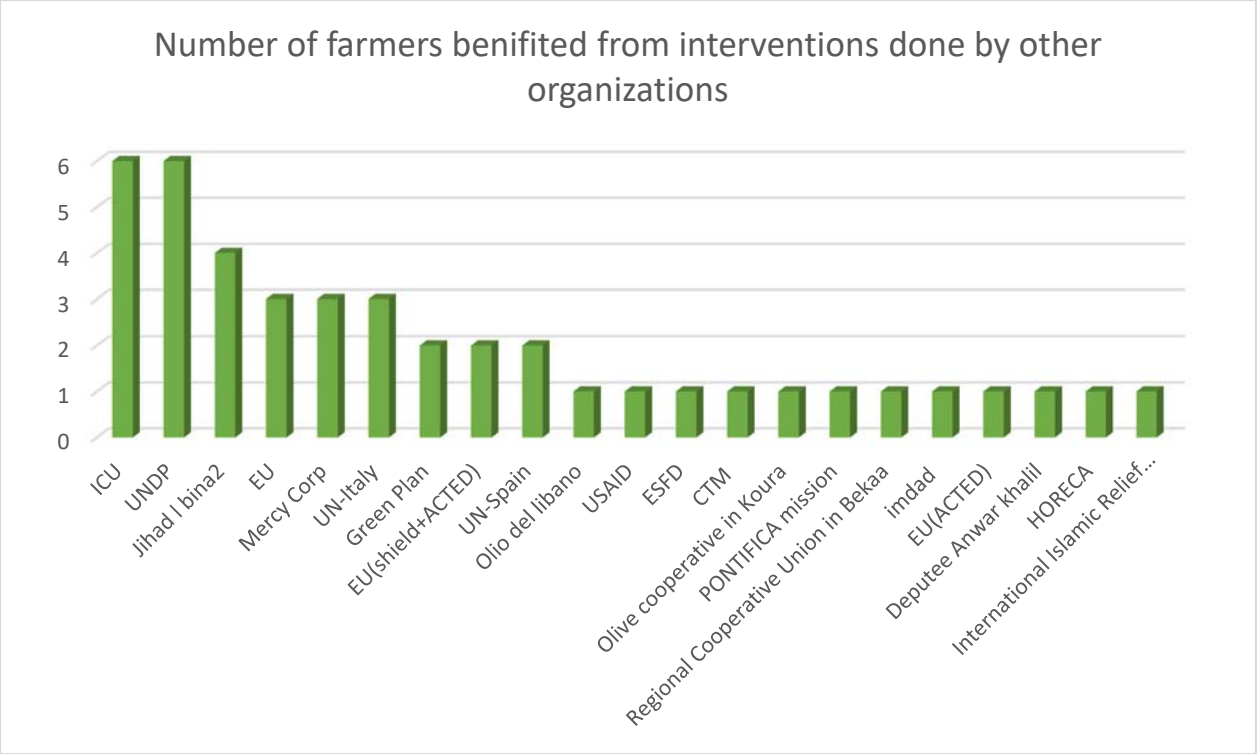
In fact, most farmers did not know about the existence of this laboratory, and even more, did not know its importance for the development of the sector. This confusion extended to the questions about olive producer benefiting from this laboratory. The answer was only 5% with yes to the question if the laboratory helped in marketing the oil. As for whether this laboratory has helped improve the quality of the oil, the answer was yes only for 4 % of the interviewed.

Recommendations:

