

AMERICAN UNIVERSITY OF BEIRUT

AGRICULTURAL ATLAS OF SINAY VILLAGE

by

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submitted in partial fulfillment of the requirements
for the degree of Master of Science
to the Department of Landscape Design and Ecosystem Management
of the Faculty of Agricultural and Food Sciences
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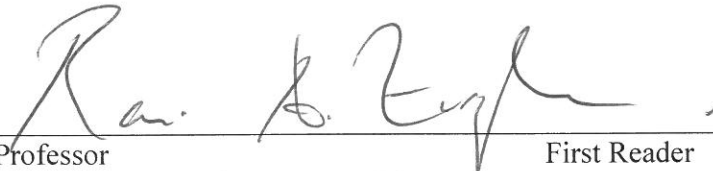
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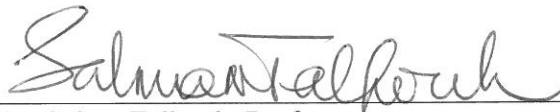
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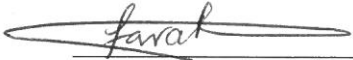
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AN ABSTRACT OF THE PROJECT OF

Farah Hisham Al-Samarai for Master of Science
Major: Ecosystem Management

Title: Agricultural Atlas of Sinay Village

The agricultural atlas describes and explains the processes of agricultural production in the village of Sinay, in Jabal ‘Amel- South Lebanon. The atlas aims to act as guide to those wishing to understand clearly the opportunities and challenges facing the agricultural sector in the village of Sinay.

This project also focuses on the agricultural production in Sinay in 2013, based on the methodology of Participatory Rural Appraisal using interview, mapping and transect walk with the farmers in the village. This project shows the multifunctional aspect of agriculture, social and economic sector in Sinay. We conclude by showing the change in the role and position of agriculture in the area.

Keywords: Village Atlas, Agricultural Practices, Land Use, Production Levels, Factors Affecting Agricultural Production.

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Dedication...

My beloved family and people who always encourage me...

I dedicate this work.

CHAPTER I

INTRODUCTION

The agricultural sector worldwide is witnessing rapid changes concerning its position and its role on the local and regional level. These transformations affect the production of food as well as the landscape, society and economy of the rural areas. In the last decades, Lebanese villages in particular, faced tremendous changes in their structure. The transformations of the landscape, the changes in land use and landownership as well as the urban growth in villages at the expense of agricultural land jeopardize the role of farmers in local and regional food security. South Lebanon is even more affected by period of conflicts, wars and occupation, contributing to the dynamic changes of the rural today.

Agricultural atlases document the agricultural practices in order to guide researchers wishing to understand more clearly the opportunities and challenges facing the agricultural sector (General statistics office of Vietnam, 2001). The atlas aims at documenting agricultural practices and methods of use of natural resources in order to serve the status and trends of natural resources use and landscape formation as well as pressure on ecosystems. It also aims to contribute to long-term development studies to provide researches with data and descriptive information. Indeed the atlas of Vietnam and Myanmar covered the subsectors within the overall agricultural sector, including: social structure, food production, livestock, irrigation, etc. However, in the Middle East there are no atlases covering the agricultural practices and methods in the region. This study is an attempt to fill this gap focusing on the atlas of a single village. This study

describes and explains the agricultural sector and agricultural processes in the village of Sinay, located in Jabal ‘Amel, South Lebanon. Context

A. Context

Jabal ‘Amel is the historic name of the southern extension of Mount Lebanon, extending over an area of around 2000sq km from the Awwali River to the borders of Lebanon with occupied Palestine. After the creation of the Lebanese state in 1920, Jabal ‘Amel became known as South Lebanon (Al-Safa, 1998). In the 19th century, Jabal ‘Amel was a commercial passage-point linking the Syrian mainland to other parts of the Ottoman Empire (Bazzi, 2002). However as Beirut’s harbor grew and the Beirut-Damascus railway developed, Jabal ‘Amel lost its commercial importance.

Predominantly rural in the early 20th century, Jabal ‘Amel’s landscape changed with its integration in the global market (Bazzi, 2002). Tobacco plantation, migration, economic changes and the geo-political location of Jabal ‘Amel in relation to the occupation of Palestine and the creation of the Zionist entity, marked the transformation of the area.

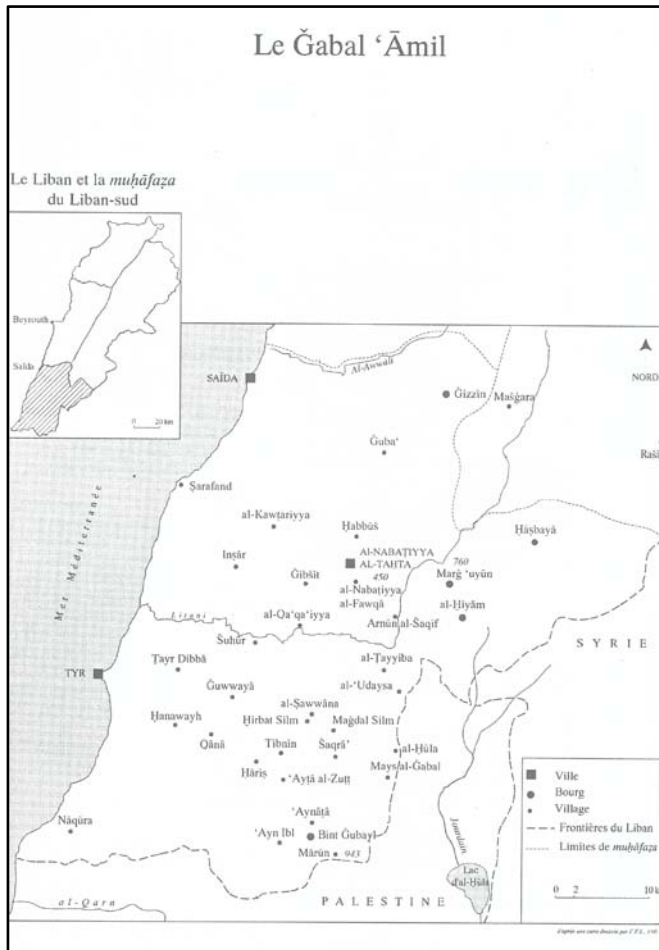


Figure 1: Map of the area of Jabal 'Amel (Mervin, 2000)

The area consists of three general morphological zones: first the coastal plains region stretching from the estuary of Al Awali River in the north, until Ras Al Bayada in the south. Second, the plateau region, which is considered an extension to the western chain and hills down to the sea in the west, till the borders of Palestine in the south. And third the mountainous region which is considered the low part of Lebanon's west mountain's chain (Zein-al-dein, 1994). The morphology and the topography of the area are suitable for agricultural production despite the existence of various geographical areas with varying production capabilities (Zein-al-dein, 1994).

The soil of Jabal 'Amel varies according to the different areas and depends on the morphology. Agricultural activities thus vary and are adapted to each type of soil. Black and sandy soil is planted with vegetables and citrus. Calcareous soil is planted with olive trees. Red soil containing grit is planted with all kinds of annual crops. While dark and semi-red soil and rendzina poor soils are planted mainly with rain-fed crops (Zein-al-dein, 1994).

The climate is a moderate one consisting of a cold winter season, a hot summer season and two mild mid-seasons. As we go further south, the quantity of rain decreases (Zein-al-dein, 1994).

The region suffers from water scarcity affecting agricultural production and livelihood in the region (Zein-al-dein, 1994). The importance and need of water in the area, which depends on cultivation for livelihood, imposed local reliance on three main sources of water in the region. One of the important water sources in the region is the groundwater. Nevertheless the decrease in average rainfall and the scarcity of porous layers in the ground – which allows water penetration through it – decreased the allocation of groundwater in good quantities (Zein-al-dein, 1994). Surface water is also an important source. Five rivers cross south-Lebanon: Al Litani, Al Zahrani, Al Hasbani, Al Wazzani, and Al Awali rivers (Zein-al-dein, 1994). On these rivers, large water projects are under study or already established. Some of these projects were not finalized due to funding problems such as Al Litani project. Finally, villages used to collect rainwater in ponds that would be used in dry summer months to water animals and crops in addition to some household use (Zein-al-dein, 1994).

B. Focus Area and Aim of the Project

Sinay, a 6sq km village at 500m elevation, is located in Jabal 'Amel – in the district of Nabatiya South Lebanon – 89km away from Beirut and 13km from the city of Nabatiya. In the last decades, Sinay witnessed changes in its living pattern moving from agricultural space inhabited by an almost exclusively farming community, to a village depending on multi-activities – mainly tertiary sector – and remittances. Despite having favorable natural resources for agricultural activities, the political instability and economic situation of the villagers have proved major obstacles.

Our aim is to create an agricultural atlas for the village explaining the detailed stages of agricultural production. Through the atlas of Sinay, we would be able to look in detailed at the various factors affecting agricultural production in the village including the accessibility of agricultural land, the means of irrigation, agricultural inputs, planting options, marketing and finance methods, and then to discuss the reasons which led to the social and economic changes in the village, and their influence on the inhabitants' livelihoods. The goal of such measure is to understand the socio-economic changes in the village, and the reasons that led the villagers to shift from farming to other occupations.

Two tales state the origin of the name and the meaning of the word "Sinay". Sayyed Mohsen al Amin points out, in his book "the charts of Jabal Amel" that the word (Sin) in Syriac language means the moon, or that the name came from "Sini" who is one the Canaanites (Al-Safa, 1998). The villagers, however, claim that the origin of the name refers to the fact the moon in their village is seen much more beautifully than it is anywhere else.

Sinay is divided into four zones; two of them are inhabited and the other two are cultivated. The inhabited part of the village are first the old part, north of the village which includes the village's historical site, and the modern part, south of the village which represents the evolution and expansion in the village, in which properties are owned by expatriates from both the village and abroad.

C. Methodology

The methodology of this study is based on Participatory Rural Appraisal (PRA). Participatory Rural Appraisal (PRA) is defined as “a set of participatory techniques to facilitate analytic abilities of local people and empower them to plan and undertake sustainable action” (Chambers, 1994). This method is a conjunction of a number of research programs, such as activist participatory research, agro-ecosystem analysis, and rapid rural appraisal (Chambers, 1994). Although a number of PRA sourcebooks have been listed, PRA specialists commonly suggest that methods should be used following the principle of “use your own best judgment at all times” to encourage creativity and flexibility (Robichaud, 2007). PRA promoters work to put the targeted people in position of controlling all planning process (Adelbo, 2000).

Five different data collection methods were used in this study.

