

AMERICAN UNIVERSITY OF BEIRUT

AGRARIAN TRANSITION AND FOOD SECURITY IN THE  
VILLAGE OF NAHLE, NORTHERN BEKAA

by  
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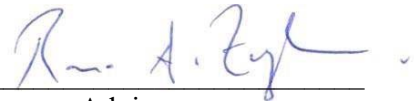
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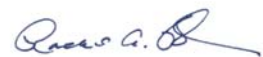
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# ABSTRACT OF THE THESIS OF

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Title: Agrarian Transition and Food Security in the Village of Nahle, Northern Bekaa

My thesis addressed agrarian transition and livelihood diversification and how they contribute to remarkable changes in the survival of rural households in parts of the developing world, in Lebanon and particularly in the Lebanese village Nahle. It included these issues in the rural African countries in Sub-Saharan Africa, Nigeria and Ethiopia, in the Vietnamese rural area, and in the rural communities in Rwanda and Honduras. Literature reviews on livelihood diversification identified many reasons behind its prevalence amongst rural households in developing countries. Agrarian transition and its accompanying livelihood diversification can have various impacts on the agricultural sectors and food and nutrition security of most developing countries including Lebanon. In this regard, agricultural transformation and livelihood diversification can strengthen food and nutrition security and livelihood resilience to predicaments such as pandemics, wars and economic crises and be pro-poor. To test the validity of this hypothesis, a sample of 150 heads of households in the Lebanese village of Nahle was selected. The following survey tools were used based on a system of indicators for assessing food and nutrition security: 1) Livelihood Questionnaire, 2) Food Consumption Score (FCS), 3) Household Expenditure Module, and 4) Food Insecurity Experience Scale. Using Statistical Package for the Social Science (SPSS) software, the results were statistically analyzed. The findings indicate that most of the permanent residents in Nahle shifted from full-agrarian to non-agrarian sources of livelihood between the 1960 period and the recent crises' period which extends from September 2019 and June 2021. The village of Nahle witnessed a decline in the cultivation of wheat and barley used for the preparation of staple foods in the Lebanese diet. The study also found out that using both scales, the Lebanese scale and the global scale categories' grouping of FIES raw scores, about 70 percent of the sample studied in Nahle experiences food insecurity. Thus, this decline negatively impacted the food security and the socio-economic status and well-being of Nahle villagers. Therefore, to combat the prevalence of food insecurity in the village of Nahle, it is highly recommended to revitalize the Bekaa valley, especially Nahle village, with cereal and legumes cultivation. In addition, there was no significant association between livelihood sources and the heads of households' (HH) food security according to their food consumption neither between livelihood sources and food security (through testing global and Lebanese FIES scales) of Nahle residents; nevertheless, results showed a significant relationship between the FCS and FIES variables: those who had higher affirmative answers in the FIES were more likely to have significantly low scores in the FCS. Moreover, results also showed a significant positive association between total expenditure and income and the correlation between the two indicators is almost moderate; income significantly explains observed variations in expenditures: those who

had higher income were more likely to have significantly high expenditures. In the retrieved results and its analysis, food insecurity was found more prevalent among the studied heads of households in the village of Nahle. As a conclusion, the null hypothesis was rejected and Lebanon National Agricultural Strategy (NAS) (2020-2025) was recommended.

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# CHAPTER 1

## INTRODUCTION

My thesis entitled “Agrarian Transition and Food Security in the Village of Nahle, Northern Bekaa” will enable me to answer the research question I have been thinking of for long. This question is: “What possibilities do agrarian transition and livelihood diversification in Nahle village have for ensuring food and nutrition security, enhancing livelihood resilience to crises, and reducing poverty?”. I have formulated a hypothesis that I am going to test throughout my thesis and that assumes the following: In the Lebanese village of Nahle, agrarian transition and the accompanying livelihood diversification can improve food and nutrition security and livelihood resilience to crises such as the COVID-19 pandemic, the economic crisis, and the Russian-Ukrainian war, as well as be beneficial to the poor. The kick-off of my thesis will be an analytical review of secondary resources on agrarian transition and livelihood diversification in rural villages in developing countries and particularly in Lebanon. The body of my thesis, which will help me dig further to reach an answer to my research question in order to accept or reject my assumed hypothesis, will use qualitative data collected through interviews conducted with the residents of Nahle to explore the main causes of agrarian transition. Then, my thesis will evaluate the coping strategies adopted according to its potential to improve livelihood resilience to crises. It will also estimate income using the household expenditures module to discover what kind of impacts livelihood diversification has on food and nutrition security and on poverty alleviation as well. Besides, it will encompass a deep interpretation of the Food Consumption Score (FCS) and Food Insecurity Experience Scale (FIES) to establish links between

food security at household level and livelihood diversification as a coping strategy in rural areas that allow better calibration of agricultural policies and measures.

## CHAPTER 2

### BACKGROUND/OBSERVATION

My thesis will discuss the agrarian shift and livelihood diversification, and the ways in which both affect the sustainability of rural households in some developing countries like Ethiopia, in Lebanon and, more specifically, the Lebanese village of Nahle. Simultaneously, it emphasizes that the deviation from subsistence farming towards the inclusion of integrated urban-rural methods of production consequently made the market economy more accessible. Despite the various challenges that accompanied these transitions such as environmental degradation and changing migration patterns (van Asseldonk, 2013), some perspectives believe these shifts strengthen food and nutrition security. Numerous factors contribute to the prevalence of livelihood diversification among rural households in developing countries, according to various studies on the topic. For instance, in Sub-Saharan Africa (SSA), the agricultural sector failed to meet the population needs for food due to the decrease in agricultural investment over the past twenty years. Besides, the use of outdated farming technologies and the dwindling agricultural resource base led to off-farm income diversification livelihood strategy amidst rural households. Thus, examining the role of this strategy and its huge impacts on rural development in Africa became of great interest. In comparison, little effort has been made to develop policies sponsoring for off-farm income diversification in favor of the poor because of lacking robust contemporary evidence on its role in food security and poverty alleviation. The way off-farm activities take part in equitable development is not clear. However, particularly in Nigeria where 75 percent of the population rely on agriculture as their source of

revenue, the decline in farm incomes has pushed rural households to progressively diversify their income sources through the engagement in on-farm and off-farm activities (Babatunde, 2009). Therefore, my thesis delves into the multifaceted modes in which Lebanese rural households mix agricultural and non-agricultural income within the framework of de-agrarianization. It tackles this issue in the village of Nahle. It will discuss the two interconnected processes called “de-agrarianization” and “de-peasantization” which are widespread in rural areas around the world and prevalent in rural Lebanon, and which amplify livelihood diversification leading to distinct models of social class differentiation. By definition, de-agrarianization, also termed agrarian transition, is a long-lasting procedure of labor modification, income-generating realignment, social recognition and geographical repositioning of rural inhabitants far from absolute agricultural forms of livelihood, whereas de-peasantization is a particular kind of de-agrarianization wherein peasants not only miss their economic potential and social cohesion but also decrease in population size as compared to that of non-peasants (Mtero, 2014). Lately, agricultural deterioration became highly correlated with the inevitable capitalization of agriculture due to the inability of small-scale agricultural producers, mainly in rural areas, to catch up with sizeable agricultural holdings and investments in supply chains (Mtero, 2014). In the “Agricultural sector review in Lebanon”, Dal et al. (2021) described a sizable portion of the population as “economically inactive or unemployed”. They mentioned that the market for agricultural inputs had been severely influenced by global confinement efforts, and the COVID-19 pandemic had resulted in a large drop in the supply of agricultural labor because of lockdown and sickness (Dal et al., 2021). Given no direct access to small-scale and large-scale farmers in Nahle and other rural areas in Lebanon due to COVID-

19 pandemic, the first section of my thesis provides an overview on agrarian transition and livelihood diversification through a brief review of secondary data and external sources which will include journal articles, and recent books and dissertations. This review offers an understanding of the significance of income diversification and poor small-scale farmers' participation in non-agricultural activities which can help determine potential impediments and limitations for participation in such activities. It also allows me to better present my research objectives and questions. Findings can later contribute to the design of policies and measures that enhance the rural poor's accessibility to higher off-farm revenues and reduce rural income inequality in order to attain equitable growth of the non-agricultural sector.



## CHAPTER 3

### LITERATURE REVIEW

#### **3.1. An Overview on Agrarian Transition and Rural Livelihood Diversification**

De-agrarianization, known as agrarian transition, should be perceived as an integral component of social change with possible convertibility between agricultural and non-agricultural livelihood strategies adopted by households i.e. with possible re-agrarianization (Yaro, 2006). Unlike most de-agrarianization studies, some studies questioned the association of de-agrarianization with the increased well-being of peasants and discovered that what distinguished rural livelihoods is livelihood adaptation through diversifying into secondary livelihood activities while modifying the form, nature and content of the farm sector (Babin, 2020). Agrarian livelihoods of households are altered into non-agrarian livelihoods through structural adjustment (Bryceson, 2002). However, there exists a preconception of the presence of an unchangeable move from on-farm to off-farm activities due to the beneficial impact of off-farm work on agricultural output (Lien et al., 2010). To get out of this preconceived notion about development and modes of production, a neutral evaluation is achieved through adopting a livelihood approach which disentangles the biases regarding diversification, adaptation forces and many-sided nature of activities whilst keeping in view the convertibility of peasant actions (Yaro, 2006). In addition to seasonal diversification from on-farm to off-farm activities, the adaptation process comprises intensified efforts in the farm sector. The supposition that the non-farm sector is thriving is not totally genuine due to disempowerment and preclusion of poor peasants as a consequence of sub-structural market limitations. The farm household model

anticipates diversification through comparison of on-farm revenues to off-farm earnings taking into account labor time (Singh et al. 1986). This allows households to decide whether to utilize more of their labor time in farm activities or to employ it in off-farm income-generating activities. Self-employment in various non-farm activities motivates diversification to a large extent. However, proportionally, the farm sector is considered a higher contributor to household income and livelihood security in comparison to non-farm small income (Yaro, 2006). Nevertheless, as households combine on-farm and off-farm activities in sequence in accordance with seasons, this can bring them multifarious benefits. In other words, though off-farm activities generate a small secondary income, it is stable and crucial for the survival of rural households owing to the seasonal timing of on-farm activities (Barrett, 2001). The significance of non-agricultural income shows up in the months following harvesting at a period that rural households consider a stressful coping period as they exploit the income earned from non-agricultural activities for their live on until the next harvest season. Besides, when shocks such as drought hit planted crops or raised animals, this non-farm income becomes the alternative source for purchasing food thus guaranteeing better food accessibility and ensuring food security (Robaa and Tolossa, 2016). Hence, rural livelihood diversification has obvious short-term effects on the food security of the rural household; however, comparatively, little experiential evidence exists on the long-term effects of food security (Robaa and Tolossa, 2016). Agrarian transition has engendered a new type of peasant called “middle-income peasant” whose livelihood is dependent on a diversified economy rather than being challenged by food insecurity and subsistence survival (Drahmoune, 2013). These agrarian transitions mirrored broader socio-

economic transformations which have been reflected in contemporary agrarian discourses raising diverse agrarian questions (Drahmoune, 2013).

Bryceson (1996) observed that in the 1990s, expanded youth education, at the primary and secondary levels, in rural areas produced a more educated generation than that of their parents which got dissatisfied with absolute agrarian working life. Other major changes in rural areas have induced a demand for rural employment in non-agricultural fields. For instance, the changing settlement patterns encouraged establishing enduring villages of sturdy infrastructure which engendered employment in construction and maintenance (Bryceson, 1996). Though, Western countries' obsession with industrial manufacturing negatively influences agrarian nations causing terrible effects on the ecology of the world (Patel and Goodman, 2020). Nevertheless, as a result of the lack of urban-rural market integration, the poor productivity of the food industry and the high costs of local transportation, governments of developing countries relied extensively on inexpensive staple food imports to feed their fast-growing urban residents. Even in abundant harvest years, Third World countries continued to depend on imports of grain surpluses provided by the United States and European countries on conditions advantageous to the latter's behalf (Guoyomard et al., 2013). In most of these developing countries, the unpredictable staple food harvests and the slow agricultural supply of peasants who safeguarded their own food needs before selling to the market resulted in an unstable staple food supply for the urban population (Bryceson, 1996). This had adverse effects on the social allocation of labor and led to achieving food security in urban areas through dependence on imports at the expense of local staple food production of rural areas.

In a similar vein, the Lebanese government's economic policies and governance record are confronted with aid conditionality imposed by the International Monetary Fund (IMF), the World Bank among others. These funding organizations, which seek programs of structural adjustment, exerted inevitable pressure on the Lebanese government to cut down its expenditure (Abdo et al., 2020). The following government and semi-public budget reductions led to substantial job losses and quick drops in salary levels in urban settings. Besides, prices of consumer goods escalated with the elimination of food subsidies and reduction of commodities imports. As a result, the living standard of all urbanites' classes deteriorated and urban areas started suffering from an economic crisis. Eventually, rural-urban migration decreased as several soon-to-be migrants were discouraged from leaving their towns while many urban migrants returned to their rural homes (Dal et al. 2021).

Deteriorating living standards and cautioning insecurities alerted rural and urban populations to strategically minimize these risks through individual and household diversification of economic activities pushing rural farmers to diversify their crops and urban dwellers to seek livelihood diversification tactics involving subsistence activities, market-oriented production, and trading (Bryceson, 1996).

Historically, rural industrialization has been described by Saith (1992, p. 17) as “a transition stage between peasant agriculture and modern industry, and also as the vehicle for affecting both the necessary primitive accumulation of capital from the agricultural sector, and its subsequent investment in industrial activities.” Historical or contemporary topics of research regarding de-agrarianization could be studied especially that rural households might either go after de-agrarianization as a longstanding historic practice or as a short-to-medium term fundamental part of their

livelihood strategies. Analyzing both ranks of de-agrarianization at the same time consequently help reaching out the associated policy implications from a sector-by-sector viewpoint. Moreover, studying non-agricultural rural employment and small scale enterprises along with entrepreneurialism and specialism development would encompass the integration of many ongoing suppositions related to these areas of study. While occupational specialization remains lacking, one of these inaccurate assumptions entails that a dwindling agriculture sector indicates individual specialization and economic diversification. However, there remains a large gap between household livelihood activities – which signify a risk reduction strategy – and professional vocation, which assumes livelihood stability. As economic diversification garners more attention, it is revealed that the latter is inclined to reduce risks and protect the means of livelihood, particularly when it comes to the realization of household subsistence as levels of income drop. Up till now, insufficient research has been issued regarding the influence of off-farm activities on the rural sector's development. Social scientists' data collected over decades on rural off-farm activities had seldom been examined in terms of growth potential. Therefore, it is crucial to shed lights on the appearance of specialized areas of expertise, the public or private arrangement of the rural service sector, the structural change of entrepreneurs' activities, social differences amongst representatives of the rural service sector and the technological proficiency in the development of the rural service sector (Bryceson, 1996).

In light of the paucity of capital in the farm sector, subsidies continued to be a tactical resource for small, medium and large-scale farmers. The agricultural rural society witnessed inconsistent changes after political and economic transitions. According to Bański (2019: 29), throughout the last three decades “every factor and

element of them [rural communities]—from the ownership structure to the local municipalities—transformed, some of them several times. For the majority of the country, rural population turned out to be a loser of this transformation”. To indicate how rural communities got detached from the lands they belonged to and can only sustain it under exceptional circumstances, he gave the example of an average village consisting of 2500 hectares’ arable land which used to support 100-120 families merely supports 4-5 families at the present time. Rural communities’ detachment from their land can result in inevitable consequences including a growing urban-rural (and even rural-rural) wealth gap, unemployment, and rural outmigration (Bański, 2019).

### **3.2. Approaches to Map and Better Understand Small-scale Farmers**

With the development of Geographical Information Systems (GIS), Remote Sensing techniques, and machine learning algorithms, documentation and mapping of farms worldwide have gained momentum throughout the years (Eastwood et al., 2010; HLPE 2013; Teluguntla et al., 2018). Recent global mapping exercises revealed that most of the 570 million farms worldwide are small-scale farms (less than 2 ha) and are family businesses covering 75% of the world’s agricultural land (Lowder et al., 2016). Given their magnitude and significance, small farms have recently gained momentum garnering the attention of global agriculture and development communities. The inclusion of small farmers in policies that sought to reduce poverty, guarantee food security and protect natural resources has proven successful. On the premise that smallholder and family farms are essential to alleviate poverty, malnutrition and hunger, the recent focus on smallholders largely aligns with the sustainable development goals

(SDG) established by the United Nations (UN) and which emphasize the need for agricultural development and investment in small farms.

Earlier large-scale approaches to map smallholders have failed to integrate household census data that can differentiate between farming and non-farming population (van Asselen and Verburg, 2012; Fritz et al; 2015). Others have focused on specific regions while ignoring others (Masters et al., 2013; Jayne et al; 2014). In response to the lack of spatial data on smallholder farms, Samberg et al. (2016) developed a map at the subnational scale that depicted the concentration of small family farms across the developing world. Apart from survey the number of smallholders and the mean agricultural area, the proposed methodology unveils the spatial distribution of small family farms thereby facilitating comparative studies and analyses between different sites. By integrating household-level census data, the map enables researchers to distinguish agricultural populations from the total human population density. The mapping is also aimed at evaluating the role of smallholders and their contribution to food security. Additionally, it is used to direct investments and enhance decision making by effectively addressing loopholes in agriculture and land use policies. Understanding the spatial pattern and average size of small-scale farms helps policy makers to design better strategies as well as market and development programs for sustained agricultural growth and poverty alleviation.

As a result, the agricultural industry is made up of a lot of small-scale lands that are mostly used for subsistence and a few big, sophisticated fields that focus on the market. Small farms are a defining feature of agricultural systems committed to preserving cultural and familial legacy, where farming is a secondary source of income with little chances for capital investment. Small holdings that provide farm households

with a supplemental source of income are typical of agriculture in mountainous or hilly areas (Dal et al. 2021).

The proposed methodologies are largely significant given the rising risks, across sectors and scales, that smallholder's livelihoods are confronted with. Examples of these risks and challenges include inequitable access to markets and resources to manage shocks. Besides, the rapidly changing structure, nature and intensity of smallholder farming also require constant updating of data and maps. Therefore, such methodologies along with effective policies can contribute to the success of smallholder agriculture by providing market and technological support as well as establishing incentives for sustainable intensification (Samberg et al., 2016).

### **3.3. Production Challenges and the Impact of the Incipient Economic Crisis on Yields and Production of the Lebanese Farmers**

According to Chaudhry and Ryan (1984) and Doueri (1996), the following is a summary of the agriculture industry's primary problems: (1) Small-farm holdings are getting urbanized, which is driving up land prices; (2) Rural areas have no solid infrastructure and are undeveloped; (3) Except for a few intensive cash crops, agriculture is known for its low yield; (4) Credit is limited and hard to get; (5) Public funding for agriculture is lacking; (6) Most technology is out-of-date, and mechanization is difficult to access; and (7) Export criteria are not being followed.

Despite having a cooler and wetter environment than other Middle Eastern nations, the Lebanese agriculture sector is unquestionably in decline (Chaudhry and Ryan 1984; Doueri 1996).



Both the terrace-based conservation farming of the hills and mountains and the ecologically sound integrated agro-pastoral system of the plains have almost completely disappeared (Zurayk, 2000). In other places, it has been replaced by a massive monoculture of wheat and barley that is grown without the use of any fertilizers, which is resulting in a reduction in soil fertility. Some fruit trees are still picked in the terraced mountainous lands, but the terraces are left to degrade. High-input agriculture has become the sole workable option in regions where irrigation water is readily available from renewable or non-renewable sources, yet it is not environmentally sustainable (Zurayk, 2000).

It is obvious that major efforts are needed to increase agricultural sustainability in Lebanon, some of which must be focused on the creation and application of innovative technologies in which the public, industrial, small-scale commercial, agricultural and non-governmental organizations (NGO) sectors will be involved as they have the potential to advance agricultural technology for sustainability.

In the past years, Lebanon has been witnessing a financial meltdown that exacerbated during the pandemic. Amid the liquidity crisis, the inflation rates in Lebanon have escalated to an unprecedented rate of 136.8% in October (Trading economics, 2020). In their recent report, the UN ESCWA has estimated that around 55% of the Lebanese population is living in poverty where around 70% of the wealth is in the hand of 10% of the population (ESCWA, 2020). The deteriorating economic situation has reflected across sectors and has largely impacted smallholders and small-scale family businesses and farmers (FAO, 2020).

Prior to the deterioration of the economic and financial situation in Lebanon, the increasing costs of land and variable input, such as seeds and fertilizers, as well as the

rising costs and the intermittent supply of energy have contributed significantly to an increase in production costs and low yields. However, the low value of the agricultural yield is not only economically driven but often attributed to inadequacies in the supply chain, particularly collusions between middlemen and wholesalers at the expense of the farmer's profit.

Apart from challenges in the supply chain, the constantly changing consumer demands and the need to customize production to meet these ever-changing demands is another challenge to farmers. This is largely evident in the mismatch between supply and demand since the produced varieties are often not favored by consumers.

Agricultural produce also witnesses quality and marketing challenges. These challenges are aggravated in small-scale farms that often lack any cost and revenue accounting and that solely depend on farming income compared to efficient commercial and large-scale farms (FAO, 2020).

In the previous years, farmers in Lebanon would purchase input on credit provided by input suppliers, wholesalers and middlemen and would repay them gradually after the harvest. However, the incipient economic and financial crisis, have exacerbated farmers' conditions, particularly when the credit to purchase new inputs diminished (high interest rates and inflation of the Lebanese currency); increasing requests to pay undue debts; and pressure to buy inputs in cash either at face value in US dollars or in Lebanese pounds using unofficial exchange rate (FAO, 2020). As a result, many farmers suffered diverse repercussions such as critical liquidity problems related to cash flows. These implications have not only impacted small scale farmers but have also affected large-scale commercial farmers who suffered losses and resorted

to day-to-day planning given the limited liquidity and lack of credit facilities. In light of these challenges, time-sensitive agricultural operations came under high risk.

Given the above-mentioned challenges, the implications of the financial crisis in Lebanon will become more evident with time. The liquidity and cash flow problems will result in lower yields as farmers shift from intense agriculture to low input agriculture and cheaper alternatives. With the exorbitant costs of inputs, farmers are expected to plant and cultivate smaller areas given the low agriculture input. This measure would lead to lower agricultural output compared to previous years. Consequently, the prices of agriculture products will escalate. This assumption is also contingent upon the supply and demand interaction in the market, “as agricultural production is likely to decline and the demand for basic food commodities tends to be inelastic” (FAO, 2020: 22).

### **3.4. COVID-19 Implications on Agriculture and Food Security in Lebanon and its Rural Areas and Recommendations for Livelihood Resilience**

The past 30 months in Lebanon have been a time that no one wants to experience again. Since October 2019, the nation has seen political unrest, violent protests or uprisings, an economic crisis, and financial collapse, all of which have had a considerable negative impact on the livelihoods and general well-being of its 6.8 million inhabitants (World Population Review, 2021). The COVID-19 pandemic struck in the winter of 2020, adding to the already significant pressure, which had a negative impact on the healthcare sector's resources and productivity (Jabbour et al, 2021).