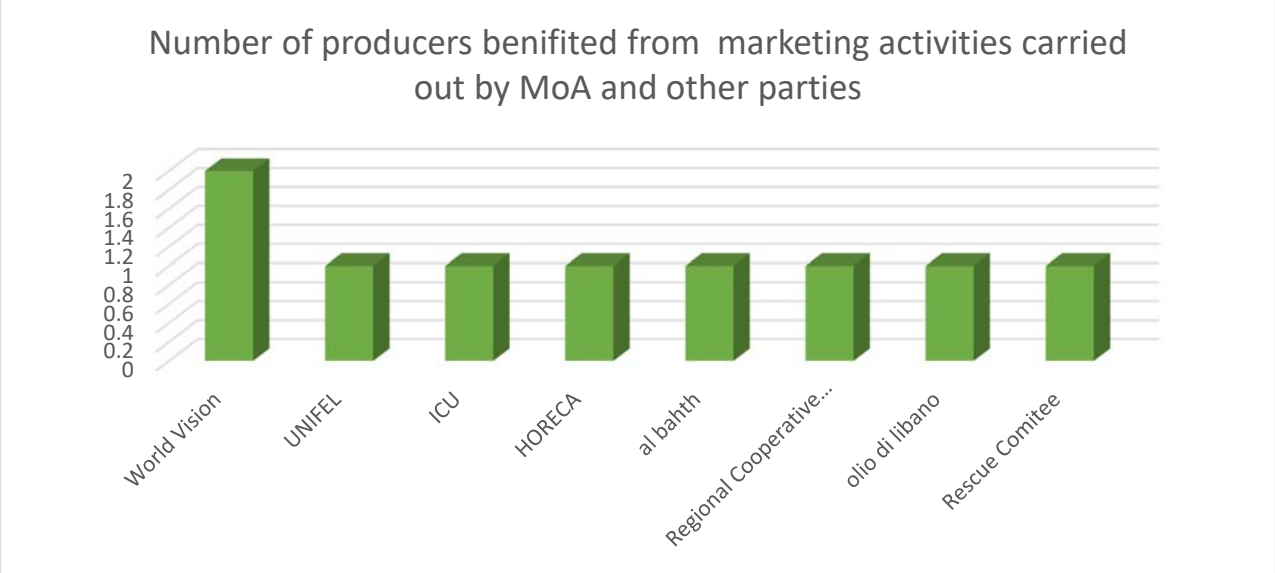
- Activate and develop the olive oil laboratory and introduce farmers to the services that can be provided.
- Accelerate the process of accreditation of Panel test at national and international level.
- Create a legal formula that allows MoA's laboratory to provide paid and not free services. This ensures sustainability and secures the necessary supplies.

4.5.8 Other Information

The farmers were also asked if they benefited from the interventions related to the olive sector from sources other than MoA. The answer was as shown in the diagram below.

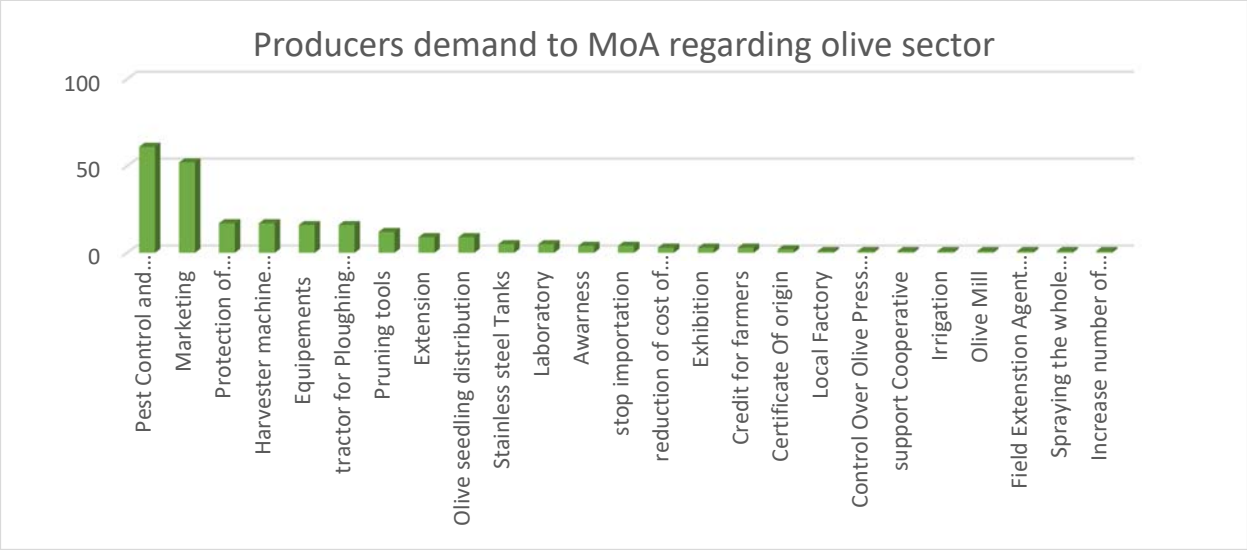


As for the question of whether they benefited from marketing activities carried out by MoA and other parties, the figure was low, indicating that the subject of marketing needs a lot of work from different actor in the sector.