1. Semi-structured interview

The main purpose of semi-structured dialogue technique is to aggregate general and specific information (Davis, 2001). This collection of information will be done through conversations with the key informant, farmers, family representatives, and/or focus groups. Using semi-structured dialogue technique avoids the negative aspect of

structured formal interviews, which include closed themes and an incapability to adapt to the participant's point of view (Davis, 2001). The initial objective here was to come up with a summary of the essential themes in the study; i.e. agricultural practices, factors behind food production, and landscape transformation. Six interviews were conducted in the village with farmers to collect baseline agricultural data. The interviews lasted from 20 minutes to over two hours. Oral consent was used in the interview process, following the code of ethics obtained from Institutional Review Board (IRB) conditions. According to IRB conditions, farmers' real names are being used in the research and they were replaced with letters in order to achieve privacy.

In every interview, I introduced myself and my study to the participant, and s/he was informed of the purpose of my visits to the village. At all times, the participants were made comfortable and were allowed to do most of the talking and to give any additional information they felt useful.

2. Dialogue with key informant

A dialogue with the key informant is really useful in the preparation of meetings with the village community. The benefit from interviewing key informant is to rapidly obtain relevant information, and to orient any interview session with villagers (Kejela Gemtessa, 2005). Transparency about the aim of the research is used to avoid confusion and mistaken expectations, since it is likely that the key informant will later talk about the interview with other community members. One key informant was consulted in Sinay. This informant, Mr. Ali Ismail, is a young farmer who is considered as the representative of this study in the village. Besides, he was an informant in several

previous studies for AUB. In addition, the Head of the municipality was consulted on the village's agricultural practices and history.

3. Focus group discussion

In this method, we used the semi-structured dialogue technique with a group of targeted farmers in the village. Focus groups are mainly participants who are directly involved in the research questions (Kejela Gemtessa, 2005). Interestingly, a dynamic group allows for a more open participation from all and allows for the exchange of ideas (Kejela Gemtessa, 2005). Mr. Ali Ismail, the key informant, invited this group of farmers.

4. Community mapping

Community mapping is an important tool and reference that helps the research visualize the farms and ecosystems in the village (Adelbo, 2000). Mapping can be performed by individuals or by groups (Adelbo, 2000). In this study, the key informant performed mapping. The map that was created contains rivers, roads, farms, major infrastructure, etc....

5. Transect walk

The main purpose of a transect walk in the village is to visually allocate the characteristics and changes occurring within the village (Adelbo, 2000). A transect walk across Sinay was taken with the key informant whereby he describe the surroundings. This technique is useful since it tells what the villagers know about their village and how they manage its resources (Adelbo, 2000). The most important topics that were mentioned are soil characteristics, water resources, crop production, animal production, in addition to some management practices and historical events in the village.

There were some obstacles affected the data collection in this research. Some of the interviewees were not comfortable to talk about some details concerning their career such as input, costs, and revenue of agriculture production. As a result of this discomfort, some of the information has not been taking into account to preserve the research information accuracy. Two interviews out of eleven - have not been used in details. The rest of the interviewees were very welcoming and comfortable to talk about small details in order to explain how the agricultural production in their village is working.

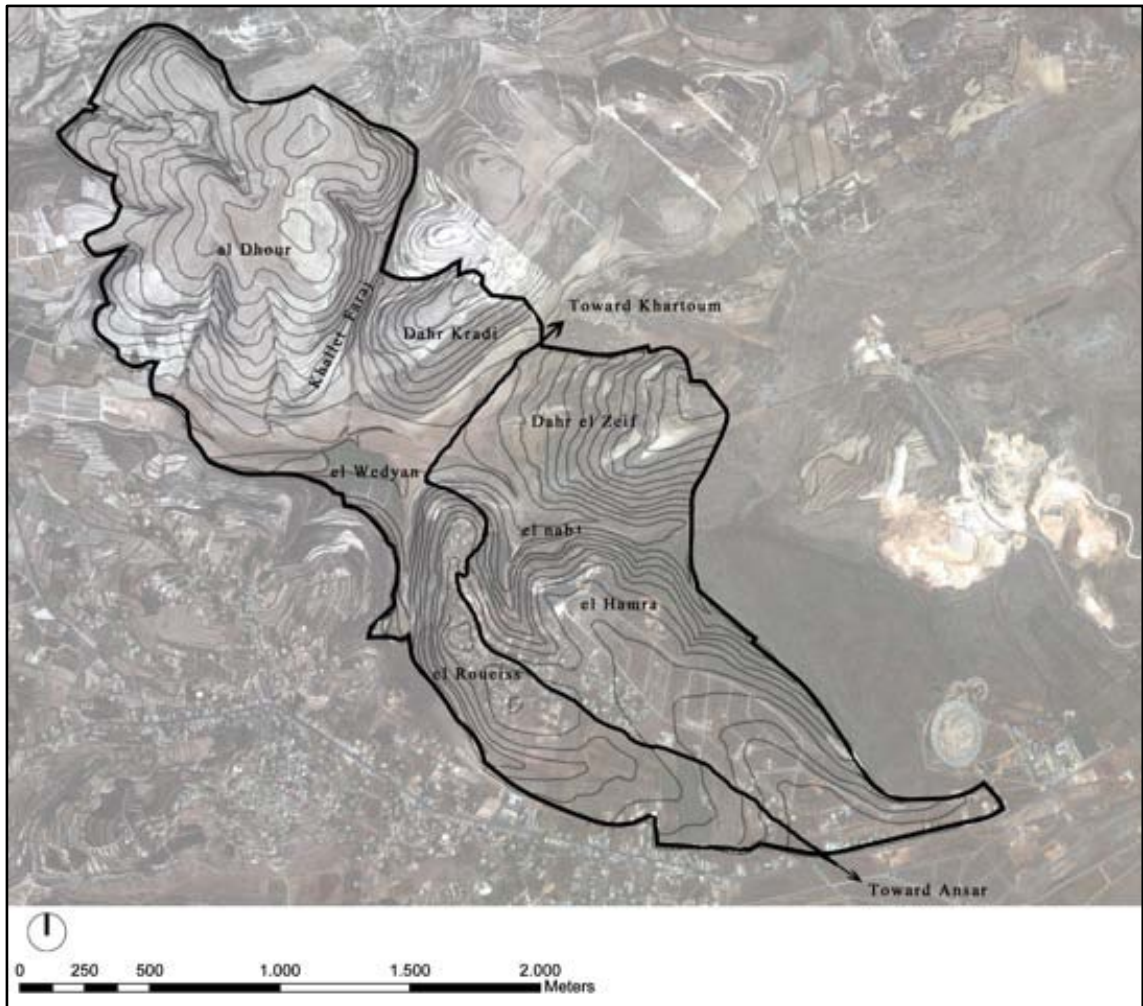
CHAPTER II

VILLAGE DESCRIPTION

Sinay follows the composition of a village including a society, a built environment, open spaces as productive units and a natural environment. It is bounded by Al Khartoum from the north, Bsaffour from the north east, Mazra'at Shilba'al from the east, Mazra'at Dmoul from the south east, Ansar from the south west, Al Kawthareyeh from the west, and Al Ghassanieh from the north west.

The village is composed of four hills, three of which are mainly used for agricultural production. The four main agricultural zones of the village are the three hills of Dahr el Zaif, Dahr Karadi and Deir Qoubba also known as al Dhour as well as the valley between these hills whereby the seasonal stream passes. The villagers first settled on a fourth hilly area surrounded by terraced agriculture, referred as [the old village]. The last two areas are the plateau extending from the old village. Al Hamra is partly covered by oaks and shrubs and is now dominated by the urban development of the village. And 'Al Hamra-khallet el sahra' is the area south of the major street of Sinay, where the first extension of the village started. Figure 2 shows the different zones of the village.

Figure 2: Map of the main geographical features in Sinay



A. The History of Sinay

The presence of several caves in the northern entrance of the village, and the discovery of remains of sarcophaguses, pottery and seals testify of the ancient inhabitation of the village.

The modern history of Sinay starts in the late 19th century when it was a mazraa or a farm, owned by one big *muqtaji* landowner from al Nabatiya Hussein Beik Al

Darwich. He built the great castle (named al umra)¹. The *iqta'* was “allotted tax farming rights, in mountainous or desert area to ethnic or tribal chiefs under the control of the Ottoman walis. The holders of the *iqta'*, the *muqata`ji* families, enjoyed varied degrees of autonomies in running the affairs of their *iqta'a*” (Traboulsi 2012, 3). In the 1920s, Darwich sold the village of Sinay to Youssef Beik Al Zein. Zein was not a *muqtaji* but he behaved like one. Back then, the village was divided into two parts: the lands of the Beik, and the public lands¹. The villagers used to have unofficial papers which guarantees their right to their houses without actually owning it, and maybe a few olive trees around the house without owning the land its planted in. In late 1920s, the French started drawing topographic charts for the villages, and due to the Beik's solid relation with the French, he was able to register the whole village as his ownership ignoring the papers the villagers had¹. But to bond the villagers to the land, fearing that they might quit and go to work elsewhere, he admitted to their right to the trees without the land. This is why there are no public lands in the village¹. The villagers also talk about the Beik's exploitation of the peasants through performing free work. In the summer; the women of the village were obliged to keep him comforted and take care of the house including, cleaning, cooking and other². And farmers had to work in the fields for an insufficient portion of the production not enough to feed themselves¹. The Beik was also known for his cruelty and the villagers rendered him as the “evil”. For example it is said that if a girl wanted to get married she would have to spend her wedding night with the Beik and nobody is to object². It's also said that a young villager, working abroad came to visit his parents one day wearing a white shirt, and when the Beik saw him, he ordered him brought in front of him and beaten, because he was wearing a white shirt.

¹ Interview with Mr. A.Z., Head of the municipality (Feb 13, 2013)

² Interview with farmer L (Feb 20, 2013)

The Beik asked him: if he is wearing white shirt what should I suppose to wear?². This clearly attests to the loathing way the Beik treated his villagers.

In the late 1930s, the Beik went through financial problems after working on the implementation of a water project from Al-Tasseh spring to Nabatieh, and the project was unable to pay back the money spent, thus the Beik sold many parts of his lands including Mazra'at Sinay³. Hassan Shams, a solvent expatriate working in Africa bought the village from the Beik¹. Shams was different from the Beik in treating the villagers, and decided that they must own the land on which they built their houses, in order to encourage peasants to stay in the village and work in agriculture. He aimed at developing Sinay as a capitalist agriculture productive village by cultivating cash crops, like tobacco.

Towards the end of 1960s, Shams parcelled the land of the village, and sold the plots to investors and villagers. At that time the peasants mostly needed the land to provide for their growing families so the villagers demanded that they purchase small properties at cheaper prices, for the price of an acre was nearly 150,000 L.L. which was a great sum, none of the peasants had, thus none was capable of purchasing^{1,3}.

