



Food and Agriculture Organization
of the United Nations



NON-WOOD FOREST PRODUCT VALUE CHAINS IN LEBANON

NON-WOOD FOREST PRODUCT VALUE CHAINS IN LEBANON

Kanj HAMADE

FAO Supervising Officer:

Abdel Hamied Hamid

Senior Forestry Officer

Food and Agriculture Organization of the United Nations (FAO),
Regional Office for the Near East and North Africa, Cairo, Egypt

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-109530-0

© FAO, 2016

FAO encourages the use, reproduction and dissemination of material in this information product. Except where otherwise indicated, material may be copied, downloaded and printed for private study, research and teaching purposes, or for use in non-commercial products or services, provided that appropriate acknowledgement of FAO as the source and copyright holder is given and that FAO's endorsement of users' views, products or services is not implied in any way.

All requests for translation and adaptation rights, and for resale and other commercial use rights should be made via www.fao.org/contact-us/licence-request or addressed to copyright@fao.org.

FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org.

Cover photo: © FAO/Abdel Hamied Hamid

TABLE OF CONTENTS

List of Acronyms.....	vi
Foreword	vii
Executive summary	viii
CHAPTER 1	
Background	1
1.1 Lebanon's forest management: policies and regulations	1
1.2 Methodology	3
CHAPTER 2	
<i>Pinus pinea</i> nuts	5
2.1 Overview	5
2.2 Pine nut production	8
2.2.1 The production steps	8
2.2.2 The value chain actors.....	11
2.3 SWOT analysis and Recommendations.....	13
CHAPTER 3	
Honey.....	15
3.1 Overview and value chain map.....	15
3.2 The production base.....	16
3.3 Trade and market prices structure	19
3.3.1 Marketing channels.....	19
3.3.2 Import/Export trade.....	20
3.4 SWOT analysis and Recommendations.....	23
CHAPTER 4	
<i>Origanum syriacum</i>	25
4.1 Overview and value chain map.....	25
4.2 The value chain actors and their marketing channels	28
4.2.1 Direct sales and sign value.....	29
4.2.2. Mainstream market channel.....	30
4.2.3 Import/Export trade.....	31
4.3 SWOT analysis and Recommendations.....	33

CHAPTER 5	
Laurus nobilis	35
5.1 Overview and value chain map.....	35
5.2 The production base and market prices	39
5.3 SWOT analysis Recommendations.....	41
CHAPTER 6	
Conclusion	42
References	44
ANNEXES	45

LIST OF FIGURES

Figure 1. Lebanon forest cover map	2
Figure 2. Map of Lebanon stone pine forest	6
Figure 3: <i>P. pinea</i> harvest team at work (Bkassine, 2014)	9
Figure 4. Lebanon <i>Pinus pinea</i> value chain map	12
Figure 5. Lebanese honey production in tonnes 1993-2013.....	15
Figure 6. Lebanon honey value chain map	18
Figure 7. Distribution of honey price value across different actors by marketing channels	19
Figure 8. Lebanon import of honey between 2004 and 2014 in thousands of US\$	20
Figure 9. Lebanon export market diversification prospect for Honey.....	22
Figure 10. Evolution of Lebanon honey export value per export channels 2004-14 in thousands of US\$.....	22
Figure 11. Lebanon <i>Origanum syriacum</i> value chain map.....	26
Figure 12. Volume of import/export of Lebanon zaatar mixes and <i>O. syriacum</i> (2011-2015, in tonnes).....	32
Figure 13. Distribution of Lebanon export of zaatar mixes and <i>O. syriacum</i> 2015	33
Figure 14. Distribution of Lebanon export of zaatar mixes and <i>O. syriacum</i> 2012	33
Figure 15. Mixed Forest with a relatively high laurel presence in Lebanon	36
Figure 16. Mixed Forest with a relatively high laurel presence in southern Lebanon	37
Figure 17. Mixed forest with a relatively high laurel concentration in Akkar.....	37
Figure 18. Lebanon laurel oil value chain map.....	38
Figure 19. Laurel oil starting to surface	40
Figure 20. Backyard household production unit of laurel oil	40

LIST OF TABLES

Table 1.	Lebanon NWFPs summary table	3
Table 2.	Distribution of pine nut exploitations by typologies.....	6
Table 3.	Price black shells and white cones (2014).....	10
Table 4.	SWOT analysis of the <i>P. pinea</i> value chain.....	13
Table 5.	SWOT analysis of the honey value chain.....	23
Table 6.	SWOT analysis of the <i>O. syriacum</i> and <i>Salvia fruticosa</i> value chain	33
Table 7.	SWOT analysis of the <i>L. nobilis</i> value chain.....	41
Table 8.	Data table for Figure 5 (Lebanon honey production in tonnes)	45
Table 9.	Data table for figure 8 (Lebanon import of honey in tonnes).....	45
Table 10.	Data table for Figure 10 (Lebanon honey export – in tonnes)	45
Table 11.	Data table for Figure 9 (Lebanon honey export diversification)	46
Table 12.	Data table for Figure 12 (export and import of zaatar mixes and <i>O. syriacum</i> – in tonnes).....	46

LIST OF BOXES

Box 1.	Lebanon’s Carob opportunity	4
Box 2.	Threats to Lebanon pine forest	14
Box 3.	Rules and regulations regarding honey	23
Box 4.	Sage – <i>Salvia fruticosa</i> , <i>O. syriacum</i> and the international essential oil markets.....	28

LIST OF ACRONYMS

CBO	Community Based Organization
CCD	Colony Collapse Disorder
DCS	Dry Cone Syndrome
EU	European Union
FAO	Food and Agriculture Organization of the United Nation
GCC	Gulf Council Countries
MOA	Ministry of Agriculture
MOE	Ministry of Environment
NENA	Near-East and North Africa
NWFP	Non-Wood Forest Product
PA	Protected Area
UNDP	United Nations Development Program
US	United States
USAID	United States Agency for International Development

FOREWORD

There is global recognition that forests are not only about trees but they are about the people who live around them. Empirical evidence on the role of forests in food security, poverty reduction through income and employment generation and in addressing the challenges of climate change are increasingly generated and documented. Over 1.6 billion people worldwide depend heavily on forest resources for their livelihoods, of which 1.2 billion people in developing countries use trees on farms to generate food and income.

For the Near East and North Africa (NENA) region where forest resources are scarce and the potentials for timber production are limited, Non-wood Forest Products (NWFPs) such as fruits, bark, roots, tubers, corms, leaves, flowers, nuts, gums, sap, resins, dyes, honey, mushroom, medicinal and aromatic plants and wildlife animal products are gaining growing importance. The local people use these products for their domestic daily needs as a source of food, fodder, medicine and for income generation. However, the actual production of the majority of NWFPs remain a small fraction of their potential production in most countries of the region and their full potentials for poverty reduction, livelihoods improvement and environmental sustainability has yet to be harnessed to help local people in the region out of poverty and food insecurity. Though the commercialization of NWFPs in the NENA region goes deep in the region's history and for millennia, still the local producers/collectors remain at the sidelines and get the smallest commercial margin as compared with other market actors.

It is under this background that the FAO through its Regional Initiative for Small Scale Family Farming (SSFF) supported country studies in selected NENA countries on the potential of NWFPs for value chain development and value addition to generate evidence-based data on the valorization of the NWFPs in the NENA region to support policy recommendations, strategies and actions that can increase benefit retention and poverty reduction from NWFPs commercialization at the local level and enhance their contribution to the well-being of the rural communities, to the national economies and to sustainable development of NENA countries at large.

Abdel Hamied A Hamid

Senior Forestry Officer

FAO Regional Office for the Near East and North Africa

EXECUTIVE SUMMARY

Lebanon has undertaken significant efforts, with the support of the FAO as well as other international donors, to improve and preserve its forest capital, which covers approximately 139 376 hectares (ha) of land – representing 13.3 percent of country’s land area- in addition to 108 378 ha of other wooded land or shrub land. Policy makers and private actors have tried to link forest preservation and reforestation efforts to the support and valorization of non-wood forest-based livelihoods. In Lebanon, Non-Wood Forest Products (NWFPs) directly generate between US\$ 80 to 97 million of sales per year, creating (primary and secondary) income for 10 000 to 15 000 rural households, so between 42 000 and 63 000 people¹.

This report triangulates qualitative and quantitative primary and secondary data to analyze Lebanon’s main NWFPs value chains: pine nuts – *Pinus pinea* -, honey, Syrian oregano and sage – *Origanum syriacum* and *Salvia fruticosa* -, and laurel - *Laurus nobilis*. For each value chain, the report proposes recommendations for the development of innovative and adaptive interventions that allow for the improvement of forest-based sustainable livelihoods.

These recommendations are centered on the need for the development of competitive strategies for value chains that should be focused on quality improvements linked to a branding that promotes the territory as well as the sustainability and fairness of production practices. Quality focus is a *sine qua non* condition for the economic viability of NWFPs, especially since expansion of production is in most of the cases restricted due to the limited availability of the natural resources. This quality and differentiation-focused strategy needs to be supported by improvements to value chain governance through the implementation of rules and regulations, including product nomenclature standardization. National institutions should create an enabling business environment, allowing for better integration and cooperation between the value chain actors. Specific emphasis should be put on improving forest management and collection practices, as well as on developing up-to-date processing technology.

The report shows that there is scope for capitalizing on NWFPs to valorize forests and create income generating activities. Income generated from the main NWFPs could witness a significant increase if efforts are made to: (1) valorize production by focusing on quality and develop sustainable forest collection labels and territory-based branding schemes - especially for *Pinus pinea* and *Origanum syriacum*; (2) develop innovative and up-to-date technology processing methods – especially for *Salvia fruticosa* and *Laurus nobilis*. Furthermore, throughout the analysis honey stood out as having strong potential for production expansion and for accessing high value export markets; the honey value chain could potentially positively impact the livelihood of a large number of rural households, while at the same time contributing to the valorization and the sustainable management of forests and wooded areas.

¹ Income generated from NWFPs constitutes more than 95 percent of the overall forest products’ income since logging activities and charcoal production are illegal and practiced – for market purposes - on a very limited scale. Nonetheless these activities are still present in some areas of Lebanon due to hard economic conditions and households’ heating needs in winter.

Background

1.1 Lebanon's forest management: policies and regulations

Lebanon has undertaken significant efforts, with the support of the FAO as well as other international donors, to improve and preserve its forest capital, which covers approximately 139 376 ha of land – representing 13.3 percent of country's land area- in addition to 108 378 ha of other wooded land or shrub land² (Figure 1). National efforts have included legal reforms, protective measures, large national and local reforestation programs, as well as projects aimed at improving the productivity and sustainability of Non-Wood Forest Products (NWFPs). Most of these projects have included a local community engagement component to ensure the sustainability of interventions.

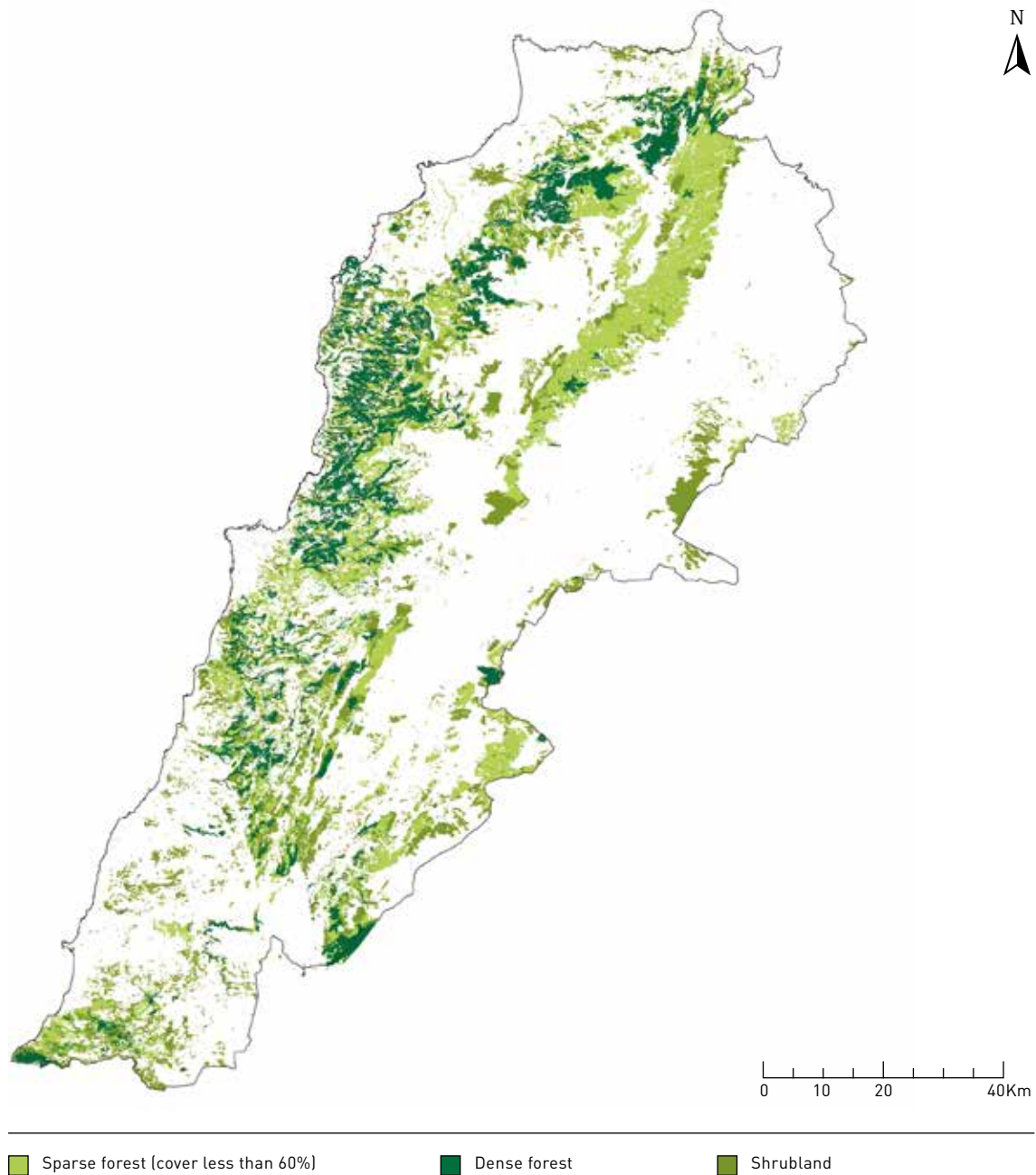
Today most of the laws and regulations governing forested areas fall under the responsibilities of both the Ministry of Agriculture (MOA) and the Ministry of Environment (MOE). Lebanon has two forest laws. The Forest Code of 1949 provides the basis for the management of forests by the MOA, while a second law (law 85/1991) is related to forest protection and was promulgated in 1991 and amended in 1996 (law 558/1996) by law 558 of 1996. In addition, the Law 690/2005 governs the establishment of protected areas. Based on law 558/1996, the MOA has designated more than a dozen sites as himas³and/or protected forests. As a result a number of activities have been banned inside forests (including camping, pruning and logging, grazing and hunting) within a specified protection radius, usually 500 meters. The ban exempts activities related to forest management and research. Although the MOA has used law 558/1996 to implement protection regulations, the MOE is the leading government agency responsible for the management of officially protected areas in Lebanon. Article 23 of Law 690/2005 mandates MOE to determine candidate areas for establishing protected areas (PA) and criteria for PA designation, and to propose necessary laws and regulations for PA management. Today, Lebanon has 14 legally established nature reserves covering 2.2 percent of its territory. In addition to these nature reserves, the number of other types of

² FAO and MOA (2005). National Forest and Tree Assessment and Inventory. TCP/LEB/2903. FAO: Beirut. Data of National Forest Assessment: the percentage of forest cover is calculated after subtracting inland water from the total of Lebanon's surface area.

³ The word hima usually refers to traditional locally and informally managed agro-pasture areas. A hima- in the Lebanese context – refers to a locally protected area – to which specific formal and informal management rules apply. The decision of designating an area as a hima is usually made at the municipality level in coordination with local CBOs. A hima is not an officially recognized protected area at the national level – in Lebanon protected and natural reserve areas are designated by law.

protected areas has also increased, including three biosphere reserves (measuring 414 Km², almost 4 percent of the territory), 13 protected forests, 16 protected natural sites/landscapes, four Ramsar sites (convention on wetlands), five World Heritage Sites, as well as 15 classified important bird areas.