The last question done in the survey was “In which part of the olive production chain would like Ministry of Agriculture to intervene?”. There were no proposed choices in this question, a free

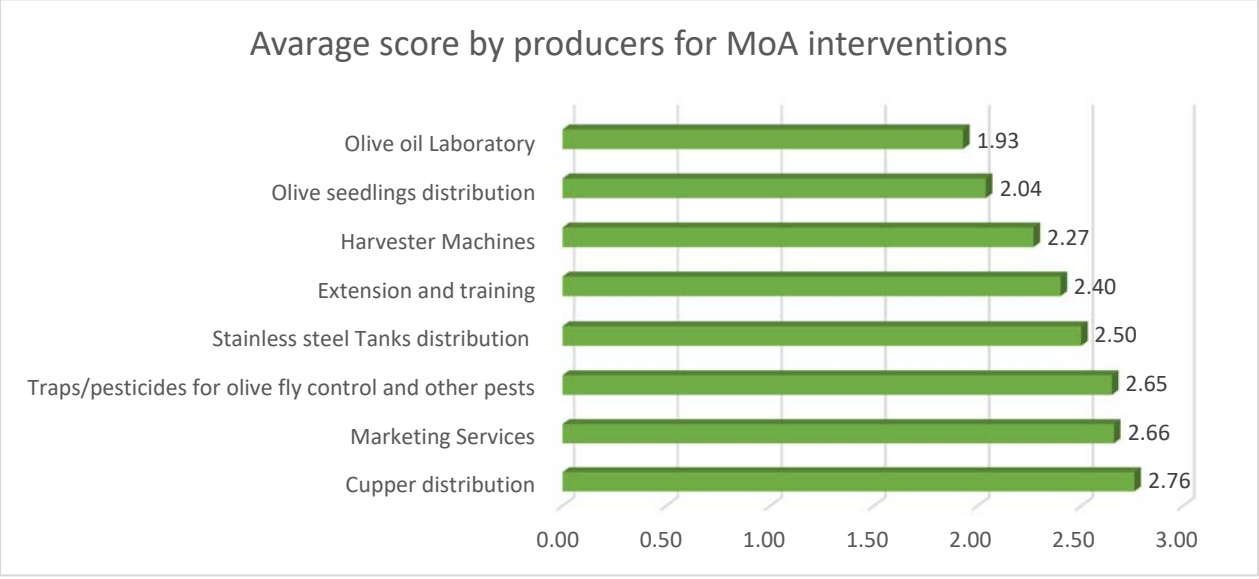
answers was requested. Consequently, the answers, which are actually the producer's demands to the Ministry of Agriculture, are as shown in the diagram below:



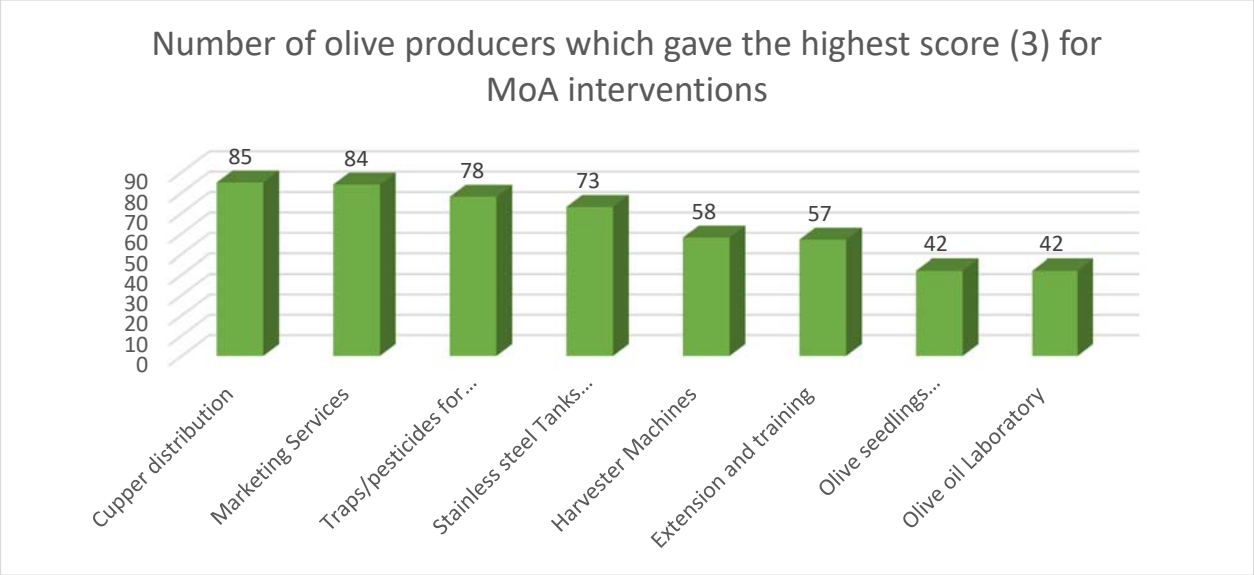
4.5.9. Olive oil producers' evaluation regarding MoA interventions to support olive sector in terms of importance, effectiveness and need