The coronavirus 2019 (COVID-19) epidemic struck Lebanon at a period when unrest was particularly acute. The 5 million nation, which has been sheltering an additional 1.5 million Syrian refugees since 2011, is renowned for its fortitude in the face of political unrest and armed violence. The populace was unprepared for this extraordinary task since it had already suffered from the combined effects of a political and financial crisis that began in October 2019 and persistently affected all facets of daily life (Khoury et al., 2020).

Ben Hassen et al. (2021) investigated the ways in which the COVID-19 pandemic has affected food consumption, dietary practices, and food purchasing habits in Lebanon. The study was based on a 201-adult online survey conducted in Lebanon between July 15 and August 5, 2020. and highlighted a number of significant consumer trends that are now influencing Lebanon's diet and eating habits. Indeed, the results of the survey pointed to a shift toward healthier diets, an increase in domestic product consumption due to worries about food safety, a change in grocery shopping habits (with an increase in online shopping), a surge in food storage, and a decrease in family food waste. Unexpectedly, COVID-19 appears to bring about a number of improvements in Lebanon's consumption patterns that are more sustainable and healthy (Ben Hassen et al., 2021).

The COVID-19 situation is exceptional in a number of ways. Beyond its devastating consequences on health, the COVID-19 pandemic caused an unparalleled global crisis that had an impact on socioeconomic development and people's quality of life everywhere (United Nations, 2020). This is true even though the pandemic's immediate impact on primary agriculture could be negligible. An increasing number of

studies showed that COVID-19 has disrupted food systems, exposing their susceptibility to shocks and crisis (Ahmed et al., 2020; Béné, 2020).

An oncoming worldwide food emergency is a result of the COVID-19 pandemic, which has caused a devastating disaster, halted all economic activity, and interrupted food supply chain (FSC) operations from farmers to processors and consumers at various levels (Sharma et al., 2021). During the epidemic, food became ever more important in the consumers' life. Indeed, COVID-19 is not merely a health problem but is predicted to trigger a major worldwide economic recession raising global poverty rates and endangering the food security of billions of people (HLPE, 2020; Zurayk, 2020).

The pandemic is anticipated to have a significant impact on food consumption, which is easily disrupted by the overall diet quality because health, nutrition, and socioeconomic results are closely related (Pérez-Escamilla et al., 2020). The Theory of Planned Behavior (TPB) and other models have been utilized in literature to analyze consumer behavior during the COVID-19 pandemic (Alexa et al., 2021; Al Amin et al., 2021). However, the most important elements influencing consumer behavior and purchasing decisions during a pandemic are risk attitude and risk perception (Hesham et al., 2021; Mehta et al., 2020). People are not all the same, and not everyone views a situation having negative impacts like an economic or other crises in the same way, and so new tendencies in consumer behavior appear during times of crises (Amalia et al., 2012; Mehta et al., 2020). Risk attitude indicates how the consumer interprets the risk content and how much such content is despised by the consumer, while risk perception indicates how the consumer interprets the likelihood of being exposed to the risk content (Mehta et al., 2020).

The final COVID-19 results will most likely differ from country to country, obviously it depends not only on the epidemiological situation but also, among other things, on the baseline situation and resilience to shocks (Ben Hassen et al., 2021; HLPE, 2020). From an economic and food security viewpoint, some low- and middle-income countries are more vulnerable than others (World Food Programme, 2020a). In this regard, Lebanon, an unstable middle-income country where 80% of food needs are imported, warrants further attention as a case-study. On August 4, 2020, an explosion occurred in the port of Beirut, Lebanon's capital, causing significant human and material damage throughout the city.

Following that, several protests were held to voice disapproval to the government's failure to act and manage, which was believed to contribute to the lethal blast. Consequently, Lebanon's government resigned on August 11, 2020 (Al Jazeera, 2020). After seven months of political wrangling, the country's lawmakers have failed to reach an agreement on a new administration, and Lebanon now operates under a caretaker government (Arab News, 2021). The Lebanese lira (LBP) fell against the US dollar on the black market during the first week of March 2021, sparking nationwide protests against rising inflation, diminishing purchasing power, and deteriorating living standards (Bahn et al., 2021; AFP, 2022).

According to CIHEAM (2020a, b), the combined effects of the financial crisis and COVID-19 resulted in an increase in all food product prices in Lebanon. Prior to the COVID-19 pandemic, Lebanon's food security and nutrition situation was already dire. The pandemic struck at a time when Lebanon's food system was already under stress.

The COVID-19 pandemic is new, and its duration is unknown, emphasizing the need to better understand its effects on food security and consumption. Furthermore, it appears that some continuing domestic dangers to the food system (such as the economic crisis and political unrest) may be made worse by the COVID-19's effects on low- and middle-income countries.

In a recent study, Al-Mulki et al. (2022) mentioned that the number and quality of the responses to the pandemic varied greatly between Lebanese municipalities and among geographical regions, with rural areas visibly suffering from a lack of adequate and comprehensive responses. The majority of municipalities frequently cited issues like economic collapse, poverty, insufficient resources, a lack of support from the federal government, stigma, unawareness, failure to report, weak points in the Ministry of Public Health (MOPH) surveillance system, inaccessibility to healthcare services, a lack of municipal police and a weak role for them, an increase in mental illnesses, and political influence, biasness, and intervention. Contrariwise, major facilitators included increasing endowments, community involvement, societal support and sympathy, adequate human resources, the efficiency of the healthcare systems role, and sound governance.

The outbreak struck Lebanon at a moment of radical economic and political turmoil, local currency devaluation, and a rapid weathering in the middle class. All localities were able to prosper during the epidemic despite the limited public financial resources thanks to increased donations from wealthy members of the community, immigrants, and in certain cases, NGOs. Additionally, task sharing and involvement of a variety of community actors (such as school administrators, medical teams, the

Islamic Medical Society, civil society, NGOs, etc.) were distinguishing characteristics among municipalities that provided an adequate response (Al-Mulki et al., 2022).

Municipalities that responded partially or inadequately, on the other hand, were restricted by a lack of resources and more onerous requirements. The availability of human resources also provided insight into the level of community involvement.

All localities consistently highlighted the recession and poverty as obstacles. The pandemic accelerated the economic decline, raised poverty levels, led to widespread business closures, raised the unemployment rate, and encouraged the emigration of educated individuals. It was also emphasized that those with middle-class incomes and those who worked daily were the most impacted. In remote, rural communities that were already crumbling under great poverty, the situation was considerably worse.

Municipalities encountered access to healthcare services as a significant barrier, with both adequate and inadequate/partial responses. Only a few expensive private hospitals opened COVID-19 wards as the healthcare system crumbled and became overcrowded. The lack of competent medical staff and the distance between hospitals added to the stress on rural areas (El-Jardali et al., 2013).

A key informant in a Lebanese municipality iterated the following statements:

“There are no available beds in governmental hospitals, private hospitals are overpriced, and all hospitals are far-distanced. We also find difficulty in transporting patients by equipped ambulances” (Al-Mulki, 2022: 10).

Healthcare professionals with expertise are prized resources in the community, not just for their patient care but also for their crucial role in containing outbreaks. In addition, despite having limited resources and inadequate equipment, the primary



healthcare system was crucial throughout the epidemic and its impact was especially obvious in rural and underdeveloped areas.

Since primary healthcare centers (PHCs) can serve as the backbone in the face of emergencies, particularly in low-resource settings, this emphasizes the urgent need to strengthen the role of PHCs and to improve the quality of services offered. PHCs are at the center of ministerial agendas in universal public health systems because they are the sole means of providing comprehensive medical treatment that aims to minimize health inequities in the community and is accessible, inexpensive, and sustainable (White, 2015). In times of crisis, social cohesion is a crucial component of stability. According to Al-Mulki et al. (2022) in this study “Epidemics and local governments in struggling nations: COVID-19 in Lebanon”, it is observed that numerous municipalities offered psychological assistance to the locals, particularly the elderly who were particularly hard hit by the crisis because of their isolation and the emigration of their children.

Numerous communities had inept individuals filling leadership roles, with some rural municipal council members being illiterate and lacking basic medical expertise. This predicament resulted from the power-sharing political structure, which is based on sectarian and political divisions, nepotism, and favoritism (Al-Mulki et al., 2022). Although Lebanon had had a number of other epidemics before COVID-19, neither the federal nor municipal administrations expanded their capacities or allocated resources for a potential disaster. As a result, there was an inappropriate amount of preparedness, which delayed the response.

When compared, China, Taiwan, and South Korea were able to stop the spread of the pandemic thanks to quick decisions and a sufficient level of preparedness (Kim et al., 2022). The preparedness plan does, however, need a lot of resources and

capabilities, which were absent in this situation. All municipalities had complaints on the lack of funding and the long waits for their receivables payments, which paralyzed them and hampered their activities. Rural outlying municipalities, however, suffered significantly greater damage than those close to Beirut, Lebanon's capital, as a result of the lack of human, financial, and relief resources available to them. The situation in Lebanon is comparable to that in Yemen, where the weak and disjointed government lacks the technical capacity to prioritize resources (Dureab et al., 2020).

Given that Lebanon's healthcare system is predominately private and expensive, this widens the divide between rich and poor when it comes to health. This is especially true because governmental hospitals were overburdened because they were the first to deal with this public health emergency. Because they cannot afford private hospitals, the less fortunate and more vulnerable people were forced to struggle to obtain a bed in the overcrowded facilities. As we travel further from the capital, the situation becomes even worse because hospitals are underfunded and located in remote areas.

Despite the recognized positive outcomes of biodiversity and its accompanying ecosystem services on the livelihood of individuals, unrestrained technology advancement, economic development as well as consumption patterns progressed persistently till COVID-19 pandemic subjected the predominant developmental pathways followed by capitalists to social and ecological vulnerability (Altieri and Nicholls, 2020). With the continuation of specific consumption patterns at a time of economic and ecological disruptions, the pandemic could be of catastrophic effects on humankind. Far earlier than the COVID-19 pandemic, there were warnings by agro-ecologists notifying the arising ecological narrowness of industrial agriculture, its high reliance on off-farm inputs and its extreme susceptibility to pests, diseases and climate

change (Altieri et al. 2015; Altieri and Nicholls, 2020). Currently, the COVID-19 pandemic proved that industrial agriculture is inclined to full closure or stoppage due to an unanticipated crisis and that human, animal and ecological health are strongly related. Altieri and Nicholls (2020) believe that agro-ecology provides the standards on how to devise agricultural systems most apt to endure forthcoming crises such as climate disturbances, unexpected epidemics and economic crises. They consider agro-ecology and its consequent agricultural system as the best coping strategy with COVID-19, because it displayed significant degrees of resilience and diversity and is known for its increasing potentiality to lessen health and climate change risks, supply adequate yields and offer essential ecosystem services (Nicholls et al., 2016; Altieri and Nicholls, 2020). As the COVID-19 pandemic caused millions of additional families to become food insecure, agro-ecology serves as a way to restructure a post-COVID-19 agriculture that could prevent extensive future losses and discontinuities of food supplies through reorganizing and reorienting food production and consumption. In addition to the world-wide exacerbated cases of people experiencing chronic hunger, children stunting, micronutrient deficiencies, extreme poverty, insufficient caloric intake, and the resulting weakened immunity (FAO, 2015), COVID-19 is inducing instabilities and troubles to these people's accessibility to food (Altieri and Nicholls, 2020). Regardless of efficient COVID-19 confinement, quarantine and control measures, it is estimated that 14 to 22 million people around the world will become extremely poor after COVID-19 pandemic and its subsequent numerous income losses thus impeding the consumers' affordability of food and worsening global food security (IPES-Food 2020). Constraints on trade and travel as well as the lockdown imposed on most cities and villages around the world limited the arrival of imported food thus affecting food accessibility by the poor. Hence,

a significant reduction in road transport and air shipment restricted the capability of moving fresh agricultural products large distances to provide people who suffer from sudden income losses with abundant food supply. Besides, roadblocks and stoppage of transportation routes exceedingly hold back fresh-food supply chains and increase food wastes and food losses (Purdy, 2020). Given the lockdown of restaurants and farmers' markets, small-scale farmers, who produce vegetables and fruits have struggled with the shortage of labor and markets. With declining demand for fresh produce, people have shifted towards consumption of processed foods that have longer shelf lives. This trend, which emerged due to potential disruptions in the supply chain, can augment diabetes and other diet-related non-communicable diseases which are major causes of COVID-19 mortality (IPES, 2020; UNSCN, 2020). People with such medical conditions, particularly those from lower-income groups and communities of color, are more prone to acute illnesses and hospital treatment (Popovich et al., 2020). The supply of food is increasingly at risk in countries that depend on low-income farmers who are migrant workers. The living conditions of many of these migrant workers provide limited opportunities for social distancing and put these workers at a greater risk of COVID-19 infection. With rise of COVID-19, the ensuing economic recession and loss of remittances largely impacts families in developing countries that rely on these remittances through monetary transfers (Altieri and Nicholls, 2020).

The pandemic uncovered the socio-ecological vulnerabilities of global and industrialized food systems. The impacts of COVID-19 on farming, food supply chains, food shortages and soaring prices call for shifts to socially just, ecologically resilient and more local food systems (Altieri and Nicholls, 2020). A 'Green Stimulus' plan that prompts the development of the green economy can tackle ongoing problems in the

food system which are worsened by COVID-19 (Green Stimulus Proposal, 2020). This plan increases the strength and the resilience of societies to crises and pandemics by supporting farming and land use practices that enhance soil health. Doing so supports the plan's key objective in creating a more sustainable food system that guarantees global accessibility to healthy food. Indeed, increasing the farmer's self-reliance and resilience in the face of extreme events through rural agricultural programs that support rural prosperity and local food production can help achieve the plan's goals (Patel and Goodman, 2020). New circumstances arising from COVID-19 require compelling agricultural solutions. Agroecology is a key to the rebuilding of a post-COVID-19 food system. It is a transformational science dedicated to the achievement of sustainability; it redefines power relationships from farm to table and is endorsed by strong transnational agrarian and food justice movements against the globally domineering capitalist agri-food system (Mier et al., 2018). These movements advocate for new food production and consumption patterns that simultaneously contribute to the emergence of local and all-encompassing food system initiatives. As a response to COVID-19 pandemic, new economic movements have emerged to aid marginalized groups. These movements are guided by community-based initiatives such as cooperatives, local credit associations, collective kitchens, and local food procurement programs to meet local needs (Altieri and Nicholls, 2020). Holden draws on several actions and recommendations to urge governments and societies to improve resilience of food systems and ensure food security. Examples of these actions include financial incentives by governments and bottom-up approaches that delegates food production to small producers and peasants (Holden, 2020). Such strategies reduce the reliance on capitalist supply chains while guaranteeing the affordability of local fresh food supplies. After the pandemic, the

application of these strategies require changes in public policy to eliminate inequalities of the prevalent agri-food system (Altieri and Nicholls, 2020).

### **3.5. The Russian-Ukrainian War Consequences on Food and Nutrition Security and on the Supply of Agricultural Products**

The Russia-Ukraine war worsens the present food availability and pricing issues in Lebanon, which is a significant wheat importer, due to Russia and Ukraine's crucial roles in the supply of its grains and cereals. Given these limitations, the recent study “The Ukraine–Russia War Is Deepening Food Insecurity, Unhealthy Dietary Patterns and the Lack of Dietary Diversity in Lebanon: Prevalence, Correlates and Findings from a National Cross-Sectional Study” was conducted by Yazbeck et al. (2022) to examine the predominance and coincides of reduced dietary diversity (DD), unhealthful dietary habits, and changes in household food-related behaviors in response to the Russia-Ukraine war from among a nationally representative sample of 914 Lebanese household members whose ages are 18 years and over. They were asked to take part in the study by completing an online form of a survey that was disseminated over social media platforms such as Instagram, Facebook, and WhatsApp (Yazbeck et al., 2022). So, the data of this study were gathered via self-reporting surveys during June and July 2022. Its results revealed that the higher proportion of Lebanese households ate fewer than two meals per day, and approximately half of them eat a diet that lacks variety. Food insecurity was prevalent in the Lebanese context as three-quarter of the studied sample had food insecurity and one in each four of the households had severe food insecurity. Additionally, around 70 percent of members of the households went shopping and bought food fewer times than they did before the conflict (Yazbeck et al.,

2022). Due to the fact that the availability of cereal products was the least and its stockpiling or hoarding was the most, the majority of the households' members mentioned price hikes for cereal products. In addition, statistics of this study's data indicated that food insecurity was twice as high in households with low monthly income, 35 percentage points higher in females, and three times greater in participants who were married (Yazbeck et al., 2022). This study concluded that a systematic strategy and international cooperation are needed to comprehend the bottlenecks and identify solutions in order to reduce the detrimental consequences of the Russia-Ukraine conflict on food security in Lebanon.

Russia and Ukraine are two of the principal exporters of agricultural products to the world. These two nations supplied 30% of the world's wheat exports and one-fifth of the world's exports of maize ahead of the Russia-Ukraine war (FAO et al., 2022). Additionally, they supply 80% of the world's exports of sunflower seed products (FAO et al., 2022). Moreover, Russia was ranked among the top fertilizer exporters in 2021. Fertilizer prices have been growing since end of 2020 as an outcome of higher energy costs and increased transportation expenses brought on by the COVID-19 pandemic. At least 50 nations buy at least one-third of their wheat from Russia and Ukraine, according to the Food and Agriculture Organization (FAO). It is terrible that the Russia-Ukraine war started on February 24, 2022 and has resulted in a severe and worsening food security crisis as well as interruptions to Ukrainians' way of life during the agrarian planting season. Although the early expectations of output for freshly grown crops in Ukraine were encouraging, the fighting is stopping numerous farmers from harvest and export of their crops. According to recent reports, one-third of total crops could stay unharvested and go to waste during the 2022–2023 growing season. Yet, yields are also

anticipated to be affected. In that light, this war will have a wide range of effects on international markets and on food security, creating an additional problem for many nations, especially for vulnerable populations and low-income countries that rely heavily on imported food. Recent findings show that war increased rising inflation on the already high food costs brought by the COVID-19 disruptions, local weather events, increasing financial constraints, and currency devaluations. In March 2022, the FAO Cereal Price Index reached the greatest level over the past thirty years (FAO, 2022). Because of this, poor households will be particularly hard-hit by rising food prices, and they are more likely to fall farther into poverty in order to escape famine. Moreover, the poorest households devote more than half of their income on food, which may push them to skip meals and decrease their calories' consumption.

In the midst of a severe economic crisis that is now in its third year, Lebanon faces a special set of problems that have significant effects on food security. The number of Lebanese households facing poverty and food insecurity grew as a result of the country's economic condition, political chaos, and the August 4 explosions at the Beirut Port, which led to the partial destruction of the port's silos. The outcome of these complicated economic crises is considered among the 10 worst economic catastrophes since the 1850s. Hoteit et al. (2021)'s recent study on food insecurity amongst Lebanese households revealed that over half of Lebanese residents in the country had insufficient dietary diversity and ate less than two meals each day. In addition, the World Food Programme (WFP) predicted that a third of Lebanese populace will become food insecure towards the end of September 2021 as a result of the country's ongoing economic downturn. Furthermore, Lebanon is heavily dependent on food imports, receiving 78% of its wheat from both Russian and Ukrainian sources, and ranking one



of the top ten countries for imports from Ukraine (Yazbeck et al., 2022). The financial crisis has also constrained farmers' ability to buy agricultural products, despite favorable weather conditions for agricultural output during the past two years (Yazbeck et al., 2022). As a consequence, it is anticipated that national cereal production in 2021 will be fewer than it was in the five preceding years. Meanwhile, around 40 percent of the total calories consumed by the Lebanese people come from wheat (Yazbeck et al., 2022). As a result, the impoverished households in Lebanon will struggle even more to meet their fundamental needs. Because the effects of the Russia-Ukraine war on food security in Lebanese households have not yet been the subject of any studies, Yazbeck et al.'s (2022) article helped identify the reasons and challenges of food insecurity among Lebanese households in light of the several problems affecting food security in Lebanon, including the economic crisis, the COVID-19 pandemic, and on top of this, most recently, the Russia-Ukraine war which not only led to greater food insecurity but to changes in household's food-related habits and lower dietary diversity.

### **3.6. Livelihood Diversification as a Food Security Strategy for the Rural Poor in Lebanon**

Households equipped with inadequate major livelihood assets such as small landholding hinders their efforts to supply enough food for their own consumption. Livelihood diversification is adopted by poor households who are deficient in livelihood assets as a food security strategy (Robaa and Tolossa, 2016). In addition to that, it is a fundamental way to tackle rural poverty as off-farm activities contribute significantly to rural livelihood security in the developing world (Robaa and Tolossa, 2016). Moreover, it lessens vulnerability through reducing the unfavorable effects of seasonality on

consumption. In order to eliminate poverty and attain food security in rural communities of developing countries, policy makers repeatedly propose the following four approaches: small-scale agriculture intensification, commercial farms expansion, resettlement as well as livelihood diversification (Robaa and Tolossa, 2016). The first two approaches are unachievable due to the spread of small landholdings. Anyway, although agricultural intensification, previously marked as the “Green Revolution”, has manifold desired impacts on the agricultural sector such as increased land and labor productivity and advancing the current transition from subsistence to commercial agriculture, it led to massive chaos in the socio-cultural and demographic flows of rural societies demonstrated by changing gender relations, migration patterns and consumption behaviors (Drahmoune, 2013). Re-settlement was a questionable approach as well not only because of its environmental effects, but also due to the fact that urban facilities cannot offer satisfactory employment to all those who fail to eke out a living from agriculture. All this signals that rural off-farm activities have a significant potential in rural poverty reduction. Therefore, the last approach which is livelihood diversification proved to be the best technique among the abovementioned approaches to restrain rural poverty and food insecurity (Robaa and Tolossa, 2016). It has become a necessity for rural areas in Lebanon characterized by micro-holdings.

In their article, “Review on livelihood diversification and food security situations in Ethiopia”, Kassegn and Endris (2021) reported better food security in Ethiopian villages adopting livelihood diversification as it contributed to the improvement and achievement of the four pillars of food security: food availability, food accessibility, food utilization and food stability (Kassegn and Endris, 2021). Another success story of livelihood diversification’s contribution to food security and

poverty alleviation of rural households in Nigeria is reported in the article “Effect of livelihood diversification on food security status of rural farm households in Abia State Nigeria” by Echebiri et al. (2017) (Echebiri et al., 2017).

## CHAPTER 4

### MAIN RESEARCH QUESTION

The main research question of my thesis is: What are the potentials of agrarian transition and livelihood diversification for food and nutrition security, livelihood resilience to crises and poverty alleviation in the village of Nahle?