Figure 1. Lebanon forest cover map



Source: derived from FAO land cover data 2005

Although Lebanon is the most forested country in the Near-East, several factors such as forest fires and urbanization, persistent maladaptive management practices, and lack of sustainable forest and range management plans are affecting forests. Visible changes in habitats reflect fundamental transformations in Lebanese society, including uncontrolled urban expansion (urbanization, population growth), destruction and/or permanent alteration of the coastal zone, extension of agricultural areas, overgrazing, quarries, sand removal, destruction of sea bed habitats due to pollutants or trawling, and forest fires⁴. This emphasizes the need for the valorization of forest resources and the sustainable exploitation of NWFPs.

1.2 Methodology

The aim of this report is to present Lebanon's main Non-Wood Forest Product value chains. The selection and identification of the main NWFPs was carried out during a focus group organized at the Ministry of Agriculture. Selection criteria were based on the economic importance of the value chains, as well as the degree of available information. Finally, six main NWFPs were identified. They are, in order of economic importance and relevance: pine nuts – *Pinus pinea* –, honey, Syrian oregano and sage – *Origanum syriacum* and *Salvia fruticosa* –, carob – *Ceratonia siliqua* –, and laurel – *Laurus nobilis* (see Table 1).

Table 1. Lebanon NWFPs summary table

NWFP	Quantity produced	Market retails value	Export volume	Import volume
<i>Pinus pinea</i> Pine nuts	800-1 000 tonnes	US\$ 44.8-56 mil. (2014 prices)	40 tonnes	Significant volume of imports not registered
Honey	1 620 tonnes (total) 1 000 tonnes (Forest and wood land honey)	US\$ 35 mil. (total) US\$ 23 mil. (Forest and wood land honey)	545 tonnes	254 tonnes
<i>Origanum syriacum</i> Syrian oregano	1 000 tonnes (dried)	US\$ 7-12 mil. (dried <i>O. syriacum</i>) Significantly higher value for final zaatar mixes	548 tonnes (<i>O. syriacum</i> and zaatar mix)	32 tonnes (<i>O. syriacum</i> and zaatar mix) Most imports are not registered
<i>Salvia fruticosa</i> Sage	600 – 1 000 tonnes (dried)	US\$ 1.8-3 mil.	600 – 1 000 tonnes (approximately all production)	No import
<i>Ceratonia siliqua</i> Carob	2 200 tonnes of fruits producing: 660-770 tonnes of molasses and 220 tonnes of seeds	US\$ 2.5-3 mil. (total) Molasses: US\$ 2-2.3 mil. Seeds: US\$ 0.5-0.7 mil.	154 tonnes	No import

⁴ Ministry of Environment-Lebanon. (2009). Fourth National Report of Lebanon to the Convention on Biological Diversity. MOE/GEF/UNDP 2009.

NWFP	Quantity produced	Market retails value	Export volume	Import volume
<i>Laurus nobilis</i> Laurel	7 tonnes	US\$ 0.112 mil.	No export	15 tonnes of essential oil registered – mostly Laurel oil
Others	Other NWFPs includes several herbs and spices such as: <i>Rosemarinus officinalis</i> (Rosemary) and <i>Rhus typhina</i> (Sumac), as well as various mushrooms, roots and tubers; however the economic impact of these NWFPs is considerably limited.			

Table compiled from various sources: details available in the report's specific sections

The report provides the findings of the research undertaken to study five of these 6 value chains: the carob value chain was dropped to avoid duplicating efforts (see Box 1, hereunder). The research triangulated information from desk reviews and expert interviews for the *Pinus pinea* and honey value chains analysis. As for the *Origanum syriacum* and *Salvia fruticosa*, the analysis relied on a desk review, on semi-structured interviews with value chain experts and specialists, as well as on a structured questionnaire filled in by over 20 actors who are active at different levels of the value chain. For the *Laurus nobilis* value chain, the research relied only on interviews with stakeholders due to the limited literature on this subject matter.

Box 1. Lebanon's Carob opportunity

The Lebanese Ministry of Agriculture together with the German Federal Enterprise for International Cooperation have recently conducted a research study on the carob value chain as part of the project entitled "Adaptation au changement climatique des politiques forestières dans la region NENA".

The carob tree – *Ceratonia siliqua* – can be found along the coastal areas of Lebanon, as well as on the western part of Mount Lebanon at up to 800 meters of altitude. Carob trees are extensively used in the reforestation of barren and degraded land. They are also used for decorative purposes.

Carob pods are made into molasses after pitting. Carob molasses production still follows simple traditional techniques. There is only one larger manufacturing plant that has more modern production technology. The transformation process consists of several steps. Firstly, the molasses pods are pitted and the pulp is extracted. The pulp is then soaked and boiled to yield the carob molasses and some residues.

There are approximately 1 400 registered carob exploitations, covering a total area of 240 ha, according to the 2010 national agricultural survey. It is estimated that total production is around 2 200 tonnes of fruit per year. Processing of the fruit will produce 220 tonnes of seeds and between 660 and 770 tonnes of molasses.

Around 20 local intermediaries collect and aggregate carob trees' output and sell it to processors at US\$ 0.5 per kg, with a US\$ 0.2 margin per kg. It is estimated that harvesting and collection costs are US\$ 0.3 per kg. There are around 30 carob mills in Lebanon, especially in the Nabatieh and Mount Lebanon areas. Mills sell their output (seeds and molasses) to local distributors and exporters. Prices of carob seeds range between USD\$ 2.5 and 3 per kg, there are very few buyers of carob seeds. Molasses is sold at US\$ 2 per kg to distributors with a margin of US\$ 0.8 per kg. The final retail price of molasses ranges between US\$ 2.6 and US\$ 3 per kg. In 2014 Lebanon exported 154 tonnes of carob molasses.

There is scope for expanding carob molasses production by capitalizing on the potential demand of the Lebanese diaspora, as well as increasing demand for specialized functional foods, such as gluten free foods.

Pinus pinea nuts

2.1 Overview

Pinus pinea - in English Italian pine, stone or umbrella pine, or parasol pine, in French pin parasol or pin pignon, in Arabic صنوبر ثمري - is one of the most widespread trees in Lebanon. Dense and sparse forests of pine stone - *P. pinea* but also *P. halepensis* (Aleppo pine) and *P. brutia* (Calabrian pine) - cover 28 200 ha of land, representing approximately 20 percent of Lebanon's total forest cover (Figure 2). Stone pine forests are found on the western slopes of the Mount Lebanon range. *P. pinea* forests extend on altitudes ranging between sea level and 1500m, and are particularly present in the Metn, Baabda and Jezzine areas. Other types of pine forests are located at middle elevation, whereas *P. brutia* forests occupy a large area in North Lebanon, and *P. halepensis* are present in the southern part of the country (Cazas of Marjaaoun and Hasbaya), as well as in the Shouf Caza area on Mount Lebanon.

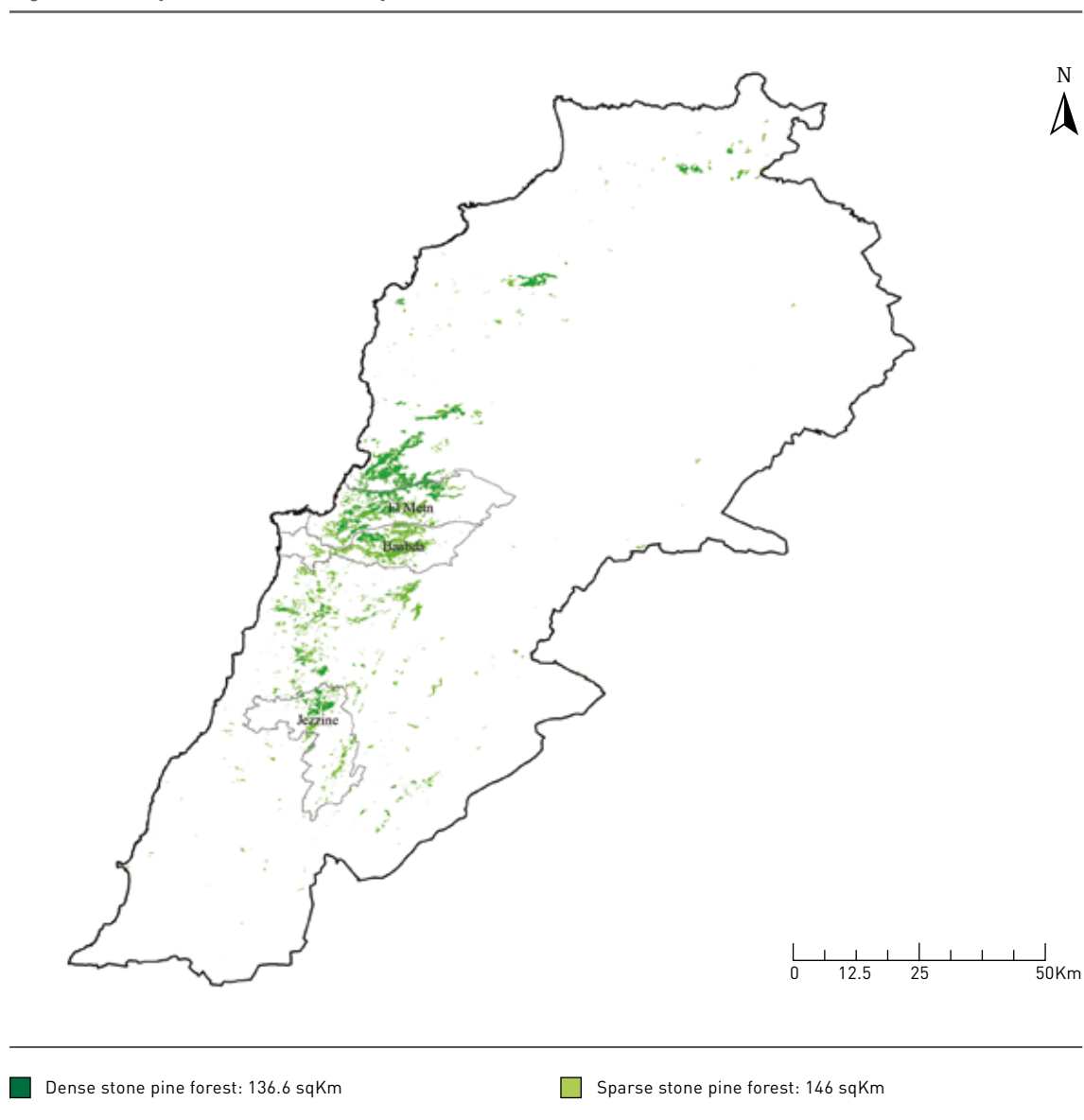
P. pinea is economically exploited for its edible seeds, which are used as a garnish in several traditional Lebanese dishes and sweets. *P. halepensis* is only exploited locally and on a limited scale in the Shouf region: its seeds are used to produce a specific zaatar mix (see section 4.2.1). *P. brutia* is not economically exploited in Lebanon.

Land ownership

According to the 2010 FAO and MOA agricultural census, there are 4 769 *P. pinea* nut exploitations with a size equal to or larger than 0.1 ha (1 dunum)⁵. These exploitations cover approximately 5 684 ha of forest land which is equivalent to 20 percent of total pine nut cover and 2.6 percent of total forest cover. Around one third (34.7 percent) of private exploitations have a size ranging between 0.1 ha and 0.2 ha; these exploitations are probably not market oriented.

⁵ Around 3 500 pine nut plots - of size less than 0.1ha - registered during the FAO and MOA 2010 census were disregarded from the data analysis. The average size of these plots is 0.034 ha, they cover a total area of 118 ha.

Figure 2. **Map of Lebanon stone pine forest**



Source: derived from FAO land cover data 2005

Table 2. **Distribution of pine nut exploitations by typologies.**

	Private	Public	Religious (Waqef)	Total
Number of exploitations	4 611	61	91	4 769
Area	2 859 ha	1 746 ha	1 079 ha	5 684 ha
Percentage of total area	50.3%	30.7%	19.0%	100%
Average exploitation size	0.62 ha	28.6 ha	11.1 ha	1.19 ha

Source: FAO and MOA 2010 agricultural census

As shown in Table 2, 61 public and 91 religious entities (mainly monasteries) own approximately 50 percent of the exploited area of *P. pinea*. The average public forest plot is 28.6 ha, while the average waqef plot is 11.1 ha. Private ownership however is highly fragmented, with around a third (34.7 percent) of private exploitations being a size that ranges between 0.1 ha and 0.2 ha, and probably not market oriented. The average size of privately owned and exploited *P. pinea* plots is 0.62 ha.

Production

Total world production of pine nuts was estimated at 32 000 tonnes in 2011, and 20 550 tonnes in 2010⁶. The high increase of production was due to a significant increase of Chinese production. China is the main producer of pine nuts worldwide (between 40 percent and 60 percent of total production depending on the year)⁷. Estimates for Lebanon's total production vary greatly between different sources, ranging between 800 and 1 000 tonnes⁸, to approximately 3 000 tonnes⁹ per year. Unfortunately exact data on production does not exist at national level.

In terms of international trade, Lebanon registered the export of 44 tonnes of pine nuts in 2014 and 30 tonnes in 2015, for a registered value of US\$ 0.9 and US\$ 0.27 million respectively¹⁰. For both years no import was registered¹¹. The lack of import data is definitely due to the registration of pine nut imports under another trade category to avoid the payment of a high tariff (70 percent of value or a minimum of US\$ 10 per kg, whichever is higher). As a matter of fact, Chinese and Turkish pine nuts can be found easily in the Lebanese market, especially since only a limited number of Lebanese households can afford to buy Lebanese pine nuts with retail prices ranging between US\$ 40 and US\$ 60 per kg depending on the year, while imported pine nuts are sold at US\$ 25 per kg (retail price). This difference in price between local and imported pine nuts is due to the high cost of production of Lebanese pine nuts compared to the Turkish or Chinese ones, which benefit from large economies of scale, but also because Lebanese pine nuts are highly valued and considered of higher quality by local and international consumers. Indeed, it is this quality margin that has allowed the Lebanese industry to export its – expensive – production to international markets.

⁶ International nuts and dried fruits council data base. www.nutfruit.org

⁷ Idem.

⁸ FAO (2012). The case of Stone pine in Lebanon. In FAO – office for the Near East (Ed.). Experiences of Near East Countries on Utilization and processing of Non-Wood Forest Products. FAO: Cairo.

⁹ Author estimate based on published Lebanese Ministry of Agriculture statistics data for 2008/2009. Available online in Arabic: http://www.agriculture.gov.lb/Arabic/DataAndAgriStatistics/AgriInLebanon/Documents/Enquete%20prod2008_2009.pdf

¹⁰ Note that registered export customs value data are not reliable for determining price received for export – since registered exports are a mix of different grade and quality of pine nuts.

¹¹ Source Lebanese customs HS code 08029010 “pignolia nuts”. www.customs.gov.lb

2.2 Pine nut production

2.2.1 The production steps

Pine nuts with white kernels are produced through the collection of cones followed by three processing steps:

- **Collection or harvesting of pine cones of the stone pine tree**

Land owners (either public or private) do not collect their own cones. Usually a value chain actor (stage 1, stage 2 or stage 3 processing – see hereunder) leases harvest rights from the owner and hires a team of workers to perform the harvest. The harvest can be done starting in November up until April of each year. Municipalities usually undertake an annual blind auction in cooperation with the Ministry of Agriculture which evaluates the minimum bid value. For a bid to be accepted, it must be 10 percent higher than the ministry's valuation, e.g. in the recent years the ministry set the bid value at between US\$ 90 000 and US\$ 110 000. Each monastery will attribute harvesting rights case-by-case.

Harvesting crews are usually Syrian workers paid between US\$ 50 and US\$ 60 per day. The relatively high wage paid to *P. pinea* harvesting workers is due to the lack of semi-skilled workers wishing to undertake this task in the absence of any security measures and/or health insurance for an activity where high risks are encountered. As a matter of fact, harvesting of *P. pinea* involves climbing the tree using only a ladder to reach the middle of the tree and then climbing higher to harvest the cones with the help of a hook attached to a 6 m long stick. It is estimated that a harvesting team can harvest four trees every half hour (a team of an average of 8 people working simultaneously on 4 trees).

After the harvest, cones are stored and moved to step 1 of processing.