The most important incident to make the villagers land owners was a small revolution in 1987¹. At that time, land prices started to increase after the withdrawal of Israeli occupation from a part of south Lebanon, which caused an increase in the demand on lands by southern expatriates³, and as a result, the prices increased to hit 40,000 L.L. per durum, which was extremely high for the villagers³. Thus the landowner started to divide the land into small properties, but the villagers tried to

³ Interview with cattle owner J (Mar 23, 2013)

purchase the land undivided considering its price would increase after its sorting³. Yet, the landowner refused aiming for profit. So, the villagers – residents with no ownership of any land - decided that no foreigner has the right to own the lands they cultivated and defended during the Israeli occupation, and they have a right to it¹, and they told the landowner that since they live in a lawless state and there is nothing which guarantees the rights of the poor, they will put justice to their own hands^{1,3}. And when the villagers started the constructions, the landowner decided to use bulldozers to wipe it out, so they raised arms in the faces of the bulldozers to stop it^{1,3}. As the situation raged and nearly turned to an armed conflict, a high official in Amal movement – a party dominant in that region – stepped in but his efforts for reconciliation did not succeed¹, and eventually, the landowner grudgingly agreed to selling it as a single land to the peasants^{1,3}. The following table highlights the key events in the village's history:

Table 1: Approximate dates of key events in the history of Sinay

Date	Event
1870	The village was owned by Hussein Beik Darwich- lord of Nabatiya.
1933	Youssef Beik Al Zein purchased the lands of the village.
1934	Division and registration of lands by the French.
1936	The first migration wave towards Beirut.
1940	Hussein shams purchased the village.
1969	Dividing the land to large properties and selling it, and giving the villagers ownership to their houses.
1975	Lebanese civil war broke.
1982	The Israeli occupation of the south, which caused the second migrating wave to Africa.
1987	The revolution held by the villagers in the face of Hussein Shams

	demanding to purchase the land with suitable prices.
1998	The establishment of the municipality in the village.

The table clarifies the trajectory of the village changing from a single feudal property, to a semi feudal one, to a single capitalist, and finally to multiple ownership. The table also shows the importance of local movement in the villagers aspire to land through a struggle with the landowners. Eventually we point out to the fact that the village turned from a single active and owned farm, into a subsidiary village for Ansar municipality, with multiple landowners and activities, and then an independent municipality in the end of the nineties.

B. Housing and Population in Sinay

In the 1930s, the village had only 19 houses and the rest of the land was used for cultivation¹. Now Sinay became a small village containing 156 housing units, which is located basically in the old part of the village, the place where housing first started. Generally the population is high in the part called the old village, due to the structural construction of villages in the past¹. Villages ages ago, and due to the scarcity of construction, were more of a wild nature than urban one such as today, thus the villagers used to build their houses in places close to each other for the purpose of protection against wild animals which might attack their livestock or poultry, and as a protection from thieves^{1,3}. So, recent construction started to expand away from the center of the village, and the modern trend of construction became valued by the green areas within the property^{1,3}.

Based on information obtained from Sinay's municipality, the village consists of 2500 persons in 2013. Only 700 are registered voters – the rest are either underage or abroad – and around 1000 persons are full-time residents. The rest of the villagers were emigrated to Africa, Europe, gulf countries and some of them are living in Beirut¹.

C. Land Use in Sinay

In addition to agriculture use and urban usages, there are several other land uses in the village including grazing, collecting of wild plants, hunting, housing, commercial, educational, sportive and religious activities. The main land uses are represented in (Figure 3).

1. Agricultural use

Agricultural uses in the village are permanent, seasonal, or raising livestock.

- a. Land used for permanent cultivation

It is the land used to plant fruit trees. The cultivations of fruit trees are meant for the commercial production and are two-fold: olive trees and citrus trees (Valencia, Mandarins, Tangerines, Lemon, and Clementine). Five olive orchards are present in the village although few olive trees are planted near houses and are for household consumption. Three citrus orchards are also found in the village.

Moreover, many fruit trees are planted near houses for household consumptions such as Orange, Lemon, Avocado, Loquat, and Fig.

- b. Land used for seasonal cultivation:

It includes the land used for the cultivation of seasonal crops such as: cereals, grains and vegetables both exposed and sheltered. It's also worth mentioning that some of these cultivations are developed on lands not owner by the framers. These lands are owned by absentee landowners and on which specific types of rental agreement and right of use applies. Farmers usually plant those lands with cereals and legumes without paying a rental fees but rather a percentage of the crop. The deal between the landowner and the farmer states clearly that the last part is allowed to cultivate the land free of charge on the condition that he evacuates the land when the landowner asks for it even if the crops were not ripe yet. Therefore, only seasonal crops are planted on these lands.

- c. Land used for animal production

It is the land used in raising animals such as: cows, sheep, goats, and poultry. This type of use decreased with the decrease of this activity. Today, only 3 people are raising livestock while in the past almost every house used to have several numbers of animals to benefit from their products.

2. Traditional land use:

Although the lands are privately owned, the villagers are still using those lands for multiple traditional purposes. Those lands are characterized by being open lands with no constructions, and are used as follows^{1,3,6}:

- Gathering plants: a process of picking some edible wild plants or medicinal herbs such as: blackberry bushes, wild thyme, dandelion, chamomile, wild fennel, hyssop, and many other plants and herbs. These plants are gathered by

women and used for house consumption and sometime for commercial purposes. It is an ingredient of many local dishes for the people of Sinay.

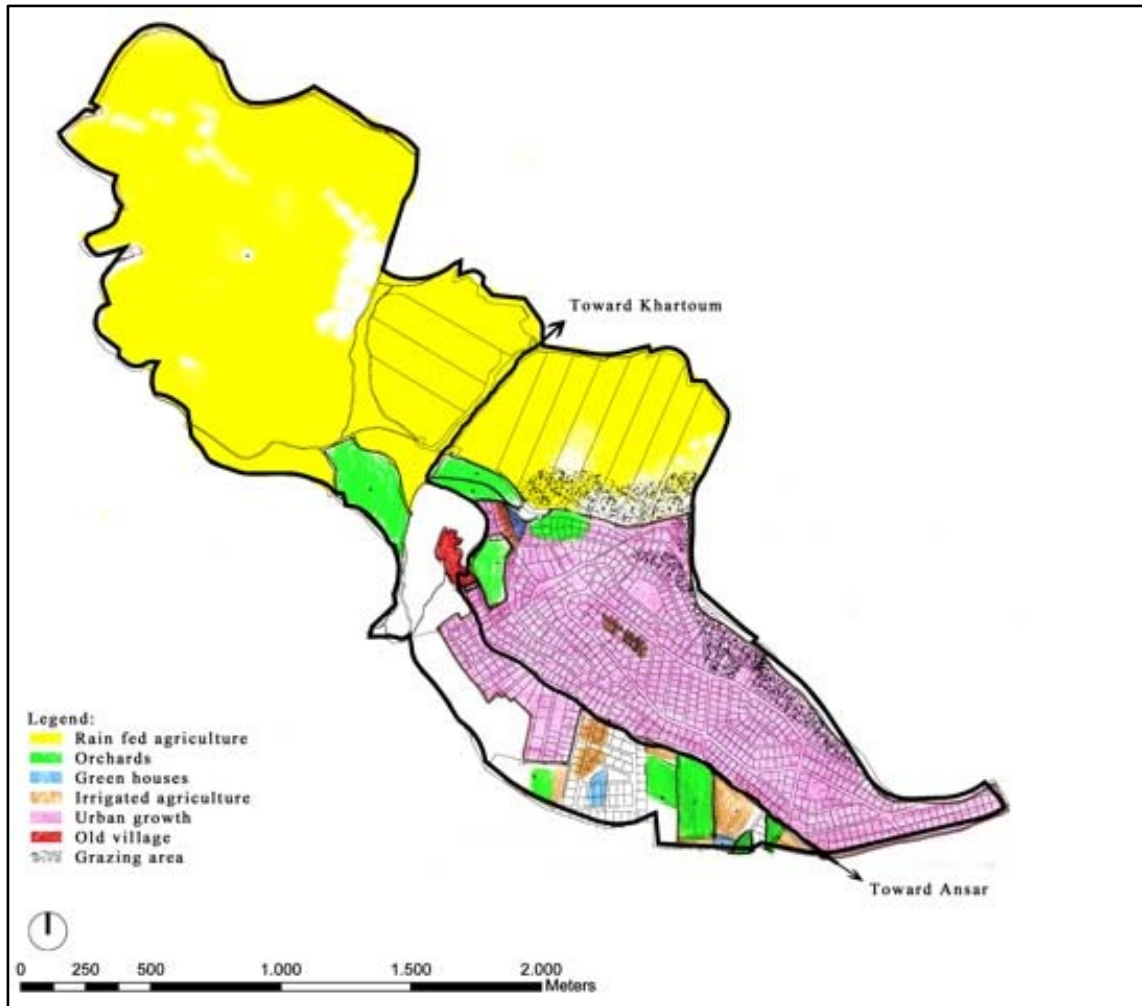
- **Grazing:** livestock owners feed their flocks through moving them from one pasture to the other except in cold weather.
- **Wood gathering:** such lands are used for collecting small to medium branches for starting fire hearths. This kind of usage is no longer common due to the prevalence of urban life trends and the evolving heating and cooking tools from depending on wood combustion to the combustion of other forms of energy sources like gas or gasoline. However, villagers are still gathering wood to use it in fireplace.
- **Hunting:** usually done by villagers in rural places far from houses and in rugged areas. Hunting is restricted to birds during spring season. Hunters depend on birds migrating from Europe and Turkey towards Africa through which the fields of Jabal 'Amel becomes an obligatory rest stop for migrating flocks⁴.

3. Non-agricultural (urban) use:

Recently, non – agricultural usage of land increased noticeably in the village. The area of Al-Hamra is being developed as a urban settlement; mainly dedicated for constructions of private properties, houses, shops, governmental holdings such as the municipality hall, schools, infrastructure including roads, water tanks and others.

⁴ Interview with key informant, farmer C (Feb 13, 2013)

Figure 3: Land use in Sinay Village



D. Social Structure of Sinay

In a society with agricultural base, property is the center base of social relations, because ownership categories are compatible with the social authoritarian diversity of categories and classes in villages (Baalbaki, 1985). As for social categories in relation with product – social aspects, it is as follows, and which applies entirely to livelihood standards in the village of Sinay. Then, the following categories represent the actual structure in the village today, including new categories in Sinay’s society. In the same

time, some of the farmers in village can be following the more than one category. For example, most of the share- cropping farmers considered as small farmers.