## CHAPTER 5

### RESEARCH OBJECTIVES

1. Review the manifestations of agrarian transition and livelihood diversification in rural villages in Lebanon in particular.
2. Investigate agrarian transition in Nahle and determine its main causes.
3. Identify the coping strategies adopted by the residents of Nahle.
4. Study the implications of agrarian transition and Nahle residents coping strategies on food security, nutrition security and poverty alleviation.
5. Propose policies that enhance the rural poor's accessibility to higher off-farm revenues and reduce rural income inequality in order to attain equitable growth of the non-agricultural sector (Babatunde, 2009) and recommend measures that advocate small-scale farmers and agricultural investment in their lands to alleviate poverty, approach food security and protect natural resources.

Nevertheless, one of the objectives of this research can be to come up with a food self-sufficiency program for the village Nahle which provides financial support and extensive assistance to villagers. Such program's main targets would be community empowerment, rural poverty alleviation, and village level's food security sustainability. Policy implementation, as will be revealed in my paper, has many bottlenecks when it comes to food security and poverty alleviation policies. To avoid repetition of the same problematic issues and to reach outcomes specified in policy objectives, certain measures should be taken by institutions and accredited information should be taken from the source when addressing future implementation of policies. For most developing

countries, it has always been the case that agricultural growth reduces rural poverty especially that the agricultural sector generates employment for poor people and develops non-agricultural employment opportunities in rural areas (de Janvry and Sadoulet, 2010). In developing countries, the development of the sector is a crucial step towards industrialization particularly due to the fact that farming is the spine of economic growth in these countries (Kniivilä, 2007). Farming not only contributes to food self-sufficiency but also plays a role in value-added improvement of exports' competitive capacity, diversification and eventually food security (Rusliyadi, 2019). Thus, it results in increased farmers' welfare and poverty alleviation. In other words, the agricultural sector enhances the farmers' standards of living and reduces their poverty. Because the majority cannot fulfil their basic necessities and live at the minimum level of subsistence, the number of people living in poverty is rising. Thus, in order to ensure food security at household level, the affordability of the agricultural working environments and the sustainability of policies addressing the fundamental needs of the agricultural sector are essential elements of food security policies. The aforementioned food self-sufficiency program for the village Nahle would serve many purposes such as increasing food availability, rising each nuclear family's quota, retrieving the effectiveness of programs aimed at food delivery and accessibility, improving the availability of internal markets for trading food commodities, increasing rural income through the development of highly productive seed varieties, and enhancing the dietary intake of households and the quality of the food they consume as well. For the coming two decades, several countries around the world will have an unmatched concern regarding food security policies addressing its economic recovery and sustainability (FAO, 2006). Many current attempts taken by governments that tackle food issues in agrarian communities should analyze food security

at national and village level, examine their development policies comprehensively and execute it properly.

Household food security is achieved through rural development, the last of which to be achieved, needs the factors of availability, distribution, and consumption all together. Several implications vary amongst the indicators before and after a food security policy in a village. Rusliyadi (2019) showed that the impact of a self-sufficiency program accompanied with the introduction of a food security policy in villages induced positive implications and decreased poverty levels by 8-40%. The positive implications of the program were highlighted by the results of the household food security analysis. The rural household low income and their inability to afford food prices makes the household members susceptible to diseases as well as to food insecurity; which is the reason why they are forced to pursue other jobs in their spare time. Even when food is available in households, there are other pillars that need to be ensured for food security on a household level. On the village level, much action need to be taken for food security to be established. Due to socio-cultural behaviors of villagers, many problems might arise during the implementation of a self-sufficiency program for the village. The poor attendance in activities aimed at raising awareness and the lack of village staff members and authorities who can make the program publicly available and present it to villagers might create a set-back for the program and hinder achievement of sustainability. People's incapability of using available resources creatively is due to their socio-cultural backgrounds. The high rate of illiteracy hurdles the way villagers manage their businesses productively. This is portrayed in the agricultural activities of cultivation, maintenance, and post-harvesting as well as in livestock raising (Clemons et al., 2018). The lack of knowledge of market

trends and changes, in addition to the size of the supply chain of low priced agricultural commodities, are among other problematic issues that might surface when establishing a self-sufficiency program for the village. This program would engage farmers with small agricultural businesses and industries. However, a village participating in a food self-sufficiency program would have scarce networks and lack in marketing tools that would allow business partners to invest in the village's products that would reach larger markets (Buheji et al., 2020). Depending on Rusliyadi's findings (2019), such a village might suffer from lack of transportation too which results in selling the products to the closest merchants, or passer-by buyers, instead of being able to sell their products at a larger scale for higher prices. Additionally, another problem a village might be facing is that its valley might not have easy access to water. This depends on the location and topography of the village i.e. if it receives its water from the hills and not from the ground. From a farmers' affairs institution's viewpoint, the aforementioned problems are due to misconceptions regarding challenges faced by farmers that should be well-understood at the level of the government. Policies that tackle agricultural and non-agricultural issues related to farmers are not easily implemented due to the unexplored and not apprehended farmers' problems, caused by less time spent in field work by civil servants (Rusliyadi, 2019). The civil servants have helpful tips and sound designs, but their failure in its implementation is caused by misinformation of the existing problems and by financial deficiencies.



# CHAPTER 6

## METHODOLOGY

### 6.1. Study Area

This study is implemented in the Lebanese village Nahle referred to as “the town of Nahle”. Nahle is a town on the slopes of the eastern mountains in Lebanon, 92 km away from north of Beirut, about 7 km away from Baalbek, 1300 m above sea level. It covers an area of around 12,387 hectares (120 km<sup>2</sup>). Nahle covers 1.18 percent the area of Lebanon.

The characteristics of Nahle lands and its crops are numerous:

The town is famous for its fertile green valley and for the cultivation of some types of vegetables such as peas, radish, eggplant, broccoli flower and some types of fruits such as locally produced apricots, pears, peaches, and sugary apples.

It is renowned for growing walnuts in its valley as well (See Appendix 11). The valley's cultivation of Nahle walnuts, known for their remarkable quality and yield, is made possible by the water's availability. Due to their extensive water requirements, walnut trees are typically grown along riverbanks.

Moreover, Nahle is a town famous for the cultivation of sweet Ajami apricot of yellowish color and mountainous cherry of reddish black color. These trees are grown in the mountainous part of Nahle adjacent to the border towns of Syria which has frequent rain and snow. These borders are appropriate for the growth of these trees because they live rain-fed, and because the peasants of the town of Nahle hire cheap Syrian labor from adjacent Syrian countries to participate with them in taking care of their lands.

By definition, “Jroud” are desolated areas found at highest levels of mountains or hills; however, some of it were rehabilitated for cultivation. Most of the lands of Nahle are not planted, especially its barren “Jroud” except what has been pointed out a short while ago, because agriculture in Nahle is affected by various factors often adversely and slightly positively (J. Yahfoufi, personal communication, May 14, 2021). In a key informant interview (KII), Dr. J. Yahfoufi, the municipal of Nahle, categorized the aforementioned factors and rhapsodized about it as follows:

### ***6.1.1. Natural Factors***

The influence of natural factors (topography - soil - climate) on the field of agriculture in the Bekaai town of Nahle is as follow:

- The negative impact of climate: The blowing of snow storms and of the hot “khamseen” wind and the advent of waves of sudden frost and of the extremely cold “sarsar” wind all affect the agricultural seasons negatively.
- Variation of rainfall from year to year, which adversely affect the rain-fed crops especially in the season of scarcity noting that most Nahle crops are rain-fed.
- The positive impact of climate: Average moderate climate allows the production of various Mediterranean crops.
- The positive impact of the soil: The soil of the town of Nahle is variable; in certain places in Nahle town, it is calcareous soil which water flows within and is of medium fertility, while in other places, it is fertile sedimentary soil which leads to good and varied production.

- The negative impact of soil: The paper thickness of the soil in its “Jroud” leads to erosion and loss of nutrients.
- The positive impact of topography (such as the high slopes of the hills and mountains) lead to a diversity of agricultural crops and to the emergence of agricultural terraces on the arable (suitable for agriculture) slopes.
- The negative impact of topography (terrains): Most of Nahle town is mountainous and difficult to cultivate and this affects the few areas suitable for agriculture and reduces the possibility of the use of mechanization especially that these mountainous lands are exposed to torrents and floods, particularly in its barren “jroud”.

#### ***6.1.2. Social and Economic Factors***

The social and economic factors affect crops in the town of Nahle dramatically.

These factors are many, including:

- Poverty of the peasants, which prevents them from reclamation of the arable lands and drives them to feel hesitation and fear, and to not rely on agriculture for fear of poverty and external factors that might hit the agricultural season.
- The lack of agricultural credit banks to offer farmers loans with little financial benefits for medium or long terms.
- Following the traditional methods of irrigation and not using modern technological techniques in agricultural work, whether it is the use of mechanization on one hand or the use of synthetic fertilizers on the other hand.

- Absence of agricultural scientific centers to teach the peasants the modern agricultural science allowing them to know how to take care of their crops and how to develop their agricultural production.

All these negative factors led to the displacement of many of the people of the town of Nahle to cities such as Baalbek-Beirut, and to the migration from Lebanon due to the deterioration of the agricultural economy at Nahle and the difficulty of living there in poverty and lack of social care and service, and the presence of most industrial and commercial enterprises and services in the cities, while these institutions do not exist in the town of Nahle, and the presence of most of health and cultural services of good level in the cities, while it is absent in the town of Nahle, etc. ...

## **6.2. Introduction to the Intended Methodology**

Mixed-method research methodology will be followed in my thesis i.e. both qualitative and quantitative approaches will be used in my research. I will be using qualitative research methods such as peer-reviewed articles, secondary data and external sources including case studies and documentaries. Due to COVID-19 situation, I will carry out phone interviews with relevant stakeholders to understand the current situation and challenges in Nahle. For assessment of food and nutrition security, I will use the food insecurity experience scale (FIES), the food consumption score (FCS), and the food expenditure module which originated from the Vulnerability Assessment of Syrian Refugees in Lebanon VASyR (2017) and was lately used in projects that assess the correlation between agrarian transition and household food security in three other Lebanese villages which are Batloun (Weber, 2018), Nabha (Amhez, 2019), and Khreibet El Jundi (El Jundi, 2019). I will also employ qualitative research methods in

which the answers retrieved from the livelihood questionnaires conducted and all its open-ended questions through WhatsApp chats and phone calls with the villagers in Nahle would then be categorized and analyzed using the Statistical Package for the Social Science (SPSS) software. The derived results would help me propose appropriate instruments and strategies that would better guarantee food security.

### **6.3. Sampling Technique**

The population of Nahle is 10,000 people. Generally speaking, in winter 35% of the population resides in the village, while in summer this percentage increases to 70%. After the Corona pandemic, winter residents became 60% and summer residents 80%. Around 5000 people vote each year of which 55-60 percent i.e. 3000 are residents who are not necessarily permanent residents. The targeted sample is selected from the 2020 elections' voters lists in which 386 heads of households who are permanent residents are labelled by the mayor with the help of an active employee at the municipality and a municipality member. Out of these heads of households' phone numbers, around 190 phone numbers are retrieved from the head of the municipality. 150 heads of households of permanent residents are targeted by choosing them randomly through the use of SPSS. After selecting my sample, I will be having certain contacts with whom I share the advertisement and clarifications of the objectives of my questionnaire then either these interviewees contact me or I contact them through WhatsApp application after securing their permission of sharing their numbers with me in order to proceed with the phone interview questionnaire and survey.

## **6.4. Data Collection**

After my research objectives was clarified to the 150 participants, I retrieved their oral consent. Next, to conduct my phone interviews, I used the following survey tools which are based on a system of indicators for assessing food and nutrition security: 1) Livelihood Questionnaire, 2) Food Consumption Score (FCS), 3) Household Expenditure Module, and 4) Food Insecurity Experience Scale.

### ***6.4.1. Livelihood Questionnaire***

The intention of this livelihood questionnaire is studying livelihood changes of villagers who are residing permanently in the town of Nahle throughout 1960-2021 period. This questionnaire inquires about the major driving forces leading to livelihood diversification of the permanent residents and the key motivations for their cultivation practices at the present time in case they continued performing agricultural activities. Thus, it will provide familiarity and sound knowledge about livelihood transformation in Nahle. To correlate the share of income from agriculture with livelihood, two questions look into the share of annual income of Nahle residents from agriculture and the percentage of household consumption from own land currently versus in the sixties. Besides, there are questions about the motivations for having home gardens and about the mostly grown crops.

This questionnaire is considered a qualitative data collection tool which consists of eight questions; each question is asked two times: the first time to refer to the current situation, while the second time to refer the 1960s period situation. I have selected this 1960s time period specifically for the reason that it is an unforgettable exceptional time for the villagers in Nahle as it precedes the Lebanese civil war and coincides the time of

agrarian transition and livelihood diversification in Lebanon. The Lebanese real estate industry is highly influenced by economic activity and is a crucial part of the country's economy. It is also important to note that the market for real estate has changed in parallel with Lebanon's post-war economic cycle. Additional general factors influencing Lebanon's residential property market include low-interest rates, a favorable young demographic trends, high banking sector cash flow, the availability of long-term loans, export growth, favorable laws for foreign land ownership, low taxes, an of Arab and foreign capital, and additional financing sources (Darwish et al., 2012). The youth are being provided with new and more permanent employment options as Lebanon has evolved since the Civil War, which is helping to accelerate the agrarian transition in rural areas. Nevertheless, for the current situation, I have selected the period from September 2019 till June 2021 as it starts from before the onset of COVID-19 pandemic and the economic crisis to study the villagers' livelihood resilience at present through identification and analysis of the different coping strategies informed by the interviewees.

#### ***6.4.2. Food Consumption Score***

In 2008, the World Food Programme (WFP) developed a quantitative indicator used as a data collection tool to be used for the analysis of standard food consumption called Food Consumption Score (FCS). The participants are asked about the frequency of the consumption of their household of the below retrieved food groups over the past seven days. Then, the FCS is calculated by multiplying each of the 9 groups by its corresponding standard weight then summing up all these values.

Afterwards, instead of using the following WFP's recommended cut-offs: 0-21: "Poor"; 21.5-35: "Borderline"; >35: "Acceptable" to be applied to the FCS to classify the

households' food security according to their food consumption, these cut-offs were adjusted in the following manner: 0-28 for “poor food security”; 28.5-42 for “borderline food security”; >42.5 for “acceptable food security”. These adjustments imitate the ones used in the Vulnerability Assessment of Syrian Refugees in Lebanon (VaSyr 2017) and are done because in Lebanon, there is an increased consumption of sugar and fat which are of low nutritional value. 112 is the uppermost FCS as it indicates that all food groups have been consumed each day of the past seven days.

	<b>Food Items (examples)</b>	<b>Food Groups (definitive)</b>	<b>Weight (definitive)</b>
1	Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals	Main staples	2
	Cassava, potatoes and sweet potatoes, other tubers, plantains		
2	Beans. Peas, groundnuts and cashew nuts	Pulses	3
3	Vegetables, leaves	Vegetables	1
4	Fruits	Fruit	1
5	Beef, goat, poultry, pork, eggs and fish	Meat and fish	4
6	Milk yogurt and other diary	Milk	4
7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	spices, tea, coffee, salt, fish power, small amounts of milk for tea.	Condiments	0

Figure 1. Standard food groups and their corresponding current standard weights used in FCS (WFP 2008)

#### ***6.4.3. Household Expenditure Module Following an Optional Income Template***

Using this module, the household's income is estimated indirectly through asking the 150 permanently residing heads of households in Nahle about their household



expenditure. I will be using such a survey tool due to the sensitivity and embarrassment that might be caused by the income related close-ended multiple-choices in an income questionnaire template having some ranges and the choice to refuse to answer (See Appendix 10) that was addressed to the interviewees before using this module. This survey tool is prepared using the two expenditure modules that the Vulnerability Assessment for Syrian Refugees in Lebanon (VaSyr-2017) and the 2012 Lebanese Central Administration of Statistics employed in their surveys and studies. The formed expenditure module was used in previous studies on the impact of agrarian change and livelihood diversification on food and nutrition security conducted in 2019 by Nour El Houda Amhez in the village of Nabha located in Central Bekaa, by Nour El-Jundi in the village of Khreibet El Jundi located in Akkar, and in 2018 by Cara Weber in the village of Batloun located in Chouf. This module is composed of nine categories and is designed in a way that tackles all possible household expenditures. After collecting yearly, monthly and daily expenditure data, the total expenditure per month is calculated and used as an estimate for income. At the end of her thesis, El Jundi advocated gathering household total monthly income to aid in examining the association between total income and household food and nutrition security (El Jundi, 2019). Unintentionally, the question on household size was not asked to help determine the household expenditure per capita. In order to capture farmers' debts or remittances effectively, I asked about the currency used by the participants to answer expenditure as well as subtract the income from the total expenditure per month in the cases it exceeds it.

Using the expenditure module tool, I asked people about their expenditures on food and beverages, clothing and footwear, housing, water, electricity, gas and other fuels, household maintenance, health, transportation, recreation, amusement, culture,

education, agriculture, and others per month and per year, and likewise per LBP and per USD during a time when the rate for 1 USD was 13,000 LBP. After asking these questions, I relied in my study on summing up their expenditures per month and per LBP through transforming answers in the USD currency to the LBP currency. Then, I divided the suggested multiple-choice responses to income amount question into the following 8 groups:

<b>Income</b>	<b>Groups</b>
<b>Less than 675,000</b>	1
<b>675,000-1,000,000</b>	2
<b>1,000,001-1,500,000</b>	3
<b>1,500,001-2,000,000</b>	4
<b>2,000,001-2,500,000</b>	5
<b>2,500,001-3,000,000</b>	6
<b>3,000,001-5,000,000</b>	7
<b>More than 5,000,000</b>	8

I would like to mention that inadvertently, I missed the question on income currency and monthly income amount for the first 28 interviews or cases.

A study on the declining minimum wage in Lebanon as a result of the economic crisis and the depreciation of the Lebanese pound was released by Information International, a research and consulting organization based in Beirut as law sets the country's minimum wage at LBP 675,000, or \$450 at the time of August 2017 (Yassine, 2021). I imitated this analysis at the time of conducting this survey tool i.e. when the official LBP to USD exchange rate of 1,500 as well as the black market rate of 13,000 LBP per USD to explain the importance of income currency and to justify the reason I transformed USD to LBP monthly income amount and not otherwise. My analysis found that because of the Lebanese pound's depreciation, the minimum salary has decreased by 88% since LBP 675,000 was about equivalent to 52 USD at the time my survey was conducted. People in the public sector, including employees, judges, soldiers, and officers of all ranks, as well as public school teachers, have been greatly

impacted by the drop. The devaluation has also affected the private sector; according to the report, just about 5% of private organizations currently pay their staff in U.S. dollars. Others have accepted the 3,900 USD/LBP exchange rate (the rate set by the Central Bank's platform) for wages or pay employees 50% of the value of their initial earnings, while some enterprises pay their staff partially in hard currency. However, the report also reveals that the majority of private enterprises have maintained salaries in Lebanese pounds as they were prior to the crisis, all with no changes.

#### ***6.4.4. Food Insecurity Experience Scale***

In the *Voices of the Hungry* (VOH) project, the Food and Agriculture Organization of the United Nations (FAO) established a global survey tool called “Food Insecurity Experience Scale (FIES)” and authenticated its use internationally. In 2015, researchers in the Center of Research for Population and Health (CRPH) at the Faculty of Health Sciences (FHS) at the American University of Beirut (AUB) confirmed that this tool can be used in Lebanese rural areas. The FIES survey tool monitors food accessibility thus helping to achieve the Sustainable Development Goal, SDG target 2.1. This method for measuring food insecurity severity depends on “yes” or “no” answers to 8 questions ordered in ascending order of food insecurity severity on the food insecurity global scale (Figure 2). The sum of “yes” answers gives a “raw score” ranging between zero and eight. On the global scale, the raw scores classify people into 3 categories: category I for food secure people who score 0 to 3, category II for moderate food insecure people who score 4 to 6, and category III for severe food insecure people who score 7 or 8 (Figure 3). Nevertheless, the Lebanese scale divides people into two categories: category I for food secure people who score 0 to 2, and category II for food insecure

people who score 3 to 8. Using the global and the Lebanese scales, food Insecurity and its severity will be measured for the villagers who are permanently residing in the town of Nahle.



Figure 2. Food insecurity global scale (FAO 2021)



Figure 3. Food insecurity severity along a continuous scale of severity (FAO 2018)

## CHAPTER 7

### RESULTS AND STATISTICAL ANALYSIS

The four surveys' worth of data were gathered, coded, entered on an SPSS sheet, and copied to an Excel sheet.

The qualitative data from the questionnaire was cautiously studied and examined. This dataset was used to track and account for changes in livelihood between the period of 1960 and September 2019–June 2021.

The answers permitted categorizing the ways of living into three groups: non-agrarian livelihoods, which refer to the way of living of people with no income from agriculture, diversified livelihoods, which refer to the way of living of people with income derived partially from agriculture and partially from a non-agricultural source(s), and full-agrarian livelihoods, which refer to the way of living of people whose income is entirely derived from agriculture.

Using IBM SPSS statistics 26, the quantitative data from the FCS and the FIES were analyzed.

Different variables (continuous and categorical) were used, and statistical tests were performed in accordance with the variables that were tabulated. All test results' significance was studied using the 95% confidence interval (95% CI). The following table shows the tests which have been conducted to statistically analyze the data.

Table 1. Statistical Tests Performed According to the Topics of Analysis

<b>Topic</b>	<b>Dependent Variable</b>	<b>Independent Variable</b>	<b>Test Performed</b>
<b>Agrarian Transition</b>	1960 Livelihood	September 2019- June 2021 Livelihood	Cross tabulation Proportion test (McNemar test compares the proportion of two paired populations that have same single characteristics)
	Wheat type of agriculture around the sixties	Wheat type of agriculture currently	Cross tabulation Proportion test (McNemar test)
	Barley type of agriculture around the sixties	Barley type of agriculture currently	Cross tabulation Proportion test (McNemar test)
	Wheat for HH consumption around the sixties	Wheat for HH consumption currently	Cross tabulation Proportion test (McNemar test)
	Barley for HH consumption around the sixties	Barley for HH consumption currently	Cross tabulation Proportion test (McNemar test)
<b>Food and Nutrition Security</b>	FCS	Current Livelihood	Cross tabulation Fisher's exact test (2 qualitative variables have a small sample, more than 20% of cells have expected cell counts less than 5)
	Raw FCS	FIES	Scatter plot Regression test (2 continuous variables)
	FIES	Current Livelihood	Cross tabulation Chi-square test (2 qualitative variables)
	Raw FIES	Current Livelihood	One-way ANOVA (dependent variable is continuous and independent variable is categorical with more than 2 groups)
	Expenditure	Income	Scatter plot Regression test
	Income	Agriculture as a way to reduce HH food expenditures	Cross tabulation Fisher's exact test

By definition, a full-agrarian income source of a head of household means the household has one income source only which is from agriculture, while a non-agrarian income source of a head of household indicates the household has one or more income sources none of which is agriculture. A diversified income source of a head of household means the household has more than one income source, one from agriculture and one or more from another (or other) source(s).