At the end of each interview, the interviewees were asked to evaluate the MoA's most essential interventions in terms of importance, effectiveness and need for the development of the olive sector. Interviewees were required to give a score of zero to three for each intervention of the Ministry. 3 (high) - 2 (medium) - 1 (poor) - 0 (no need)

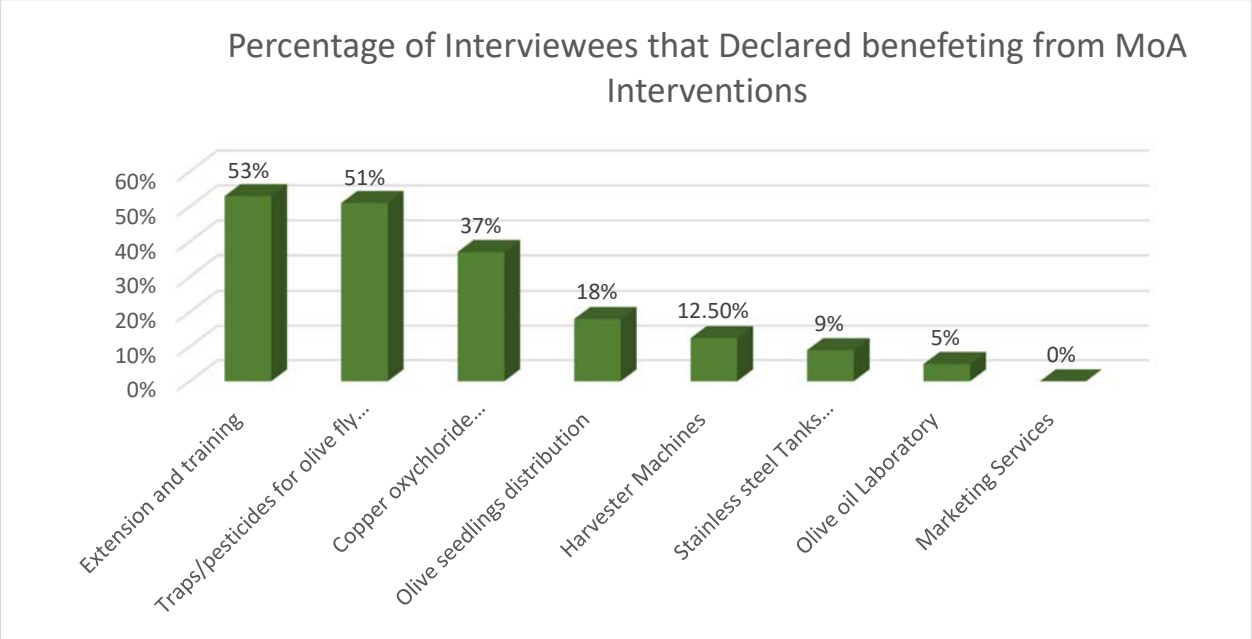
The average score for each intervention was as shown in the diagram below:



For the highest score 3, which means that this intervention is of high importance, high efficiency and an urgent need for producers, the interventions Copper oxychloride distribution, marketing, traps and pesticides for pest control and Stainless steel tanks distribution were the most required. The results are in the diagram below:



The chart below gather all MoA's interventions and shows the percentage of interviewees who announced that they have benefited from MoA interventions in the past 10 years.



4.5.10 Evaluation of MoA Heads of Agriculture Centre (Extension Agent)

In order to complete the evaluation of the MoA's interventions, and to highlight the point of views of the heads of MoA Agricultural Centers in the six selected areas, the heads of the Centers have been interviewed. They are considered the MoA representatives, they are extension agents or they lead the agricultural extension team in their respective areas, and they are in direct contact with the farmers, experiencing their problems, suffering, and daily demands that the farmers complain about it.