1. Agricultural laborers

This category developed in parallel to the increasing capitalist holdings in citrus cultivation, greenhouses cultivation cultivations, and animal keeper (Baalbaki, 1985). Mainly their work is the key source for their income, since they are laborers separated from production means they work on and own none of it but their efforts which provide for them. Usually farmers can be from both sexes and their wages ranging from 25,000 to 30,000 L.L. per day^{1,4}. Nowadays there are mainly Syrian laborers due to war situation in Syria. Generally, the Syrian labor is much cheaper, so it's abundant in agriculture sector¹. The farmers in Sinay today are not anymore labors as opposed to their position to the owners of the village in the past¹.

2. Small farmers

Farmers owning limited properties while exploiting other pieces of land so it would form sustaining holdings for their families (Baalbaki, 1985). Those are mainly farmers depending on seasonal and rain fed cultivations in the village. Moreover, many of small farmers' sons migrated due to the low productivity and severe competition by imported products and pressures by big landowners and merchants. Most of the farmers in the village considered as a small farmers¹.

3. Share- cropping farmers

A category of agriculture society who works by sharing- cropping agreements, through those framers invests in smallholdings given to them by its migrant or immigrant owners (Baalbaki, 1985). In fact, the incomes of these two categories are

decreasing as a result to its submission to an increasing deduction applied by semi monopolizing marketing networks on one hand, and the rise of living costs on the other hand. In the list of farmers of the village, farmers A, C, I, J and N mentioned in (Table 2) are share –cropping farmers. This category of farmers invests in smallholdings given to them by the owners.

4. Big farmers

This category owned and rented lands are characterized by being relatively important (Baalbaki, 1985). Generally they hire small farmers after assigning small investments to them. They also act as mediums for facilitating equipment or marketing services¹. For example, farmers E, H, K and L are considered as big farmers. Those four farmers are raising small number of animals, and they may work in another field.

5. Big landowners

This category consists of: capitalists, carrying their funds into modern cultivation (Baalbaki, 1985), and expatriates. This category represents farmers with cash, those who are investing in the village. Farmers D and M own properties and they have established agricultural projects using modern technologies.

6. Free businesses

A recent category consisting of young generation, a group of villagers who deserted agriculture sector and headed towards free businesses. The utmost important businesses the villagers established were: clothes and garments shops, food business, car repair shops, constructions and others¹.

7. Emigrants

This category includes a large number of villagers who were able to establish careers abroad. Villagers migrated mainly to UAE, the UK and Ivory Coast¹. This class earned the cash for ownership and establishing big projects in the village, and who consider the village a place for summer vacations for leisure and visiting their families from time to time. Many emigrant villagers decided to return and settle in their homeland, but failed due to the unstable political and economic situation in the whole region^{1,3}.

8. Employees

A new category in the village depends on official and private enterprises' jobs in Beirut or major southern cities. This category considers the village a place for summer vacations for leisure and visiting their families from time to time¹.

Such diversity in social classes or scales is a result of compound processes of accumulations, social formation and reformation which was not secluded from the political, geopolitical, and economic factors surrounding the region where Sinay is in its middle.

Table 2: Farmers and agricultural production in Sinay

Famer's Name	Evergreen Orchards	Seasonal Cereals/Legumes / Vegetables	Animal production	Honey bee production	Herding	Planted areas	Full/ part time farmers
Farmer A	-	Wheat+ Corn	-	-	-	Not in Sinay	Full
Bee	-	-	-	Honey	-	-	Part

Keeper B							
Farmer C	-	Wheat+ Pea	Cows	-	-	90 d.	Part
Farmer D	Citrus	Tomato+ Cucumber	-	-	-	100 d.	Full
Farmer E	Olive	Wheat+ Lentil+ Tomato+ Cucumber	-	-	-	60 d.	Full
Bee keeper F	-	-	-	Honey	-	-	Part
Herder G	-	-	-	-	Goats+ Sheep	-	Full
Farmer H	-	Wheat	Cows	-	-	60 d.	Part
Farmer I	-	Wheat+ Corn+ Sesame	-	-	-	90 d.	Full
Cattle Owner J	-	-	Cows	-	-	-	Full
Farmer K	-	Wheat+ Corn+ Sesame	-	-	-	35 d.	Part
Farmer L	-	Wheat+ Corn+ Lentil+ Sesame	Cows	-	-	150 d.	Full
Farmer M	Citrus+ Olive	-	-	-	-	60 d.	Part
Farmer N	-	Wheat+ Lentil	Cows	-	-	750 d.	Full

E. Economic structure of Sinay

Sinay moved from fully dependent on agriculture, toward a multi-activity space, relying mainly on non-agricultural sectors. We notice that many villagers who were farmers shifted from agricultural activities to working in other sectors such as construction, shops owners, transportation, mining, or depend on salaries from official

jobs and remittances from expatriates. Today only 14 people in the village still cultivates, while often farmers also have another job. This type of agriculture is referred to as “marginal cultivation”, which is defined as the disability of a farmer to provide the appropriate effort to produce, or the disparity between efforts subjected in comparison with production for cultivation to be the main source of income and main source of livelihood for a family (Hazell, 2007). This definition applies to farmers who do not own land in Sinay.

Still, lots of young villagers emigrated in order to provide decent life for their families, and most on them have no intention of returning back to their homeland, due to the negligence regarding main services like electricity, water, and sanitation¹. There’s also the main and most important reason which is the fear of another war breaking nationally or regionally (Slavova Sep, 2012). But, the national political and security instability on one hand, and the negligence of the state for all sectors on another, weakened all work sectors in the south (Slavova Sep, 2012).

CHAPTER III

CULTIVATION IN SINAY

Village cultivation in Jabal ‘Amel has some characteristics affected by many factors, which define the general characteristics of agricultural production. This part of the atlas will clarify the way agricultural production is done in Sinay focusing in particular in the production in 2013.

A. Agricultural Production in Sinay

In order to obtain a clear image of cultivation in the village, we should recognize the sources and processes of agricultural production. Resources of production such as land, water, and invested capitals define the primary shape of cultivation. Moreover, production processes such as plowing; land terracing, irrigation, and many other processes show the obstacles for large production. We cannot also disregard the method of managing production like using cultivation cycles and calendar, crops choices and marketing which gives a farmer bigger benefit. For obtaining important production details, farmers were questioned about the crops which are cultivated in the village. Seasonal cultivation was mainly specific kinds of grains and vegetables, while permanent cultivation included two types of fruit trees for commercial usage.

1. Agricultural production resources

- a. Land

The lack of access to land for agricultural production, make this resource as an obstacle in the evolution of this sector (Forni). Most of the farmers do not own the land they cultivate, but apply sharing forms familiar in Jabal 'Amel. One of the most important sharing forms in Sinay is "Daman". This type of rent based on an agreement between farmers and landowners. By this agreement the farmer can cultivate the land with two third shares for the farmer and one third for the owner. Also, there is another type of agreement when the landowner allows one of the farmers to cultivate his land with free of charge agreement. This agreement is implemented with one condition, which is leaving the land at anytime the landowner wants.

As a result, landless farmers would not conduct any improvements on the land such as terracing or water drawing. Thus we notice that this kind of cultivation gives a limit the evolution of the production.

- b. Water

Water scarcity in Sinay stand in the way of the potential evolution of agriculture. The village holds only seasonal streams, and the village spring is not enough for irrigation. Villagers rely on artesian wells, tank water, and rainwater. Thus we notice that there are two kinds of cultivations in the village: rain fed cultivations adopted by small farmers, and watered cultivations that depend on tanks by medium farmers, and wells by big farmers. This type of cultivation especially the rain fed mainly located in Dhour, Daher Al Zaif, and Daher Al Karadi.

Artesian wells is only adopted by big farmers due to its high cost ranging between 150,000\$ and 350,000\$. The cost depends on the location and rocks type. Small or medium farmers cannot afford this sum. They Instead they depend on water tanks filled through water purchasing from water companies.

- c. Capital

Capital investment in agriculture in Sinay is very small. This is limited to a few who used money saved through emigration and was thus able to provide the costs of modern cultivation techniques. Capitals are used for terracing lands, digging artesian wells, using machinery, pesticides and fertilizers for obtaining the highest production. Small farmers do not have the financial abilities to provide modern cultivation techniques, thus the limits of capital is an obstacle for agricultural production evolution.

2. Production processes

- a. Plowing

Plowing in the village does not follow the official and scientific recommendations from authorities such as the ministry of agriculture. Farmers are in fact unable to apply these recommendations due to its high cost. Thus, they depend on expertise inherited from their fathers and forefathers. Plowing is an expensive mechanical process measured by the hours of work and not the area needed to plow, and reaches up to 30,000 L.L. per hour. Moreover, the hours of work depend on the area and nature of the cultivated land. For instance, as the land grows more slope or rockier, the cost of its plowing increases³. Generally, farmers adopt a specific plowing trend: shallow plowing for the land once a year for rain fed cultivations, and shallow plowing for the land twice a year perpendicularly for vegetables cultivations, as is shown in

(Table 6). The few modern agricultural projects adopt modern production methods following some scientific recommendations.

b. Land terracing

It is one of the cultivation processes applied on sloping lands. It created terraces of horizontal platforms cut of from the slopes or hillsides to increase cultivatable land. This method preserves the soil, and limit soil erosion. It is also considered the best way to help the soil absorb water, whether by rain or irrigation water, instead of quickly running on the surface down to the slopes. That is why landowners adopted such process in order to preserve the soil and help it absorb the water, thus reducing the need of irrigation. However, this process is very expensive because it requires modern machinery to straighten the land, and build stonewalls to help preserving the soil is very costly in the village⁵. Due to the high cost of investment, only landowners do terracing. Landless farmers cannot afford to invest a large sum in a project that would not benefit him^{3,4}.

- c. Cultivation

The process of cultivation and sowing seeds is usually performed manually according to the kind of crops and method of planting.

- Grains are rain fed and sowed directly in the soil.
- Vegetables are either rain fed or irrigated. Seeds are put in holes ready for planting in lines, or are scattered on beds. In green houses, plants need to be transferred from planting zones into permanent land inside the greenhouses.

⁵ Interview with farmer E (Mar 18, 2013)

- Fruits are transferred small when small from nurseries into permanent land manually, and hire farmers to work within the orchards.

- d. Irrigation

Irrigation is important for non-rain fed cultivation such as intensive agriculture in green house, orchards and some vegetables. Supplementary irrigation process depends on climate: as the climate becomes warmer in summer, it decreases the humidity consistency of the soil, thus urging the farmers to irrigate. But if winter season brought heavy rain, and the summer was not very hot, the humidity consistency of the soil becomes appropriate for cultivation, thus decreasing the quantity of water needed. Irrigation details of the village are explained in (Table 6).