Three categories—non-agrarian livelihoods, diversified livelihoods, and full-agrarian livelihoods—were used to classify the household means of subsistence. Whether the interviewee currently has/had around the sixties an income source only from agriculture, or the interviewee currently has/had around the sixties an income source only from agriculture and is currently/was around the sixties retired, or the interviewee currently has/had around the sixties an income source only from agriculture and is currently/was around the sixties unemployed, the participant is considered full-agrarian. Nevertheless, if the interviewee currently works/ had worked around the sixties in agriculture and is currently/ had been in the sixties retired from a governmental position, then he/she gets or used to get paid a pension and is considered to have a diversified income source. After recording livelihood changes between the 1960s and the September 2019-June 2021 period, statistical analysis was performed.

The Food Consumption Score (FCS) and the Food Insecurity Experience Scale (FIES) are the two tools used to assess current food consumption and food security. The impact of the agrarian transition on food consumption and food security currently is then investigated using statistical analysis.

## 7.1. Livelihood Changes Results

The reason for examining the sources of income is to do comparison of the participants' current and 1960's sources of livelihood. The reported changes in livelihoods are as follows:

Table 2. *Percentage of Livelihood Sources as Reported by Nahle Residents*

Livelihood sources	1960s	September 2019-June 2021	P-value (95% CI)
<b>Non-agrarian</b>	35(24.3%)	75(51%)	0.00
<b>Diversified</b>	31(21.5%)	30(20.4%)	0.59
<b>Full agrarian</b>	78(54.2%)	42(28.6 %)	0.02
<b>Total</b>	144(100%)	147(100%)	0.00

The data presented in table 2 shows that there has been a change in livelihoods between the 1960s and the September 2019-June 2021 period. The two studied periodic phases, the 1960s period and the period that extends from September 2019 till June 2021, show that changes in livelihoods took place. It is remarkable that the results pave the way for answering the main research question. In the sample studied, the percentage of residents who used to have a non-agrarian livelihood has increased from 24.3% to 51%. However, the percentage of those with diversified livelihoods has decreased from 21.5% to 20.4%. Also, the percentage of residents who have a full-agrarian livelihood has decreased from 54.2% to 28.6%. Currently, the 151 households studied are divided, according to their livelihood adopted, in such a way that 75 have non-agrarian livelihoods, 30 have diversified livelihoods, only 42 have full-agrarian livelihoods, and 4 have missing answers. Nahle residents, who shifted to a non-agrarian or a diversified livelihood, have reported the following reasons:



- One participant, who shifted from having full-agrarian income source in the sixties to diversified income source currently, reported: “In 2019, income was better because the exchange rate of the dollar was 1515 LBP; the annual income from agriculture was \$10,000 which is now considered 170 million LBP, but this number (10,000 USD yearly income) does not exist now; 40-60 million LBP is the current received annual income. Income from agriculture compensates the loss in salary.”
- Another participant, who had a full-agrarian income source in the 60s has a non-agrarian current income source, used to have an income from agriculture but now it had stopped.
- A third participant used to have a full-agrarian income source but shifted to diversified income source due to having a slight income from agriculture, and losing the capital spent on pesticides, weeding, spraying and plowing during winter 2020-2021 when the frost hit the season.

To study the significance of livelihood changes, a proportion test for each group is done. Current income is a qualitative variable having 3 groups (non-agrarian, full-agrarian and diversified). Because I compared the proportion for each group currently and in the sixties, the two samples were considered paired samples. So, in this case, I applied proportion test (McNemar test) by creating dichotomous variables out of the two variables for each group. These dichotomous variables were compared using the McNemar test which is derived from the Chi<sup>2</sup> test. Thus, the results show that the transition in the non-agrarian and full-agrarian livelihood categories from the 1960s to September 2019-June 2021 is significant at a 95% confidence interval, unlike the

diversified livelihood category, which is not significant at a 95% confidence interval. This means there has been a significant change in the livelihoods of Nahle residents.

Table 3 shows the change in each livelihood between the 1960s and the September 2019-June 2021 period.

Table 3. Changes in Livelihoods 1960- September 2019- June 2021 Period

**Current\_Income\_Source \* Sixties\_Income\_Source Crosstabulation**

Count

		Sixties_Income_Source				Total
		Diversified	Full-agrarian	Non-agrarian	Missing	
Current_Income_Source	Diversified	8	19	3	0	30
	Full-agrarian	10	28	4	0	42
	Non-agrarian	13	28	28	6	75
	Missing	0	3	0	1	4
Total		31	78	35	7	151

**7.1.1. Livelihood changes of the 1960s' non-agrarians**

The category of the 1960s non-agrarians has 35 individuals. 28 individuals are still non-agrarians in September 2019-June 2021, 3 adopted a diversified livelihood recently, and 4 shifted towards a full-agrarian livelihood (See Table 3). The non-agrarians who remained as such currently believe that being governmental employees or municipality members do them more good in gaining a living than agriculture would especially that they do not have large-scale agricultural lands though some of them have had their children help them live. However, among those who reported the change in their livelihoods, one participant who had non-agrarian livelihood in the 1960s and shifted to a diversified livelihood used to work for a daily wage back then but now preferred to engage in part-time agricultural work for a better living. Nahle heads of households justified that they recently moved from other cities in Lebanon

and became permanent residents in the village after the COVID-19 lockdown and the financial crisis and embraced a full-agrarian livelihood due to the fact that few cases reported getting infected in the village, and that they wanted to return to their inherited lands, have fewer expenditures and live healthier lives.

### ***7.1.2. Livelihood changes of the 1960s' diversified***

Of the 31 participants who had diversified livelihoods in the 1960s, 13 shifted to a non-agrarian livelihood, 10 rely fully on agrarian livelihoods and 8 remained in this category (See Table 3). Some people with past and current diversified livelihoods work in the ruminant animals' business (sheep, cows, and goats). Their parents were also engaged in livestock trade but to a lesser extent and did not depend only on agriculture for income. Currently, according to them, agriculture is for self-sufficiency and not for income. The heads of households who were involved in the dairy value chain sector in the 1960s remained as such due to the fact that dairy products are not only considered an important source for their nutrition but also an economic factor that improves their well-being.

### ***7.1.3. Livelihood changes of the 1960s' full-agrarians***

Of the 78 who reported a full agrarian livelihood in the 1960s, 28 participants have shifted completely towards a non-agrarian livelihood, 19 participants have shifted to a diversified livelihood, the remaining 28 still rely fully on agrarian livelihoods, and 3 are missing answers (See Table 3). The ex-agrarians, those who had a full agrarian livelihood in the 1960s, had an income from agriculture but now it had stopped. Since the 1960's full-agrarians started facing during the current period

a lot of issues including high transportation expenditures caused by the constantly increasing fuel prices, high electricity and motor participation bills as well as unfavorable weather conditions, these factors motivated them to leave agrarian livelihoods. In addition, in 2021, the frost hit the season, so one of the participants even lost the capital spent on pesticides, weeding, spraying, and plowing. Many other participants reported that back in the sixties, agriculture provided 200-300 LBP which was sufficient for a whole year, unlike the current situation.

## **7.2. Socio-economic Results**

Figures 4 and 5 consecutively illustrate the results of the income currency and the monthly income amount of all the 151 interviewees who are heads of households and permanent residents in Nahle. Figure 4 shows that 19 out of the 151 cases refused to answer what their income currency is while 27 out of the 151 cases including the aforementioned 19 cases refused to answer what their monthly income amount is. In addition, some people did not have an answer (no response), but noted that either their income is small, or it depends on their sales, or have no monthly income and are depending on aid and debts. Figure 5 is a bar graph which shows the frequency for 8 different income groups in increasing order; 999 stands for missing and sums up three

cases: did not ask, no response and refuse to answer.

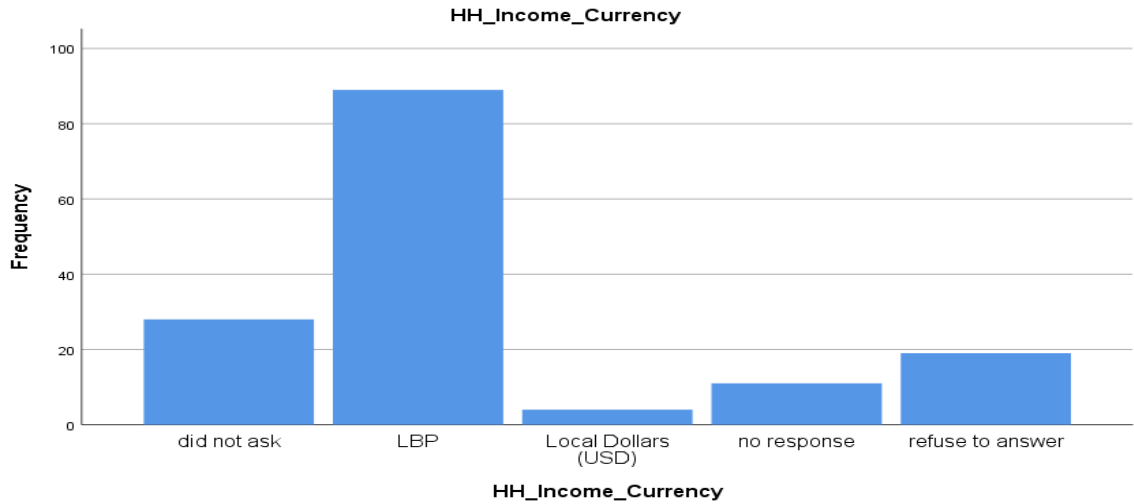


Figure 4. Nahle heads of households' income currency answers frequencies

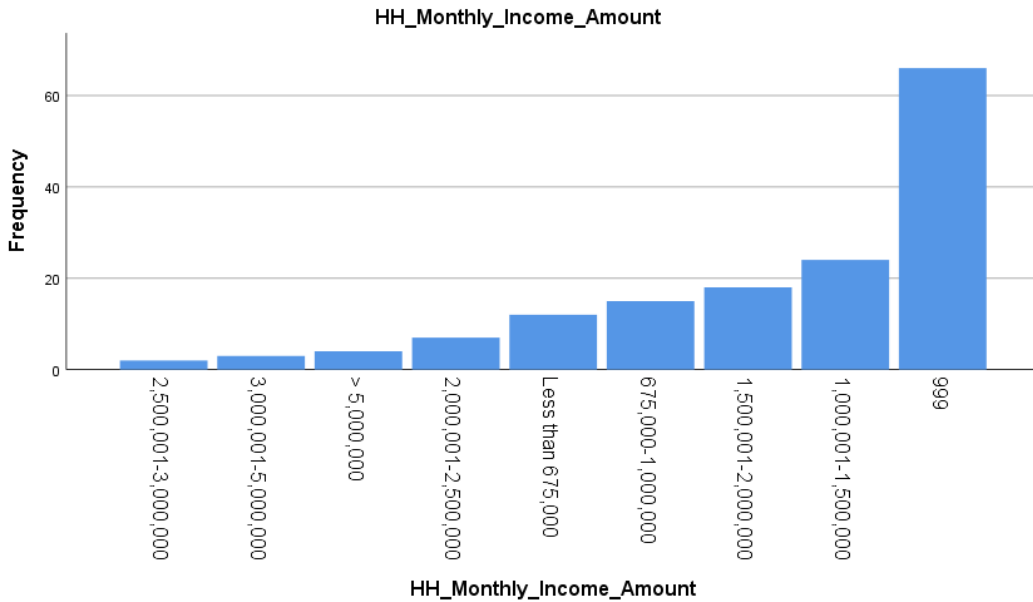


Figure 5. Nahle heads of households' monthly income amount answers frequencies

Table 4 exhibits the SPSS results of all the 151 interviews conducted with heads of households who are permanent residents in Nahle on their share of annual income from agriculture currently versus around the sixties. It might be interesting to explore the food security status of households of Nahle's heads of households whose share of income from

agriculture shifted from 35.8% in the 1960s to 3.3% today: from 53 to only 5 – that is seeming quite a change. Agriculture-based earnings are becoming less prevalent; based on qualitative data, this seems to be because those whose incomes were exclusively derived from agriculture no longer see an economic advantage in continuing practicing agricultural production (Weber, 2018).

It is worth comparing the cumulative percentage of heads of households who are permanent residents in Nahle whose share of annual income from agriculture is none and only a little (but minimal) in the sixties versus currently especially since it increased from 33.1 to 77.3 percent. The number of those whose most of their share of annual income is from agriculture is almost halved as it decreased from 29 in the sixties to 16 currently. These changes in percentages and numbers indicate better self-sufficiency from agriculture in the sixties than currently in the village of Nahle. This is further reconfirmed by the frequency tables of the two variables (See Table 4 and Table 5) on the share of annual income of Nahle residents from agriculture and on the percentage of household consumption from own land currently versus in the sixties.

Table 4 Share of Annual Income of Nahle Heads of Households from Agriculture Around the Sixties Versus Currently (September 2019-June 2021)

		1960s	Cumulative Percent	Currently	Cumulative Percent
Valid	None	34	23.0	71	47.3
	only a little (but minimal)	15	33.1	45	77.3
	around half	17	44.6	13	86.0
	Mostly	29	64.2	16	96.7
	all/ 100%	53	100.0	5	100.0
	Total	148		150	
Missing	999	3		1	
Total		151		151	

Table 5 shows that 60 percent of the valid cases (150 families) consume only a little (but minimal) from their own lands currently whereas for 63.7 percent of the valid cases (143 families), most and all percentage of household consumption came from their own lands in the sixties.

Table 5. The Difference Between Nahle Households' Consumption from Their Own Lands in 1960 Versus September 2019-June 2021

		1960s	Valid Percent	Currently	Valid Percent
Valid	None	19	13.3	18	12.0
	only a little (but minimal)	15	10.5	90	60.0
	around half	18	12.6	28	18.7
	Mostly	38	26.6	11	7.3
	All	53	37.1	3	2.0
	Total	143	100.0	150	100.0
Missing	999	7		1	
Total		151		151	

Table 6 presents the results of the question “Do you consider agriculture/your garden as a way to reduce your household food expenditures?”. In the 1960s, 126 participants among the 151, considered agriculture a way to reduce their household food expenditures but the number reduced currently (108 among the 151 participants).

Table 6. Agriculture as a Way to Reduce Nahle Residents' Food Expenditures in the Sixties Versus the September 2019-June 2021 Period

		1960s	Valid Percent	Currently	Valid Percent
Valid	Missing	5	3.3	2	1.3
	No	20	13.2	41	27.2
	Yes	126	83.4	108	71.5
	Total	151	100.0	151	100.0

To answer a question about the type of agriculture practiced currently (September 2019- June 2021) and back to the time around the 1960s (What is your cropping system? What do you grow/harvest/raise?), I collected their answers and studied them (Appendix 11: in this appendix, I present frequencies for type of agriculture currently and in the 1960s). 142 people answered about the type of agriculture currently, while 140 people answered this question in the sixties.

I noticed a remarkable decline in the percentage of farmers who cultivate barley and chickpeas. In the sixties, there were 87 farmers out of 140 who used to grow barley, so now there are only 12 farmers out of 142. The same applies to chickpeas, as the number of farmers has decreased from 75 to 20 farmers only. The same is true for the cultivation of many other crops such as lentils, fava beans, corn, and wheat. This decline is likely brought on by the fact that, in the 1960s, most people relied on agriculture to meet their needs and store them for the winter, as opposed to today, when most people turned to ready-made purchases. This also explains the decline in the number of people who rely on agriculture solely as a means of subsistence and the increase in marginalized or unused lands. Additionally, I observe a fall in the proportion of residents who keep goats and sheep, which, if anything, suggests a decline in the grazing system among the majority of Nahle's population as it reported a decline in rearing sheep and goats (from 61 and 55 people to 15 people respectively).

I used the McNemar test to compare proportions for 2 related samples (wheat in the sixties and wheat currently), then did the same for barley in the sixties and barley currently.



The results show that the transition in the agriculture of wheat and barley from the 1960s till present is significant at a 95% confidence interval. This means there has been a significant change in the staple foods of Nahle.

To see how this changed in wheat, I resorted to cross-scheduling: I found out that the number of people who grow wheat has declined from 93 farmers in the sixties to 14 farmers now. As for the number of people who do not grow wheat, the number of farmers increased from 48 to 127.

In addition, for the cultivation of barley, I found out that the number of people who grow barley has declined from 87 farmers in the sixties to 12 farmers now. As for the number of people who do not grow barley, the number of farmers increased from 55 to 130.

Table 7. Difference in Wheat Cultivation by Nahle Residents Around the Sixties Versus Currently (September 2019-June 2021 Period)

Wheat_Current_type_of_agriculture	Wheat_Sixties_type_of_agriculture		Total
	No	Yes	
No	45(31.9%)	82(58.2%)	127(90.1%)
Yes	3(2.1%)	11(7.8%)	14(9.9%)
Total	48(34%)	93(66%)	141(100%)

P-value (McNemar Test) = 0.000

Table 8. Difference in Barley Cultivation by Nahle Residents Around the Sixties Versus Currently (September 2019-June 2021 Period)

Barley_Current_type_of_agriculture	Barley_Sixties_type_of_agriculture		Total
	No	Yes	
No	54(38%)	76(53.5%)	130(91.5%)
Yes	1(0.7%)	11(7.7%)	12(8.5%)
Total	55(38.7%)	87(61.3%)	142(100%)

P-value (McNemar Test) = 0.000

To answer a question about the most important crops that farmers grow for their families' consumption in Nahle currently and in the sixties, I collected their answers and studied them (Appendix 12: in this appendix, I present frequencies for important crops grown for household consumption currently and in the 1960s). 142 people answered the first part of the question on the most important grown crops for consumption (currently), while 138 people answered its second part (in the sixties) because some people refused to give me their time to fill out the surveys.

The table in appendix 12 shows that farmers have grown fewer of the following crops for their own family's consumption currently than in the 1960s: wheat, chickpeas, lentils, fava beans, corn, and barley in addition to sheep and goats or dairy products. Because they relied on their crops and products to achieve self-sufficiency in the 1960s, the percentages of these grown crops gradually decreased. These percentages decreased particularly during the economic crisis due to the high prices of fodder, water and electricity. This decrease indicates that farmers were involved more in growing these crops in the 1960s than currently (September 2019-June 2021 period). After the intervention of technology and industrial growth in the dairy value chain sector, people stopped being concerned about traditional production of dairy products since it became more convenient and affordable to purchase it from the market. It is also important to note that numerous organizations, especially non-governmental organizations (NGO), have recently sprouted up that have taken the initiative to aid Nahle families by giving them rations and other forms of support (containing grains and staple food ....) as well as technical support, seeds, seedlings and organic fertilizers and pesticides. These actions taken by NGOs, which aim to support vulnerable people through their livelihood and food security programs, affect the choice of farming especially that their

intervention would allow for a temporary transformation from non-agrarian to diversified or from diversified to full-agrarian.

To study the significance of the change in staple foods grown for household consumption between 1960s and the September 2019-June 2021 period, a McNemar test for each group (wheat and barley grown for household consumption) is done and the results show that the transition in the cultivation of wheat and barley for household consumption from the 1960s to September 2019-June 2021 is significant at a 95% confidence interval (See Tables 9 and 10).

Table 9. Difference in Number of Nahle Residents Growing Wheat for HH Consumption Around the Sixties Versus Currently (September 2019-June 2021 Period)

		Wheat_for_HH_Consumption_around_the_60s		Total
		No	yes	
Wheat_for_HH_Consumption_Currently	No	51(36.4%)	79(56.4%)	130(92.9%)
	Yes	2(1.4%)	8(5.7%)	10(7.1%)
Total		53(37.9%)	87(62.1%)	140(100%)

P-value (McNemar-Test) = 0.000

Table 10. Difference in Number of Nahle Residents Growing Barley for HH Consumption Around the Sixties Versus Currently (September 2019-June 2021 Period)

		Barley_for_HH_Consumption_around_the_60s		Total
		No	Yes	
Barley_for_HH_Consumption_Currently	No	61(43.6%)	70(50%)	131(93.6%)
	Yes	1(0.7%)	8(5.7%)	9(6.4%)
Total		62(44.3%)	78(55.7%)	140(100%)

P-value (McNemar-Test) = 0.000

Now that I am looking at the most significant crops that farmers raise for sale, I've collected the findings and put them in appendix 13. 136 people answered about the most important crops grown for sale currently, while 133 people answered this question in the sixties. In the table below, it is shown that fewer farmers are raising crops for sale

(a decrease in all crops). For instance, 76 farmers produced wheat in the 1960s; currently, only 9 farmers do the same. Similarly, 65 farmers produced barley in the sixties; currently, only 8 farmers do so. These results indicate that staple farming in Nahle has declined from the 1960s to date, including raising livestock for family consumption or sale. This decline is caused by a variety of factors, including low agricultural yield and the high-risk element, which has made many people reluctant to engage in this industry. Other contributing factors include a lack of agricultural investment and the absence of an agricultural and rural finance system.

To find out what the farmers' motives were behind planting/owning a garden, back in the 1960s and currently, I completed my questionnaires by asking them this question. I collected their answers and compared them (Appendix 14). I figured out, according to the results, that the priority for income generation from agriculture has decreased from 1 in the sixties to 5 currently, and this is due to having no jobs in the sixties. All people were dependent on agriculture because the continuity of livelihood is through agriculture. Therefore, in the sixties, their motivation to keep a garden or a crop is to benefit from the crop but currently, the crops have been replaced by cherries, apricots and walnuts which are being grown not only for household consumption but also for sale. This can be verified by the increases in the frequencies and the percentages retrieved from SPSS in the appendices section (See Appendix 11-Appendix 13).

### **7.3. Food and Nutrition Security Results**

The Food Consumption Score (FCS) and the Food Insecurity Experience Scale (FIES) are indicators of food and nutrition security. This quantitative data collected reflects the period of the past week for FCS and the past 12 months for the FIES. Information about

the household total expenditure is also collected and their association with food and nutrition security is also statistically studied.

### 7.3.1. Food Consumption Score (FCS) Results

The Food Consumption Score is a qualitative tool that measures the level of food and nutrition security. The subjects are asked to report the frequency of consumption of 20 food groups where each group has its own nutritional weight. The frequency is then multiplied by the nutritional weight and the scores of all the groups are added up to get the final score; the higher the score, the better the food and nutrition security of the participant.

Using descriptive analysis, the frequencies and the percentages of Nahle households' food security categories according to the food consumption scores' results were retrieved from the SPSS output in Table 11.

Table 11. Nahle HH Food Security Calculated Using the Food Consumption Score (FCS)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	acceptable food security	105	69.5	70.0	70.0
	borderline food security	28	18.5	18.7	88.7
	poor food security	17	11.3	11.3	100.0
	Total	150	99.3	100.0	
Missing	999	1	.7		
Total		151	100.0		

Table 11 as well as the pie chart in figure 6 retrieved from SPSS show that 70% of the sample has acceptable food security, 18.7% of participants in Nahle have borderline food security and 11.3% have poor food security.