- **Processing step 1: extraction of black nut shells from the cones**

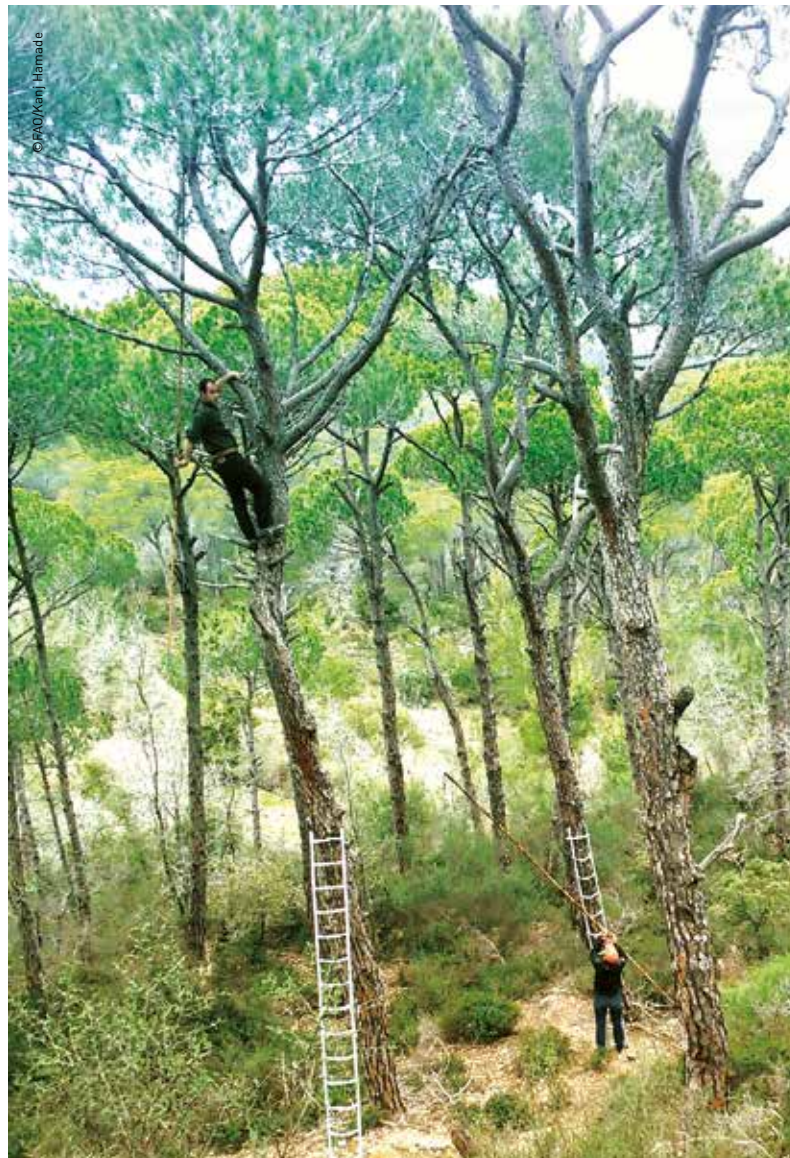
This stage is undertaken by the harvest contractor. It consists of exposing the cones to the sun during the first hot days of the summer (early June). Cones will open when exposed to a temperature equivalent to 32 °C. Some larger processors use a drum-type machine (rotating over a flame) to induce the opening of the cones: this method is used by producers who have enough stock of black nuts and want to benefit from a period of high prices.

- **Processing step 2: washing and cleaning of black nut shells**

Note that step 2 and step 3 cannot be undertaken independently.

This stage involves washing the black nuts, breaking the hard shells to extract the white nuts, and cleaning the white nuts from the residues of the hard shells and from the soft brown shells.

Figure 3: *P. pinea* harvest team at work (Bkassine, 2014)



Washing black nuts is either done manually or mechanically. After washing, nuts are soaked in water for 24 hours to increase the water content of the white nut inside the shell and decrease breakage during processing¹². Black nuts then are hulled using a desheller to extract the white nuts. Deshellers are in fact both hard shell breakers and sorters – they will separate debris from white nuts.

¹² Note that inadequate processing practices during washing and soaking of the products may affect its quality and therefore reduce its price and hamper access to the export market.

- **Processing step 3: sorting of the white nuts kernels.**

Step 3 processing involves sorting (as well as washing and potentially packing) the white nuts. Although white nuts can be graded into three different grades, most of the sorting is made to separate grade 1 (most of the production) from grades 2 and 3. Lower grades, as well as broken nuts, are sold to bakeries and sweet makers as mixes at around half the price of grade 1 nuts.

Labeling and promotion

It is expected that in 2016 a step 2 grading machine will be granted by an international donor to the Jezzine pine nut cooperative. This machine would allow the local pine nut cooperative to grade black shells prior to breaking, and it will be the only machinery of this kind in Lebanon¹³. The grant came in support of the local stakeholders' efforts aiming at valorizing local agricultural production through the creation of the Jezzine and Zahrani Development Company SAL (JAZ). The company's products will be branded with Jezzine's image and name: it will act as a distributor and promoter of Jezzine's agricultural production (including pine nuts) and is supposed to pay a premium price to its suppliers (higher than market prices).

Price table

Table 3 below shows the estimated prices per kg for 2014 of the different stages of production, as well as the price for each stage as equivalent to 1 kg of white pine nuts kernels. It is estimated that 5 kg of black shells are needed to produce 1 kg of white nut kernels and 4 kg of debris. Note that prices are highly variable and that producers will sell white nuts at today's prices, although they bought black shells the year before based on the previous year's prices. Furthermore, black shells can be stored up to 7 years: several large scale stage 3 producers will store black shells and only process them when prices of white kernels are high. It's worth remembering that it is highly uncommon to sell harvested cones prior to stage 1 of processing.

Table 3. **Price black shells and white cones (2014)**

	Cone harvesting cost ^(a)	Black shells after step 1	Debris after step 2	White nuts - grade A Producers price, after step 3	White cones - grade A Retail, after step 3
Price per Kg	N/A	US\$ 6	US\$ 0.1	US\$ 40 to US\$ 43	US\$ 56
Cost / 1kg equivalent white nuts	US\$ 18.75 ^(b)	US\$ 30	US\$ 0.4	N/A	N/A

Source: Interview with local producers

(a) It is estimated that a harvesting team can harvest four trees every half hour (a team of an average of 8 people working simultaneously on 4 trees). Each tree has an average of 40 cones, equivalent to 20 kg of cones per season. Estimating a working day of 5 effective hours, a harvesting team will harvest on average 800 kg of cones per day. Each 25 kg of cones will produce on average 5 kg of black shells, which in turn will produce 1 kg of white nuts.

(b) Costs do not include potential leasing costs: the figure aims to provide an estimation of margins.

¹³ The program will also explore the possibility of re-using black water from step 2 for irrigation.

2.2.2 The value chain actors

The main actors involved in the value chain can be defined according to the number of steps they undertake as follows:

- **Collectors and step 1 processors:** these actors undertake the production process, as well as step 1 of processing. It is uncommon for a collector to not undertake step 1 of processing; they sell their production of black shells to processors and traders, or pay a fee to use step 2 and step 3 equipment; if they do so, they then act as traders of white pine nuts.

There are approximately 100 medium-scale collectors and step 1 processors, e.g. approximately 10 bidders apply yearly to the Baskinta Forest bid. In addition to medium-scale actors, there is a significant undetermined number of small-scale collectors and step 1 processors. Note that as shown in Table 2, there are 4 769 registered exploitations of a size larger than 0.1 ha, of which more than a third have a size ranging between 0.1 and 0.2 ha, i.e. not economically viable.

Collectors and step 1 processors make a margin of approximately US\$ 11.25 every 5 kg of black shells (equivalent to 1 kg of white pine nut kernels). When applicable, leasing costs as well as cone storing costs have to be deducted – both costs are highly variable and are determined case-by-case.

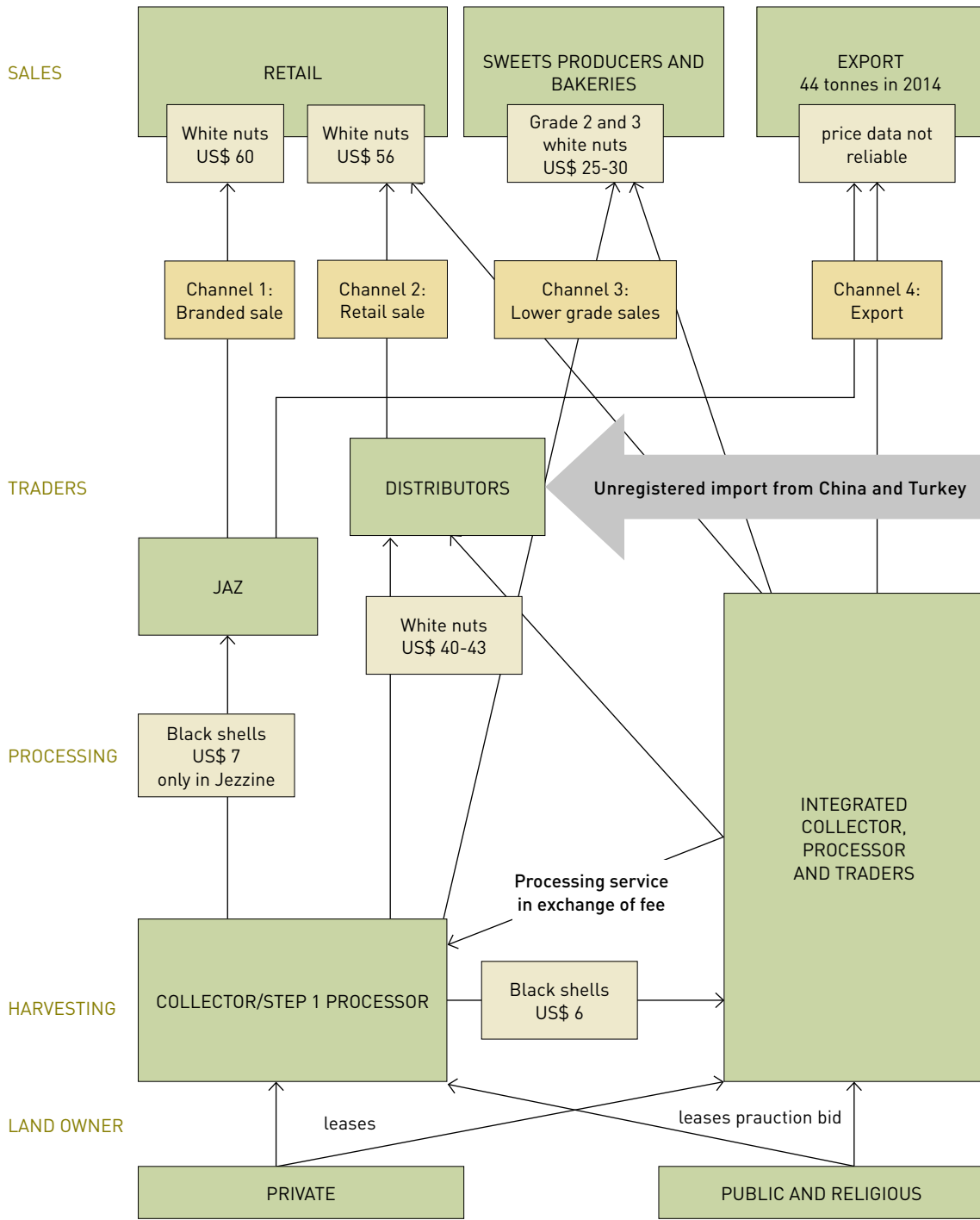
- **Processors/traders:** these actors undertake step 2 and step 3 of processing together with collection and step 1 processing – no actor undertakes step 2 and 3 processing independently of the previous steps (see value chain map in Figure 4 below). These actors also act as traders of pine nuts by selling to distributors or directly to retailers and/or by exporting part of the production.

The number of processors/traders of pine nuts is estimated to be 5 in the Jezzine area –where the local pine nut producers’ cooperative that benefited from donor support¹⁴ is based – and between 15 and 20 in the Metn area. There are no legal barriers to enter this category of actors; however, the limited production base hinders new investment. In fact, the ability of an actor to add a processing step is highly dependent on their capacity to control large forest resources, producing economies of scale by collecting a large amount of pine nut cones, in order to pay back investment in processing equipment.

Processors/traders of pines nuts make a margin of approximately US\$ 26 per kg of white pine kernels (refer to Table 3), from which operation costs have to be deducted. Operation costs vary greatly depending on the actor’s size.

¹⁴ Successive USAID economic growth projects.

Figure 4. Lebanon Pinus pinea value chain map



TOTAL PRODUCTION ESTIMATED 290 TONNES PRICE PER KG

Source: Author compilation based on data collection from key informants and desk review

2.3 SWOT analysis and Recommendations

The hereunder SWOT analysis (Table 4) summarize the main findings for the *P. pinea* value chain in Lebanon.

Table 4. SWOT analysis of the *P. pinea* value chain

Strengths	Weaknesses
<p>Perception of Lebanese pine nuts as high quality product compared to other producers. High local demand. Demand for quality products by Lebanese diaspora. Knowledge sharing and cooperation among collectors and producers – cooperative competition.</p>	<p>Limited natural resource base. High cost of production – especially in terms of harvesting cost. Inadequate pruning methods and tree management practices.</p>
Opportunities	Threats
<p>Branding of the product within an integrated territorial development strategy based on resource valorization and promotion. Political interest in valorization of forest products.</p>	<p>Diseases specific to the Mediterranean basin, as well as diseases that might emerge with climate change, in addition to inadequate pruning practices (see Box 2). Urbanization. Lower cost imports from Turkey, China and Pakistan.</p>

As pointed out in the hereinabove SWOT analysis, Lebanese production quantity of *P. pinea* nuts is constrained by the limited natural resource base, as well as by unsustainable forest management practices. Therefore, it is important to capitalize on quality promotion, including branding and sign-value, as well as on the sustainability of forest exploitation activities. Therefore, the *P. pinea* value chain actors should:

1. Valorize production and quality by developing branding strategies in order to add value to the production. These branding strategies can be integrated to territorial strategies like in the case of the Jezzine stakeholders' efforts to promote local production and local tourism.
2. As shown in the SWOT analysis, diseases and mismanagement constitute significant threats to the *P. pinea* nut production in Lebanon. There is a need to improve forest management efforts especially through:
 - a. Undertaking a proper pruning and timely thinning of the trees to optimize yields (by reducing competition between trees for both light and nutrients), while also preserving the landscape. Harvesters can take responsibility for performing the pruning, if they are provided with longer leasing rights (multiple years).
 - b. Providing forest manager entities with adequate training on good forest management principles, including, without being limited to: pruning, pest and disease management, forest fire management, cone harvesting and nut processing.

- c. Providing collection workers with proper sustainable harvesting training, as well as safety gears and medical insurance. Promoting fair workers' rights will also add value to the final product.
 - d. Sustain current public and private reforestation initiatives, increase reliance on local communities' groups and on small and medium forest-based enterprises for sustaining and ensuring success of reforestation programs.
- 3. Improve processing efficiency and reduce storage losses by:**
- a. Providing businesses with adequate business planning, processing operations, and good storing practices, which will benefit the whole value chain and increase profitability of local businesses.
 - b. Encouraging producers' cooperatives and knowledge sharing structures to reduce costs and improve production.
 - c. Undertaking mechanical harvesting trials and disseminating the method should it lead to a significant decrease in collection costs.

Box 2. Threats to Lebanon pine forest

A recent unpublished FAO and MOA assessment has identified three main challenges in *P. pinea* forest management:

1. The Dry Cone Syndrome (DCS), a phenomenon faced across the Mediterranean and detected recently in Lebanon (DCS). DCS lead to significant conelet loss before cone ripening, leading to a decrease in pine nut yield to cone weight ratio, as up to half of the seeds of the ripened cone are empty or damaged.
2. The Western Conifer Seed Bug, *Leptoglossus occidentalis*, which has been recently observed in Lebanon. Its damage is similar to the damage cause by the DCS. It is one of several pest and diseases that are threatening Lebanon's pine forest because of climate change. This is the case for a wide range of abiotic and biotic factors - such as rainfall changes and extreme drought events - that are triggered by climate change and might affect tree vitality and cones' yield.
3. Inadequate heavy crown pruning and undergrowth clearing practiced in Lebanon is significantly hampering the sustainability of *P. pinea* forests. It has been suggested that such heavy pruning practices may affect tree resilience and long term productivity.