- e. Fertilizing

Fertilizers are used in order to obtain the higher production within allocated costs. While rain fed vegetables crops are never fertilized, soil fertilizer is applied after plowing for rain fed wheat cultivation. Fertilization is very scarce for rain fed cultivations for two reasons: first due to the increase in the prices of fertilizers in local markets and being controlled by merchants, and second rain fed cultivations are considered unworthy of such costs. In intensive agriculture, such as vegetables in greenhouses, fertilizers are added and incorporated with water continuously. (Table 6) explains the quantities and timing of fertilizers.

- f. Pesticide

Using pesticides is considered a form of modern cultivation, and it also depends on the kind of crops. For example, pesticides are never used in planting rain fed grains

and vegetables crops³, but it is used in planting vegetables in greenhouses cultivation in order to obtain high production⁵. In orchards, pesticides are used in non-periodical way depending on insects and diseases affecting crops.

- g. Harvesting

Mechanical and manual harvesting methods are used in the village. For grains, mechanical methods are use, whereas vegetables crops are manually harvested – picked. This does not differ from greenhouse cultivating, for harvesting in it is also done manually. The vast cultivated spaces urge farmers to hire laborers with daily wages to help in harvesting. Harvesting in orchards is also done manually. The small harvest quantities encourage the use the manual harvesting, because it would be cheaper than the use of modern technique cultivation.

- h. Packing and storage

Packing system depends on the kind of crops. For instance; fruits are packed in boxes might weigh 15 kg; vegetables are packed in small boxes weighing from 15 kg, and grains are packed in 50 kg bags, and the remaining hay are stacked in bags large bags weighing approximately 25 kg.

Storage is unavailable for the farmers in Sinay, because the costs of storing are relatively high due to the high prices of fuel in Lebanon used to run electricity generators, and the absence of state's electricity services. Also, small farmers cannot afford the high prices for storage equipment⁵.

B. Managing Agricultural Production

The managing practices of agricultural production adopted by farmers in Sinay, depends on climate, economic condition and the crops. These practices are an accumulation of farmers' expertise from one generation to the other which helped the farmer to use ecological conditions for obtaining the highest possible production. Here are few of the adopted practices.

1. Crop rotation

It is the process of organizing crops after each other in a specific piece of land, and a specific order which is called crop rotation in its quantitative manner, which indicates the number of years passing between cultivating the main crops. It is also called bi or tri rotation, which are policies adopted by a farmer to preserve the nutrients in the soil and fight its diseases. Some crops cultivated by the villagers are considered exhausting for the soil like wheat, tomato, and corn. But, bringing some legume crops to the rotation improves soil qualities after an exhausting crop is cultivated. Following a crop rotation, a farmer cannot cultivate exhausting crops twice after each other, or crops which can get infected with one of soil diseases caught from previous crop, after a three years period at least⁶.

This method could also reorganize the economic status, for it saves the farmer from losses, especially if the farmer embarks certain crops due to the increase of its prices and profits from the previous year which causes oversupply and flooding the

⁶ Interview with farmer I (Apr 10, 2013)

market with such crops and therefore decreases its prices (Ba'albaki, 1985). Villagers take into consideration some important points when planning a rotation:

- Changing exhausting crops (tomatoes, corn, green pepper), with semi-exhausting (cucumber), or non-exhausting crops (broad beans, cowpea, peas)⁷.
- Never cultivate the same crops or crops from the same family in sequence to avoid catching the same diseases or insects⁷.

Some of crop rotations adopted by villagers are indicated in (table 3), (Table 4) and (Table 5) as follows:

- Bi rotation: crops are organized through a rotation in which the same crop is cultivated in the same piece of land once every two years^{6,7}.

Table 3: Example of bi-crop rotation in Sinay

Rotation Division	1 st half of land	2 nd half of land
1 st Year	Wheat (Exhausting crop)	Broad bean (Nourishing crop)
2 nd Year	Broad bean	Wheat

- Tri rotation: crops are organized in a sequence of exhausting crops, then semi-exhausting crops and finally soil nourishing crops^{6,7}.

Table 4: Example of tri-crop rotation used in Sinay

⁷ Interview with farmer K (Apr 10, 2013)

Rotation Division	1 st third of land	2 nd third of land	3 rd third of land
1 st Year	Wheat (Exhausting crop)	Sesame (Semi-exhausting)	Pea (Nourishing crop)
2 nd Year	Pea	Wheat	Sesame
3 rd Year	Sesame	Pea	Wheat

- Crop rotation in which the piece of land is left fallow: basically the farmer leaves the land un-cultivated for a year after plowing it, and then cultivates it the year after. The reason farmers adopt such a method is the lack of interest to cultivate the land in a specific year to^{6,7}:

Table 5: Example of abundant crop rotation type used in Sinay

Rotation Division	1 st half of land	2 nd half of land
1 st Year	Wheat (Exhausting crop)	Left uncultivated or cultivated half of this piece of land with nourishing crops
2 nd Year	Left uncultivated or cultivated half of this piece of land with nourishing crops	Wheat (Exhausting crop)

2. Choosing crops

Farmers in the village are used to plant specific crops cultivated by their fathers and forefathers in the village. These crops were chose due to its abilities to withstand the conditions of the village from lack of water, and low fertility of the soil. Until this day, the villagers kept on cultivating the same crops in the same way, for the situations in the village remain unchanged but for a few who depended on expatriates' funds to use modern cultivation methods. Crops cultivated by farmers are mentioned in (Table 6).

3. Time of cultivation

Most farmers depend on dates passed to them by their fathers and forefathers, which indicates the cultivation times for each crop. It is an accumulation of the expertise of the agricultural society through ages, which created an ecological awareness and knowledge in dealing with the surrounding to an extent it produced an environmental culture expressed in proverbs and stored in the social folklore memory. Thus we notice that cultivation times for all crops; grains, vegetables and fruits depend on the expertise of the villagers passed along from generation to another. The villagers adopted dates in relation with seasonal climate dates, which they cultivate according to. For instance:

- Between the two crosses “ bayn al salibayn”: a period between September 15 till November 15, and it's a period between two holidays season for orient Christians, characterized with raining especially in the first cross, in which the land becomes saturated with water and suitable for winter rain fed cultivations such as grains and vegetables⁴.

- The period of forties (marb'aneat): a 40 days period starts in January 20. According to folklore tales, it was called such because it is a 40 days launching the winter season. If it rains in the first 20 days at the time of Marb'aneat, it is considered a sign that the spring season is going to be fruitful. It is the period when the climate starts to change towards winter and is generally a rainy period. Farmers wait this period to fertilize wheat earth with manures⁴.
- The period of fifties (sa'udat): 50 days periods divided into four periods of time frames each is called "Saad" which is 12.5 days, starting February. It is a calendar for summer cultivations, which starts in spring season^{1, 4}.
- 4. Marketing

There are private enterprises and individuals who do agricultural activities between the farmer and the local market (al Hisbe), which is a network between the original producers and consumers through distribution channels creating a marketing system (Jaber, 1997). Farmers use multiple channels to market their products, which go through mediators before reaching the consumer. The figure 3 explains the flow of agricultural production in the area.

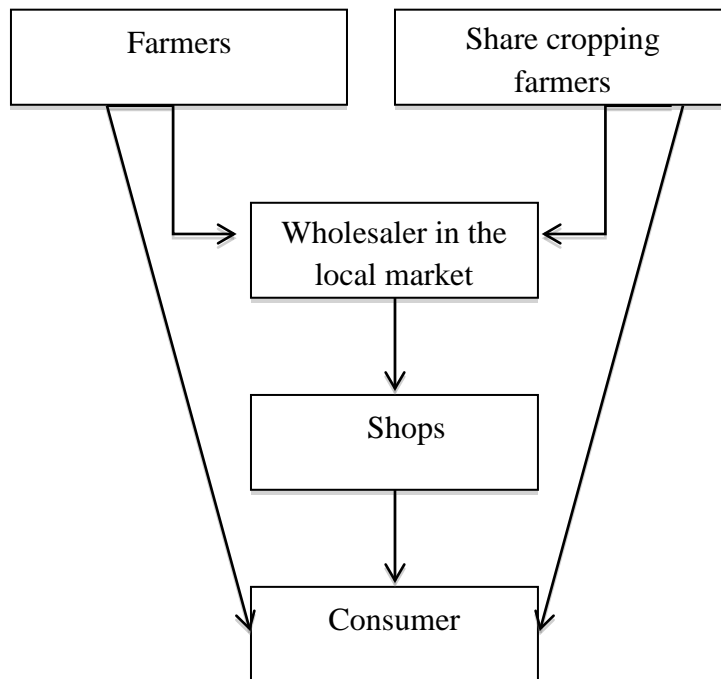


Figure 4: Marketing template of Sinay Village

The most important Hisbe market for the villagers is the Hisbe of Saida, where most of fruits, vegetables and legumes' output is dispensed, then comes the Hisbe of Nabatieh and then that of Sour. The villagers depend on the market of Said because of its proximity to the village and its great abilities to dispense outputs due to its proximity to the state capital. Many farmers explained that the prices vary from one day to the other, for wholesale merchants might sell in a specific price at the beginning of the day and with another at its end, and in a specific price at the beginning of the season and

another at the end of it⁸. For example, one of the citrus orchards owners in the village says that a lemon box is sold for 49,000 L.L. at the beginning of the season, and at the end of it, the price dropped to 7000 L.L. and as the owner explained, the high profits the box earned at the beginning of the season covered the losses at the end of it. Moreover, the price earned in the morning might be higher than the selling price in the evening, because the wholesale agent sells the output with the cheapest prices to dispense all the products, for the Hisbe will receive another batch of products at the morning of the next day. As for the field crops such as grains, they are not marketed in the Hisbe, there are merchants specialized in buying grain crops such as wheat, corn and barley. Other crops such as legume outputs and oily crops like sesame are sold directly to the consumers. Families to purchase specific crops in different quantities conduct direct selling according to special requests. These outputs are sold directly without the farmer needing to go to markets.

Moreover, village farmers suffer the exploitation of merchants, for the laws established by the state, which prohibits importing specific crops during the times of its production in Lebanon are not efficiently implemented (Jaber, 1997). This helps merchants and mediators to manipulate the farmers and buy their outputs cheap, arguing that imported crops are available, with perfect qualities and cheaper prices than that of the domestic crops^{3,8}, so the farmer sells his crops according to the prices set by mediators or merchants to avoid output depress. So the farmer suffers the absence of marketing regulations and merchants' greed, and he aspires to build good relations with mediators to avoid output depress.