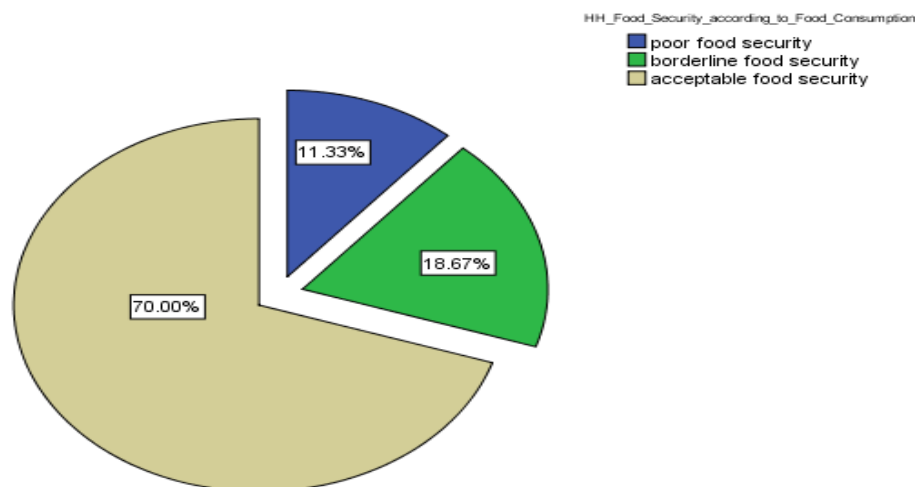


Figure 6. Household food security in the village of Nahle according to Food Consumption Score (FCS)

In this sample, as represented in Table 9, the minimum score is 7.34 and the highest score is 81.60 with an average of 49.99.

Table 12 *Summary of Total Food Consumption Scores through Descriptive Statistics*

	N	Minimum	Maximum	Mean	Std. Deviation
FCS	150	7.34	81.60	49.99	15.28

In Table 13, it can be seen that the 70.5% of heads of households having acceptable food security comprises 17.1% heads of households of diversified livelihood, 19.9% heads of households of full-agrarian livelihood, and 33.6% heads of households of non-agrarian livelihood. 18.5% of participants have borderline food security is composed of: 2.1% participants of diversified livelihood, 6.8% participants of full-agrarian livelihood, and 9.6% participants of non-agrarian livelihood. In addition, the percentage of participants who have poor food security is 11%: 1.4% is of diversified livelihood, 1.4% is of full-agrarian livelihood, and 8.2% is of non-agrarian livelihood. However, after running Fisher's exact test at a 95% confidence interval, the results show

that there is no significant association between livelihood sources and the HH food security according to their food consumption with a P-value of 0.195.

Table 13. FCS by Current Livelihood

**HH food security according to their food consumption \* Current\_Income\_Source Crosstabulation**

Count

		Current_Income_Source			Total
		Diversified	Full-agrarian	Non-agrarian	
HH food security according to their food consumption	acceptable food security	25(17.1%)	29(19.9%)	49(33.6%)	103(70.5%)
	borderline food security	3(2.1%)	10(6.8%)	14(9.6%)	27(18.5%)
	poor food security	2(1.4%)	2(1.4%)	12(8.2%)	16(11%)
Total		30(20.5%)	41(28.1%)	75(51.4%)	146(100%)

**7.3.2. Food Insecurity Experience Scale Results**

As mentioned in the methodology, the low score reflects a better food security status than a higher score. The data collected is as follows:

Table 14. Descriptive Statistics: Frequencies for FIES Yes Responses

		FIES			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	17	11.3	11.5	11.5
	1	9	6.0	6.1	17.6
	2	8	5.3	5.4	23.0
	3	10	6.6	6.8	29.7
	4	26	17.2	17.6	47.3
	5	41	27.2	27.7	75.0
	6	19	12.6	12.8	87.8
	7	11	7.3	7.4	95.3
	8	7	4.6	4.7	100.0
	Total	148	98.0	100.0	
Missing	999	3	2.0		
Total		151	100.0		

#### 7.4. FIES and Livelihoods

The association between the current livelihoods and food security is studied.

Three tests are done studying the association between livelihood and each of the Lebanese scale, the global scale, and the FIES raw scores. The results are as follows:

Table 15. Pearson Chi2 Test of Lebanese FIES Scale and September 2019-June 2021 Livelihoods

		Current_Income_Source			Total
		Diversified	Full-agrarian	Non-agrarian	
Lebanese_Scale_Category	food insecure	24(16.7%)	35(24.3%)	52(36.1%)	111(77.1%)
	food secure	5(3.5%)	5(3.5%)	23(16%)	33(22.9%)
Total		29(20.1%)	40(27.8%)	75(52.1%)	144(100%)

**Pearson Chi-Square = 5.536      P-value = 0.063**

Table 15 shows that, based on the Lebanese categorization, 22.9 % of the sample studied is considered food secure and the remaining 77.1% is considered food insecure. The table also shows that 16% of the non-agrarians are food secure, 3.5% of those with diversified livelihoods are food secure, and 3.5% of those who rely exclusively on agriculture for their income are food secure.

Table 16 Pearson Chi2 Test of Global FIES Scale and September 2019-June 2021 Livelihoods

		Current_Income_Source			Total
		Diversified	Full-agrarian	Non-agrarian	
Global_Scale_Category	food secure	5(3.5%)	9(6.3%)	29(20.1%)	43(29.9%)
	moderate food insecure	20(13.9%)	27(18.8%)	36(25%)	83(57.6%)
	severe food insecure	4(2.8%)	4(2.8%)	10(6.9%)	18(12.5%)
Total		29(20.1%)	40(27.8%)	75(52.1%)	144(100%)

**Pearson Chi-Square = 7.030      P-value = 0.134**



Table 16 shows that, as per the global scale, 20.1% of the non-agrarians are food secure, 3.5% of those with diversified livelihoods are food secure, and 6.3% of those who are exclusively in agriculture are food secure. The table also shows that 29.9% of the sample is considered food secure, 57.6% is considered moderately food insecure, and the remaining 12.5% is considered severely food insecure.

In both scales, when studying each livelihood, the highest percentage of food security is found among those with non-agrarian livelihoods, followed by those who have full agrarian income and the least percentage is among those of diversified livelihood who did not completely shift from agriculture. However, the Chi-square tests show that there is no significant association between the livelihood source and food security (both scales tested) of Nahle residents with a P-value greater than alpha of 0.05.

To study the association between the livelihood sources and the raw FIES scores, a one-way ANOVA test is done. The result shows that there is no significant association at a 95% confidence interval (P-value = 0.309). This means there is no significant association between current livelihoods and household food security.

## **7.5. Coping Strategies Results**

As responses to crises, the different coping strategies were identified as follows: spending less on food, reducing agricultural expenses and reducing the size of the cultivated land, selling off household items, products, or cutting trees to provide winter heating (jewelry, phone, furniture, electronics, domestics, etc...), selling off any useful property or vehicles (farming equipment, sewing machine, car, bicycle, etc...), lowering costs for essential medical and/or pharmaceutical treatment, taking a loan to pay for necessities, relocating to less expensive housing, going into further debt or borrowing

money to pay for essentials, utilizing savings or spending it all, or withdrawing children from the school. Then, out of 151 cases, 145 heads of households mentioned their

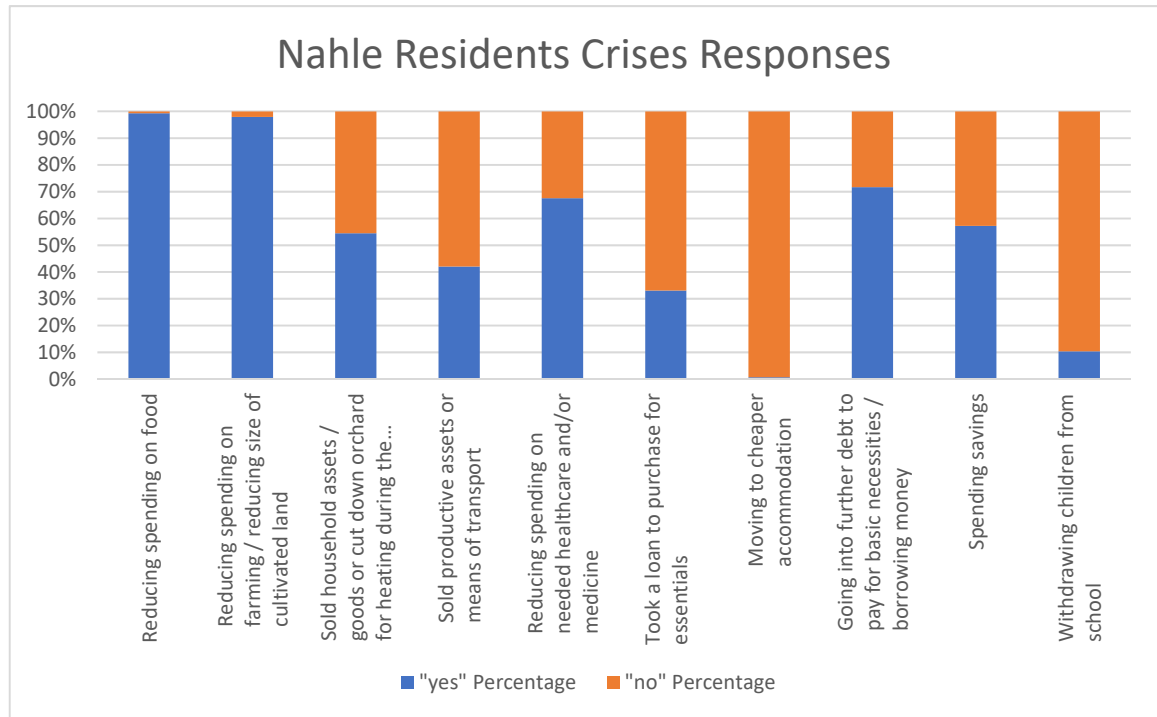


Figure 7. 100% Stacked Column Chart for Nahle Residents Crises Responses

responses to crises; these crises responses were tabulated into “yes” and “no” on columns on a separate Microsoft Excel document. The frequencies of the coping strategies adopted by Nahle residents were tabulated then transformed into a 100% stacked columns chart (Figure 7).

### 7.6. Food Consumption Score and Food Insecurity Experience Scale

Both indicators of food security and food and nutrition security were tested against each other. A regression test was carried out to check the significance of this correlation. The correlation is equal to 0.554 and P-value = 0.00, so there exists a significant relationship between the two variables.

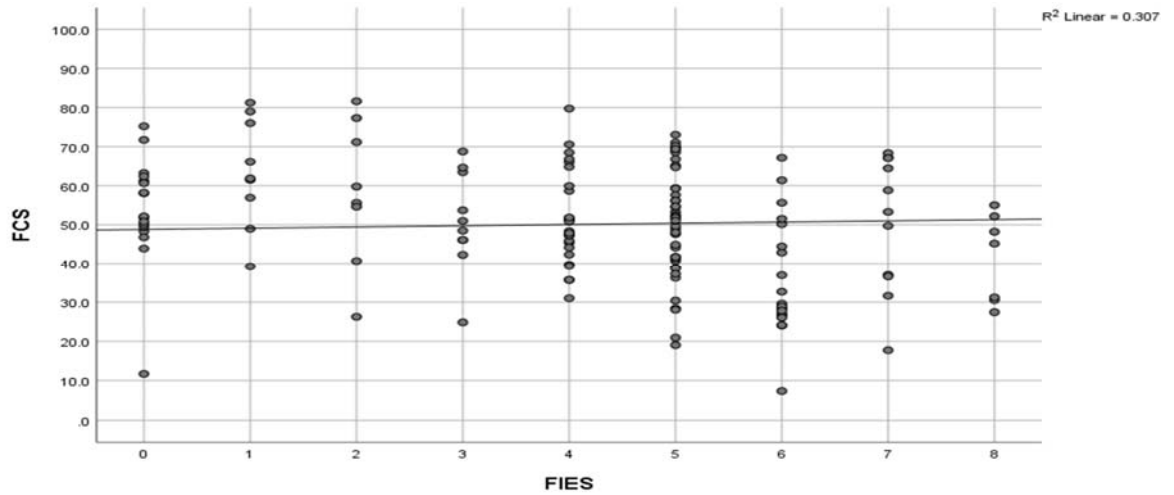


Figure 8. Scatter plot FIES and FCS

Table 17 Regression Test Between the Total Scores of FIES and FCS

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			
						F Change	df1	df2	Sig. F Change
1	.554 <sup>a</sup>	.307	.303	65.730326216 414100	.307	66.133	1	149	.000

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	285726.231	1	285726.231	66.133	.000
	Residual	643750.892	149	4320.476		
	Total	929477.123	150			

Model		Unstandardized Coefficients			Sig.	95.0% Confidence Interval for B	
		B	Std. Error	T		Lower Bound	Upper Bound
1	(Constant)	48.793	5.428	8.990	.000	38.068	59.518
	FIES	.313	.039	8.132	.000	.237	.389

The results presented in the set of tables in Table 17 show that there is a significant positive association at a 95% confidence interval between both indicators with a P-value of 0.00.

Using a straight-line model, FIES explains 30.7% of the observed variation in FCS. In addition, the P-value for the FIES variable is less than 0.05, so FIES significantly explains observed variations in FCS.

$FCS = 48.793 + 0.313 \text{ FIES}$ . Thus, those who have higher affirmative answers in the FIES tend to have a significantly low score in the FCS. In other words, those who are food insecure have a lower FCS. As FIES increases by one unit, the FCS increases by 0.313. So, they are positively correlated.

### **7.7. Expenditure and Income Results**

Both indicators of income and expenditures were tested against each other. A scatterplot is done first and it shows that those who have higher income tend to have higher expenditures. A regression test was carried out to check the significance of this correlation.

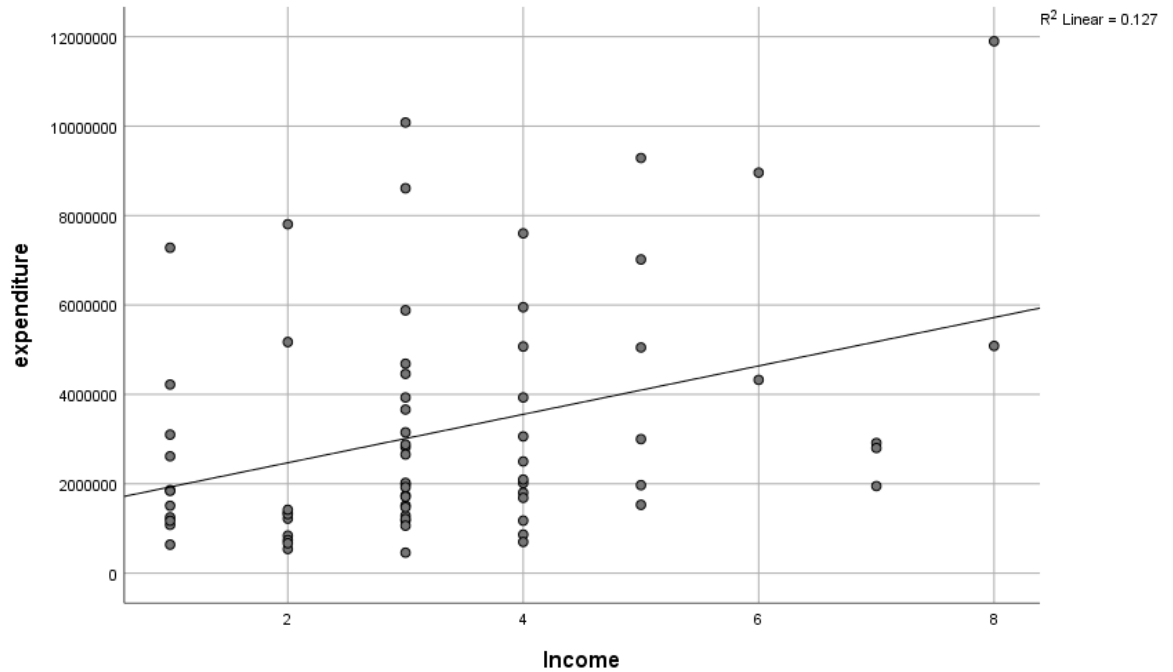


Figure 9. Scatter plot income and expenditures

Table 18 Regression test between the total expenditures and income set of tables

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.356 <sup>a</sup>	.127	.114	2440691.223

### ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	58851839104336.810	1	58851839104336.810	9.879	.002 <sup>b</sup>
	Residual	405074208010520.300	68	5956973647213.534		
	Total	463926047114857.100	69			

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients			T	Sig.
		B	Std. Error			
1	(Constant)	1388369.037	639003.559	2.173	.033	
	Income	541509.816	172281.702	3.143	.002	

The results presented in the set of tables in Table 18 show that there is a significant positive association at a 95% confidence interval between both indicators with a P-value of 0.002. In addition, the correlation between the 2 indicators is almost moderate (R= 0.356).

Using a straight-line model, income explains 12.7% of the observed variation in expenditures. In addition, the P-value for the income variable is less than 0.05, so income significantly explains observed variations in expenditures.

Expenditure = 1388369.037+ 541509.816 Income. Thus, those who have higher income tend to have significantly high expenditures.

It can also be noted that as a result of having more expenses than their monthly incomes, most people in Nahle either tend to go into debt or receive remittances from abroad to fulfil basic needs of life.

Then, I studied the relationship between income and question 8 (Do you consider agriculture/your garden as a way to reduce your household food expenditures?), the livelihood questionnaire part related to household food expenditure. To study this relationship, I performed an independent chi-square test, and I got the following results:  
Table 19 *Current monthly income amount and agriculture for food expenditure cross-tabulation*

**HH\_Monthly\_Income\_Amount \***  
**agriculture\_or\_garden\_a\_way\_to\_reduce\_HH\_food\_expenditures Crosstabulation**

		agriculture_or_garden_a_way_to_reduce_HH_food_expenditures		
		no	Yes	Total
HH_Monthly_Income_Amount	Less than 675,000	3 ( 3.6%)	8 (9.6%)	11(13.3%)
	675,000-1,000,000	1 ( 1.2%)	13 (15.7%)	14 (16.9%)
	1,000,001-1,500,000	5 ( 6%)	19 ( 22.9%)	24(28.9%)
	1,500,001-2,000,000	4 ( 4.8%)	14 (16.9%)	18 (21.7%)
	2,000,001-2,500,000	3 ( 3.6%)	4 ( 4.8%)	7 (8.4%)
	2,500,001-3,000,000	2 ( 2.4%)	0 (0%)	2 ( 2.4%)
	3,000,001-5,000,000	0 ( 0%)	3 (3.6%)	3( 3.6%)
	> 5,000,000	0 (0%)	4 ( 4.8%)	4 ( 4.8%)
Total		18 ( 21.7%)	65 (78.3%)	83(100%)

**Fisher's exact test = 12.967**

**P-value = 0.127**

In this table (Table19), it can be seen that 21.7% of people said no (agriculture does not reduce HH food expenditures) and 78.3% of people said yes (agriculture reduces HH food expenditures). Among these people, there was the highest percentage (28.9%) for the income range 1,000,001-1,500,000.

After running Fisher's exact test at a 95% confidence interval, the results show that there is no significant association between income amount and question 8 with a P-value of 0.127.

## CHAPTER 8

### DISCUSSION

“Food insecurity (FI) is a situation whereby people have limited physical, social and economic access to sufficient, safe and nutritious food preferences for an active and healthy life” (Helmi et al., 2020: 31).

In other words, people who lack sufficient, secure, and nutrient-rich food choices for an active and healthy life are said to be experiencing food insecurity. It is a widely recognized problem that affects both industrialized and developing nations' populations (Helmi et al., 2020).

Throughout my thesis, I have studied the effect of agrarian change and livelihood diversification on food security in the village of Nahle. The development of agriculture in developing countries like Lebanon is not properly managed due to the following reasons: limited technological progress, lack of access to farm machinery and infrastructural equipment, unspecialized educational level of farmers, and inadequate financial support to the agricultural sector. Thus, I would like to look at my results in light of findings of other research work regarding livelihood changes and food security in rural communities.

To start with, in their article “A typology of household livelihood changes in rural coastal areas of the Vietnamese Mekong Delta—Capturing the heterogeneity and complexity of the social-ecological context”, Pham et al. (2021) considered diversification of livelihoods a persistent trend as active households constantly look for additional sources of income rather than simply switching from one to the next. They also considered a household's number of declared sources of income a reliable measure of their ability to diversify their sources of income, because it demonstrated that they were motivated by opportunities to make changes that would improve their situation. It



has been discovered that changes in non-farm livelihoods were primarily related to labor mobility rather than opportunities in the village. Besides, the more the households were inclined to invest in their family members' education (including vocational training) the more actively they changed their means of subsistence. Farmers are currently changing their livelihoods more actively as a result of the mounting strain on land area per person brought on by the growing rural population. In general, households who can switch to a new agricultural system do better than those who can simply adopt intensification or diversification on their farms. In other words, farmers' wealth is influenced by their level of land-use independence. Additionally, land continues to be a vital resource in facilitating households' capacity for change as an important measure of a household's assets (Pham et al., 2021). When characterizing groups or comparing pairings, other demographic factors, such as culture, the percentage of households headed by women, and dependence ratio also came into play. Regardless of administrative borders, the distribution of livelihood-change categories among the observed small communities demonstrated the diversity of livelihood-change tactics employed by each community. According to Pham et al. (2021), farm-system shift versus farm diversification, however, could make the difference between household groups with and without the legal permission to change their farm-use of more significance because of the artificial division between diked (areas bounded by contours of land or a physical barrier that retains fuel to a depth greater than 1") and non-diked areas within these villages. It appears that sticking in the same system and diversifying farm goods is less of a "option" and more of a "necessity" because farmers frequently choose to switch to aquaculture where they are allowed to. To put it another way, governmental intervention once more seems to be crucial in this dynamic process as the

key to enabling households' ability to change. Households that chose the same approach on-farm, such as farm-system shifts, differ significantly when they actively shift toward non-farm revenue sources. Therefore, Pham et al.'s article's findings demonstrate that households' decisions to change are well explained by the options that are available (license to alter farming methods, market demand, jobs requiring elevated skills, and other sources of income). In other words, as households cooperate to take advantage of possibilities through following one another as opportunities prevail, household livelihoods' dynamics clearly reflect market conditions be it improved sources of income or profitability. However, this process is subject to governmental changes and interventions that may either impede or encourage decisions to change one's mode of living. Therefore, rather than only the direct effects of climatic problems, the livelihood dynamics are better characterized by the interaction of local farming practices, state intervention, and ecological changes.