The Heads of MoA Agriculture Centers have been interviewed and asked about MoA support scheme to olive sector, their evaluation regarding the accomplished interventions, the problems suffered by the sector and then compare these data with the information provided by farmers.

As for their general evaluation of the MoA's interventions in the olive sector in the past ten years, the answers were satisfactory, with some complaint about the distribution method and the access of eligible beneficiaries to the materials and equipment distributions.

As for the quantity allocated to each area, all agreed that the quantities are not enough. The shortage varies from region to region.

Their assessment of the impact of these interventions on increasing production and improving the quality of the product was in general positive. While for the marketing interventions, the results were limited and all stressed the importance of developing and activating the marketing activity carried out by MoA.

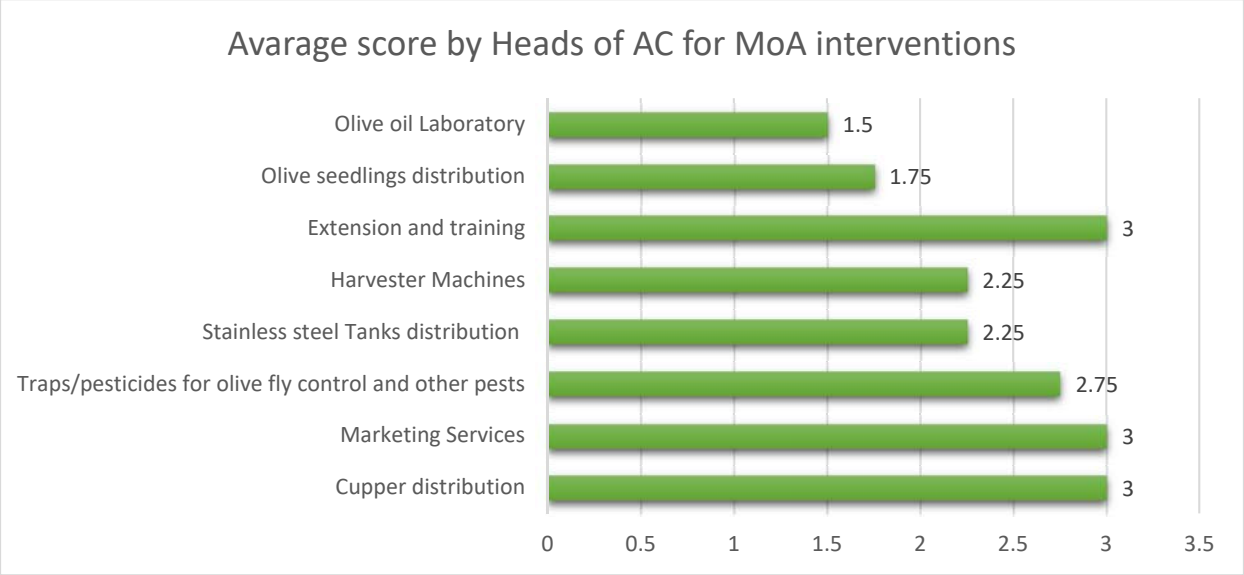
The three most important interventions undertaken by the Ministry were as follow:
1 distribution the Copper oxychloride;
2 distribution of stainless steel tanks for oil storage;
3 distribution of olive harvesting machines.

The fifth question was about what MoA has not done so far, and these missing interventions are beneficial to the olive sector. Among the suggestions were, the establishment of local committees in the regions, activation of the "olive office", or the establishment of a bodies concerned with marketing.

According to the heads of the agricultural centers, the main problems facing the sector are as follows:
- Peacock eye disease and other pests;
- Marketing and the absence of regulations of the sector;
- Smuggling foreign olive oil and selling it in the markets as a Lebanese product;
- Harvesting and post-harvesting practices that affect quality.

As done for interviewed farmers, the Heads of Agriculture centres were asked to evaluate the most essential interventions in terms of importance, effectiveness and need for the development of the olive sector. The average score for each intervention was very nearly identical as farmers scoring, except for extension which was given a higher score.

The average score done by the Heads of Agriculture Centers for each intervention was as shown in the diagram below:



5. CONCLUSION

All indications show that olive production in the last ten years has increased in terms of plantation area, quantity of production and quality of oil. In addition to the Ministry of Agriculture programs, interventions of other development projects have left their mark on the sector. Determining who is behind this improvement in production accurately is difficult. The interventions of MoA have had a significant impact, according to the results of the study. It should also be clear that some of the interventions that had vital effects on production, such as the distribution of pest control materials and the distribution of olive seedlings, were reserved exclusively for MoA in the last 10 years.