⁸ Interview with farmer D (Apr 30, 2013)

C. Main Crops Cultivated in Sinay

Through interviews conducted with farmers in the village, seasonal and permanent crops were identified as are shown in (Table 6). Through these interviews we were able to obtain lots of details which explain agricultural processes used by farmers in the village for each crop, deducing that agricultural output in the village is done on two levels: trading level and housing level.

1. Agricultural output for commercial aim

It is the agricultural production using vast areas of the land, and intended to earn high output dispensed through the Hisbe or wholesale merchants. Crops cultivated for this purpose are shown in (Table 6)

Table 6: Agriculture output for commercial aim in Sinay

Plants	Agricultural Cycle	Soil Preperation	Amount of Seeds	Plantation Date	Irrigation	Fertilization	Harvest date
Cereals							
Barley <i>Hordeumvulgare</i>	Tri- cycle	One shallow plowing	30 kg/d	Oct.	-	30 kg/d of NPK-20%- after plowing.	May
Corn <i>Zea mays</i>	Tri- cycle	One shallow plowing	10 kg/d	May	-	10 kg/d of Super phosphate+ Nitrate 46%- after plowing.	Aug.
Wheat <i>Triticum Durum</i>	Tri- cycle	One shallow plowing	30 kg/d	Nov.	-	90 Kg/d of NPK-26%- after plowing.	Jun.
Oil Cereals							
Seasame <i>Sesamum indicum</i>	Tri- cycle	One shallow plowing	1 kg/d	Mid of Jun.- Mid of Jul.	-	-	Mid of Oct.

Legumes							
Broad Beans <i>Vicia folia</i>	Bi/ Tri-cycle	Two shallow plowing in perpendicular axis	20 Kg/d	Mid of Oct.- Dec.	-	1 ton/d of Manure after plowing	Mid of Feb.- Mar.
Cow pea <i>Vigna sinenses savi.</i>	Tri- cycle	Two shallow plowing in perpendicular axis	3 Kg/d	Mid of Apr.- May	Tanks	1 ton/d of Manure after plowing	End of Jun.- Jul.
Lentil <i>Lens esculent</i>	Tri- cycle	One shallow plowing	6 Kg/d	Mid of Nov.- Mid of Jan	-	1 ton/d of Manure after plowing	Mid of Apr.- Mid of May
Pea <i>Pisum sativum</i>	Tri- cycle	Two shallow plowing in perpendicular axis	15 Kg/d	Oct.- Mid of Nov.	-	1 ton/d of Manure after plowing	Jan.- Feb.
Vegetables							
Cucumber <i>Cucumissativus</i>	Tri- cycle	Two shallow plowing in perpendicular axis	1 Kg/d	Mid of Mar.	Surface irrigation - every 4 Days.	1 ton/d of Manure after plowing-chemical ferti. When needed	Mid of May
Cucumber <i>Cucumissativus</i> - Plastic Houses	Tri- cycle	Two shallow plowing in perpendicular axis	500 gm./d	Apr.	Drip irrigation system.	1 ton/d of Manure after plowing-soliable ferti. added with every irrigation.	End of May. - Jul.
Green Pepper <i>Capsicumannum L.</i>	Tri- cycle	Two shallow plowing in perpendicular axis	300 gm./d	Beg. of May	Surface irrigation when needed	1 ton/d of Manure after plowing-chemical ferti. when needed	Mid of Aug.
Green Pepper <i>Capsicumannum L.- plastic house</i>	Tri- cycle	Two shallow plowing in perpendicular axis	500 gm./d	Mid of Apr.	Drip irrigation system.	1 ton/d of Manure after plowing-soliable ferti. added with every irrigation.	Jul.
Tomato <i>Lycoperscomes-culentum L.- Field</i>	Tri- cycle	Two shallow plowing in perpendicular axis	600 gm./d	Mid of May	Surface irrigation when needed.	1 ton/d of Manure after plowing-chemical ferti. when	Mid of Aug.

						needed	
Tomato <i>Lycopersicon- esculentum L.-</i> Plastic Houses	Tri- cycle	Two shallow plowing in perpendicular axis	800 gm./d	Beg. of Mar.	Drip irrigation system.	1 ton/d of Manure after plowing- soluble ferti. added with every irrigation.	Beg. of Jun.
Zucchini <i>Cucurbitapepo L.</i>	Tri- cycle	Two shallow plowing in perpendicular axis	1 kg/d	Apr.	Surface irrigation when needed.	1 ton/d of Manure after plowing- chemical ferti. When needed	Mid of Jun.- Jul.
Zucchini <i>Cucurbitapepo L.-</i> plastic house	Tri- cycle	Two shallow plowing in perpendicular axis	500 Kg/d	Mid of Mar.- Apr.	Drip irrigation system.	1 ton/d of Manure after plowing- soluble ferti. added with every irrigation.	Mid of Jun. – Jul.
Fruit trees							
Citrus spp.	-	Shallow plowing- every year	-	-	Sprinkler irrigation system.	50 kg/ tree of Manure in May	Dependi ng on species
Olive <i>Olea europaea</i>	-	Shallow plowing- every one or two years	-	-	-	Manure Every year in beg. of Nov.	Mid of Oct- begin. of Nov.

Through this table, we notice that grains cultivation, wheat, barley, and corn in the village, is done through a rain fed method. It is a kind of cultivation depending on rainwater and soil characteristics without any additives. Village farmers do not put lots of work or cost to it. Shallow plowing is conducted once and usually tri-rotation or follow rotation is used with legumes and vegetables, for wheat and corn are considered exhausting crops for the soil. Fertilizers are added to grain crops but with small amounts although wheat crops are considered the most important of grains output. Farmers plant

rough wheat used to make Burghoul, by grinding of wheat and use it in traditional dishes. In addition, the byproduct of burghoul grinding is Rwayshe; it is the peeling of wheat grains acquired after grinding wheat and, It is used as stuffing for locally made pillows^{2,4}. 20s fertilizers are added with the plowing process only, and the crop is never taken care of during its growing periods. Pesticides are never used. As for planting and the times of it, seeds are manually scattered and planted according to periods depending on the weather which the villagers adopted generations ago. For instance, village farmers depend on a period between the two crosses to prepare the earth and fertilize it for wheat cultivation.

As for legumes, it is cultivated both; rain fed and irrigation methods. Beans and peas are planting in winter season depend on rain fed cultivation which hardly needs any irrigation. But a broad bean is a cultivation which needs irrigation, and farmers use mobile tank water, purchased from water distributing companies, to irrigate the crops. As for plowing methods used for legumes cultivation, the earth is plowed twice perpendicularly, and farmers use legumes in bi-rotations with wheat, or in tri-rotations with wheat and vegetables. Organic fertilizers (manure) are used at first after plowing the earth and chemical fertilizers are never used for rain fed cultivations. As for water fed legumes, nitrogen fertilizers are used two weeks after growing, and at the starting of blooming. Usually no pesticides are added to the field for both water fed and rain fed cultivations except when specific diseases spread during the season. Legumes are planted manually where seeds are put in pits in planting lines. When inquiring about the dates of planting, a farmer gives unspecific answers for rain fed and field watered cultivation depends greatly on the climate.

Vegetables cultivation in the village is done in two ways; rain fed, which is no longer adopted as it used to because planting in greenhouses provides higher outputs and better quality. Thus most vegetable farmers in the village use greenhouses. In both, greenhouses and open field cultivation, tri-rotation cycles are used along with grains and legumes, for some vegetables like tomatoes and green pepper are considered exhausting to the soil. As for greenhouses cultivations, fertilizers are permanently used; chemical fertilizers like nitrogen, phosphate and potassium are added to water in small quantities, while using pesticides depend on the kind of disease or insects invading the outputs. Vegetables in greenhouses are manually planted using the method of nursing, and the dates of planting are set, for climate factors does not affect plants cultivated inside greenhouses. As for field-cultivated vegetables, it is done traditionally regarding the addition of fertilizers, pesticides, methods and dates of cultivation.

Trees implanting in the village is a relatively recent cultivation increasing lately. For some kinds of plants need several years for output to start giving profits, therefore, it is not cultivated in lands not owned by the farmer. Thus we notice that fruit trees' cultivation started with the properties possession wave in the village. Fruit trees are divided into: trees needing care and nursery, and trees which do not. Olive trees are the sorts which can withstand the climate conditions of the area, thus it does not need care regarding constant irrigation and fertilizing. Villagers depend on "alternate fruit bearing" phenomenon for acquiring high output a specific year and low output in the upcoming one.

As for citrus cultivation in all its species, it needs constant caring from irrigation, fertilizing and fighting insects and diseases. Thus we notice that big farmers are the only ones who are able to plant fruit trees. For instance, the need for a permanent

water source is a fundamental condition for establishing any orchard field. And despite using modern techniques, yet orchards owners still adopt some inherited methods to obtain a higher output such as Reactionary production.

Out of Season Production

It's an inherited techniques used by farmers to obtain fruits not in their known seasons. This method is used with Clementine, Sweet Oranges, and Lemon fruits. The notion to obtaining out of season production is to thirst the tree and water it again.

- 2. Agricultural output for home sustaining aim

It is the agricultural production aimed to provide for house needs of cultivated outputs. Of crops cultivated for home production shown in (Table 7).

Table 7: Annual crop productions for home sustaining aim in Sinay

Crops	Plantation input	Plantation methods	Plantation date	Irrigation	Harvesting date
Chili Pepper (<i>Capsicum annuum L.</i>)	Seedlings	Pots or permanent place	Apr.- May and Aug.- Sep.	No need for much irrigation to preserve the texture	All the year especially in warm months.
Coriander (<i>Coriandrum sativum L.</i>)	Seeds	Beds	Sep.- Nov.	Irrigated regularly	Dec.- Jan.
Jew's Mellow (<i>Corchorus olitarius L.</i>)	Seeds	Rows inside beds	Mar.	Irrigated regularly	End of May-Jun.
Majorana	Cutting up small branches	Pots or permanent	Oct.- Nov.	Irrigated	Any time in the

<i>(Origanum majorana)</i>	from an old plant	place		regularly	year.
Parsley <i>(Petroselinum crispum (Mill))</i>	Seeds	Beds	Oct.- Nov.	Irrigated regularly	Jan.- Feb.
Pumpkin <i>(Cucurbita Pepo)</i>	Seeds	Beds	Apr.- May.	Irrigated regularly	Aug.
Radish <i>(Raphanus sativus)</i>	Seeds	Rows inside Beds	Mar.	Irrigated regularly	End of Apr.- May
Spear mint <i>(Mentha spicata L.)</i>	Cutting up small branches from an old plant	Pots or permanent place	Feb.- Mar.	Irrigated regularly	Any time in the year.
Spinach <i>(Spinacia oleracea)</i>	Seeds	Beds	Aug.- Sep.	Irrigated regularly	Nov.- Dec.
Swiss Chard <i>(Beta vulgaris L.)</i>	Aug.- Feb.	Rows inside beds.	Aug.- Feb.	Irrigated regularly	Oct.- Apr.
Thyme <i>(Thymus capitatus L.)</i>	Cutting up small branches from an old plant	Pots or permanent place	Mar.	-	Any time in the year.
Watercress <i>(Nasturtium officinale)</i>	Seeds	Beds	Sep.- Nov.	Irrigated regularly	Nov.- Dec.