Various studies have shown that poverty impacts someone's food accessibility (Canto et al., 2014; Deller et al., 2015; Smith and Meade 2019). The prevalence of food insecurity is also influence by other elements such as food costs, income inequality and unequal food distribution between nations and households (Otsuka, 2013). In this regard, Smith and Meade (2019) found out that in low- and middle-income nations like Rwanda and Honduras, living in a rural community increases one's risk of food insecurity (compared to living in an urban community), but doing so reduces one's risk in a high-income nation like France. In low- and high-income nations, a rise in GDP per capita is linked to a reduction in the incidences of food insecurity but in middle-income nations, this relationship is statistically insignificant. By 2030, the second Sustainable Development Goal of the UN seeks to "end hunger, achieve food security, and improve

nutrition" for all. Smith and Meade (2019) highlighted the importance to use indicators at the national and individual levels, such as the FIES, to monitor progress toward this aim. In a second study that used 2014 FIES data to give a more in-depth look at food insecurity in Latin America and the Caribbean, the research findings were as follow: 1) significant regional heterogeneity in the prevalence of food insecurity is revealed by FIES data; 2) low levels of education, a lack of social capital, and being in a nation with a low GDP per capita were the top three factors linked to increased likelihoods of food insecurity in Latin America and the Caribbean; and 3) diets in nations with food insecurity frequently contain high proportions of grains, roots, and tubers because they are typically the least expensive food groups (Smith and Meade, 2019).

In their review, Kassegn and Endris (2021) found that the level of rural household livelihood diversification was negatively and considerably impacted by the age of the household head. This suggests that family heads' participation in non-farm livelihood methods decreases with increasing age of head of household. In order to help them avoid the broader situation of food insecurity, the productive (young) aged household members should be urged to engaged in non-farm and off-farm activities. It was discovered that large family size had a favorable and significant link with strategies of livelihood diversification (Kassa, 2019). So, in order to diversify their sources of income, households with big family sizes should indulge in more off-farm and non-farm activities. The educational attainment of household heads was also found to have a beneficial and significant impact on rural livelihood diversification techniques and food security. The better educated heads of households may have used on-farm and off-farm livelihood methods to increase their own levels of food security as a possible explanation (Kidane et al., 2005). Therefore, in order to improve the food security of

rural households throughout the nation, governments and private groups should work harder and encourage the spread of both formal and non-formal educational opportunities. This analysis revealed a substantial negative relation between the rural household heads' high land holdings and their non-farm and off-farm livelihood diversification measures. Designing appropriate policies and strategies to encourage rural household heads with small plots of land to engage in non-farm and off-farm livelihood diversification strategies to enhance their food security status is suggested in light of the presence of very small plots of land and its negative and significant impact on food security (Alpízar et al., 2020). A negative and strong correlation between big livestock sizes of household heads and livelihood diversification measures was also discovered by this review. This suggests that family heads did not wish to engage in non-farm and off-farm activities for additional revenue once they had received the necessary quantity of money from livestock rearing. To increase their level of food security, household heads with smaller livestock holdings are drawn to diversifying their sources of income through non-farm and off-farm pursuits. In order to ensure their level of food security, family heads with smaller animal holdings should take part and diversify their income from non-agricultural sources. Concerned organizations should provide enhanced access to rural market so that rural households can participate in non-farm income-generating activities to improve their food security status, as there is a significant positive correlation between walking distance to the nearest market and level of livelihood diversification (Kassegn and Endris, 2021). As there is a strong correlation between the annual income of heads of households and livelihood diversification strategies, there is a need for the government to take action to ease people's financial difficulties by supporting credit access, promoting emerging financial institutions, and

reducing tax burdens. In order to secure their food security, rural heads of households may need to engage in alternate non-farm and off-farm occupations so that their income sources are sufficient enough to overcome their financial limitations. Similarly, scholars discovered a favorable and significant association between formal credit access and rural livelihood diversification techniques (Abera et al., 2021; Kassa 2019). Kassegn and Endris (2021) believed that due to their involvement in addressing rural food security by offering low-interest credit services, government and private banks, as well as rural micro-finance, should be extended in rural regions. Having the option to receive remittances and having diversified sources of income were found to have positively significant relationships in their review. Therefore, to improve rural households' food security, the government should raise awareness of this issue and give them the training they need to make the most use of their remittances (Kassegn and Endris, 2021).

Previous unpublished theses studied the impact of agrarian change and livelihood diversification on food and nutrition security in different villages in Lebanon. Nour El Houda Amhez conducted her study in the village of Nabha located in Central Bekaa in 2019. Nour El-Jundi conducted her study in the village of Khreibet El Jundi located in Akkar. Cara Weber conducted her study in the village of Batloun located in Chouf in 2018. To the best of my knowledge, and since the ordeals of COVID-19, the economic crisis, and the Beirut port explosions, this current study is the first to examine the prevalence and correlates of food insecurity among a representative sample of Lebanese households in Nahle. Nevertheless, in this section, I will compare my results and findings to theirs.

When examining each livelihood on both scales in the village of Nahle, it is found that those with non-agrarian livelihoods have the highest percentage of food

security, followed by those with fully agrarian income, and those with diversified livelihoods who have not entirely shifted away from agriculture have the lowest percentage. Unlike the results in the village of Nahle, in the village of Nabha, when examining each livelihood on both scales, those with diverse livelihoods had the highest percentage of food security, followed by those who have fully abandoned agriculture, and those with full agricultural income had the lowest percentage. In her study in the village of Batloun, Cara Weber tabulated results show in both scales that transitioned, who moved away from agriculture, had higher percentages of food security and higher percentages of food insecurity than that of the diversified but this is within groups of income source and not across FIES categories. There is no other explanation for the contradiction that non-agrarians in the village of Nahle in both scales had the highest level of food security and the highest level of food insecurity among those of different sources simultaneously. According to the global FIES scale on both the Lebanese scale and global categorizations, in Batloun, people with transitioned livelihoods were more likely to fall into the moderately food insecure FIES category than people with diversified livelihoods, but this difference was not statistically significant (Weber, 2018). Unlike the village of Nahle where non-agrarians were more susceptible to food insecurity, full-agrarians in both villages, Nabha and Khreibet El Jundi, were more susceptible to severe and moderate food insecurity (El Jundi, 2019). However, in this study conducted for Nahle residents as well as that for Nabha's, statistical analysis through Chi-square tests indicated that there is no significant association between the residents of Nahle's or Nabha's sources of income and their level of food security (across both scales evaluated) with a P-value greater than alpha of 0.05 (Amhez, 2019). For the village of Khreibet El Jundi, this test also showed a significant association

between livelihoods and FIES ratings based on the global scale (El Jundi, 2019). As a result, household food security is influenced by the household's sources of income. Here comes the question: Why is it that unlike the case of the village Khreibet Al Jundi there no association between FIES and livelihood? What is the reason I did not get the expected results? I did not change the livelihood source or FIES tools used for this test. However, the timing changed and the situation is worsened. It seems as if what may have caused divergences is that there is no direct causal relationship between livelihood diversification and food security level. However, what if the same tools were used to interview people and collect data five years ago? Of course, the results of this test would have been different. This means that the crises and the macro-economic settings disadvantaged agrarians and advantaged non-agrarians in my study. Therefore, to relate to household level at this timeframe is problematic and complicated.

Using both scales, the Lebanese scale and the global scale categories' grouping of FIES raw scores, about 70 percent of the sample studied in Nahle experiences food insecurity which is greater than that percentage in Nabha (50 percent) (Amhez, 2019) and that of Khreibet El Jundi (45 percent with moderate or severe food insecurity) (El Jundi, 2019). However, like the case of Batloun, it was also spotted that the Lebanese scale FIES results in Nahle (77.1%) showed a higher rate of food insecurity than that of the global scale (70.1%). 98 percent of the studied sample in Nahle (148 out of 151 cases) answered the FIES questions as there were only three heads of households among its residents not willing to answer. 17.2 percent of those who answered had to skip a major meal at a certain time during the past 12 months, in other words, consumed insufficient quantity of food as there was no enough money or other resources to get food. Another 27.2 percent of those who answered and had affirmative answers to the

fifth question indicated less consumed quantity and ate less than they thought they should at a certain time during the past 12 months for the same aforementioned reason. 12.6 percent of them experienced having no food in the household over the past year for that same reason. 7.3 percent of them experienced the feeling of hunger but were unable to eat enough again for the same reason which is the lack of money or resources to get enough food. The least percentage, 4.6 percent of them, at a certain time during the past year did not eat anything for a whole day for the same reason. As question number 5 is the most-answered query with yes response, it proves that there have been occasions when they have eaten less but have never gone without food or gone to bed without eating due to the availability of the home-made well-preserved stored food prepared from seasonal fruits, vegetables and legumes.

The variation in food insecurity rates between villages could be explained by the fact that post-COVID situation led to lockdown. The lockdown, coupled with an increase in the exchange rate of the dollar against the LBP currency, led to the deterioration of the agricultural sector as villagers stopped agricultural production and marketing and had to increase their prices to compensate the losses incurred after purchasing pesticides and fertilizers in fresh dollars while having to sell their produce in LBP. As food accessibility for people in rural areas became harder post-COVID spread, the focus of the Ministry of Agriculture (MoA) as well as the local and international NGOs became directed towards strengthening food security through supporting the agricultural sector to improve the wellbeing of rural inhabitants thus pushing them to produce their own food. Therefore, to encourage agricultural production, a policy was enacted by the minister of agriculture to facilitate the movement of farmers while complying to the global quarantine measures even during lockdown.



I would like to bring into my discussion the article “Lebanon: How the Post War’s Political Economy Led to the Current Economic and Social Crisis” to highlight the effect of social and economic changes on the agricultural sector in Lebanon. In his article, Daher (2022) blamed the political economy of the nation and how it has evolved after the end of the Lebanese Civil War for the current situation in Lebanon. Large-scale landholders controlled the agricultural sector, which reflected the commercial and financial aristocrats and their tight ties to foreign capital. While the proportion of the working people in the sector plummeted from about 50% around the 1960 to less than 20% in 1970, agriculture's relative contribution to the national economy fell from 20% of GDP in 1948 to less than 9% in 1974 (Daher, 2022). By 2019, services made up 78.85% of the GDP, followed by manufacturing (5.6%) and agriculture (3%) (Daher, 2022). Thus, Daher (2022) considered the reliance on foreign capital inflows and remittances from the Lebanese immigrant community was also a reflection of this vulnerability in the latter productive sectors. After the Civil War, Lebanon's political economy was still marked by widening socioeconomic disparities. Daher (2022) stated: "The structure of bank deposits reflected this: as of 2018, 0.8% of accounts (24,421 accounts) controlled 51.8% of deposits (\$85,286 billion), while 60.5% of accounts (1,749,104) controlled only 0.5% of deposits (\$935 million)." (Daher, 2022, p.10)

According to the Central Statistics Office, approximately 44% of Lebanese people did not have any form of health insurance in 2019, and the estimated one million or more temporary foreign employees did not have access to social security. In addition, more than half the workforce was made up of informal employees who receive no protection from their employers, and over a third of Lebanese farmers were living below the poverty line in 2018 (Daher, 2022). In the three decades after the Civil War, urban-led

reorganization and the integration of the economy into finance, linked to inflows of foreign money, have come to define Lebanese neoliberalism (Daher, 2022). Neoliberal approaches and the characteristics of the Lebanese economy have received support from numerous regional and international entities. This led to the October 2019 economic and financial crises. Due to the country's political economy's heavy reliance on finance and the marginalization of significant sectors like agriculture and manufacturing, these approaches have exacerbated geographic and social disparities in Lebanon. Lebanon's economic limits have only been exacerbated by the financial crisis, which blew in October 2019. Agricultural productivity, for instance, experienced a steep and hazardous fall between 2019 and 2020. According to the Lebanese Center for Research and Agricultural Studies' report, the value of agricultural production for fruit and vegetable crops decreased by 33% from \$1.1 billion in 2019 to \$736.9 million in 2020 (Daher, 2022). Some farmer's associations predicted that the sector would experience a new decline at the start of 2022, so Daher (2022) found out that the nation will become even more dependent on imported food as a result.

One participant from Nahle expressed how tough the economic situation nowadays is: the current type of agriculture practiced is seasonal (apricots, cherries and walnuts) and only helps in covering tuition fees expenses for the kids. In the sixties, the participant's family hugely depended on agriculture due to the care for land and intensive weeding.

One participant who works currently as a public van driver has mentioned that his household in the 1980s used to be self-sufficient through agriculture; the interviewee's nuclear family used to have 1200 apricot and cherries fruit trees, but then came the drought crisis. There was no coordination between the Lebanese government

and that of the Gulf countries. Two years ago, the participant and his household members moved to the village. Back in the sixties, income from agriculture made his nuclear family self-sufficient. The revenue they get on top of the capital put on agriculture is very little.

For most of the studied cases in the sample (116 out of 150), the current share of annual income from agriculture is none and only a little (but minimal); their agricultural income is for food supply only and their basic income is not from agriculture. Though, their grandfather's income came from agriculture solely; however, back then their expenses were little.

I would like to discuss my results in light of several worth of mentioning findings by Lain et al. (2020) in their data blog “How should we measure food security during crises? The case of Nigeria” regarding FCS versus FIES which were published on World Bank blogs. During the most current COVID-19 outbreak, it has become increasingly crucial to monitor food access on a frequent basis. Due to widespread income loss and substantial interruptions in the chains of food supply, the availability of food in Nigeria and around the world has significantly deteriorated since the onset of the pandemic (Lain et al., 2020). Growingly, there is an agreement on various indicators used to measure the availability of food during crisis. A growing number of surveys, though, have relied on the Food Insecurity Experience Scale as their sole experiential measure of availability to food during the recent epidemic. The fact that the FIES is used as an official indicator to monitor progress towards SDG 2 "zero hunger" and that, as of 2019, approximately 100 nations have either used it already or are in the process of using it is part of the rationale for the indicator's widespread use (Lain et al., 2020). Data retrieved from the Nigerian Living Standards Survey (NLSS), which was

conducted just before the COVID-19 epidemic, gave Lain et al. (2020) the chance to compare the FIES to other commonly used indicators of food access and financial hardship in the particular but crucial case of Nigeria. The FIES does not seem to accurately identify the population that is food insecure in the nation, according to Lain et al. (2020) findings. Well first of all, Lain et al. (2020) found out that a sizable portion of the population classified by the FIES as having food insecurity is not financially disadvantaged. The FIES identifies almost equal proportions for every consumption of districts' population as having poor food availability, including the highest income districts, where food insecurity is probably at a minimum. Notably, the same data shows that the Food Consumption Score (FCS), one of the main metrics used by WFP to target food aid, largely labels the poorest households as having poor or borderline food security. Secondly, they discovered that the FIES' geographical heterogeneity did not match up well with other measures of access to food. The same data showed that financial poverty and inadequate food access using the FCS were much more common in the north of the country than anywhere else, as food insecurity using the FIES was shown to be more widespread in the south than in the north. Interestingly, a variety of other sources support the trend revealed by both financial poverty and the FCS, which shows that poor food security is considerably more common in the north of Nigeria than everywhere else. Thus, according to Lain et al. (2020), the FIES may be better at spotting changes in food access despite its inability to pinpoint vulnerable people in terms of levels. The COVID-19 situation is causing huge losses to both Nigeria's economy and population. The health issue has been made worse by the dramatic decline in oil prices, which heavily influence Nigeria's economy and governmental budget. According to recent forecasts, this combined problem may cause 10 million more

Nigerians to live in poverty by 2022 (Lain et al., 2020). It is shown that the FIES can, in elevated data collection throughout the COVID-19 crisis, discover a decline in the access to food in Nigeria, which is compatible with this prediction. Lain et al. (2020) concluded that the increased monitoring of food accessibility should take other metrics into account as well, given the stark differences between the FIES and other wellbeing indicators in Nigeria, noticeably in regions where poor food accessibility is concentrated. The FCS is potentially a better tool to gauge food security during crisis because it has a tendency to be especially sensitive to changes in income and price.

Food consumption is the cornerstone of any analysis of food security. The indicators used in the food consumption score (FCS) tool reflect the elements of food intake that form the basis for classifying families according to their level of food access. Unlike the Food Insecurity Experience Scale (FIES) which corresponds to the quantity and quality of food consumed, the Food Consumption Score (FCS) corresponds to the standard and variety of the food.

Unfavorable weather, erratic political settings, economic problems (such rising food prices), and financial crises had an impact on the level of food security of most interviewed participants. The macro-financial collapse brought on by the financial and economic crisis also involved the destruction of the banking industry, which resulted in the loss of Nuhle residents' deposited money. Additionally, due to the COVID-19 pandemic's effects and the collapse of the exchange rate, there was triple-digit inflation, a major contraction of the financial industry, and the need for lockdowns, all of which made the situation even worse.

I do not focus on potential causation pathways in this research; instead, I look at relationships between food insecurity and a variety of other factors. Despite the fact that

the measurement of FCS might not be a reliable indicator of how severe food insecurity is for each individual, it successfully evaluated food insecurity at the household level.

The food consumption score (FCS) is based on dietary diversity (the number of food groups consumed by households during the seven days before the survey), the entire interviewed sample has a minimum score is 7.34 and the highest score is 81.60 with an average of 49.99.

In Nahle, 70 % of the people have acceptable food consumption scores, this means 70% of people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life, 18.7% have borderline food security and 11.3% have poor food security.

In summary, the FCS revealed that the study's entire sample appropriately consumed food. Adopted livelihoods were not shown to have a significant association with FCS.

Both indicators of food security and food and nutrition security have a significant association (FIES explains 30.7% of the observed variation in FCS). This study found that those who have higher affirmative answers in the FIES tend to have a significantly low score in the FCS.

On the other hand, income represents the money a family makes, while expenditure stands for the costs they incur. These serve as the foundation for an income and expenditure account, and the net balance determined at the end of the year or month shows whether there is a surplus or deficit.

Similar to socio-economic results of Weber (2018), this study statistically proved the percentage of income generated by agriculture has decreased during the course of the studied periods.

Income and expenditure are interrelated. The expenditure incurred on the various needs is vital to enhance the health status and welfare of households.

This study showed that expenditure (on food and beverages, clothing and footwear, housing, water, electricity, gas and other fuels, household maintenance, health, transportation, recreation, amusement, culture, education, agriculture, and others) per month and year, likewise per LBP and USD), was found to have a significant association with income (income explains 12.7% of the observed variation in expenditures).

As a result, those with higher income also had much larger expenditures. I also see that most Nahle residents tend to accumulate debt as a result of having monthly spending that exceeds their income and some people did not limit their expenses on clothes and shoes, because during this economically hard period they are unable to buy new clothes, so they settled with their old clothes, due to the high prices and the rise in the dollar (the economic and financial crisis). In addition, some people used 2 gas bottles per month and others reduce the use of gas so that one gas bottle is enough for them.

From the 61.6 cumulative percent of the participants in my sample who have answered their income currency, 2.6 percent had their income currency in local dollars (USD), 59 percent had their income in LBP, while the rest were missing answers. Because these results showed that very few get paid in local or fresh dollars (USD), I computed their income and expenditures in LBP. Less than 14% of Lebanese have

access to fresh dollars, according to a poll conducted earlier this year (2022) by the German Konrad-Adenauer-Stiftung, with half of those people receiving salaries that are either entirely or partially paid in foreign currency (Boutros and Gemayel, 2022). Given that its purchasing power has been maintained or even expanded since the start of Lebanon's financial crisis in 2019, this segment of the population is regarded as privileged. This was particularly evident in 2020, when consumer prices did not go in parallel with the Lebanese lira's decline. But today's picture is more complex. Dollar earners still have privileges, but their purchasing power is slowly returning to its pre-crisis level. Two years ago, their affordability to purchase some luxuries sprouted. Currently, however, they are forced to face the cost of some items once more. L'Orient-Le Jour examined the statistics released by the Central Administration of Statistics (CAS) taking into account the LBP/USD exchange rate on the black market to determine a pricing trend in actual value in order to provide a fuller picture of the current situation (Boutros and Gemayel, 2022). On the surface, it seems like September 2020 saw a rise in the purchasing power of a dollar earner in Lebanon with a stable monthly income about twice that of September 2019. The conclusions get more complex upon deeper examination. However, the amount of an individual's rise in purchasing power is primarily dependent on the kind of consumption that person engages in. A dollar salary earner with children, for instance, would have seen a higher boost in purchasing power because health care and education have seen fewer price increases than other services. Dollar earners had a significant gain in their purchasing power in 2020. Based on CAS data and a comparison of price index evolution between September 2019 and September 2020, it appears that import prices, particularly for food, beverages, clothing, and footwear, have remained essentially constant in



USD terms (while considering the depreciation in the value of the LBP relative to the USD); prices only slightly increased (Boutros and Gemayel, 2022). Additionally, throughout the same time frame, local service costs decreased significantly in USD terms (Boutros and Gemayel, 2022). Education, healthcare, telecommunications, transportation, and recreation began to cost less in USD terms as of September 2020, however they began to cost an extremely higher percentage than it used to be pushing the poverty line of the Lebanese people upward.

Additionally, it should be mentioned that the Banque du Liban continued to substantially subsidize imports of gas and fuel oil up until September 2020, thereby reducing the effects of the national currency's devaluation. Therefore, for a person whose dollar-denominated earnings stayed the same between 2019 and 2020, the cost of living decreased by 50% during that time (Boutros and Gemayel, 2022). However, throughout time, this benefit to the privileged few has progressively diminished. Inflation has undoubtedly affected prices in Lebanon, especially as a result of the COVID-19 pandemic's supply chain disruptions and the astronomical rise in fuel prices. The conclusions drawn from the CAS data are startling. While the price indices for goods like food, beverages, and clothing and footwear remained essentially the same in September 2019 and September 2020, they skyrocketed in 2021. Affected by this dollar price increase are industries that had been relatively stable until 2020. There are a number of considerations to take into account, such as the rise in the cost of motor participation, brought on by higher diesel prices and the removal of subsidies, as well as the rise in communication (cellphone and internet expenditures) rates; these matters have affected the comfort of dollar earners. According to CAS data, transportation costs rose in September 2022 compared to the same month in 2019, yet today's electricity

motor participation is larger than it was three years ago. Besides, although the cost of health care has not increased, it is nevertheless more expensive for Lebanese consumers in 2021 than it was in 2020. Prior to the lifting of subsidies on the great majority of pharmaceuticals, health care prices were worth just about a quarter of their value in 2019. Now, they represent more than half of that value. In other words, a person living on a dollar wage in Lebanon in 2022 had more purchasing power than in 2019 but not more than in 2020, according to CAS calculations using the September 2022 price index (Boutros and Gemayel, 2022). This outcome takes into account the modest price increases for housing and education over the previous three years. In terms of education, this mostly has to do with the fact that public schools and universities are not permitted to raise tuition without a decision from the government. Prices are gradually rising in the private sector. For housing, the situation is a little more complicated because some occupants continue to benefit from the previous leasing structure. Although some landlords are requesting payment in USD, the real value of rentals is still declining even though the price of standard rents in LBP has increased significantly as a result of the country's currency loss (Boutros and Gemayel, 2022).