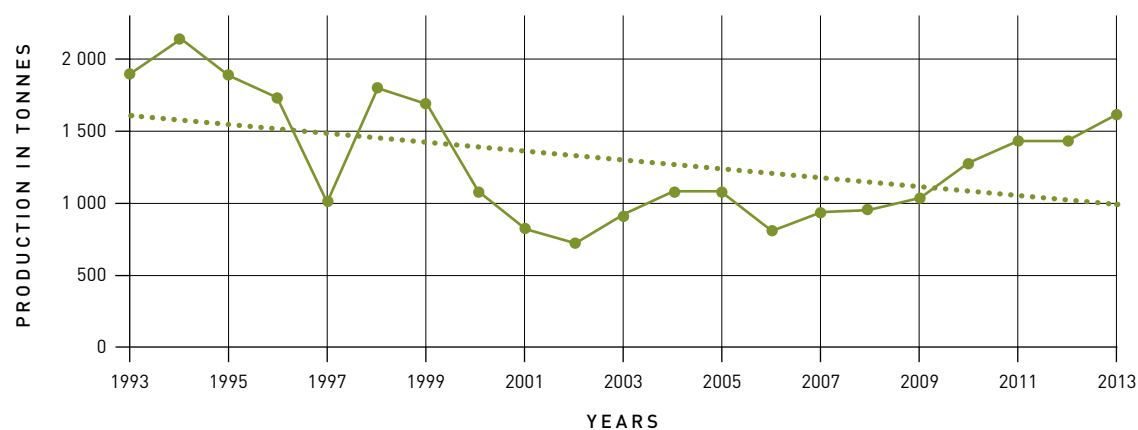
Against this background, there is a need to introduce and define innovative and adaptive pine forest management practices, in order to sustain livelihoods based on the collection of *P. pinea* cones, not only in Lebanon, but in the whole Mediterranean basin.

Honey

3.1 Overview and value chain map

Beekeeping is common in all Lebanese regions. Around 6 200 Lebanese, mostly part-time, beekeepers¹⁵ produced approximately 1 620 tonnes of honey in 2013, for a total value estimated at US\$ 32 million¹⁶, of which US\$ 23 million¹⁷ represents the value of forest and shrub land honey. During the last 20 years, production quantities have been volatile, as shown in Figure 5 below. Although the overall trend shows a decrease in production, the last five years have witnessed an increasing pattern.

Figure 5. **Lebanese honey production in tonnes 1993-2013**



Source: FAOSTAT

¹⁵ Source: MOA and FOA 2010 agricultural census.

¹⁶ Estimation based on price data reported by USAID (20013). Honey value chain assessment report. LIVCD (AID-268-C-12-0001) project document.

¹⁷ Author estimation based on personal communications with honey production specialist and honey aggregators.

Two main types of honey can be differentiated: (1) forest and shrubland-based honey, including wild flowers, such as Syrian oregano - *Origanum syriacum* - honey, oak - mainly *Quercus Libani* - honey, as well as cedar - *Cedrus Libani* - honey, although production of the latter is limited; and (2) orange blossom honey. It is common for beekeepers to move their beehives to coastal areas during winter to obtain a harvest of orange blossom honey in early spring. It is estimated that orange blossom honey constitutes around one third of the total Lebanese honey production¹⁸, and is on average 33 percent less expensive than wild flower and/or oak honey in retail outlets. In addition to the local production, Lebanon imported around 250 tonnes of honey for a value of US\$ 2.54 million in 2014, while exports were limited to 50 tonnes of honey valued at US\$ 0.63 million¹⁹.

The honey sector in Lebanon is underexploited - the level of honey production remains below the country's potential. There is scope for increasing honey production capitalizing on export markets of both Gulf Council Countries (GCC) and of the countries of the Lebanese diaspora. Furthermore, honey production can be used by policy makers and state institutions as a tool for rural development that has the capacity to alleviate poverty and valorize local forest and natural resources. This potential to contribute to poverty reduction, as well as the sector's potential to attract women and youth in rural areas, has not been sufficiently explored by policy makers and international donors and organizations.

Figure 6 below shows the map of the Lebanese honey value chain; the following section will look into each of its elements.

3.2 The production base

Although beekeeping remains mostly a complementary and part-time activity for farmers and non-farmers alike, it constitutes a substantial source of secondary income. The activity is well adapted and profitable for household production units - low start-up investment, low fixed costs, labor inputs are relatively low except at harvest time. However, sustained activity requires the adoption of up-to-date production practices, especially in terms of disease management.

Diseases affecting honey bees are the main production constraints faced by beekeepers. These include the American foulbrood disease - a bacterial disease that affects bee larvae and can be controlled through the use of antibiotics; the Varroa mite - which acts as a parasite and carries a viral disease that attacks bee colonies and that has been a main cause for hive mortality in Lebanon; and colony collapse disorder (CCD) - a phenomenon in which worker bees disappear from the hive. There is suggestion that CCD is caused by environmental degradation such as increased pesticides use, as well as by limited and/or contaminated water supplies.

¹⁸ Idem.

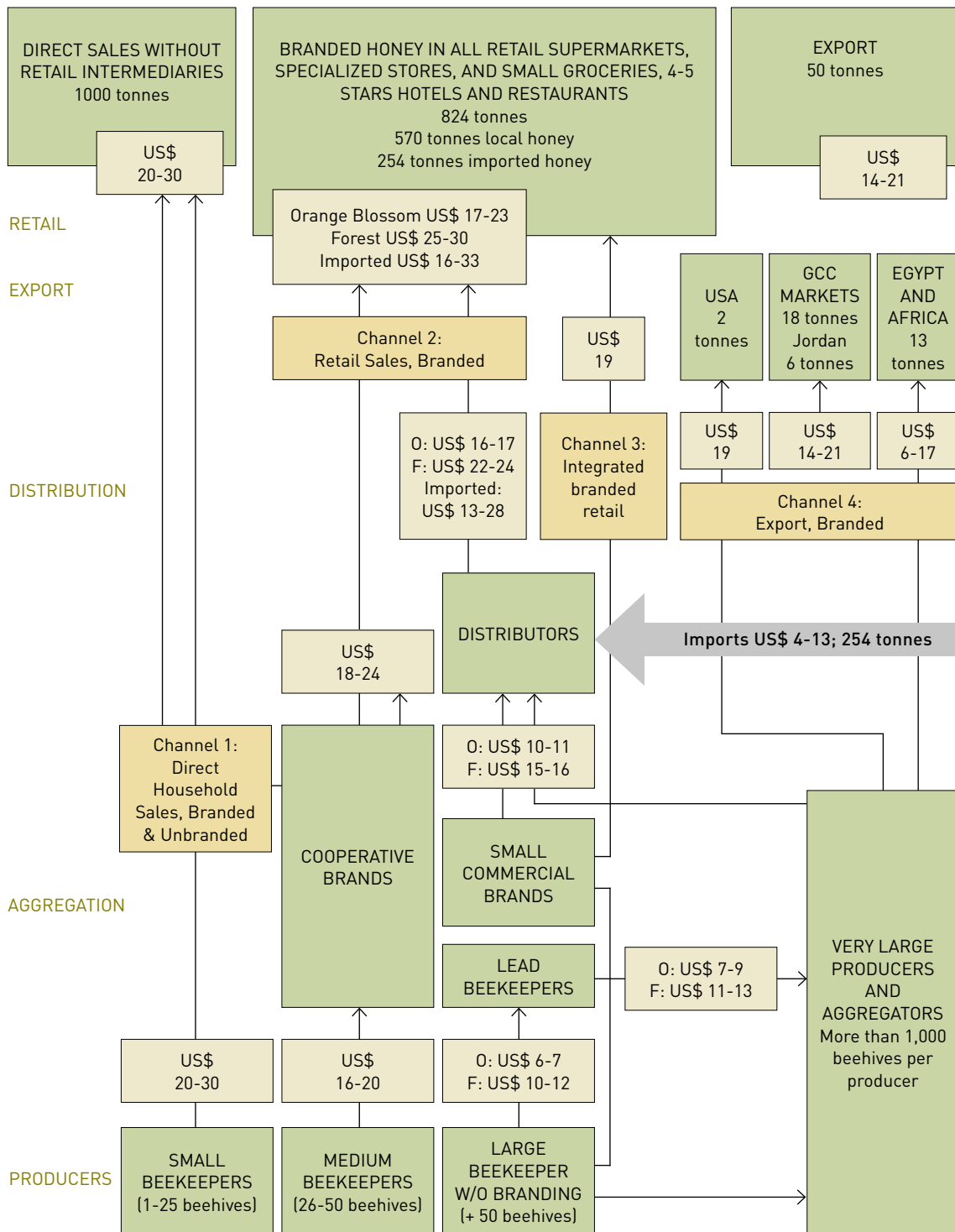
¹⁹ Lebanese Customs data. www.customs.gov.lb.

In Lebanon, the bee commonly used for production is the *Apis mellifera syriaca* or Syrian Bee. It is a local variety with a relative low productivity and high aggressiveness: however the bee is well adapted to the local environment. The *Apis mellifera ligustica* or Italian bee, which is gentle, more productive and resistant to diseases, is also used by Lebanese beekeepers. Note that there is no rearing center for certified queen bees in Lebanon. Queens are either imported or reared and shared between beekeepers (especially for the local variety).

The total number of beehives is estimated at around 170 000 beehives distributed among five main categories of beekeepers.

1. Small-scale beekeepers with 25 hives or less – 70 percent of beekeepers: these producers are mostly hobby beekeepers, and production per hive is usually lower than market-oriented production units. Honey is used for home consumption and sold to friends and networks of acquaintances. These producers are also often linked to beekeepers' cooperatives for production aggregation.
2. Medium-scale beekeepers with between 26 and 49 hives – 14 percent of all beekeepers – and operating as small family businesses using unpaid family work. A beekeeper with 40 hives can produce up to 1 200 Kg of honey per year and make an average US\$ 21 600 in sales – provided that honey is sold with a price premium through a direct sale channel – which is difficult for such volumes – and/or through cooperative branding (see section 4.4).
3. Unbranded large-scale beekeepers with 50 hives or more – 16 percent of beekeepers: these producers exhibit many similarities to medium beekeepers. Virtually all large beekeepers practice hive migration to yield at least two harvests per year. Unbranded beekeepers generally do not have more than 100 hives, since the logistical difficulties of active hive management and migration become too burdensome for small family enterprises. At this level of production, beekeepers need to develop specific sales strategies to be able to market their volume of production. These strategies are often built on business linkages and long term cooperation with medium and large scale companies – either directly or through the intermediation of local lead beekeepers – whose role is to aggregate local production to reduce transaction and transport costs.
4. Branded companies with more than 200 hives: there are only about 10 beekeepers in Lebanon with over 200 hives, all of which have their own brands. This category of large beekeepers has invested in maintaining their own specialized retail outlets in Beirut and other urban centers to be able to access consumers in those areas. In addition, they rely on fairs and exhibitions stalls that are manned by the beekeepers' direct employees or family.
5. Large branded companies with more than 1 000 hives: there are two main players in this category. These actors developed brand names and control a significant share of the domestic market and most of the export market. However, they have different supply strategies: the first consists of increasing market share through outsourcing the majority of its production to other small beekeepers (directly or using local lead beekeepers), while the second sources most of its honey internally, making it the largest beekeeping operation in Lebanon.

Figure 6. Lebanon honey value chain map



TOTAL PRODUCTION: 1 620 TONNES (2013)

Source: adapted and updated from: USAID (2013). Honey value chain assessment report. LIVCD (AID-268-C-12-0001) project document.

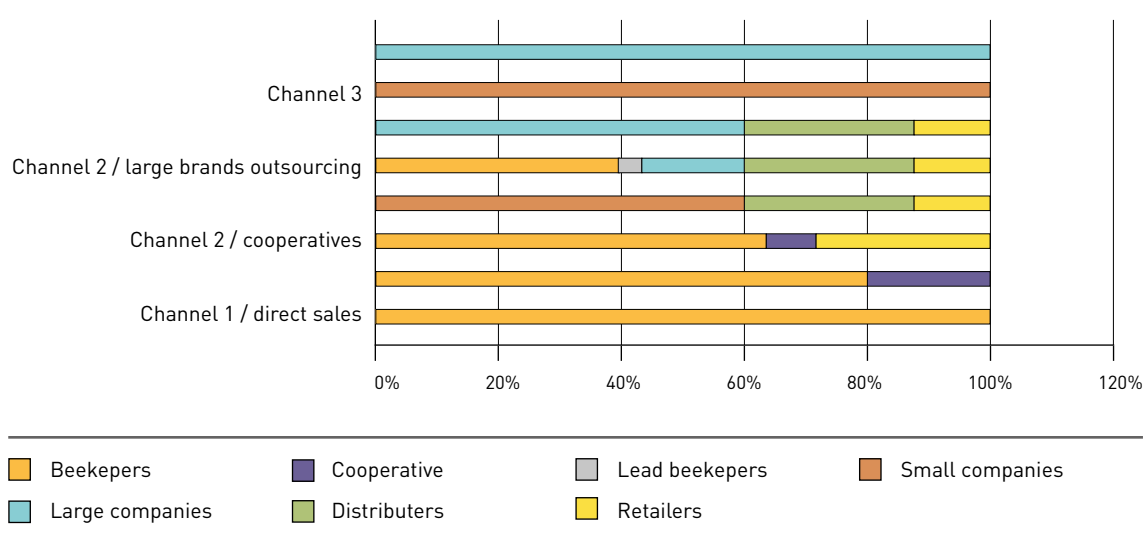
3.3 Trade and market prices structure

3.3.1 Marketing channels

Honey trade in Lebanon follows four different channels:

- Channel 1: honey is sold directly by the beekeepers to the consumers through personal relationship, or to a smaller extent, with the intermediation of a cooperative. This channel conveys to the consumer around 62 percent of the total Lebanese production and represents 54 percent of the total Lebanese honey market. It provides both a premium price to producers (price range between US\$ 20 and US\$ 30) and the opportunity to retain 80 percent to 100 percent of the product price value, thus rendering small production units profitable. It is suggested that an independent beekeeper can market the output of 20 hives per year using personal relationships and direct sale channels (approximately 600 kg of honey).
- Channel 2: honey is sold branded through retails stores. Approximately 35 percent of the Lebanese production and 44 percent of total domestic market sales are conveyed through this channel. This market channel is dominated by commercial sellers of branded honey, but it also includes other key actors, such as distributors and retailers. In practice, producers (small, medium and large beekeepers) usually sell the output from their first 20 hives into Channel 1 and output from any subsequent hives to the Cooperative and Commercial buyers that dominate Channel 2. Accordingly, honey going into Channel 2 flows mainly from medium and large producers whose production cannot be sold using personal networks. In this channel no premium price is received by the producers – distributors and retailers capture around 40 percent of the product price value, as show in Figure 7 below.

Figure 7. **Distribution of honey price value across different actors by marketing channels**



Source: based on USAID (2013) honey value chain assessment price data Chart constructed using the lowest price for forest based honey

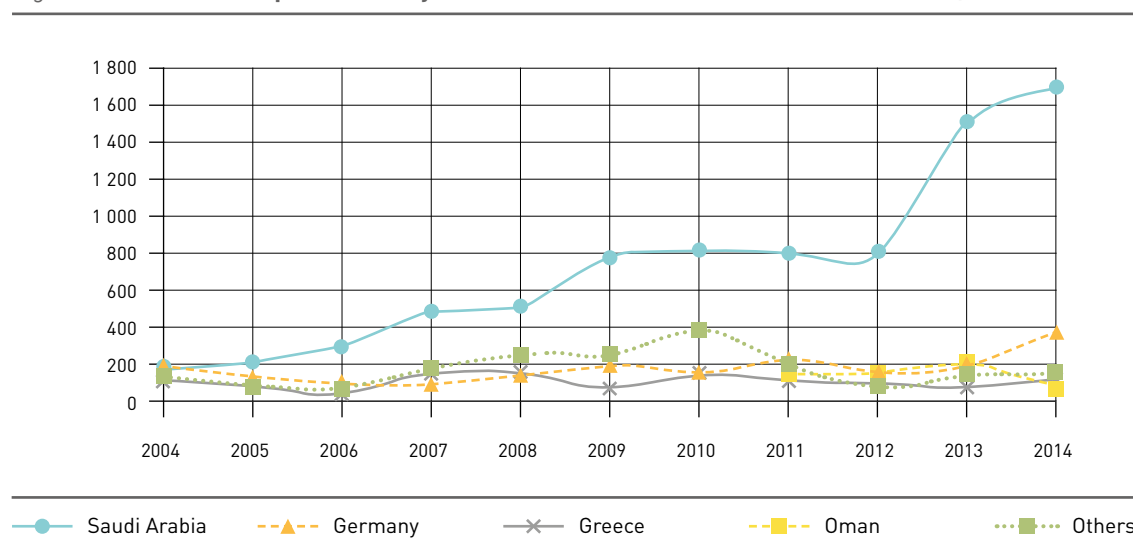
- Channel 3: this channel is used by small companies which integrate retail into their operations. This is a sub-channel of channel 2 (branded and retailed honey); however, it allows small honey companies to be independent from distributors and retailers, thus capturing all of the product value. However this is a niche market and expansion potential is limited.
- Channel 4: this export market channel is dominated by large companies that have put effort into creating linkages with distributors in GCC, as well as in the US. Lebanese large honey companies have shown the ability to respond to market changes, e.g. exports to Jordan are a direct result of the Jordanian ban of a well-known commercial honey brand. Also some large beekeepers are able to export part of their production, especially to African countries hosting a large Lebanese diaspora. Note that in most of the cases exporting is performed directly by the beekeepers without the intermediation of an exporter.