Despite the belief among those interested in the agriculture sector that a lot of assistance and support has been done for the olive sector in the past years, the figures collected in a previous assessment and the current survey indicated the opposite. These figures show that this sector did not receive the sufficient supports and funds and still needs more attention in order to resolves the problems that the sector suffer from.

All the data shows that olive cultivation still and will remain in the future of great importance to the families that carry out this activity, the agricultural sector and the national economy. The olive sector have been identified by several studies as a sector with high socio economic importance, high opportunities and potential for upgrade and improvement. Therefore, it is impossible to replace or neglect the olive sector in Lebanon at all. No reasonable person or expert in the reality of Lebanon can recommend this.

What can be recommended is to support this sector cleverly in the future. With the limited available financial resources, MoA can implement smart programs to support the sector at various levels but with clear objectives, clear target groups and concrete expected results. It is very important that these programs should be part of an unblemished strategy to promote this sector, as well as include specific and clear interventions, especially a monitoring system and an impact assessment.

The future MoA's smart interventions should address the olive production chain and focus on problems that can be solved.

6. RECOMMENDATIONS

6.1 Recommendations at field level

Working to improve production and reduce the costs through:

1.1 Support the expansion of olive cultivation, especially in marginal lands, which has economic, social and environmental benefits;

1.2 Build the capacity of olive producers in IPM, GAP, Harvesting and post-harvesting good practices, modern extraction technologies, olive oil quality, management and accounting;

1.3 Adopt pluralistic and innovative agricultural extension programs targeting all stakeholders, each one according to his competence, focusing on cost reduction, production improvement in terms of quantity and quality;

1.4 Support agriculture cooperatives by raising their capacities at various levels and improve the services that can be provide to farmers such as mechanization, marketing. The priority is for cooperatives as beneficiaries of Ministry of Agriculture interventions;

1.5 Support the creation of specialized cooperatives or union of cooperatives, in terms of olive production or olive products marketing;

1.6 Create olive and olive oil high council similar to wine sector;

1.7 Activate MoA's programs aiming to control olive pests, and supplying pest control materials environmentally friendly;

1.8 Provide special attention to table olive and derivate, organic farming olive oil soap and by-products management;

1.9 Encourage the active participation of women and youth in the management of the sector in order to maintain and ensure sustainability, by facilitating their enrolment in the production and marketing process through the introduction of profitable and attractive innovative practices and technologies such as GAP, organic production, soap production, table olive processing, marketing and E-commerce…;

1.10 Support and emphasize olive nurseries sector organization in terms of Phyto-sanitary control and varieties authentication in addition to good production practices (production of e certified seedlings) and creation of controlled mothers' fields in the concerned regions;

1.11 Conduct complete scientific studies to evaluate local olive varieties (characterization of the local varieties), especially the groups of varieties called Soury/Balady;
Studying the possibility of introducing new olive varieties characterized by pest resistance with good production in terms of quantity and quality;

1.12 Examine the primary investment options, priorities, and procedures needed to address specific weaknesses within existing agricultural extension;

1.13 Strengthen the role of MoA's Agriculture Centers present in different olive producing regions in extension, technical assistance and materials distributions;

1.14 Launch projects at regional level with clear objectives, clear expected results and time-bound to find specific solutions to the identified problems of the olive oil sector (Pest control, olive varieties to be adopted, expanding olive plantation, low productivity, low oil yield, …).

6.2 Recommendations at Harvesting and post-harvest levels, (olive oil extraction and storage levels)

In order to produce extra virgin olive oil and conserve its quality:

2.1 Build the technical capacity of olive growers in terms of Harvesting and post harvesting practices with focus on olive mechanical harvesting;

2.2 Develop system to test the various harvesting machine models before distribution;

2.3 Provide harvesting machine to the cooperatives, which in turn rents it to small/medium farmers. Follow-up these cooperatives to ensure the good use of these machines;

2.4 Activate MoA's program for the control of olive mills, emphasizing on hygiene and GMP. Strict application of laws, good production practices and hygiene conditions in mills, and up to the closure of mills in violation of the laws and rules;

2.5 Build the technical capacity of olive millers in terms of olive quality, GMP, Hygiene, modern technologies and by product management;

2.6 Facilitate access to finance for mills who wish to upgrade to modern technology and improve infrastructure, abandoning the traditional presses;

2.7 Supporting switching to good means and conditions for proper storage through awareness, guidance and facilitating access to finance;

2.8 In case of stainless steel tanks distribution, the potential beneficiaries should be the medium/large olive oil producers, cooperatives and the olive mills, depending on their needs and storage capacities.