## CHAPTER 9

### CONCLUSION

According to the study's findings, the village of Nahle, where food insecurity was found, the village is also experiencing an agricultural shift. This agrarian transition the village of Nahle experienced was reflected in the shifts in livelihoods away from agriculture between the sixties and currently. On one hand, the bulk of the sample consists of interviewees with current non-agrarian occupations, and their proportion climbed from 24.3% around the sixties to 51% currently. On the other hand, there was a significant drop in the number of heads of households in the village of full-agrarian livelihood sources between the sixties and currently. Therefore, most of the permanent residents in Nahle shifted from full-agrarian to non-agrarian sources of livelihood.

Thanks to farming and agriculture, there was greater self-sufficiency in Nahle's village in the 1960s than there is now. This is evidenced by the increase in the cumulative proportion of heads of households who are permanent residents whose share of annual income from agriculture is none and only minimal from around one third of the sample in the sixties to around three-quarters of the sample currently.

The village of Nahle witnessed a decline in the cultivation of wheat and barley used for the preparation of staple foods in the Lebanese diet. This decline negatively impacted the food security and the socio-economic status and well-being of villagers. Therefore, to combat the prevalence of food insecurity in the village of Nahle, it is highly recommended to revitalize the Bekaa valley, especially Nahle village, with cereal and legumes cultivation.

After collecting my data and conducting assessments, in collaboration with all the stakeholders, I noticed that the vulnerability of Nahle heads of households has been increasing which means Nahle farmers do not have the ability to produce wheat and barley on their own anymore given agricultural practices became unaffordable. That is why the lands are kept marginalized.

There is no significant association between livelihood sources and the HH food security according to their food consumption neither between the livelihood source and food security (both scales tested) of Nahle residents; nevertheless, a significant relationship exists between the FCS and FIES variables: those who have higher affirmative answers in the FIES tend to have a significantly low score in the FCS. Moreover, a significant positive association exists between total expenditure and income and the correlation between the two indicators is almost moderate; income significantly explains observed variations in expenditures: those who have higher income tend to have significantly high expenditures.

As a conclusion, I can reject my hypothesis that agrarian transition and its accompanying livelihood diversification can strengthen food and nutrition security and livelihood resilience to crises and be pro-poor in the Lebanese village Nahle.

To wrap up my thesis, I would like to encourage complying to Lebanon National Agriculture Strategy (NAS) (2020-2025) published by the Ministry of Agriculture on their governmental website, which is a continuously monitored, discussed and updated living document or operational tool that helps to augment the resilience of the Lebanese agri-sector to economic shocks as well as its inclusiveness and competitiveness and to recover the Lebanese economy through an approved set of interventions. One of the purposes of this document is that it serves as a strategic guiding document for the

Ministry of Agriculture (MoA). It also helps reaching out all stakeholders in public and private institutions, their development partners and external actors involved in the following sectors: agriculture, water and natural resources, and food and nutrition security. In addition, it aims at mobilizing resources for public investment, and offering policies and regulations that unlocks private investment in public resources. The main target of NAS is food security achieved through the following:

1. Drawing a framework encompassing macroeconomic as well as agri-food sector policies,
2. Enhancing livelihoods and improving the resilience of farmers and agri-food producers,
3. Increasing their production and productivity and seeking agricultural profitability through reducing agricultural imports and increasing agricultural exports, and
4. Guaranteeing sustainable natural resource management (NRM) and increased use of renewable energy thus alleviating climate change impact.

In its structure, NAS is composed of five strategic pillars; each pillar is structured into programmed or strategic interventions. For instance, pillar 1: Restoring the livelihoods and productive capacities of farmers and producers has the following programs:

- Program 1 aims at making inputs and tools accessible to improve agricultural production capacity
- Program 2 seeks making subsidized agri-loans accessible for farmers and small and medium enterprises (SMEs) in the agri-food sector
- Program 3 works toward reducing food and nutrition insecurity (including via subsidized food import)

Last but not least, after highlighting crops that affect food security, I would like to praise all efforts of NGOs and private-public partnerships (PPPs) for their recent distribution of seeds and seedlings, provision of technical support through extension services and dissemination of well-developed agricultural curricula to Nahle farmers who were invited to information sessions and conferences in order to shed light on the importance of agricultural practices in the village of Nahle to encourage agricultural production and productivity and thus rescue the villagers from food and nutrition insecurity. I would also applaud further coordination and collaboration with research centers in Lebanon such as the Lebanese Agricultural Research Institute (LARI) and the International Center for Agricultural Research in the Dry Areas (ICARDA).

APPENDIX 1  
RESEARCH APPROVAL



**AMERICAN UNIVERSITY OF BEIRUT**  
INSTITUTIONAL REVIEW BOARD (IRB)

**APPROVAL OF RESEARCH**

September 1, 2021

Rami Zurayk, PhD  
American University of Beirut  
01-350000 ext.: 4571  
[rzurayk@aub.edu.lb](mailto:rzurayk@aub.edu.lb)

Dear Dr. Zurayk,

On September 1, 2021, the IRB reviewed the following protocol:

Type of Review:	Modification, Exempt
Project Title:	Agrarian transition and food security in a Lebanese village
Investigator:	Rami Zurayk
IRB ID	FAFS.RZ.03
Funding Agency:	None
Documents reviewed:	Received August 15, 2021: <ul style="list-style-type: none"><li>• Amendment email</li><li>• Liability forms</li><li>• CITI certificates</li></ul>

The IRB reviewed and approved the proposed amendment to the protocol which entails:

- Adding two additional sites: Nahle village and Al-Fakiha village.

The IRB approval is from September 1, 2021 to August 31, 2022 inclusive.

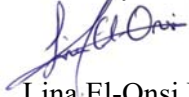
The IRB acknowledged that Ms. Fatima Yahfoufi and Ms. Nagham Khalil have joined the research team and completed their CITI certifications.

Thank you.

*The American University of Beirut and its Institutional Review Board, under the Institution's Federal Wide Assurance with OHRP, comply with the Department of Health*

*and Human Services (DHHS) Code of Federal Regulations for the Protection of Human Subjects ("The Common Rule") 45CFR46, subparts A, B, C, and D, with 21CFR56; and operate in a manner consistent with the Belmont report, FDA guidance, Good Clinical Practices under the ICH guidelines, and applicable national/local regulations.*

Sincerely,



Lina El-Onsi Daouk, MSc, CIM  
SBS IRB administrator

Cc: Michael Clinton, PhD  
Co-Chairperson IRB Social & Behavioral Sciences

Fuad Ziyadeh, MD, FACP, FRCP  
Professor of Medicine and Biochemistry  
Chairperson of the IRB

Ali K. Abu-Alfa, MD, FASN, FAHA  
Professor of Medicine  
Director, Human Research Protection Program  
Director for Research Affairs (AUBMC)



## APPENDIX 2

### INVITATION (ENGLISH)



### **AUB Social & Behavioral Sciences INVITATION SCRIPT**

#### **Invitation to Participate in a Research Study**

**This notice is for an AUB-IRB Approved Research Study  
for Dr. Rami Zurayk and student Fatima Yahfoufi at AUB.**

**Dr Zurayk (961) 1 350 000 x4571 or 4577**

I am asking you for your participation in a research study about agricultural livelihoods and food security in which I want to document how diversifying agricultural livelihoods change food security status and diets. The study is called Agrarian transition and food security in a Lebanese village.

You will be asked to complete two short surveys and to give demographic information. The surveys will ask you to recall what foods you and your family have eaten over the past week and if you or anyone in your family experiences hunger or food shortages.

The two surveys will take about 10 minutes each and I invite you to add any additional comments or explanations of your answers. This research is conducted by AUB and the information will be stored there.

Please listen as the consent form is read to you and consider if you would like to participate in the study. If have any questions about this study, now or in the future, you may ask me or contact the investigation research team at any time.

Student Researcher: Fatima Yahfoufi

[fmy01@mail.aub.edu](mailto:fmy01@mail.aub.edu) (961) 81 601290

Principle Investigator: Dr Rami Zurayk

[rzurayk@aub.edu.lb](mailto:rzurayk@aub.edu.lb) (961) 1 350 000 x 4571 or 4577

## APPENDIX 3

### INVITATION (ARABIC)



الجامعة الأميركية في بيروت

الانتقال الزراعي والأمن الغذائي في القرية اللبنانية

خطاب دعوة

دعوة للمشاركة في بحث علمي

اشعار عن بحث علمي موافق عليه من قبل لجنة الأخلاقيات

الدكتور رامي زريق و الطالبة الباحثة فاطمة اليحفوفي

أودّ دعوتك للمشاركة في دراسة بحثية عن سبل العيش الزراعية والأمن الغذائي، والتي أريد أن أوثّق فيها كيف أن تنويع سبل العيش الزراعية يعني حالة الأمن الغذائي والنظم الغذائية.

هذه الدراسة هي بعنوان التحولات الزراعية والأمن الغذائي في القرية اللبنانية.

سيُطلب منك تعبئة استبيانين قصيرين وإعطاء معلومات ديموغرافية. تتطلّب منك الاستبيانات أن تذكر ما هي الأطعمة التي تناولتها أنت وعائلتك خلال الأسبوع الماضي، وما إن كنت أنت أو أي شخص في عائلتك يعاني من الجوع أو نقص الغذاء.

تستغرق تعبئة كل استبيان حوالي العشر دقائق، وأدعوك لإضافة أي تعليقات أو توضيحات إضافية لإجاباتك.

سيتم إجراء هذا البحث من قبل الجامعة الأميركية في بيروت حيث سيتم تخزين المعلومات.

إذا كان لديك أي سؤال الآن أو في وقت لاحق، يمكنك الاتصال بي على رقم هاتفي 81601290، أو عن طريق البريد الإلكتروني [fmy01@mail.aub.edu](mailto:fmy01@mail.aub.edu)

أو عبر الاتصال بالدكتور رامي زريق على [rzurayk@aub.edu.lb](mailto:rzurayk@aub.edu.lb) أو على 01350000 تمديد 4571

إذا كان لديك أية أسئلة حول حقوقك كمشارك، يمكنك الاتصال بالمكتب التالي في الجامعة الأميركية في بيروت: IRB Office 01350000 تمديد 5445

## APPENDIX 4

### CONSENT FORM (ENGLISH)

Agrarian Transition and Food Security in a Lebanese Village

American University of Beirut

#### **Oral Consent document**

Research team: Fatima Yahfoufi and Rami Zurayk

We are asking you to participate in our research study. Please let me tell you some information before taking the decision to participate or not. Feel free to ask any questions that you may have. Your household was recommended to me by the Head of the Municipality or by someone in the community who works in agriculture. I will be conducting these surveys with 150 individuals from your community.

I am Fatima Yahfoufi a student researcher from AUB, and I am working on a study about the food security of farmers who have adopted diverse income sources and no longer rely exclusively on agriculture for income. I am conducting this study as part of my graduate degree in Food Security. In this study we would like to collect information about you and your family's diet, agricultural practices, income sources and their changes. The study will end in December 2021.

Aggregated data and information from this research study will be shared with my principal re- searcher at AUB Professor Rami Zurayk; we will be the only people with access to this information. A paper will be published as a result of this research but no names or identifying information will be revealed. If I would like to use a quote from our conversation, I will ask your permission before using it.

Your participation in this study does not involve any physical or emotional risk beyond the risks of daily life. You have the right to withdraw your consent or discontinue participation at any time for any reason. There are no particular personal benefits from participating in the re- search study. Your participation may help us to better understand the evolution of livelihoods and the food security in Lebanese villages.

Your participation is voluntary. You may choose not to answer any question. You may end the study whenever you like and your refusal or withdrawal from the study will involve no loss of benefits to which you are otherwise entitled nor will it affect your relationship with AUB/ AUBMC.

Your name or other identifiers will not be attached to your answers so that your confidentiality can be maintained. Your privacy will be ensured in that all data resulting from this study will analyzed, written, and published in an anonymous form.

I would like to take notes during our conversation. These notes are to help me remember the conversation and will not be shared or published in their original form. I will keep these notes in a locked drawer in my office. Only the aggregated data from the interviews will be shared. If you would prefer I do not take notes, please let me know. Feel free to skip any question you do not want to answer. You can end this survey at

any time you want. And you can reverse your consent or withdraw completely from the study at any time.

If you have any questions now or at any later time, you can contact me on my number 81-601290, or by e-mail [fmy01@mail.aub.edu](mailto:fmy01@mail.aub.edu) or the principal researcher Dr. Rami Zurayk at [rzurayk@aub.edu.lb](mailto:rzurayk@aub.edu.lb), or at 01-350000 Extension 4571

If you have any questions about your rights as a participant, you can contact the following office at AUB: IRB office 01-350000 Extension 5445

Are you interested in participating in this study?

yes ----- no -----

May we quote from this interview either in the presentation or articles resulting from this work?

yes ----- no -----

Researcher -----

Date ----- Time -----

## APPENDIX 5

### CONSENT FORM (ARABIC)



الجامعة الأمريكية في بيروت

التحولات الزراعية والأمن الغذائي في القرية اللبنانية

وثيقة الموافقة

دعوة للمشاركة في بحث علمي

اشعار عن بحث علمي موافق عليه من قبل لجنة الأخلاقيات

إتي أدعوك للمشاركة في دراسة بحثية. أرجو منك الإصغاء لما سأقوله من معلومات عن هذا البحث قبل أن تتخذ قرار المشاركة. يرجى عدم التردد في السؤال عن توضيح أي نقطة.

تم اقتراح منزلك إما من قبل رئيس البلدية، أو من قبل أشخاص يعملون في المجال الزراعي.

اسمي فاطمة اليحفوفي ، أعمل كطالبة باحثة في الجامعة الأمريكية في بيروت. موضوع بحثي هو الأمن الغذائي عند المزارعين الذين يعملون اليوم في قطاعات مختلفة، ولم تعد الزراعة تشكل مصدر دخلهم الأساسي.

يشكل هذا البحث جزءاً من متطلبات شهادتي في الماجستير بالتخصص الغذائي.

هدفي من هذه الدراسة تجميع بيانات عنك وعن عائلتك بما يتعلق بالغذاء، الممارسات الزراعية، سبل العيش وتحولاتها.

تنتهي هذه الدراسة في تاريخ 31 كانون الأول 2021.

ستتشارك المعلومات المجموعة مع الباحث المشارك في هذه الدراسة، الدكتور رامي زريق، وسنكون الشخصين الوحيدين اللذان يستطيعان الوصول إلى هذه المعلومات، حيث سيتم نشر ورقة بحثية تتضمن نتائج الدراسة، لكنها لن تحتوي على أسماء أو أي معلومات تدل على هويتك. وفي حال رغبتنا باقتباس جزء من حديثك سنطلب إذن منك قبل فعل ذلك.

إن مشاركتك في هذه الدراسة لن تنطوي عليك بأي مخاطر جسدية أو نفسية تتجاوز مخاطر الحياة اليومية.

لديك القدرة على الانسحاب من المشاركة في هذه الدراسة في أي وقت تريده.  
لن تتلقى أي فوائد مباشرة من مشاركتك في هذه الدراسة. ومع ذلك، فإن مشاركتك سوف تساعدنا على إدراك أفضل لتطور سبل العيش والأمن الغذائي في القرى اللبنانية.

مشاركتك تطوعية. يمكنك اختيار عدم الرد على أي سؤال. يمكنك إنهاء الدراسة وقتما تشاء ولن يؤثر هذا القرار على علاقتك مع الجامعة الأميركية في بيروت.

لن يتم إرفاق اسمك أو أي معرّف آخر بإجاباتك حتى يمكن الحفاظ على سرّيتك. سيتم ضمان خصوصيتك في جميع البيانات الناتجة عن هذه الدراسة التي سيتم تحليلها وكتابتها ونشرها في شكل مجهول.

أود تدوين الملاحظات خلال محادثتنا. هذه الملاحظات تساعدني على تذكر المحادثة ولن تتم مشاركتها أو نشرها في شكلها الأصلي. سأحتفظ بهذه الملاحظات في درج مغلق في مكتبي. سيتم مشاركة البيانات المحصلة من المقابلات فقط. إذا كنت تفضل عدم تدوين الملاحظات، فيرجى إبلاغي بهذا. لا تتردد في تخطّي أي سؤال لا تريد الإجابة عليه.

يمكنك إنهاء هذا الاستطلاع في أي وقت تريده. ويمكنك الانسحاب تمامًا من الدراسة في أي وقت.

إذا كان لديك أي سؤال الآن أو في وقت لاحق، يمكنك الاتصال بي على رقم هاتفي 81601290، أو عن طريق البريد الإلكتروني [fmy01@mail.aub.edu](mailto:fmy01@mail.aub.edu)

أو عبر الاتصال بالدكتور رامي زريق على [rzurayk@aub.edu.lb](mailto:rzurayk@aub.edu.lb) أو على 01350000 تمديد 4571

إذا كان لديك أية أسئلة حول حقوقك كمشارك، يمكنك الاتصال بالمكتب التالي في الجامعة الأمريكية في بيروت: Office 01350000 IRB مقسم 5445  
هل أنت مهتم بالمشاركة في هذه الدراسة؟

نعم ----- كلا -----

هل يمكن أن نقبس جمل من هذه المقابلة سواء في العرض أو المقالات الناتجة عن هذا العمل؟

نعم ----- كلا -----

## APPENDIX 6

### LIVELIHOOD QUESTIONNAIRE (ENGLISH)

#### September 2019-June 2021 Period versus 1960

##### **Name?**

For our filing purposes only- name will not be used in any public discussion or publication that results from this research. All of your answers are completely confidential and will remain so, this paper and survey materials will be destroyed at the completion of this research at the end of December.

- 1. In the past 21 months, what were your sources of income? / Do you have income from agriculture?**

##### **Thinking back to the time around the 1960s?**

**What were your main income sources? Did you have income from agriculture?**

- 2. What type of agriculture do you currently (September 2019- June 2021) practice?**

**What is your cropping system? What do you grow/harvest/raise?**

##### **And thinking back to the time around the 1960s?**

**What type of agriculture did you practice?**

- 3. How much of your income do you think comes from agricultural annually?**  
(considering seasons individually/ looking back at the past 21 months)  
**Would you say that none of your income, only a little but (minimal), around half, mostly (but there are other income sources), or all of your income is from agriculture?**

**And around the 1960s?**

**How much of your income do you think came from agricultural annually?**

- 4. What are the most important crops that you grow for your household's consumption?**

**And around the 1960s?**

**What were the most important crops that you grew for your household's consumption?**



**5. What are the most important crops you grow for sale?**

**And around the 1960s?**

**What were the most important crops you grew for sale?**

**6. What percentage of what you eat, seasonally, comes from your land?**

**Would you say that none of what you eat comes from your land, only a little (*minimal*), around half, mostly (*but there are other sources*), or all of your food comes from agriculture?**

*This includes from crops that produce for sale but also eat, crops you grow only for your house- hold to eat from a garden or from fields, foods and herbs you grow in a small garden*

**And around the 1960s?**

**What percentage of what you consumed, annually, do you think came from your land?**

**7. What are your current motivations for farming/ having a garden?**

*(for income? to save on food expenditures? to help the environment?)*

**And around the 1960s?**

**What motivated you to keep a garden?**

**8. Do you consider agriculture/your garden as a way to reduce your household food expenditures?**

**And around the 1960s?**

## APPENDIX 7

### LIVELIHOOD QUESTIONNAIRE (ARABIC)

استمارة (عربي)

الفترة ما بين أيلول 2019 وحزيران 2021 مقابل 1960

اسم؟

لأغراض التقديم فقط - لن يتم استخدام الاسم في أي مناقشة عامة أو منشور ينتج عن هذا البحث. جميع إجاباتك سرية تمامًا وستظل كذلك ، وسيتم تدمير هذه الورقة ومواد الاستطلاع عند الانتهاء من هذا البحث في نهاية كانون الأول.