3.3.2 Import/Export trade

Lebanon's honey imports

Lebanon imports 14 percent of its domestic demand for honey. Imports are primarily low-value commercial brands of honey – most probably a re-export of Chinese honey – from Saudi Arabia (70 percent of import value in 2014, see Figure 8 below). Imports from Saudi Arabia have witnessed a significant increase since 2012, due to the increased demand for all food and non-food items caused by the Syrian crisis and the hosting of more than a million Syrian refugees in Lebanon. To a lower extent, Lebanon imports European standards commercial honey, mainly from Germany and Greece, as well as a significant volume of quality honey from Oman since 2011. In general, Lebanese consumers prefer to buy directly from beekeepers – similar market preferences are also true for products such as olive oil- and will pay a significant price premium for unbranded honey purchased from beekeepers or beekeeper cooperatives.

Figure 8. Lebanon import of honey between 2004 and 2014 in thousands of US\$



Source: International Trade Center (ITC), calculation based on Lebanon Ministry of Economy and Trade data

Branded bottled honey from retail markets is usually sold at lower prices, mainly because of brand distrust in a context of limited quality testing, traceability and brand accountability. However, with the increase of supermarkets and commercial malls, large domestic honey brands have started selling in retail markets since 2008 and have increased their market share to over 30 percent of domestic sales.

Lebanon's honey export

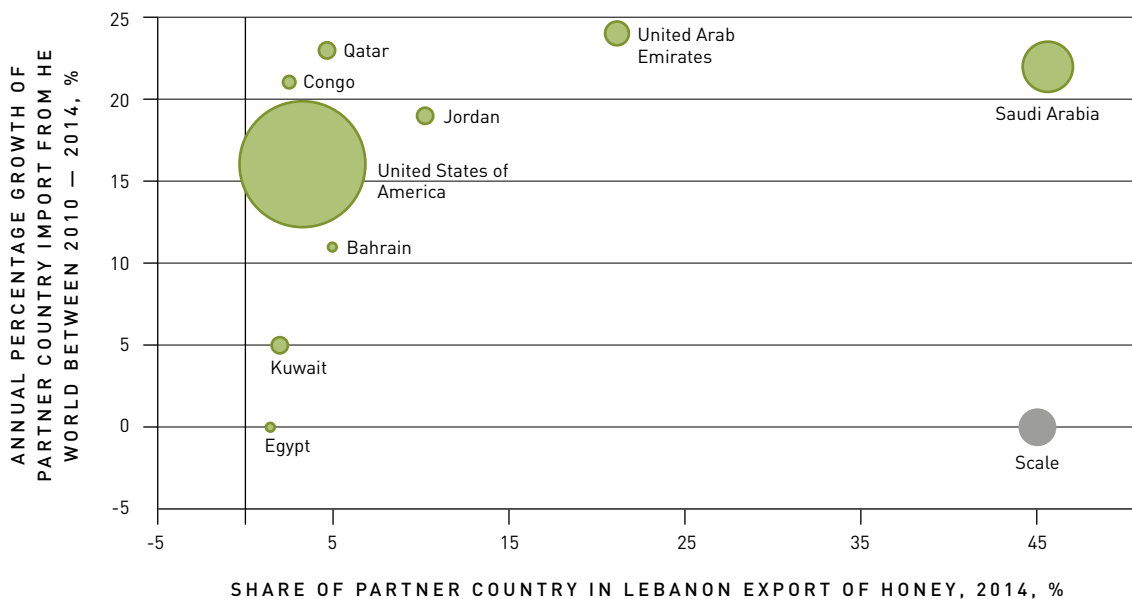
There are great export opportunities for Lebanese honey; however, honey exports remain at the stage of market channel identification, although they have been growing since 2008 (see Figures 9 and 10). Furthermore, potential for export has to be seen as a way to expand local production and therefore create part-time rural jobs and additional income for rural families, including farmers.

In 2014, around 78 percent of Lebanon's honey exports were directed to the GCC market (of which more than half were sold in the Saudi market). Lebanon was also able to penetrate the Jordanian market after the ban of a Saudi commercial brand. The GCC markets – especially the Saudi market which represents 3.7 percent of total world import of honey – are important markets for Lebanon. Efforts should be made to promote Lebanese brands and open new market channels with large distributors; semi-integrated aggregation strategies should allow to reach a significant supply volume needed to penetrate large distribution channel, in both the Saudi mainstream market, and the US niche delicacy and ethnic food market.

As a matter of fact, Lebanese honey brands have been able to reach the US market since 2005 with limited sample volumes and since 2008 with relatively higher quantities. Lebanese honey exports to the United States are sold in ethnic markets that target the Lebanese diaspora community who is willing to support the noticeably higher price of Lebanese honey. As recently as 2010, large commercial Lebanese honey producers created new brands that were designed to appeal to American consumers in mainstream markets – although mainstream market penetration is still limited.

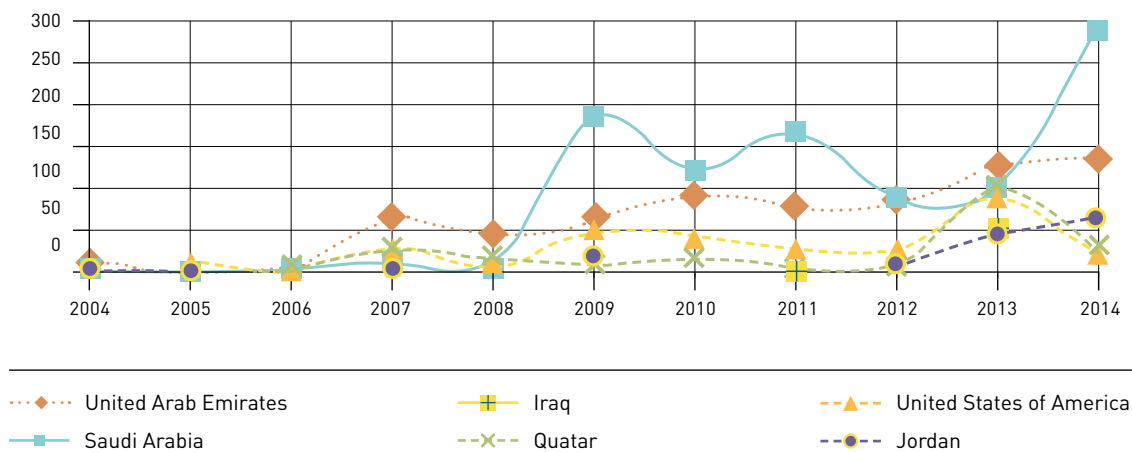
As of 2012, Lebanese exports to the US are still essentially in the very early stages of market penetration: however, the US honey market, which represents around 25 percent of the world's imports of honey, should be seen as a strategic market for Lebanese honey production and an entry point for any potential expansion of production. Nonetheless, the implementation of proper rules and regulations – e.g. in terms of phytosanitary measures, antibiotic use and traceability, especially if volumes are to be gathered from small producers – is a *sine qua none* condition for export expansion in high value markets (see Box 3, on rules and regulations).

Figure 9. Lebanon export market diversification prospect for Honey



Source: International Trade Center (ITC), calculation based on Lebanon Ministry of Economy and Trade data. Bubble size represent partners share in world imports. Bubble scale is 2 percent. Countries in the chart represent 97.5 percent of Lebanon's export of honey

Figure 10. Evolution of Lebanon honey export value per export channels 2004-14 in thousands of US\$



Source: International Trade Center (ITC), calculation based on Lebanon Ministry of Economy and Trade data

Box 3. Rules and regulations regarding honey

Traceability:

Full product traceability to the farm/beekeeper-level has become a requirement for all honey sold in Lebanon since 2011. Complete enforcement of this regulation is yet to be achieved, but significant progress has been made so far, mainly through the registration of cooperatives that accompanied the MOA's campaign to fight diseases with the distribution of treatment. In addition, traceability of the majority of honey is quite straightforward because large amounts of honey are sold directly from the farmer to the consumer. However, compliance with the regulations is largely voluntary due to the absence of effective control mechanisms.

Norms:

Honey sold in Lebanon prior to 2013 was only required to meet LIBNOR norms, which set limits for purity and freshness and required eight simple chemical tests. As of 2013 however, a new decree that set stricter levels of pesticide and chemical residues in honey was issued, notably with the enactment of residue thresholds for the common antibiotics tetracycline and oxytetracycline that were progressively reduced with a total ban on their use as of 2015. The new regulations also introduced effective residue limits on a total of 54 different chemicals and pesticides beginning in 2013. These new regulatory standards are designed to bring Lebanese honey standards broadly in-line with those enforced in the EU over the next two years.

Regrettably, none of the three functioning Lebanese honey testing laboratories are capable of conducting the full battery of required tests under the new decree. Therefore, the new regulations are not being enforced yet.

Export regulations:

All export shipments of honey must be tested, and this is done at one of the three main laboratories with capacities for honey testing (LARI, IRI, and the QCC Laboratory in Tripoli). These laboratories are able to test for the limits on pesticide residues required by the US and the counties of the region; however, they are not equipped to test for the EU zero tolerance thresholds for tetracycline and oxytetracycline, which also became effective for all honey sold in Lebanon in 2015. This is indeed quite problematic for the certification of compliance with standards. It is worth noting here that Lebanese laboratories do not certify shipments as being compliant with importers' residue regulations because there is no physical control mechanism that traces samples to specific shipments.

3.4 SWOT analysis and Recommendations

Table 5 hereunder summarizes the strengths, weaknesses, opportunities and threats faced by the Lebanese honey value chain.

Table 5. SWOT analysis of the honey value chain

Strengths	Weaknesses
<p>Profitable production even in small-scale units.</p> <p>Existence of competitive export oriented semi-integrated value chain linking small producers to large aggregators/exporters.</p> <p>Local human resources with adequate knowledge of production techniques.</p> <p>Existence of well managed honey producers' cooperatives.</p>	<p>Need to improve management practices through knowledge transfers.</p> <p>Non application of rules, regulations and standards – especially with regards to the use of antibiotics.</p> <p>Lack of consumer knowledge on honey quality.</p>

Opportunities	Threats
<p>High capacity for increasing production. Accessing high value market such as the US market (approximately a quarter of world import of honey). The honey value chain can be a source of income diversification for a significant number of people - including women and youth - in rural areas.</p>	<p>Diseases and pest such as the Varroa mite and the colony collapse disorder (CCD) phenomenon. Urbanization.</p>

There is a great opportunity for Lebanon to capitalize on the honey value chain’s capacity to provide additional income to rural households. This opportunity is generated by the relative profitability of small units of production, as well as by the potential for reaching high value export markets, such as the United States market. Such actions would help in alleviating poverty, while at the same time increase the valorization of forests and other natural resources. Nonetheless, there is a need to:

1. Expand production through:
 - a. Improving productivity of household-based beehives through the provision of technical training on up-to-date production practices
 - b. Support women and youth to start honey production through facilitated access to micro-finance
 - c. Increase research and training on bee diseases’ preventive measures, as well as support the development of local centers for the production of queen bees better adapted to the local environmental conditions

Note that any expansion in production should be done in parallel with a close monitoring of the bees’ forage resources.

2. Connect additional production to the export market through semi-integrated linkages within the value chain. This is a key factor for success if Lebanon wishes to increase its export volumes. Fairness of these linkages in terms of distribution of margins between small and large beekeepers should be preserved, promoted and used as a marketing argument.
3. Increase traceability and application of rules and norms to ensure food safety and accessibility to export market.
4. Build the capacity of national public institutions such as the Ministry of Agriculture, chambers of commerce, national laboratories and value chain actors to support the implementation of regulations, as well as strengthen national coordinated efforts for developing the value chain.

Origanum syriacum

4.1 Overview and value chain map

Origanum syriacum - in English: thyme, Syrian Oregano, or wild marjoram; in French: hysope de la bible; in Arabic (Lebanon): commonly zaatar (زعتر), which refers to both the plant and the herb mix²⁰ -, is the most commonly collected and consumed aromatic herb in Lebanon. It is present in forests, shrubland and wooded areas, as well as non-wooded areas, especially at altitudes ranging between 200 and 1 500 m on the Western Lebanon Mountain range including Lebanon's southern and northern hilly areas. It is not present in the Beqaa valley plateau. In total it is estimated that approximately 880 km² of land are covered with *O. syriacum* in Lebanon for a total of approximately 100 million plants (approximately 0.22 plants/m² and twice the concentration in wild collection areas, equal to 0.44 plants/m²)²¹.

Regulations

Concerns have been raised about the sustainability of wild collection of *O. syriacum*, especially that early collection and removal of the roots – together with increased urbanization – constitute significant threats to *O. syriacum*, as well as other species such as *Origanum ehrenbergii*, a Lebanese endemic species which is often confused with *O. syriacum* by collectors²². In 2012, the Lebanese Ministry of Agriculture (MOA) issued a decree regulating collection and export trade of *O. syriacum* as well as *Salvia fruticosa* (see Box 4). The MOA decision 1/179 (2012) entitled “Decision related to the investment in and export of Zaatar and Sage” has:

- Imposed the need to obtain a ministerial permission for collection and export (export permission also applies to farmers cultivating of *O. syriacum*²³).

²⁰ Zaatar can also refer to:

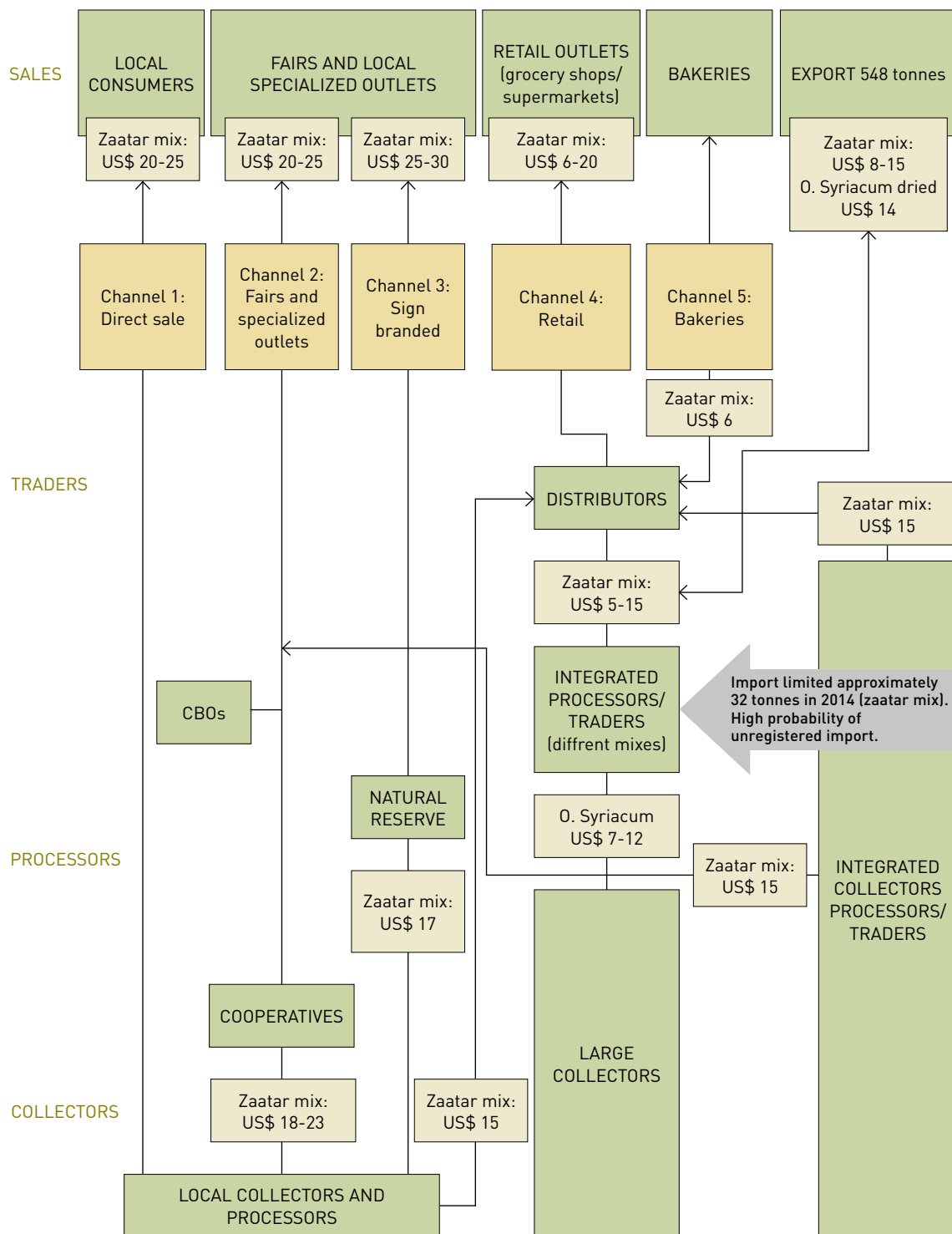
- a- Ground dried herb mixture – containing *O. syriacum* - used for the preparation of the Lebanese “Manqousheh”,
- b- *Satujera hortensis*, a fresh cultivated plant used in salads
- c- *Thymbra spicata*, *Thymus capitatus* or *Th. vulgaris*, fresh wild plant used as a sharp-tasting salad or pickled with olives and/or vegetables.