6. 3 Recommendations at marketing level

In order to identify new marketing channels and organize the internal informal markets as it is crucial for small/ medium producers, olive mills and cooperatives, trough:

3.1 Develop national olive oil marketing strategies based on the production of extra virgin olive oil, application of clear regulation in the local markets, identify new marketing channels and potential international markets;

3.2 tighten border control to prevent the entry of smuggled olive oil from neighboring countries;

3.3 Develop and implement legal mechanisms to limit the marketing of foreign olive oil as Lebanese olive oil in the national and international markets:

- impose traceability;
- impose labeling requirements with regards to origin and olive oil quality;
- develop regulations regarding geographical denomination.

3.4 Build the capacities of olive oil producers and cooperatives on best production practices and marketing requirements;

3.5 Support and emphasize the creation of specialized marketing cooperatives that could aggregate small and medium producers, with the aim purpose to facilitate olive products marketing and increase Lebanese product selling in the internal and external markets;

3.6 Facilitate effective participation of cooperatives in relevant local, regional and international exhibitions, directly or through MoA participation. This participation to this kind of exhibitions should be based on clear objectives, focusing on international markets that the Lebanese olive oil is actually exported (GCC, USA, …) or new potential markets where Lebanese olive oil could be able to penetrate;

3.7 Convert the ceremony "Olive Day" to become an annual activity with the targets of consumers awareness, in addition to facilitate direct selling, in different regions of Lebanon;

3.8 Special attention for other olive products in order to facilitate the marketing, such as table olive, olive tapenade, aromatized olive oil, and finally olive oil soap which has been developing in Lebanon in recent years and needs support to improve its marketing;

3.9 Special effort aims at increasing olive oil consumption per capita at national level, through promotional programs aimed at highlighting the health and therapeutic benefits of olive oil and its importance in cooking instead of other vegetable oils;

3.10 Organize awareness campaigns through the media to inform the consumer about the quality of extra virgin olive oil and encourage its consumption;

3.11 Introduce the Lebanese Extra Virgin Olive Oil in the tourism sector (Culinary tourism) through coordination with the Ministry of Tourism, Restaurant Owners Association and Artisanal Shops;

3.12 Oblige restaurants to use sealed and labeled glass bottles of extra virgin olive oil to be placed on the table, just like the European Union countries that have legally imposed with the intention of consumer protection;

3.14 Establish a legal framework that requires to all public institutions, security and military forces that consume olive oil in large quantities to buy Lebanese olive oil only and make sure its source.

6.4 Recommendation at legislative and administrative level

In order to develop cooperatives activities and protect olive and olive oil local production:

4.1 Coordinate with the Customs Department and the Consumer Protection Department to combat fraud at all levels, especially with regard to origin and quality of olive oil. in addition, combating smuggling of olive oil and tracking it in the local markets to prevent its sale as Lebanese oil;

4.2 Conclude trade exchange agreements with non-olive producing countries to obtain customs exemption for olive oil;

4.3 Develop traceability system, field register framework and geographical indications programs;

4.4 Review the olive oil Norms issued by LIBNOR and make it mandatory;

4.5 Empower, support and build cooperatives' capacities to mitigate structural, financial and regulation problems that are facing, allowing to play its roles of reducing cost of production, aggregating product and creating linkages farmers/traders;

4.6 Organize the olive oil direct sales process (informal market), especially regarding labelling (a label on each container) and bind the use of appropriate container for oil, preventing what is harmful;

4.7 Setting up a clear and applicable distribution mechanism that ensure reaching the target farmers in the selected regions and in sufficient quantity;

4.8 Develop a system to safeguard and archive information related to MOA interventions and a system to collect feedbacks from fields, monitor results and evaluate these interventions. Develop measurable indicators to evaluate these interventions;

4.9 Activate and develop the olive oil laboratory and introduce farmers to the services that can be provided. Prepare a decree or law proposal to amend the management and operation system in order to ensure sustainability.

7. LIST OF ANNEXES

Annex I: Questionnaire templates