1. في الإحدى وعشرين شهرًا الماضية، ما كانت مصادر دخلك؟ / هل لديك دخل من الزراعة؟

بالعودة إلى وقت حول الستينيات؟

ما كانت مصادر دخلك الرئيسية؟ هل كان لديك دخل من الزراعة؟

2. ما نوع الزراعة التي تمارسها حاليًا (ما بين أيلول 2019 وحزيران 2021)؟  
ما هو نظام المحاصيل الخاص بك؟ ماذا تزرع / تحصد / تربي؟

بالعودة إلى وقت حول الستينيات؟

ما نوع الزراعة التي مارستها؟

3. ما مقدار الدخل الذي تعتقد أنه يأتي من الزراعة سنويًا؟ (النظر في المواسم بشكل فردي / النظر إلى آخر 21 شهرًا)  
هل ستقول إن لا شيء من دخلك ، فقط قليل ولكن (ضئيل) ، نصفه تقريبًا، في الغالب (لكن هناك مصادر دخل أخرى)، أم أن كل دخلك يأتي من الزراعة؟

وحول الستينات؟  
كم من دخلك في رأيك أتى من الزراعة سنويًا؟

4. ما هي أهم المحاصيل التي تزرعها لاستهلاك أسرتك؟

وحول الستينات؟  
ما هي أهم المحاصيل التي قمت بزراعتها لاستهلاك أسرتك؟

5. ما هي أهم المحاصيل التي تزرعها للبيع؟

وحول الستينات؟  
ما هي أهم المحاصيل التي قمت بزراعتها للبيع؟

6. ما هي نسبة ما تأكله ، موسميًا ، تأتي من أرضك؟  
هل تقول إن ما تأكله لا يأتي من أرضك ، فقط القليل (الحد الأدنى) ، حوالي النصف ، في الغالب  
(لكن هناك مصادر أخرى) ، أو كل طعامك يأتي من الزراعة؟  
يشمل ذلك المحاصيل التي تنتج للبيع ولكن أيضًا تأكل ، والمحاصيل التي تزرعها فقط لمنزلك -  
وتأكل من الحديقة أو من الحقول ، والأطعمة والأعشاب التي تزرعها في حديقة صغيرة

وحول الستينات؟  
ما هي نسبة ما كنت تستهلكه سنويًا برأيك أتى من أرضك؟

7. ما هي دوافعك الحالية للزراعة / امتلاك حديقة؟  
(للدخل؟ لتوفير نفقات الغذاء؟ لمساعدة البيئة؟)

وحول الستينات؟  
ما الذي دفعك للاحتفاظ بحديقة؟

8. هل تعتبر الزراعة / حديقتك وسيلة لتقليل نفقات طعام أسرتك؟

وحول الستينات؟

## APPENDIX 8

### FOOD CONSUMPTION SCORE FORM (ARABIC AND ENGLISH)

<p>How many days over the last 7 days, did members of your household eat the following food items, prepared and/or consumed at home, and what was their source?</p>	<p>كم يوم في خلال السبعة ايام الماضية تناولت فيه عائلتك الأطعمة التالية</p>
<p>1. How many days over the last 7 days, did members of your household eat: Tubers (potatoes) and Cereals (bread, rice, pasta, wheat, bulgur, other cereals)</p>	<p>1. الدرنيات (البطاطس) والنشويات: الخبز، المعكرونة، الأرز، الذرة، القمح، البرغل ، الفريكة</p>
<p>2. How many days over the last 7 days, did members of your household eat: Cereals (bread, rice, pasta, wheat, bulgur, other cereals)</p>	<p>2. النشويات: الخبز، المعكرونة، الأرز، الذرة، القمح، البرغل ، الفريكة</p>
<p>3. How many days over the last 7 days, did members of your household eat: Roots and Tubers (potatoes)</p>	<p>3. الدرنيات (البطاطس)</p>
<p>4. How many days over the last 7 days, did members of your household eat: Legumes / nuts : beans, cowpeas, peanuts, lentils, nut, soy, pigeon pea, chick peas, Groundnut; Ground Bean; green peas, Cow Pea; and / or other nuts</p>	<p>4. المكسرات والبقول : الفاصوليا، العدس ، الحمص، الفول السوداني، الفول، البازلاء الخضراء، اللوبيا، وغيرها جوز-لوز-صنوبر /نواة) ، (البازلاء الحلوة)</p>
<p>5. How many days over the last 7 days, did members of your household eat: Milk and other dairy products: fresh milk / sour, yogurt, labneh, cheese, other dairy products (Exclude margarine / butter or small amounts of milk for tea / coffee)</p>	<p>5. الحليب ومنتجات الحليب (حليب طازج أو مجفف، اللبن، اللبنة، الجبن، منتجات الحليب الأخرى – بإستثناء السمنة / الزبدة أو كميات صغيرة الحليب لصنع الشاي / القهوة)</p>
<p>6. How many days over the last 7 days, did members of your household eat: Meat, fish and eggs: goat, beef, chicken, pork, blood, fish, turkey, including canned tuna, escargot, and / or other seafood, eggs (meat and fish consumed in large quantities and not as a condiment). (if 0 skip to section k)</p>	<p>6. اللحوم والأسماك والبيض: الماعز، البقر والدجاج ولحم الخنزير، والأسماك، وديك الرومي، بما في ذلك التونة المعلبة، قوقعة، و / أو غيرها من المأكولات البحرية والبيض (اللحوم والأسماك المستهلكة بكميات كبيرة وليس باعتبارها مطيبات). (إذا صفر انتقل إلى القسم ك)</p>

<p>7. How many days over the last 7 days, did members of your household eat: Flesh meat: beef, pork, lamb, goat, rabbit, chicken, duck, turkey other birds</p>	<p>7. اللحوم الحمراء: لحم البقر، لحم الماعز، لحم الخنزير، الدجاج، الديك الرومي، الأغنام، اللحوم الأخرى.</p>
<p>8. How many days over the last 7 days, did members of your household eat: Organ meat: liver, kidney, heart and / or other organ meats</p>	<p>8. اللحوم العضوية: الكبد، الكلى، القلب و / أو غيرها من اللحوم العضوية</p>
<p>9. How many days over the last 7 days, did members of your household eat: Fish/shellfish: dried, fresh and smoked fish, including canned tuna, and / or other seafood (fish in large quantities and not as a condiment)</p>	<p>9. الأسماك: الأسماك المجففة، الطازجة، المدخنة، مأكولات بحرية أخرى باستثناء صلصة ومسحوق السمك (الأسماك المستهلكة بكميات كبيرة وليس باعتبارها مطيبات)</p>
<p>10. How many days over the last 7 days, did members of your household eat: Eggs</p>	<p>10. بيض</p>
<p>11. How many days over the last 7 days, did members of your household eat: Vegetables and leaves: spinach, onion, tomatoes, carrots, peppers, lettuce, cucumber, radish, cabbage etc. (If 0 skip to section o)</p>	<p>11. الخضروات والأوراق: السبانخ والبصل والطماطم والجزر والفلفل، والخس، والخيار والفجل والملفوف وغيرها. (إذا صفر انتقل إلى القسم م)</p>
<p>12. How many days over the last 7 days, did members of your household eat: Orange vegetables (vegetables rich in Vitamin A): carrot, red pepper, pumpkin, squash, orange sweet potatoes</p>	<p>12. الخضار الغنية في الفيتامين أ (البقطين، القرع، الفلفل الأحمر، الجزر، البطاطا الحلوة) الخضار البرتقالية و المتنوعة الالوان</p>
<p>13. How many days over the last 7 days, did members of your household eat: Green leafy vegetables:, spinach, broccoli, amaranth and / or other dark green leaves, cassava leaves, wild leaves, chicory, rockets, mulukhiyi</p>	<p>13. الخضار ذات الأوراق الخضراء: السبانخ، البروكلي، قطيفة و / أو غيرها من الأوراق الخضراء الداكنة، وأوراق من الكسافا والأوراق البرية، الهندباء البرية والروكا والملوخية</p>
<p>14. How many days over the last 7 days, did members of your household eat: Other vegetables: onion, cucumber, radish, tomatoes, eggplants, zucchini etc...</p>	<p>14. الخضار الأخرى: البصل والخيار والفجل والطماطم والباذنجان والكوسا الخ ...</p>
<p>15. How many days over the last 7 days, did members of your household eat: Fruits: banana, apple, lemon, mango, papaya,</p>	<p>15. الفاكهة: الموز، التفاح، الليمون والمانجو والبابايا والمشمش والخوخ والبطيخ وغيرها. (إذا صفر انتقل إلى القسم ف)</p>



apricot, peach, watermelon etc. (If 0 skip to section r)	
16. How many days over the last 7 days, did members of your household eat: Orange fruits (Fruits rich in Vitamin A): mango, papaya, apricot, peach	16. الفاكهة الغنية في الفيتامين أ : المانجو، المشمش، الدراق، البابايا، والفاكهة البرتقالية اللون
17. How many days over the last 7 days, did members of your household eat: Other fruits: Banana, Apple, watermelon, cherry, dates	17. الفواكه الأخرى : الموز، ألتفاح، البطيخ، الكرز، والتمر
18. How many days over the last 7 days, did members of your household eat: Oil / fat / butter: olive oil, other vegetable oil, gee, Butter, margarine, other fats / oil	18. الدهون / الزيوت (زيت الزيتون، الزيت النباتي ، زبدة، سمن، الدهون أخرى )
19. How many days over the last 7 days, did members of your household eat: Sugar, or sweet: sugar, honey, jam, cakes, candy, cookies, pastries, cakes and other sweet (sugary drinks)	19. السكر / المنتجات السكرية/ العسل (السكر، قصب السكر، العسل، مربى، جبلي، حلويات / بونبون/ الشوكولاته، وغير ذلك من منتجات السكر والبسكويت والبايتيسري والكعك)
20. How many days over the last 7 days, did members of your household eat: Condiments / Spices: tea, coffee / cocoa, salt, garlic, spices, yeast / baking powder, tomato / sauce, meat or fish as a condiment, ketchup/hot sauce; Maggy cubes, powder; other condiments including small amount of milk / tea coffee	20. بهارات / توابل (شاي، قهوة، نسكافيه / كاكاو، ملح، توابل، خميرة / باكنج بودر، كاتشب/ صلصة حارة، مكعبات ماجي، بهارات أخرى - بما في ذلك كميات صغيرة من الحليب لصنع الشاي / القهوة)

## APPENDIX 9

### EXPENDITURE MODULE (ARABIC AND ENGLISH)

Category	الفئة	مثال
Food and Beverages	المواد الغذائية والمشروبات	
Clothing and Footwear	الألبسة والأحذية	أقمشة الملابس الملابس أصناف ألبسة أخرى وكماليات للألبسة تنظيف وتصليح واستئجار الألبسة الأحذية تصليح واستئجار الأحذية
Housing, Water, Electricity, Gas and Other Fuels, and household maintenance	مسكن وماء وغاز وكهرباء ومحروقات أخرى, وصيانة مستمرة للمنزل	الإيجارات المدفوعة فعلياً من المستأجر إيجارات فعلية أخرى لوازم أعمال صيانة وتصليح المسكن خدمات تتعلق بصيانة وتصليح المسكن تزويد المياه جمع النفايات المنزلية الصرف الصحي للمياه المبتذلة خدمات مشتركة أخرى متعلقة بالمسكن الكهرباء الغاز وقود سائل, وقود صلب
Health	الصحة	منتجات صيدلانية منتجات طبية أخرى الأجهزة والمعدات العلاجية خدمات طبية (معاينة طبية) خدمات أطباء الأسنان خدمات طبية أخرى خدمات الاستشفاء
Transportation	النقل	سيارات دراجة نارية دراجة هوائية صيانة وتصليح وسائل النقل النقل البري خدمات النقل الأخرى
Recreation, Amusement, and Culture	الاستجمام والتسلية والثقافة	لعب وألعاب ووسائل تسلية ألعاب الحظ كتب جرائد ومجلات مطبوعات أخرى القرطاسية وأدوات الرسم
Education	التعليم	رسوم تسجيل وأقساط برامج تعليمية أخرى

<b>Agriculture</b>	الزراعة	تأجيج, عمال ماء, بذور سماد مبيدات حشرات الآلات وسيط/ نقل الى سوق كهربات مضخات المياه مداخلات أخرى	
<b>Other</b>	سلع وخدمات متفرقة	تبع وتنباك تأمينات سداد الديون الاتصالات/ خدمات اتصالات البرق والهاتف	

## APPENDIX 10

### INCOME TEMPLATE (ENGLISH)

*Specify the household monthly income: ( Check all that apply)*

<b>Portion in LBP</b>	<b>Portion in Local Dollars (USD)</b>	<b>Portion in Fresh Dollars (USD)</b>
<i>Less than 675,000</i>	<i>&lt; 450</i>	<i>&lt; 450</i>
<i>675,000 – 1,000,000</i>	<i>451 – 650</i>	<i>451 – 650</i>
<i>1,000,001 – 1,500,000</i>	<i>651 – 1,000</i>	<i>651 – 1,000</i>
<i>1,500,001 – 2,000,000</i>	<i>1,001 – 1,500</i>	<i>1,001 – 1,500</i>
<i>2,000,001 – 2,500,000</i>	<i>1,501-1,667</i>	<i>1,501-1,667</i>
<i>2,500,001 – 3,000,000</i>	<i>1,668-2,000</i>	<i>1,668-2,000</i>
<i>3,000,001 – 5,000,000</i>	<i>2,001-3,332</i>	<i>2,001-3,332</i>
<i>Greater than 5,000,000</i>	<i>Greater than 3,333</i>	<i>Greater than 3,333</i>
<b><i>I DO get paid LBP but prefer not to specify amount</i></b>	<b><i>I DO get paid Dollars but prefer not to specify amount</i></b>	<b><i>I DO get paid Fresh USD but prefer not to specify amount</i></b>
<b><i>I DO NOT get paid in LBP</i></b>	<b><i>I DO NOT get paid in Dollars</i></b>	<b><i>I DO NOT get paid in Fresh USD</i></b>
<b><i>Refuse to answer</i></b>	<b><i>Refuse to answer</i></b>	<b><i>Refuse to answer</i></b>

## APPENDIX 11

### NAHLE PERMANENT RESIDENTS' CURRENT (SEPTEMBER 2019-JUNE 2021 PERIOD) VERSUS 1960'S TYPE OF AGRICULTURE FREQUENCIES AND PERCENTAGES

	Currently		Sixties	
	N	Percent	N	Percent
Apricot	97	5.5%	108	4.2%
Cherries	92	5.2%	101	3.9%
Walnuts	75	4.3%	86	3.3%
Almonds	38	2.2%	57	2.2%
Figs	48	2.7%	61	2.4%
Pears	22	1.3%	38	1.5%
Apples	62	3.5%	67	2.6%
Sugary Apples	36	2.1%	56	2.2%
Olives	38	2.2%	45	1.7%
Grapes	46	2.6%	68	2.6%
Plums	31	1.8%	51	2%
Sour Green Plums	26	1.5%	42	1.6%
Pomegranates	40	2.3%	47	1.8%
Quince Fruits	12	0.7%	16	0.6%
Persimmon	18	1.0%	29	1.1%
Watermelon	16	0.9%	20	0.8%
Muskmelon	15	0.9%	19	0.7%
Potatoes	53	3.0%	89	3.4%
Stringless Beans	63	3.6%	91	3.5%
Onions	64	3.6%	66	2.6%
Garlic	54	3.1%	61	2.4%
Odessa Summer Squash or Cousa	43	2.4%	45	1.4%
Armenian Cucumber	65	3.7%	61	2.4%
Cucumbers	65	3.7%	66	2.6%
Tomatoes	89	5.1%	82	3.2%
Eggplants	43	2.4%	45	1.7%
Pepper	32	1.8%	33	1.3%

Cauliflower	11	0.6%	15	0.6%
Cabbage	16	0.9%	26	1%
Parsley	47	2.7%	52	2%
Lettuce	37	2.1%	49	1.9%
Radishes	39	2.2%	45	1.7%
Okra	23	1.3%	26	1%
Mulukhiyah_or_Mloukhieh	21	1.2%	25	1%
Spinach	15	0.9%	25	1%
Broccoli	10	0.6%	11	0.4%
Pumpkins	27	1.5%	36	1.4%
Carrots	14	0.8%	22	0.9%
Wheat	14	0.8%	93	3.6%
I_Do_Not_Plant	13	0.7%	15	0.6%
Beehives	21	1.2%	21	0.8%
Sheep	15	0.9%	61	2.4%
Goats	15	0.9%	55	2.1%
Cows	6	0.3%	20	0.8%
Poultry	13	0.7%	44	1.7%
I_Do_Not_Raise	60	3.4%	46	1.8%
Barley	12	0.7%	87	3.4%
Chickpeas	20	1.1%	75	2.9%
Lentils	5	0.3%	64	2.5%
Bitter_vetch_or_Kersannah	6	0.3%	42	1.6%
Fava_Beans	4	0.2%	33	1.3%
Corn	9	0.5%	44	1.7%

## APPENDIX 12

### CROPS GROWN BY PERMANENT RESIDENTS IN NAHLE VILLAGE FOR HOUSEHOLD CONSUMPTION BACK IN 1960 VERSUS CURRENTLY (SEPTEMBER 2019-JUNE 2021 PERIOD) FREQUENCIES AND PERCENTAGES

	Sixties		Currently	
	N	Percent	N	Percent
Apricots_for_HH_Consumption	98	4.1%	93	5.8%
Cherries_for_HH_Consumption	92	3.9%	85	5.3%
Almonds_for_HH_Consumption	54	2.3%	35	2.2%
Pears_for_HH_Consumption	36	1.5%	23	1.4%
Apples_for_HH_Consumption	65	2.7%	61	3.8%
Sugary_Apples_for_HH_Consumption	52	2.2%	37	2.3%
Figs_for_HH_Consumption	58	2.4%	47	2.9%
Olives_for_HH_Consumption	45	1.9%	37	2.3%
Walnuts_for_HH_Consumption	83	3.5%	72	4.5%
Grapes_for_HH_Consumption	62	2.6%	44	2.7%
Plums_for_HH_Consumption	46	1.9%	32	2%
Pomegranates_for_HH_Consumption	45	1.9%	38	2.4%
Quince_Fruits_for_HH_Consumption	13	0.5%	13	0.8%
Persimmon_for_HH_Consumption	27	1.1%	19	1.2%
Watermelon_for_HH_Consumption	17	0.7%	15	0.9%
Muskmelon_for_HH_Consumption	16	0.7%	14	0.9%
Potatoes_for_HH_Consumption	88	3.7%	51	3.2%
Garlic_for_HH_Consumption	62	2.6%	56	3.5%
Stringless_Beans_for_HH_Consumption	88	3.7%	61	3.8%
Onions_for_HH_Consumption	64	2.7%	63	3.9%
Sour_Green_Plums_for_HH_Consumption	38	1.6%	25	1.6%
Armenian_Cucumber_for_HH_Consumption	60	2.5%	62	3.9%
Odessa_Summer_Squash_or_Cousa_for_HH_Consumption	46	1.9%	42	2.6%
Tomatoes_for_HH_Consumption	80	3.4%	85	5.3%
Cucumbers_for_HH_Consumption	63	2.7%	60	3.7%
Pepper_for_HH_Consumption	32	1.3%	30	1.9%

Eggplants_for_HH_Consumption	43	1.8%	40	2.5%
Cabbage_for_HH_Consumption	23	1.0%	16	1%
Cauliflower_for_HH_Consumption	14	0.6%	11	0.7%
Lettuce_for_HH_Consumption	49	2.1%	34	2.1%
Parsley_for_HH_Consumption	51	2.1%	45	2.8%
Okra_for_HH_Consumption	24	1.0%	19	1.2%
Mulukhiyah_or_Mloukchieh_for_HH_Consumption	23	1.0%	19	1.2%
Spinach_for_HH_Consumption	24	1.0%	14	0.9%
Radishes_for_HH_Consumption	44	1.9%	39	2.4%
Pumpkins_for_HH_Consumption	35	1.5%	27	1.7%
Broccoli_for_HH_Consumption	11	0.5%	9	0.6%
Wheat_for_HH_Consumption	87	3.7%	11	0.7%
Carrots_for_HH_Consumption	21	0.9%	13	0.8%
Chickpeas_for_HH_Consumption	68	2.9%	19	1.2%
Lentils_for_HH_Consumption	57	2.4%	7	0.4%
Bitter_vetch_or_Kersannah_for_HH_Consumption	35	1.5%	4	0.2%
Fava_Beans_for_HH_Consumption	28	1.2%	3	0.2%
Corn_for_HH_Consumption	39	1.6%	8	0.5%
Barley_for_HH_Consumption	78	3.3%	9	0.6%
Cows_or_dairy_products_for_HH_Consumption	15	0.6%	3	0.2%
Sheep_or_dairy_products_for_HH_Consumption	53	2.2%	9	0.6%
Goats_or_dairy_products_for_HH_Consumption	50	2.1%	10	0.6%
Beehives_Honey_for_HH_Consumption	20	0.8%	17	1.1%
Poultry_Eggs_or_Chicken_for_HH_Consumption	39	1.6%	10	0.6%
0_Crops_for_HH_Consumption	14	0.6%	10	0.6%



## APPENDIX 13

### CROPS GROWN BY PERMANENT RESIDENTS IN NAHLE VILLAGE FOR SALE BACK IN 1960 VERSUS CURRENTLY (SEPTEMBER 2019-JUNE 2021 PERIOD) FREQUENCIES AND PERCENTAGES

	Sixties		Currently	
	N	Percent	N	Percent
Apricots_for_Sale	86	4.5%	62	7.3%
Cherries_for_Sale	78	4.1%	64	7.5%
Walnuts_for_Sale	69	3.6%	49	5.8%
Almonds_for_Sale	41	2.2%	22	2.6%
Figs_for_Sale	45	2.4%	25	2.9%
Pears_for_Sale	32	1.7%	6	0.7%
Apples_for_Sale	57	3.0%	37	4.3%
Sugary Apples_for_Sale	46	2.4%	25	2.9%
Olives_for_Sale	34	1.8%	18	2.1%
Grapes_for_Sale	47	2.5%	24	2.8%
Plums_for_Sale	35	1.8%	15	1.8%
Sour_Green_Plums_for_Sale	31	1.6%	12	1.4%
Pomegranates_for_Sale	38	2.0%	21	2.5%
Quince_Fruits_for_Sale	13	0.7%	5	0.6%
Persimmon_for_Sale	24	1.3%	9	1.1%
Watermelon_for_Sale	14	0.7%	5	0.6%
Muskmelon_for_Sale	13	0.7%	4	0.5%
Potatoes_for_Sale	66	3.5%	27	3.2%
Stringless_Beans_for_Sale	68	3.6%	33	3.9%
Garlic_for_Sale	45	2.4%	26	3.1%
Onions_for_Sale	48	2.5%	24	2.8%
Odessa_Summer_Squash_or_Cousa_for_Sale	30	1.6%	17	2%
Armenian_Cucumber_for_Sale	43	2.3%	26	3.1%
Cucumbers_for_Sale	45	2.4%	30	3.5%
Tomatoes_for_Sale	51	2.7%	36	4.2%
Eggplants_for_Sale	32	1.7%	13	1.5%
Pepper_for_Sale	24	1.3%	13	1.5%
Cauliflower_for_Sale	11	0.6%	4	0.5%
Cabbage_for_Sale	19	1.0%	6	0.7%

Parsley_for_Sale	30	1.6%	18	2.1%
Lettuce_for_Sale	29	1.5%	15	1.8%
Radishes_for_Sale	27	1.4%	12	1.4%
Okra_for_Sale	20	1.1%	8	0.9%
Mulukhiyah_or_Mloukhieh_for_Sale	22	1.2%	8	0.9%
Spinach_for_Sale	18	1.0%	6	0.7%
Broccoli_for_Sale	9	0.5%	3	0.4%
Pumpkins_for_Sale	23	1.2%	9	1.1%
Carrots_for_Sale	18	1.0%	5	0.6%
Wheat_for_Sale	76	4.0%	9	1.1%
Barley_for_Sale	65	3.4%	8	0.9%
Chickpeas_for_Sale	53	2.8%	7	0.8%
Lentils_for_Sale	50	2.6%	2	0.2%
Bitter_vetch_or_Kersannah_for_Sale	32	1.7%	2	0.2%
Fava_Beans_for_Sale	30	1.6%	1	0.1%
Corn_for_Sale	33	1.7%	3	0.4%
Sheep_or_dairy_products_for_Sale	44	2.3%	6	0.7%
Cows_or_dairy_products_for_Sale	13	0.7%	2	0.2%
Goats_or_dairy_products_for_Sale	42	2.2%	5	0.6%
Beehives_Honey_for_Sale	17	0.9%	9	1.1%
Poultry_Eggs_or_Chicken_for_Sale	31	1.6%	5	0.6%
0_Crops_for_Sale	27	1.4%	51	6%

## APPENDIX 14

### NAHLE PERMANENT RESIDENTS' 1960 VERSUS CURRENT (SEPTEMBER 2019-JUNE 2021 PERIOD) MOTIVATIONS FOR FARMING/ HAVING A GARDEN FREQUENCIES, PERCENTAGES AND RANKS

	Sixties			Currently		
	N	Percent	Rank	N	Percent	Rank
Entertainment / Psychological Comfort	44	7.8%	7	43	7.9%	7
Love of Land	85	15.1%	2	83	15.2%	2
Inherited	75	13.3%	4	71	13%	3
Income Generation	89	15.8%	1	62	11.4%	5
Reduce Food Expenditures	73	12.9%	5	63	11.5%	4
To help the environment	11	2%	10	20	3.7%	9
For Trial	9	1.6%	11	18	3.3%	10
Improve Economic Situation	60	10.6%	6	54	9.9%	6
Food Supply Storage	79	14%	3	84	15.4%	1
Eat Healthy Food	24	4.3%	8	42	7.7%	8
Not to Reduce Expenditures (Agriculture Costs More)	1	0.2%	12	3	0.5%	11
No Land / No Home Garden	14	2.5%	9	3	0.5%	11

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