²¹ Global Environment Facility (GEF)-UNDP-Lebanese Agricultural Research Institute (LARI). 2013. Monographs for selected medicinal and aromatic plants in Lebanon. Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants Production Processes in Lebanon Project.

²² idem

²³ Several projects supported by international donors and implemented in collaboration with the MOA have promoted the cultivation of *O. syriacum* (most experts agree that there are no differences between the wild and cultivated plant; however adoption by farmers remained limited, e.g. less than 20 farmers are registered at the MOA, most of them being already wild collectors. According to interviewed key informants, wild collection practices provide higher revenues than small-scale irrigated and/or non-irrigated production, especially if investment costs and labor time are taken into consideration).

Figure 11. Lebanon *Origanum syriacum* value chain map



TOTAL COLLECTED O. SYRIACUM: 1000 TONNES PER YEAR

Source: Author's compilation based on data collection from key informants and desk review

- Allowed for only one collection on a specific site between early June and end of October – avoiding periods of great heat
- Allowed regeneration by collecting only 2/3 of the plant population as well as 2/3 of the branches of each plant. The plant branches must be cut at a height of 10 to 15 cm from the ground in order to allow young sprouts to sprout again (root removal is not allowed).
- If collection takes place on public land, prior authorization from the Municipality or any other relevant entity is needed. Until now the MOA has refused authorization to harvest *O. syriacum* on public land.

This regulation is only partially implemented by the MOA and partially respected by collectors (see section 4.2 discussing collector typologies). As a matter of fact, the MOA has requested prior registration of collectors and is imposing a control on exports: however the monitoring on the implementation of the decree has proven hard to enforce on the field.

O. syriacum and zaatar mixes

After wild collection, *O. syriacum* branches, including leaves and flowers, are shade-dried in beds raised 20 to 30 cm from the ground. Then the flowers and leaves are ground having been removed from the branches. Ground and dried *O. syriacum* is then used to produce zaatar mix, which is a dried and ground mix of *O. syriacum* with sumac (*Rhus typhina*), sesame seeds and salt.

This mixture is sold in the local market with different qualities and therefore at different prices. The level of grinding of *O. syriacum*, as well other potential additional cheaper substitutes for *O. syriacum*, such as *Thymbra spicata* or *Thymus vulgaris*, or, as mentioned by several interviewed stakeholders, wheat milling products' residues and colorant, all contribute to lowering the selling price of the mixes. Great effort has been made involving the value chain stakeholders and the Lebanese standards and norms institutions (LIBNOR) to develop production norms for zaatar mixes and to protect denomination. However, these efforts have not yielded results yet; and retails prices of a kg of zaatar mix can vary from US\$ 30 for a high end hand-ground mix to US\$ 5.6 for mixes used by bakeries for the production of “manqousheh” - a widespread Lebanese pastry eaten during breakfast and/or as a snack or entrée.

Total collection of *O. syriacum* is estimated at 1 000 tonnes (dried) per year – for an approximate collection value, i.e. not processed and not mixed, of US\$ 5.33 million. Approximately, 10 percent of the production is exported in the form of dried *O. syriacum* (110 tonnes in 2012²⁴), and another 20 percent is exported in the form of zaatar mixes. As a matter of fact, it is difficult to track the exact quantities of traded *O. syriacum* since Lebanese trade statistics only consider mixes²⁵, and quantities of *O. syriacum* in these mixes are unknown (see section 5.3.2, on import/export trade). Total export of dried *O. syriacum* and zaatar mixes amounted to 548 tonnes in 2014 for an approximate value of US\$ 1.9 million.

²⁴ Ministry of agriculture department of Forestry and natural resources data – personal communication

²⁵ HS codification 2106 9030: “Mixtures of thymes and other edible products”

Lebanon also imports a limited quantity of pre-packaged zaatar mixes from Syria and Jordan (approximately 32 tonnes for a value of US\$ 270 000 in 2014). It is possible for packaged zaatar mixes imported by Lebanon to contain Lebanese *O. syriacum* exported dried in bulk. Note that trade statistics do not capture smuggled and informal trade between Lebanon and Jordan through Syria, although this trade route has been highly negatively impacted by the Syrian crisis.

Overall, it is estimated that the local Lebanese market consumes around 700 tonnes of dried *O. syriacum* in the form of a diverse range in quality of zaatar mixes (see value chain map for *O. syriacum* in Figure 11).

Box 4. Sage – *Salvia fruticosa*, *O. syriacum* and the international essential oil markets

Salvia fruticosa – in English sage, trifoliolate sage, sage, Greek or Turkish sage; in French sauge trilobee; in Arabic Qassin - قاصين - or mariamieh - مريمية - is the second most important collected medicinal herb after *O. syriacum* in Lebanon. It is present mainly on the western versant of Mount Lebanon's range for a total estimated one million plants over 80 km².

It is estimated that between 600 and 1 000 tonnes of sage are collected every year for a total value of US\$ 1.8 to US\$ 3 million.

Wild collection of sage follows the same regulation as *O. syriacum*, and is usually undertaken by the same collectors, using workers paid US\$ 20 to US\$ 24 per day (4 to 6 hours, in which time between approximately 50 to 60 kg of the plant are collected per collector, equivalent to approximately 38 to 46 kg of undried sage leaves). After collection, sage leaves are shade-dried in beds raised 5 to 10 cm from the ground. Collected sage is sold at US\$ 3 per dried kg to traders with exporting licenses. Most of the sage collection is exported to Jordan and only a very slight proportion is sold in the local market and to consumers as tisanes.

Several stakeholders believe that a small share of imported dried Lebanese sage is sold as tisane in the Jordanian market, and that most of it is re-exported mainly to Israel where it is processed into aromatic essential oils. Sage essential oil is highly demanded in the international market. On the contrary of *O. syriacum* essential oil, the characteristics of which are not well known and therefore not in demand – the international essential oil market is used to and currently only demands essential oil from *Origanum vulgare*. Furthermore, field cultivation of sage has up to now not been successful (due to a problem in the irrigation process), and aromatic oil production has to rely on wild plant collection. Therefore, there is a great opportunity for Lebanon to sustainably capitalize on its natural capital of wild *Salvia fruticosa* and support investment in the production of essential oils.

4.2 The value chain actors and their marketing channels

The *O. syriacum* value chain can be divided into two main sections. On one side, collection and processing of *O. syriacum* represents a part-time activity and a source of secondary limited income for a significant number of rural households. The generated output is either used for home consumption or sold through direct sales channels to friends and acquaintances. Income generated by this activity can increase if collectors, in this case mainly women, are linked

to local cooperatives or natural reserves. On the other side, a dozen large scale collectors are involved in the business, most of them controlling access to relatively large areas of land in specific regions. These large scale collectors are either processors or traders of zaatar mixes themselves or linked to a limited number of spice and herb traders not necessarily specialized in zaatar production and trade. The different actors of the *O. syriacum* value chain are presented below.

4.2.1 Direct sales and sign value

Local collectors and processors: mostly women collect *O. syriacum* and other local herbs, at the local level for household consumption, as well as for limited market-oriented production. *O. syriacum* is dried, hand-ground and mixed to prepare high quality zaatar mixes. Production exceeding household needs is sold through direct channels to consumers in the locality and in neighboring villages, as well as to urban friends and acquaintances. Prices within the direct sales channel range from US\$ 20 to US\$ 25 per kg of zaatar mix.

Local collectors and producers also include medium scale market-oriented local collectors and processors. It is estimated that a market-oriented local collector will work 10 days, for 4 to 6 hours, collecting an average of 20 kg of undried *O. syriacum*; this quantity is equivalent to 5 kg of marketable dried *O. syriacum* per day. Over a season this quantity is equivalent to 50 kg of dried *O. syriacum*, which would be equivalent to between 120 kg and 150 kg of zaatar mix. Such quantities – that cannot be entirely sold through direct sales – are sold to local distributors (marketing channel 4) for approximately US\$ 15 per kg. It is not common for small local collectors to sell dried un-ground and not-mixed *O. syriacum*. Given the small quantities collected, they prefer preparing their own high quality mixes to benefit as much as possible from the added value. Note that local collectors do not usually request authorization from the MOA.

Women cooperatives: although generally not specialized in zaatar production exclusively, cooperatives act as local aggregation centers of collected products and can also provide mechanical cleaning and milling equipment (small-size equipment that has an average cost of US\$ 1 500 each). Although mechanical grinding can slightly reduce the quality of the zaatar mix (compared to hand-grinding), the cooperative label gives a civic engagement sign added value to the product, so it still sells at a high price. Cooperatives support local collectors in the sales of their products through participation in fairs, local exhibitions and specialized outlets (marketing channel 2). It is often the case that cooperatives' access to marketing channel 2 is facilitated by Community Based Organizations (CBOs) with the support and within the framework of international donor projects.

Natural Reserve: Natural reserves in Lebanon have put significant effort into developing branded local traditional products including local zaatar mixes. In the latter case, natural reserves have worked in enforcing the MOA regulations and in organizing local small-scale collectors' work. For example, the Shouf Cedars Natural Reserve buys local collectors' production of hand-grounded *O. syriacum* at a premium price of US\$ 17 per kg (channel 3), and then produces specific zaatar mixes, including a traditional local mix that contain *Pinus halepensis* (Aleppo pine) nuts: the mix sells for US\$ 30 per kg.

4.2.2. Mainstream market channel

Large collectors: there are around a dozen large collectors of various sizes in Lebanon. They collect large amounts of wild *O. syriacum* and *Salvia fruticosa* and, to a smaller extent, herbs such as rosemary (*Rosmarinus officinalis*). Large collectors employ worker teams ranging in size between 5 and 20 people for a period that lasts between 20 and 30 days per season. A large family business – the only one operating on this scale in southern Lebanon – employs 10 teams of 20 people for 28 days per season. It represents by far the largest wild collection harvesting operation in Lebanon. Wild collectors are usually semi-skilled experienced workers. They need to be able to recognize and differentiate between plants, cut at the right place and the required amount of crops. They are paid US\$ 24 per trip in southern Lebanon and US\$ 20 per trip in northern Lebanon. If working with a large collector, a semi-skilled worker can expect an income of US\$ 600 to 700 per season.

Large collectors are aware of the need for sustainable collection since their long-term business profitability depends on it. However, the MOA's authorization is rarely respected in terms of area of land collected and quantity declared. Large collectors will collect herbs from their own land as well as from other privately owned land in exchange for a fee. There is no clear mechanism regarding how the fee is set, but rather a kind of local gentlemen's agreement between the collectors and the land owners who usually do not intend to collect or undertake other investment on the land. It is also highly probable that most large collectors do collect wild herbs on publicly owned land, since municipalities rarely have management systems and rules for the control and supervision of such areas.

Collected herbs are stored and dried in warehouses. They are then sold to integrated processors at highly variable prices depending on quality of the product. Prices range from US\$ 7 to US\$ 12 per kg (dried and ground). It is estimated that a worker can collect up to 30 kg of green *O. syriacum* per day, which corresponds to approximately 7.5 kg of dried *O. syriacum*. Therefore, a large collector will make a margin ranging between US\$ 3.8 and US\$ 8.8 per kg of dried *O. syriacum*. However, large collectors endure additional transport costs, warehouse costs, drying and grounding worker costs, and land owner payment costs, all of which influence the profit margin, which in turn is highly dependent on the collector's scale and on the total amount of the production. There is large variation and heterogeneity between the different large collectors involved in the Lebanese *O. syriacum* value chain, and a proper estimation of the profit margins should be done case-by-case.

Large collectors also have direct access to the export market, mainly to Jordan.

Processors and traders: there are no more than 11 medium and large-scale spice and herb companies officially registered at the MOA. There is a significant number of small scale informal spice and herb companies; however, they usually get their supplies from local collectors and their total production output is limited. Marketing channel 4, or the mainstream channel, can be defined as the legally registered channel and includes large collectors, as well as integrated processors and traders, i.e. medium and large-scale spice and herb companies.

Integrated processors and traders produce different types of zaatar mixes to be sold in the retail markets and to bakeries. Bakeries are the main buyers of zaatar mixes in Lebanon. Mixes sold to bakeries are of a lower standard quality and usually contain limited amount of *O. syriacum*. They are sold to bakeries at the price of US\$ 6 per kg.

As a matter of fact, the high variability in zaatar mixes is the main factor that drove stakeholders (especially local collectors, cooperatives and integrated businesses) to ask for a standardization of zaatar mixes. This standardization would allow for a grading of different mixes and therefore a different pricing. A mechanism is already in place, due to standard market supply and demand, but formal regulation and standardization would valorize the production of small collectors/processors, as well as other non-mainstream actors.

Integrated Businesses (integrated collectors, processors, and traders): there are two medium sized companies; one of them not specialized in herbs and in zaatar mixes. They are different from the other value chain actors because of the medium-sized production and due to the fact that they aim to integrate all steps of the value chain. Integrated businesses produce high quality zaatar mixes (most of them carrying quality and civic labeling, e.g. organic and/or support to rural producers) and develop marketing strategies that make best use of most marketing channels.

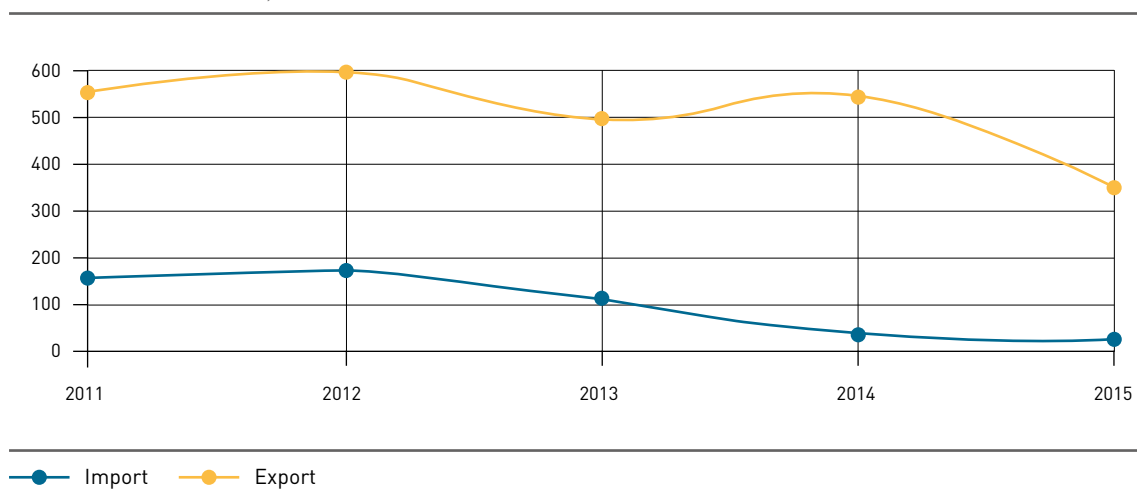
4.2.3 Import/Export trade

Lebanon's import and export trade of *O. syriacum* and zaatar mixes have been significantly impacted by the Syrian crisis. As mentioned in section 4.1., Lebanon imports approximately between 160 and 175 tonnes of zaatar mixes per year, mostly from Syria and Jordan. These mixes differ from the traditional Lebanese mixes and are demanded in relative quantities by the local market. It has been reported by several stakeholders that these imports may contain re-exported Lebanese *O. syriacum*, and that most of the trade between Lebanon and Jordan is not accurately reported in trade statistics or is done illegally.