Fruit production for home consumption is shown in (Table 8)

Table 8: Fruit production for home sustaining aim in Sinay

	Fruit Trees	Details
1	Citrus spp.	These types of trees are commonly cultivated in the area. The most desirable trees are Orange, Lemon, and

		Clementine. These types of trees need for irrigation especially in period of fruiting.
2	Fig (<i>Ficus carica L.</i>)	Fig tree considered as one of most common tree in the area. This tree does not need for irrigation and fertilization. It has been replaced with other trees because of its low production.
3	Loquat (<i>Eriobotrya japonica lindl</i>)	An evergreen tree, needs for a lot of care. This tree need for irrigation especially at beginning of fruiting period. In April, Loquat tree can give 10- 20 kg of fruits.
4	Avocado (<i>Persea americana</i>)	This tree recently is being introduced to the area. It does not need for a lot of care especially for irrigation. In summer months, Avocado tree can give 5- 10 Kg of fruits.

3. Costs and profits of agricultural production in Sinay

As a result for what is mentioned above concerning lack of regulations and rules supporting the farmer and agricultural production in Lebanon, we notice that profits vary from one year to another, depending on seasons' output. And according to interviews conducted with the village farmers, they point out that prices depend on seasons' output. Seasons with high outputs means low prices, even it might not make enough profit to cover the costs, whereas if the output is scarce the prices will be high and profitable. Thus, the production of a farmer is a subject to demand and supply, causing losses one time and profits another. For example, one of the wheat farmers in the village says that wheat cultivation this season was non profitable, for 1 kg of wheat was sold for 1000 L.L., where it sold for 1100 L.L. it would have been profitable⁴.

The costs and profits of wheat cultivation in Sinay were chosen as a case study, for wheat crop is one of the most cultivated crops in the village. Data obtained from

interviews with wheat farmers in the village were analyzed. This study will calculate the cost of 1 dunum production of wheat in summer 2013, noting that these calculations were based on the numbers obtained from farmers C and I, and these numbers are basically average cost and prices for 2013. All data obtained are speculative numbers because no farmers has any numbers or accounting books, so these numbers might give inaccurate results, thus it is settled to present a study about costs and profits of wheat cultivation to clarify the situation of farmers in the village.

9: Wheat production costs and revenue in Sinay - 2013

	Description	Farmer C		Farmer I	
		Cost	Details	Cost	Details
Yields	Wheat & hay			Wheat, hay & burghoul	
Production cost per d.	Seeds	-	Stock from previous year production. 1 d. needs for 30 kg of seeds	-	Stock from previous year production. 1 d. needs for 30 kg of seeds
	Chemical fertilizers	24000 L.L.	One bag of 50 kg fertilizers costs 40000 L.L. each 1 kg of seeds need for 1 kg of fertilizers.	24000 L.L.	One bag of 50 kg fertilizers costs 40000 L.L. each 1 kg of seeds need for 1 kg of fertilizers.
	Land plowing	50000 L.L.	Cost of plowing 1 d.	50000 L.L.	Cost of plowing 1 d.
	Wheat harvesting	60000 L.L.	1 d. needs 2 h. harvesting (one h. plowing costs 30000 L.L.)	60000 L.L.	1 d. needs 2 h. harvesting (one h. plowing costs 30000 L.L.)
	Wheat threshing	135000 L.L.	1 d. requires 3 hours; cost of one h. range between 40000 L.L. & 50000 L.L. Thus, an average cost 45000	135000 L.L.	1 d. requires 3 hours; cost of one h. range between 40000 L.L. & 50000 L.L. Thus, an average cost 45000 L.L. was adopted

			L.L was adopted		
	Fuel used for transporting	50000 L.L	Transporting fertilizers to agricultural land, & transporting the production from the farm	50000 L.L	Transporting fertilizers to agricultural land, & transporting the production from the farm
	Wheat grinding to produce burghoul	-	-	2500 L.L	Costs of grinding 10 kg of wheat to produce 7 kg of burghoul.
	Total cost	319000 L.L	1 d.	321500 L.L	1 d.
Wheat production value	Production of 1 d.	-	1 kg of planted seeds produces 7.5 kg as an average. 1 d. gives 225 kg of wheat.	-	1 kg of planted seeds produces 8kg as an average. 1 d. gives 240 kg of wheat.
Revenue per 1 d.	Wheat	214500 L.L	225 kg is the total production, with 30 kg stored as a stock seeds for upcoming years, which leaves 195 kg. Price of 1 kg for this year is 1100 L.L	220000 L.L	240 kg is the total production, with 30 kg stored as a stock seeds for upcoming years, and 10 kg used for burghoul, which leaves 200 kg. Price of 1 kg for this year is 1100 L.L
	Hay	60000 L.L	1 d. gives 3 large bags, price of 1 bag is 20000 L.L	60000 L.L	1 d. gives 3 large bags, price of 1 bag is 20000 L.L
	Burghoul	-	-	21000	Selling price of 7 kg of burghoul, selling price of 1 kg is 3000 L.L
	Total revenue	274500 L.L	-	301000 L.L	-
Loss per 1 d.	The farmer's loss	44500 L.L	We subtracted the value of the revenue from the value of production	20500 L.L	We subtracted the value of the revenue from the value of production

It is recognized that the farmers do not gain any profits from wheat cultivation and output selling for 2013, and when conducting the calculations and discovering the losses, he was once again asked about the reason to carry on this kind of cultivation realizing that he's losing. The farmer's answer as simply that it was the only career he knows and they are not depending on wheat production as the main source of income, besides he cannot afford risking high costs to obtain high production for the market sets the price. The farmer is obliged to accept the price set even if he loses to avoid output depress. The farmer also pointed out that he does not calculate the costs and profits on books because there is no actual profit. Note that one of the farmers is of old age, and illiterate, and all the information obtained concerning numbers were not accurate but depending on what he remembers from paying or getting paid.

CHAPTER IV

ANIMAL PRODUCTION IN SINAY

Animal production in the village is one of production forms starting to shrink. For livestock, poultry and bees keeping demands great efforts and care. Animal production in the village is now limited to three individuals raising livestock, one individual raising poultry and another two raising bees. And there are two levels of production: commercial level and house level which today is restricted to raising only few chickens. (Table 10) shows the animal kinds raised by the villagers and some details about its keeping.

Table 10: Animal production in Sinay

Details	Cow	Sheep	Goat	Chicken	Honey bee
Species	Local and imported species from USA	Local and imported species from Syria	Local and imported species from Syria	Local and imported species from Syria	Imported species from Syria
Feeding	20Kg/day in winter- 10kg/day in summer	4kg/day in winter- 0kg/day in summer	4kg/day in cold winter days- 0kg/day in summer	3 kg/month	Only in cold winter days
Watering	Always available	Always available	Always available	Always available	Always available
Veterinary Care	Only in serious cases	Only in serious cases	Only in serious cases	Only in serious cases	-
Production	Milk only	Milk & meat	Milk & meat	Egg only	Honey

Collection of products	Milked by hand	Milked by hand	Milked by hand	Collected by hand	Collected by hand
Marketing	Inside & outside the village	Inside the village	Inside the village	Inside the village	Inside & outside the village

According to interviews conducted with animal keepers and herder, we noticed that livestock keeping diminished gradually with time and only three animal keepers and one herder remain in the village. The reason for this is the evolving urban life, and the availability of animal products in shops. Besides, keeping animals needs caring and careful observation, for if the keeper notices an unnatural behavior or appetite loss in the animal this might be a sign of a certain disease, which might infect the rest of the animals if not treated instantly. The experience of the keeper might help him in curing some diseases without referring to a veterinarian, but sometimes a veterinarian is indispensable for curing some intractable situations, which needs surgery. Moreover, farmers also complain about the negligence of the ministry of agriculture to support small numbers livestock keepers. Animal keepers in Sinay own different numbers of one of the keepers own 60 cows, and depends on dairy factories in the area to market his production, a second farmer owns nearly 80 heads of sheep and goats, and depends on grazing for feeding his livestock except for rainy days when he is obliged to feed them in barns. The third keeper owns five cows which he raises near his house. Regarding the herder, he owns different numbers of cows, goats, cheeps and chickens. As for milk prices in the village, it ranges between 7000 L.L. and 8000 L.L., while meat wise, a small sheep is sold for 350,000 L.L. and a small goat is sold for 150,000 L.L. for goat meat is hard thus it's not ordered much.

There are several kinds of cows raised in Lebanon, some imported and some local, but the cows used in the village are American cows which the ministry of agriculture subsidized, and the most raised cows in the region are from Syria which are considered of a good quality and adaptive to the circumstances of the area, and are not expensive. As for the prices of other kinds of cows like Dutch, Danish, or German cows, it ranges from 1 - 5 million L.L. each which are considered very high prices, while local and Syrian sheep and goats are raised because it is the most suitable kinds for the circumstances of the area.

It is the same for poultry keeping, which became a very limited activity. Raising poultry requires caring and efforts for cleaning, feeding, and watering and disease prevention. There is only one keeper in Sinay who depends on livestock and poultry owning as a source for income, and sells a single egg for 1000 L.L. there are 3 families raising a few number of chickens to provide house needs. The reason why the villagers abandoned poultry keeping is because poultry products are available all the times in shops.

As for bees keeping in the village, only one villager still does it. And despite the fact that Sinay is considered medium bees keeping area (between 400 m and 900m) yet the location of the village is considered a good location to raise bees (Ministry of Agriculture, FAO, 2004).

Honey production in the village is characterized by being natural and of high quality. Because bees' keepers abide with the following:

- Choosing disease resistant family lines. The keeper chooses Syrian lines which are resistant to the two most common diseases: Varroa and decaying.