Nonetheless, imports of zaatar mixes have witnessed a significant drop in volume since 2013 (as shown in Figure 12 below). Imported quantities have decreased from 173 tonnes for a total value of US\$ 271 000 in 2012 to 30 tonnes for a value of US\$ 67 000 in 2015.

This drop is most probably caused by the ongoing Syrian conflict that has led to the collapse of the Syrian herb and spice industry and has created difficulties for road trade between Jordan and Lebanon – which was finally interrupted in May 2015 after the Syrian government lost control of the last official border crossing point within its control.

Lebanon exports zaatar mixes as well as dried *O. syriacum* and shows a positive balance of trade, in terms of both volumes. As shown in Figures 13 and 14 below, Lebanon's export partners are diversified but generally correspond to countries with large Lebanese diaspora communities. Lebanon's exports also witnessed a significant decrease because of the Syrian crisis. The reduction of imports and the presence of more than a million Syrian refugees have increased local demand for zaatar mix, and also the road trade routes became increasingly risky before closing in 2015.

Figure 12. **Volume of import/export of Lebanon zaatar mixes and *O. syriacum* (2011-2015, in tonnes)**

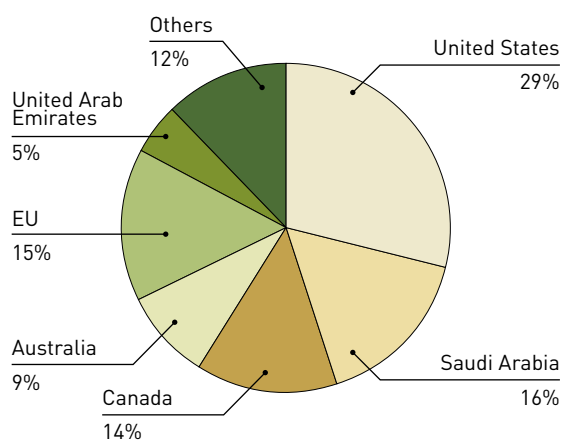
Source: Lebanese Customs data.

Lebanon's exports dropped from 596 tonnes in 2012 to 360 tonnes in 2015; however, this drop has not affected the total export value which remained approximately unchanged at US\$ 1.46 million in 2012 to US\$ 1.50 million in 2015. This unchanged total export value is due to an overall increase in the local price of zaatar mixes (because of increased demand²⁶), which led to an increase of export prices. In addition, the drop in exports did not impact high value markets, such as the EU and North America, which witnessed an increase in their share of Lebanon's export. In contrast, relative lower value markets for zaatar mixes, such as Saudi Arabia and other GCC countries, have reported a decreased share of Lebanese exports, since exporting to these countries is preeminently done via road routes.

As a matter of fact, Lebanon's zaatar industry has great interest in focusing its exports towards high value and stable markets, such as the EU and North American markets. Although there is a very low probability that zaatar mixes will significantly reach non-Lebanese and Levantine diaspora communities, there is scope for adding value to the product by promoting sustainable and organic production labels. Promoting environmentally sustainable wild collection practices in Lebanon could increase the product value in a global market, which has increasing interest in offering sustainably produced products at premium price. By adopting differentiation of labels, such as the Sustainable Forest Management certification label, Lebanese production would differentiate itself from its competitors, mainly the Jordanian and (past and future) Syrian production, in order to gain market shares in the international niche market for *O. syriacum* and zaatar mixes.

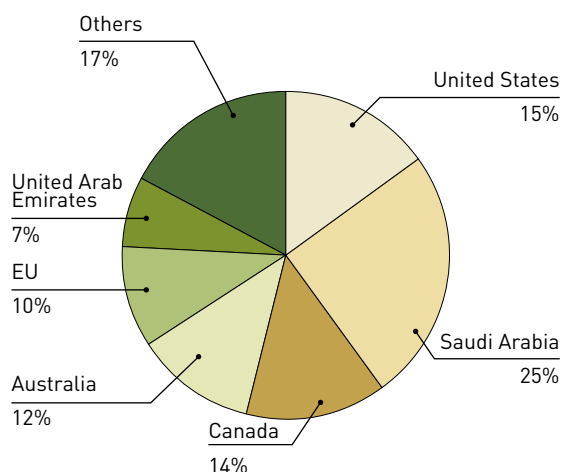
²⁶ Since most of the zaatar mix exports are sent to the Lebanese diaspora community abroad, which usually has a much higher purchasing power than local resident in Lebanon. It is reasonable to assume that an increase in price of zaatar mix in Lebanon – caused by a significant shock such as the increased demand for the product generated by an approximate 25 percent increase in the population (because of Syrian refugee's successive flows into the country) and a significant (more than 80 percent) drop in import – will lead to an increase in export prices of products consumed by the Lebanese (as well as Syrian and Palestinian) diaspora.

Figure 13. **Distribution of Lebanon export of zaatar mixes and *O. syriacum* 2015**



Source: Lebanese Customs data.

Figure 14. **Distribution of Lebanon export of zaatar mixes and *O. syriacum* 2012**



Source: Lebanese Customs data.

4.3 SWOT analysis and Recommendations

The following table (Table 6) summarizes the strengths, weaknesses, opportunities and threats faced by the Lebanese *O. syriacum* and *Salvia fruticosa* value chain.

Table 6. **SWOT analysis of the *O. syriacum* and *Salvia fruticosa* value chain**

Strengths	Weaknesses
<p>High local demand.</p> <p>Awareness of local producers about the need to implement sustainable collection practices.</p> <p>Cultivated and wild collected <i>O. syriacum</i> have the same characteristics and properties.</p>	<p>Lack of standards for the regulation of the different types and qualities of zaatar mixes.</p> <p><i>O. syriacum</i> essential oil is not demanded by the international market.</p> <p>Trial of field cultivation of <i>Salvia fruticosa</i> has not been successful.</p> <p>Lack of expertise in production of essential oil for <i>Salvia fruticosa</i>.</p> <p>Limited natural resource base, making expansion of zaatar mixes based on wild collected plants unsustainable.</p>
Opportunities	Threats
<p>Development of sustainable collection and fair work condition standards and branding labels for high quality zaatar mixes, intended for export to high value markets.</p> <p>Significant interest from public institutions and international donors to support cultivation of <i>O. syriacum</i>, which opens the door for potential increase in production and export of <i>O. syriacum</i> and/or zaatar mixes</p> <p>Production of <i>Salvia fruticosa</i> essential oil.</p>	<p>Early collection and other violations of the regulations.</p> <p>Urbanization.</p>

Lebanon's *O. syriacum* and zaatar mixes value chain(s) constitutes a competitive niche sub-sector for Lebanese agriculture. It generates income for a significant number of rural households; however, there is a series of needed interventions in order to increase wealth generated by this subsector, while ensuring its long term sustainability.

1. In terms of the regulations and monitoring of the wild collection process, it is unrealistic to believe that all collectors, including small scale collectors, will apply for an authorization at the MOA. However, there is a need to promote sustainable wild collection through:
 - a. Follow-up on the significant effort undertaken by public institutions and local stakeholders on raising awareness and training local collectors on sustainable collection practices.
 - b. Undertake additional efforts to monitor the work of large collectors especially regarding the quantity and area harvested. A strategy aimed at large spice and herb companies to raise their awareness – but also to apply sanctions – on the importance of the new regulations and the necessity for them to purchase products that have been harvested according to the regulations and following proper collection practices.
2. Encourage *O. syriacum* cultivation, in parallel with: (1) a proper implementation of the wild collection regulation, which would lead to a potential increase of price; (2) a successful marketing campaign to increase export potential and outlets through the promotion of organic and sustainable labels, as well as the development of zaatar mixes that are more suited to international consumers' tastes. Encouraging cultivation without a proper implementation of collection regulations and an increase in number of export marketing channels might be counterproductive and have a limited success.

It is recommended that the MOA establishes incentive programs to support the cultivation of *O. syriacum*. This would encourage production and lower pressure on the natural resource base.

3. Develop and implement production standards, including standardization of zaatar mix recipes and grades. This would allow the valorization of small-scale quality production. Consumers may be willing to pay a higher price if they were informed and understood the higher quality of a specific product, either because the mix is richer in *O. syriacum* or because the products support the livelihoods of rural women. Furthermore, such regulation would also open the door for innovation and patents on potential new zaatar and other *O. syriacum*-based mixes that would be better suited to the average international consumer.
4. There is also a big opportunity in the research and development of the production of *Salvia fruticosa* essential oil, which is demanded on the international market on the contrary of *O. syriacum* essential oil, which is unknown and therefore not demanded by the international market.

Laurus nobilis

5.1 Overview and value chain map

Collection of *Laurus nobilis* - in English: laurel or bay laurel; in French: laurier; in Arabic: غار -, the fruits for oil extraction and the leaves as a cooking spice, has been historically performed in the area of Menjez in Akkar in northern Lebanon, as well as in the area of Aita Al-Shaab and the surrounding villages in southern Lebanon (see Figures 15, 16 and 17). In Aita Al-Shaab, production is still done exclusively by women using traditional methods within household production units, while production in Menjez stopped in the mid-1970's with the exception of leaf collection for domestic use.

Hot borders forest

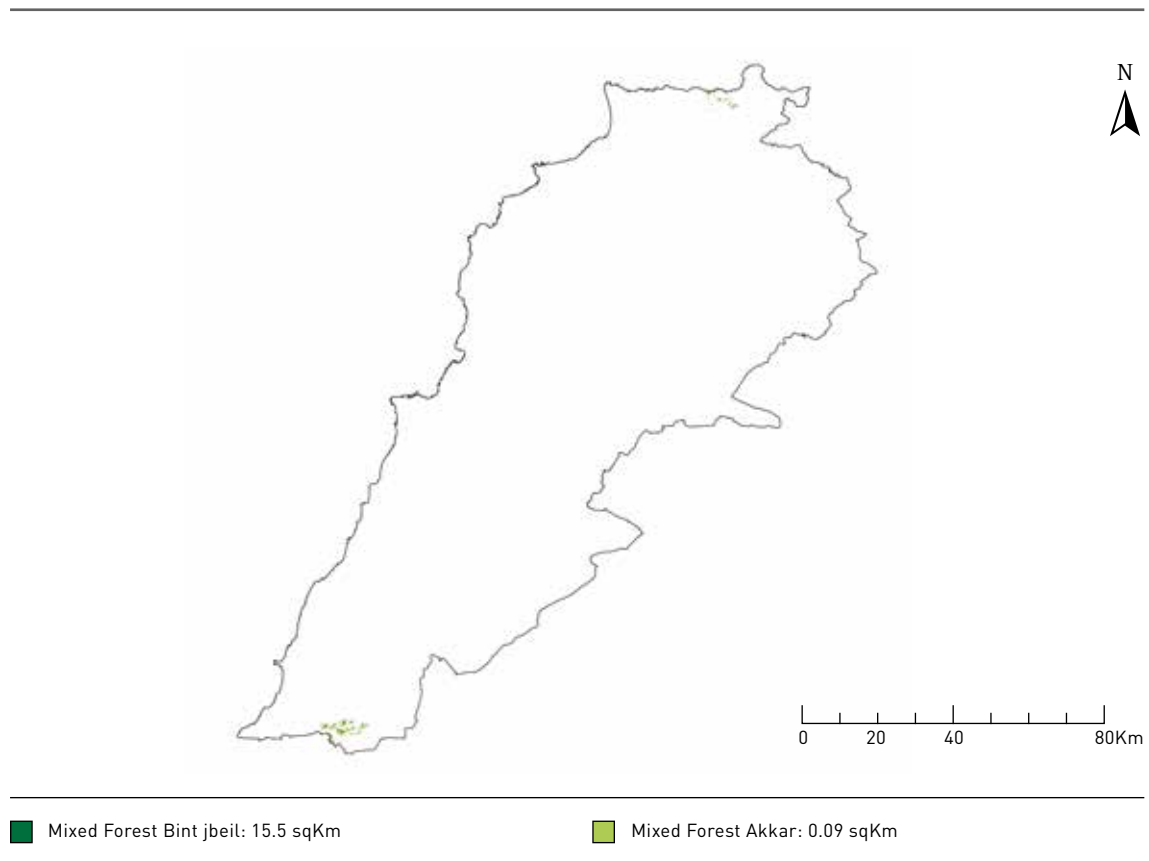
Forests and other wooded land in Menjez are mostly found on public municipal land, in addition to some private parcels. Forest land is composed of oak, carob and laurel trees – with a distinctive portion covered exclusively by laurel trees known by the local as the “black forest” – north of Menjez, adjacent to the Syrian border. The forest is not exploited, and is currently not accessible because of the ongoing state of conflict in Syria²⁷. The “black forest” is a potential site for conservation, nature-based tourism activities and ecotourism, as well as laurel oil and laurel soap production. An assessment of the laurel production capacity is currently being carried out by the Balamand University in collaboration with Menjez municipality. The program intends to reintroduce production of laurel oil with more technologically updated methods. The municipality is also developing a strategic plan for future implementation of ecotourism activities. The aim is to valorize local natural resources in a sustainable manner, although neither rural tourism nor laurel oil production seems feasible before the end of the Syrian crisis.

²⁷ Any presence in the forest could be considered by the Syrian governmental border guards as a hostile activity and/or a smuggling attempt.

The forest and wooded land in Aita Al-Shaab and surrounding areas is mixed forest with a relatively high concentration of laurel trees, most of which is privately owned or controlled. The publically owned land, which is also the most densely forested area, is close to the international border and is closely monitored by the Israeli army, the UN peace keeping forces, the Lebanese army and Hezbollah –therefore it is not used for the collection of laurel fruits. Local women in Aita Al-Shaab and surrounding areas collect laurel fruits – mostly on private land – to produce laurel oil as well as laurel oil-based soap, in household backyard production units.

Most of the laurel oil is used by the traditional soap industry. It is estimated that the total production reaches 7 tonnes of laurel oil with an estimated value of approximately US\$ 112 000²⁸. In 2014, Lebanon imported (less than) 15 tonnes of essential oil, including laurel oil for a value of US\$ 120 000²⁹, in addition to unknown quantities of imports from Syria.

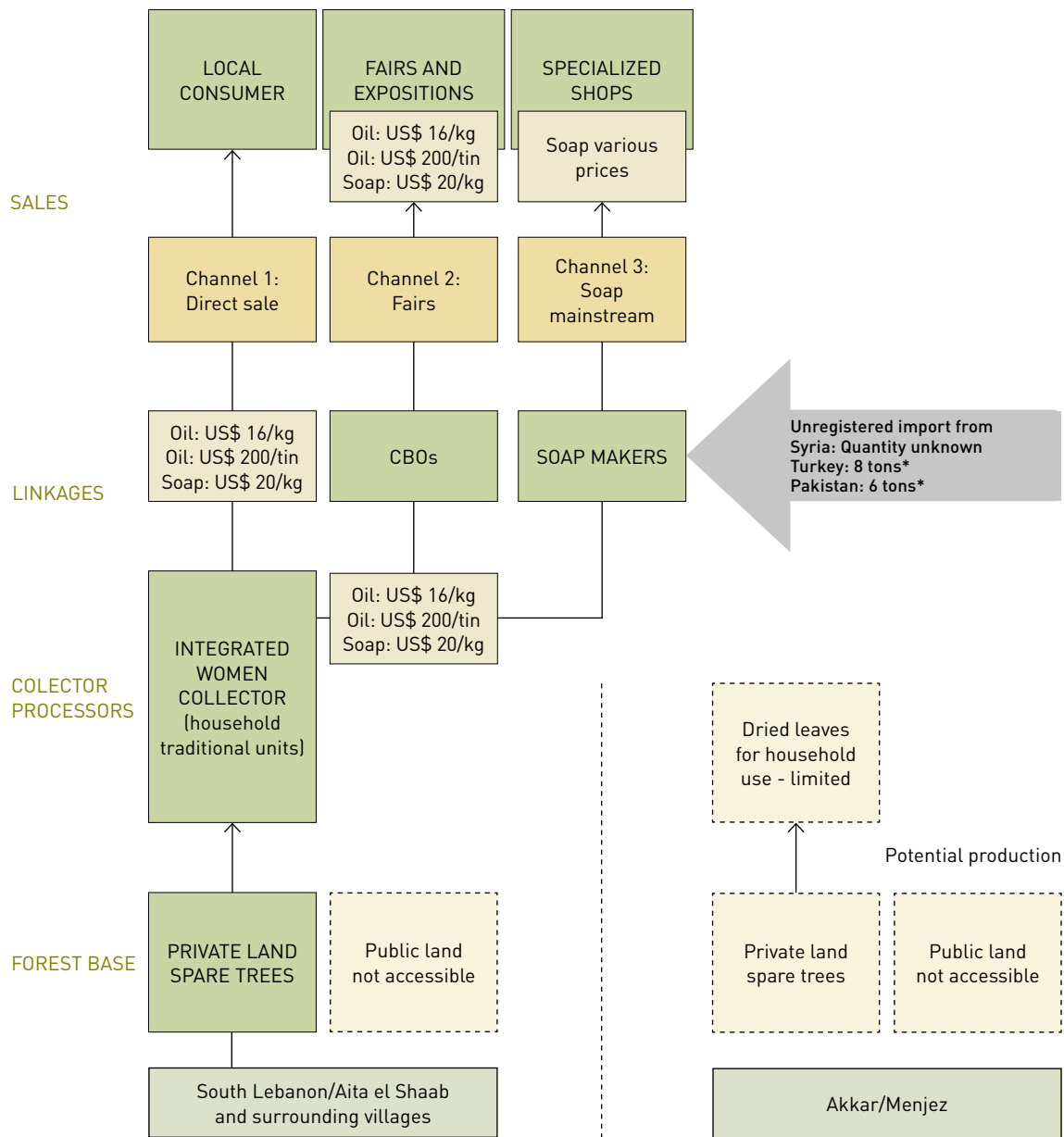
Figure 15. **Mixed Forest with a relatively high laurel presence in Lebanon**



²⁸ Author estimation based on stakeholders' interviews.

²⁹ Lebanese customs data, www.customs.gov.lb data. Note that import data is estimated for HS code 330129 "essential oils". It is assumed that imports under this codification are mostly laurel essential oil needed by the local soap industry. No data is available for laurel oil HS code: 33012990 and is assumed to all be laurel oil needed by the Lebanese soap industry.

Figure 18. Lebanon laurel oil value chain map



* Import data for HS code 330129 (2014)

TOTAL ESTIMATED PRODUCTION OF LAUREL OIL: 7 TONNES (2015)

Source: Author compilation based on data collection from key informants

5.2 The production base and market prices

Laurel oil work

Production of laurel oil in Aita Al-Shaab and the surrounding villages has remained very traditional, women labor-intensive and in home-based production units. This type of production follows the line of production of tobacco³⁰ and olive oil that are historically present in the area and which rely heavily on women's work for harvesting and home-based post-harvesting tasks. Men are generally in charge of agricultural production and of other non-agricultural income generating activities. The collection of laurel fruits starts in October, at the end of the tobacco curing season, and lasts till the end of December.

During these three months, women hand-collect laurel fruits on a regular basis. Collection is made on owned land and/or through an agreement with land owners in exchange for one quarter of the laurel (in fruits) or an equivalent share of the laurel oil or soap: in rare cases the land owner will receive a maximum cash payment of a LBP 100 000 (approximately US\$ 66).

A woman usually collects up to 20 kg of laurel fruits per day (5 hours of work). Assuming that there is one woman per household, she will need at least 3 days of work to collect the 60 kg needed to start laurel oil production. Laurel oil is produced using a large barrel with a capacity of 60 kg of laurel fruit (see Figure 20). The fruits are mixed with water and heated using a wood fire. Gradually laurel oil forms on the top (see Figure 19) and is gradually collected using a large spoon-like tool. The operation requires between 48 and 72 hours to produce 6 kg of laurel oil (a 1 to 10 ratio). Overall a woman using a single barrel needs 6 days of work to produce 6 kg of laurel oil. If she uses two barrels, she will need at least 9 days of work to produce 12 kg of laurel oil. Women sell laurel oil directly and/or use a part of it to produce pure laurel oil or mixed soap - when blended with olive oil, honey and more recently avocado. Household-based soap production in Aita Al-Shaab is rudimentary.

There are no mechanical and industrial laurel oil mills in Lebanon. The municipality of Aita Al-Shaab and the local agricultural cooperative were provided with a mechanical modern mill that was supposed to help local producers. However, the mill is not functional, as it seems that it is not suited for laurel oil extraction and/or has missing parts.

Laurel oil prices and marketing channels

Laurel oil producers have reported a significant increase – up to 30 percent - in laurel oil prices in the past years. It is highly probable that this increase is due to the reduction of the Syrian laurel oil supply to the local traditional soap industry. Laurel oil is sold in tins of 16 Kg (identical to olive oil tins) for US\$ 200 per tin – equivalent to US\$ 12.5 per Kg, or if a smaller volume is required the price is US\$ 16 per Kg. A tin of laurel oil will produce approximately 20 kg of pure laurel soap: pure laurel oil soap is sold at US\$ 20 per kg. Laurel oil production

³⁰ See Hamade, K. (2014). Tobacco Leaf Farming in Lebanon: Why Marginalized farmers need a better option. In Leppan, W., Lecours, N., and Buckles, D. (Eds). Tobacco control and tobacco farming separating myth from reality. Anthem Press: London

is highly demanding in terms of work: nonetheless, a household production unit can aim to produce 4 tins (64 kg) per season. This would provide a rural household with an income of US\$ 800 to US\$ 1 200 per season (depending on how much laurel oil is used to produce soap).

Figure 19. **Laurel oil starting to surface**



Photo location: Aita Al-Shaab, December 2015

Figure 20. **Backyard household production unit of laurel oil**



Laurel oil and laurel-based soaps are sold through direct sales using three different channels. Prices and margins do not change according to the channel; however, quantities may significantly vary:

- Channel 1: direct sales to local consumers living in Aita Al-Shaab and surrounding villages, mainly in the form of soap. This channel represents a limited proportion of total sales.
- Channel 2: sales during fairs and exhibitions; producers will join production in order to participate in a fair. Depending on the year, the fairs can help to sell the entire production – especially the Ardi fairs organized in Beirut’s southern suburbs (not organized since 2012 due to security concerns and to the risk of potential terrorist attacks). Participation in fairs and exhibitions is usually mediated through local community-based organizations, free of charge.
- Channel 3: direct sales of laurel oil to soap makers that come to procure the oil on site. This is currently the main sale channel, especially in the absence of Syrian laurel oil supplies.

5.3 SWOT analysis Recommendations

The following table (Table 6) present the *L. nobilis* value chain SWOT analysis and summarizes the report’s findings about the *L. nobilis* value chain in Lebanon.

Table 7. SWOT analysis of the *L. nobilis* value chain

Strengths	Weaknesses
<p>Represent a source of income for vulnerable rural women.</p> <p>Low cost start-up investment for household production units.</p> <p>Production period is complementary with other activities carried out by local women in southern Lebanon (tobacco curing, olive harvesting and laurel oil production).</p>	<p>Very limited natural resource base.</p> <p>Localized production.</p> <p>Lack of knowledge about industrial and/or semi-industrial oil extraction techniques.</p> <p>Labor intensive traditional production methods.</p> <p>Traditional production methods reduce laurel oil quality and purity.</p>
Opportunities	Threats
<p>Local universities’ interest in developing a semi-industrial production unit.</p> <p>Valorization of production through fair trade standards and branding labels.</p>	<p>Cross border armed conflict hampers full economic sustainable exploitation of local forest resources.</p> <p>Industrial and/or semi-industrial production technology may switch control of the resource from women to men.</p>

Laurel oil production is a limited and localized activity in Lebanon. Difficult access to border forests and labor-intensive methods of production act as a barrier for the over-exploitation of this resource. Furthermore, opportunities for the expansion of production are limited, especially because prices are expected to drop when supply of Syrian laurel oil becomes available again to soap makers.

Nonetheless, there is scope for the introduction of semi-industrial and less labor-intensive innovative methods of production and processing. Such methods will also allow for production of higher quality laurel oil – eliminating impurities, thus increasing demand from local soap producers, allowing for higher producer prices and improved rural household wellbeing. Such an activity should be regulated and undertaken in close collaboration between women producers, local municipalities, and public institutions in charge. A similar cooperation and regulatory framework would ensure that the natural resource is sustainably exploited and that generated income is still earned and managed by local women.

CHAPTER 6

Conclusion

The present report analyzed the main Lebanese NWFPs – pine nuts - *Pinus pinea* -, honey, Syrian oregano and Sage - *Origanum syriacum* and *Salvia fruticosa* -, Carob - *Ceratonia siliqua* - and laurel - *Laurel nobilis* - with the aim of defining innovative and adaptive interventions that allow for the improvement of forest-based sustainable livelihoods. The total value of NWFPs' output totaled US\$ 80 to US\$ 97 million in sales, and generated income for 10 000 to 15 000 households. In the vast majority of cases this revenue constitutes a secondary, but much needed income for most of these households.

Although many of the report recommendations are value-chain-specific, there are several common findings that apply to most value chains. Firstly, with the exception of the honey value chain, there is very limited potential for expanding production due to the limited natural resource base. Therefore, most of the value chains' competitive strategies should be focused on quality improvements linked to a branding that promotes the territory as well as the sustainability and fairness of production practices.

In addition, there is a need to improve value chain governance through the implementation of rules and regulations, including product nomenclature standardization. National institutions should create an enabling business environment, allowing for better integration and cooperation between different value chain actors. Within this context, emphasis should be placed on improving forest management and collection practices, as well as on developing up-to-date processing technology allowing to capture additional added value – especially for *Salvia fruticosa* and *Laurel nobilis*.

Throughout the analysis, honey stood out as having strong potential for expanding production and accessing high value export markets. Collaborations between small and medium-sized beekeepers and honey aggregators have shown to yield positive results in term of market penetration, product quality improvement and traceability, though at the same time allowing for a fair distribution of added value. Well planned strategic interventions in the honey value chain have the potential to positively impact the livelihood of a large number of rural households, while at the same time contributing to the valorization and the sustainable management of forest and wooded areas.

RECOMMENDATIONS

The report's main recommendations are summarized hereunder:

1. Resource sustainability

- Improve forest management, through training of all forest actors on good silviculture practices, including pruning, pest and disease management, forest fire management, sustainable harvesting practices (*P. pinea* and *L. nobilis*)
- Enforce regulations and increase awareness on sustainable collection practices (*O. syriacum* and *S. fruticosa*)
- Sustain current public and private reforestation initiatives, increase reliance on local communities' groups and on small and medium forest-based enterprises for sustaining and ensuring success of reforestation programs (all value chains).

2. Production and processing

- Increase beehives' productivity through the provision of technical training on up-to-date production practices (honey).
- Connect honey production to export market through semi-integrated linkages between small and medium producers with larger producers and exporters (honey).
- Improve processing efficiency and reduce post-harvest storage losses (all value chains).

3. Income generation and market access

- Providing businesses with adequate business planning, processing operations and good storing practices will benefit all value chains and increase profitability of local businesses (all value chains).
- Increase traceability and application of rules and norms to ensure food safety and accessibility to export market (all value chains).
- Valorize production through focus on quality and capitalize on sustainability and territory-based branding labels (all value chains).
- Encourage *O. syriacum* cultivation.
- Develop technological up-to-date processing methods for *S. fruticosa* and *L. nobilis*.

4. Institutional settings

- Build the capacity of national public institutions, such as the Ministry of Agriculture, chambers of commerce, national laboratories and value chain actors to support the implementation of regulations, as well as strengthen national coordinated efforts for developing NWFPs value chains.
- Develop and implement production standards for all NWFPs, including standardization of zaatar mix recipes and grades.

REFERENCES

- FAO (2012). The case of Stone pine in Lebanon. In FAO – Office for the Near East (Ed.). Experiences of Near East Countries on Utilization and Processing of Non-Wood Forest products. FAO: Cairo.
- FAO and MOA (2005). National Forest and Tree Assessment and Inventory. TCP/LEB/2903. FAO: Beirut.
- Global Environment Facility (GEF)-UNDP-Lebanese Agricultural Research Institute (LARI). 2013. Monographs for selected medicinal and aromatic plants in Lebanon. Mainstreaming Biodiversity Management into Medicinal and Aromatic Plants Production Processes in Lebanon Project.
- Hamade, K. (2014). Tobacco Leaf Farming in Lebanon: Why Marginalized farmers need a better option. In Leppan, W., Lecours, N., and Buckles, D. (Eds). Tobacco control and tobacco farming separating myth from Reality. Anthem Press: London
- Ministry of Environment-Lebanon. (2009). Fourth National Report of Lebanon to the Convention on Biological Diversity. MOE/GEF/UNDP 2009.
- MOA and GIZ (2016, forthcoming). Analyse de la chain de valeur du caroubier au Liban. Beirut: MOA
- USAID (20013). Honey value chain assessment report. LIVCD (AID-268-C-12-0001) project document.

Annexes

Table 8. **Data table for Figure 5 (Lebanon honey production in tonnes)**

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Production	1 900	2 130	1 900	1 738	1 028	1 775	1 676	1 082	832	732	935

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Production	1 070	1 095	810	965	970	1 045	1 278	1 424	1 424	1 620	

Source: FAOSTAT

Table 9. **Data table for figure 8 (Lebanon import of honey in tonnes)**

Exporters	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
KSA	41	50	59	105	97	132	129	124	122	149	164
Germany	34	25	18	18	18	25	19	25	19	25	52
Oman	0	0	0	0	0	0	0	19	19	25	11
Greece	13	10	6	16	13	8	12	9	8	7	8
Others	27	14	17	22	34	55	69	26	15	26	19
Total	115	99	100	161	162	220	229	203	183	232	254

Source: International Trade Center (ITC), calculation based on Lebanon Ministry of Economy and Trade data

Table 10. **Data table for Figure 10 (Lebanon honey export – in tonnes)**

Importers	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
UAE	15	1	4	66	43	63	93	79	82	127	133
Qatar		1	8	26	18	10	17	9	7	101	29
KSA	4	2	5	13	6	183	121	168	87	99	287
USA		13	2	31	8	49	41	30	28	88	21
Iraq								2		53	
Jordan	3	7		3		20			12	45	64
Others	30	21	14	24	195	91	152	43	64	57	11
Total	52	45	33	163	270	416	424	331	280	570	545

Source: International Trade Center (ITC), calculation based on Lebanon Ministry of Economy and Trade data

Table 11. **Data table for Figure 9 (Lebanon honey export diversification)**

	Share in Lebanon's exports (%)	Total import growth in value of partner countries between 2010-2014 (% per year)	Country's share of world import (2014)
Saudi Arabia	45.6%	22%	3.7%
United Arab Emirates	21.1%	24%	0.8%
Jordan	10.2%	19%	0.3%
Bahrain	4.9%	11%	0.1%
Qatar	4.6%	23%	0.3%
USA	3.3%	16%	24.6%
Congo	2.5%	21%	0.1%
Kuwait	1.9%	5%	0.3%
Egypt	1.4%	0%	0.1%
China	1.3%	62%	2.6
Nigeria	0.6%	-20%	0
Benin	0.5%	7%	0
Côte d'Ivoire	0.5%	8%	0
Gabon	0.3%	28%	0
Zambia	0.3%	18%	0
Angola	0.2%	23%	0
Guinea	0.2%	-	0
Mozambique	0.2%	41%	0

Source: International Trade Center (ITC), calculation based on Lebanon Ministry of Economy and Trade data

Table 12. **Data table for Figure 12 (export and import of zaatar mixes and *O. syriacum* – in tonnes)**

	2011	2012	2013	2014	2015
Import	164	173	113	33	30
Export	558	596	498	548	360

Source: Lebanese Customs data.



©FAO/Abdel Hamied Hamid

NON-WOOD FOREST PRODUCT VALUE CHAINS IN LEBANON



**NON-WOOD FOREST PRODUCT
VALUE CHAINS IN LEBANON**

More information:

ABDEL HAMIED HAMID

Regional Office for the Near East and
North Africa, Cairo, Egypt

AbdelHamied.Hamid@fao.org

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS
(FAO)

WWW.FAO.ORG

ISBN 978-92-5-109530-0



9 789251 095300

I6506EN/1/11.16