- Remote location of the hives from contamination sites like factories and main streets. Factories are a source of pollution for their toxic vapors, while main streets are polluted with noise, yet bees might get poisoned by the honey dew (Cryptoblabes) produced by pine and oak trees or from some orchards after being sprayed with insecticides.
- No additional feeding is given for the hives unless it's extremely crucial for fearing of its death in winter season. Usually feeding is done between the harvesting of the last season and 15 days before harvesting in spring. Because climate circumstances cannot be controlled by the keeper and it is a time difficult for bees to gather pollens.
- Hives are removed from cold north wind and rainy locations. The keeper also avoids placing the hives in shady locations during winter for fear of humidity accumulation in the hive; otherwise bees will use the energy to earn a 37 C degree. But it is preferable to place the hives in shady locations during summer.
- Insecticides are only used when an infection occurs and proved and never precautionary.
- No chemicals are used to preserve wax tablets; such as Paradi Chloro Benzene, it is preserved through cooling.
- Honey is packed after its extraction. The keeper puts the honey in glass jars to sell it, and a jar is sold for 40,000 L.L.

CHAPTER V

ANALYSIS

When analyzing the results obtained from the research, we notice that most farmers in Sinay sell their production outside the village. Farmers cultivating for house usage, are in general not interested in marketing their product and practice this activity as a hobby. Through the research we could also not the importance of animal production in agriculture in the village.

A. Production Levels

Agricultural and animal productions in the village have two levels: commercial production and house providing production.

1. Commercial agricultural and animal production

Most farmers and animal keepers in the village depend on production dispense outside the village. Citrus orchard owners, olive vineyards owners, grain producers, livestock keepers, and bees' keepers depend on the Hisbe or big traders to dispense their outputs. Besides, orders and requests within the village is considered a fractional dispense of their production.

2. House production

Few resident villagers cultivate and raise poultry in small properties subsidiary to their houses. This kind of agricultural production aims to provide house needs of

vegetable and herbal needs like peppers or for medicinal aims. It is possible to commercially benefit from it if any of the neighbors or relatives shows an interest in obtaining specific crops, but mainly it's not sold but given as presents.

B. Factors Affecting Agricultural Production

In this part, we shall deal with the factors affecting agricultural and animal production in the village, which were observed through interviews. Discussing the details of agricultural production gave us the opportunity to know the factors forming the shape of production in the village, to an extent that the farmers spoke freely stating wishes which might increase their productivity but always with an "if only" statement. The following factors gave agricultural production in the village its basic structure and stood in the way of its evolution:

1. Land ownership

It's one of the most important obstacles in the way of agricultural evolution in the village. Most farmers do not own the lands they cultivate same as most of the farmers in Jabal 'Amel area. This is not a new situation but it has been so since the days of Mamluks (Bazzi 2002). The problem lies in the fact that a farmer who does not cultivates his own land has no chances to evolve it, were he cultivating his own property he would definitely add to it for instance, terracing, or plant fruit trees such as citrus or olive, or he would have even worked on evolving modern cultivation projects such as plastic tents cultivation. But as long as he's working in someone else's land, he will not evolve it. For money and effort spent will not benefit the farmer but the owner. It is also

worth mentioning that a farmer is generally poor, and any evolving of the land requires high costs mainly he is unable to provide, and if he did, it would be an investment for the owner and not for him.

2. Water

The region of south Lebanon suffers from the scarcity of water due to the absence of water policies since the days of independence, and the growling of water which flows to the sea. And as a result to the lack of streams, most cultivation in southern Lebanon, and not just Sinay, are rain fed. As for orchards and greenhouses cultivations it needs a constant water source which consists mainly of artesian wells. But the problem in those wells is its high costs and impossible for any of the farmers or villagers to provide. And the cost of water providing and drawing water from groundwater wells is one of the main reasons for the high costs of agricultural production in the village.

3. Agricultural production policies

The agricultural policy in Lebanon is generally a reflection of government's economic policy, which prefers not to interfere in economic activities and give the main role for the private sector (Jaber, 1997). And the role of the public sector was limited to establish the infrastructure for the agriculture sector such as terracing pieces of lands, digging channels, and land reclamation (Jaber, 1997). And from time to time the government subsidizes some crops. The governmental policies and agricultural program will be viewed as follows:

- The green project:
- In 1963 the state established this project through a legislative decree # 13335 which aims to land reclamation, rehabilitate and digging farm roads, offer some greenhouses cultivation supplies, and enhancing water preserving techniques. To achieve these goals, the project gave the farmers tractors and plows to establish terracing for fees that would cover only the operating costs (Jaber, 1997). It might also offer charge free seeds or offer loans for seeds purchasing (Jaber, 1997). This project cooperated with many bodies such as food and agriculture organization FAO, united nation development program UNDP, world food program WFP, in addition to what some countries offer such as expertise and techniques like the United States of America and France (Jaber, 1997). The truth is that many farmers tried to benefit from this project but couldn't^{1,3}. The project sets terms regarding the lands which will be reacclimatized and the most important is that the land owned by one or more farmers has to be at least 1.5 acres^{1,3}, while medium and small farmers believe that these are services offered only for those large farmers, for they can never benefit from this project because they do not own big properties³.

- Agricultural guidance and direction services:

Institutions supporting agricultural activities and guidance and direction services also include research and development (R&D). Research and development institutions focus on controlling agricultural plagues and animal diseases and soil analysis (Jaber, 1997). The state supported and financed agriculture researches and guidance services which aim to evolving and enhancing cultivation techniques used by farmers. Yet, guidance and research services were weak until it totally seized

when the civil war broke in 1975 (Jaber, 1997). Since then the ministry committed for private institutions to provide the farmers with information including fertilizers and insecticides and the methods and rates of usage (Jaber, 1997). Currently the farmers state that they ask for information and guidance from corporations which provide them with agricultural supplies, and some of it might be published in educational publications but it generally does not offer new information, it is more of advertisements than educational publications^{5,8}.

- Ministry of agriculture support for cow keepers:

From time to time, the ministry of agriculture supports cow keepers through subsidizing the prices of foreign cows and prices of fodder. For example, in 2010 the ministry subsidized the price of American cows in one year and sold it for 700\$ per cow. As for fodder subsidizing, the ministry made an offer that whoever wants to buy 300 kg of fodder will get extra 300 kg for free. According to keepers in the area, the price of a bag of fodder ranges from 3000 to 37000 L.L. and changes from one day to another, and the price of a fodder bag increased from 15000 L.L. to 37000L.L. in short time. Days after the increase in the prices the ministry declared the mentioned subsidizing, thus the ministry didn't actually subsidize the prices but made profits.

4. Packaging and transporting costs

It is considered one of the problems facing agricultural production and increases its costs. For the percentage cost of packaging vegetables and fruits in plastic and boxes is around 3,9 % of the total production cost for open field cultivations, and 12,25% of production cost for protected houses (The association of importers and traders of

agricultural production requirement in Lebanon, 2006). (Ministry of Agriculture, FAO, 2004)

5. Local market absorption capacity for agricultural production

It is considered one of the obstacles for dispensing the agricultural production. For the local market is incapable of receiving local and imported production at the same time. It is also recognizable that the local production is sold in higher prices than the imported. Thus, local outputs drops in the face of imported productions, and the reason lies in the lack of wise state policies to support local production, and the absence of implementing whatever policies available.

6. Limited exporting possibility

Agricultural production export in Lebanon depends on Arab countries, and the most important route is inland through Syria. But nowadays and due to the security instability in Syria, inland export route seized especially for products exported to Iraq and the Gulf countries. This crisis affected producers, because the production to be exported now has to be marketed locally while both sea and air shipping are costly. The crisis in Syria for instance stopped one of citrus orchards owners in Sinay, who used to export the output to Iraq.

7. Experience

Village farmers inherited cultivation occupation from their forefathers, thus we find that they have enough experience to provide a production despite inappropriate conditions. Their dependency on climate conditions such as waiting for rain season, and choosing kinds of crops are practices which help them decrease water needs for the crops, thus decreasing expensive irrigation.

8. Available options

For old age farmers there are no other options except agriculture production. Despite suffering the negligence of the state for this sector, the scarcity of water, the increase in the prices of fertilizers, and medications control, yet they never cease to cultivate. They consider cultivation as the only occupation available, for they know no other occupation, and the economic situation does not help them to enhance their production. Therefore, traditional cultivation remains the only option available, in addition to being attached to their land and its production. Note that most of the young villagers went towards other sectors such as free business and jobs, and some are working abroad.

CHAPTER VI

CONCLUSION

Through interviews conducted with farmers we notice that cultivation in the village has its own characteristics. The conditions of the farmers are the same in all the area from ecological elements, economic situation, state negligence and political instability. These factors combined affect negatively farmers in Sinay Village and might lead to the extinction of this occupation in the region. Based on this project, we were able to reach the following conclusions:

A. Village Farmers Still Adopt Traditional Cultivation Methods

Traditional cultivation methods used in the village have its advantages and disadvantages. Some methods, inherited from the expertise of forefathers – such as agricultural rotations, and the use of local calendar for cultivation dates – are now considered scientific; while other methods such as the absence of fertilizing, irrigation and the use pesticides are disadvantageous for agricultural production.

The persistence use of these methods is due to the lack of financial abilities for the farmer to implement modern methods, and the absence of guidance services to raise the awareness of young farmers to adopt modern methods, which would lead to increasing the production. For instance, we realized through interviews conducted that rain fed cultivation is still adopted and is taking most spaces of village cultivations. These cultivations are wheat, sesame, barley, corn, peas and bean. Their inexpensive cost allows small farmers to afford the cultivation although it never provides high

production within the conditions of the area. Modern technologies are limited in the village, except for three modern agricultural projects funded by emigration remittances.

B. Farmers Suffer from the Process of Marketing and Merchants

Exploitations

Village farmers suffer from the absence of marketing process organization, as well as merchants' greed. In addition, the changing price is subject to supply and demand, and is not subjected to fixed prices applied by state policies to subsidize agricultural production. Thus the farmer can do nothing but accept what the merchant or the agent offers him. For if the season is good this means that the production will be sold in cheap, but if the season was scarce it means that the production will be sold in high prices and the farmer can only accept.

C. Non-Owner Farmers are the Biggest Part of Farmers in Sinay

The biggest part of farmers in the village is still small farmers, basing their production on sharecropping. There are only 3 big farmers and one of them is not from the village. Besides, most farmers do not depend on cultivation as a main source of income; most of them have other jobs.

D. The Importance of Agricultural Sector as a Career is Gradually Declining

Although Sinay Village is characterized by being an agricultural society, and all villagers used to work in agriculture, today only 14 people are still farming in the village only 7 of which are full time farmers. Most of the village residents went to work in other jobs or emigrated. Due to the hardships facing the farmer today, this occupation might get extinct in the near future: most of those who still work in cultivation are getting old, and their children are working in different sectors and do not wish to work

in agriculture (The association of importers and traders of agricultural production
requirement in Lebanon, 2006).

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