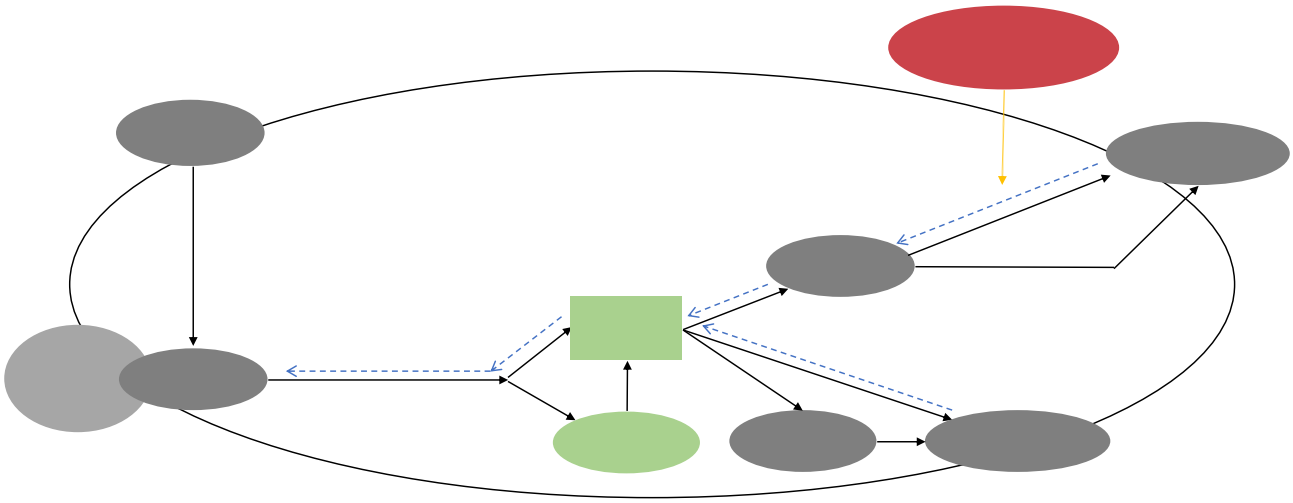
The Post-Conflict Agricultural Supply Chain: Establishing a Preliminary Framework for Barriers and Enablers Based on a Case Study in Lebanon

A dissertation submitted to The University of Manchester for the degree of Master of Science in the Faculty of Humanities



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List of Acronyms

Acronym	Meaning	Page
SCM	Supply Chain Management	2, 3, 24
ASC	Agribusiness Supply Chain	2, 3, 4, 6, 7, 10, 11, 12, 16, 17, 19, 22, 34, 41, 45, 47

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Abstract

Purpose: The objective of this dissertation is to establish a preliminary framework for barriers and enablers affecting the post-conflict agricultural supply chain. This involves first creating a theoretical framework based on a synthesis of academic literature, and then comparing it to a second framework created from an analysis of interview data sourced in Lebanon. The synthesis of these two models creates a preliminary framework for barriers and enablers in the post-conflict agricultural supply chain supported by the academic literature and grounded in empirical evidence from the Lebanon case study. It is intended that this framework may prove foundational to a transferable model which may be employed to inform humanitarian actors seeking to improve functionality in local food systems after conflict.

Methodology: This dissertation utilises a case study methodology. A blended data collection method is specifically designed for this study, utilising semi-structured interviews with Lebanese agricultural experts, observations and secondary data sources. This procedure attempts to overcome methodological concerns associated with utilising qualitative data in a study describing a fragmented supply chain in a fragile political context. It is hoped that this dissertation may be of some methodological value, since the encountered barriers and shortcomings of a supply chain study conducted in a post-conflict context are fully documented herein.

Results: Barriers and enablers to functionality were identified through analysis of qualitative data and a detailed framework in the form of a supply chain map is constructed. This framework is compared to the extant literature and is seen to provide a level of detail and structure beyond what is currently available in the academic studies. Likewise, it is seen that the barriers and enablers identified in the framework bear substantial similarities to those previously identified in the academic literature, implying a level of transferability of the framework, although this requires future verification.

Keywords: *Agriculture, Post-Conflict, Supply Chain, Supply Chain Management*

Declaration

This dissertation is the student's original work unless referenced clearly to the contrary. No portion of the work referred to in the dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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The Author

The author of this dissertation is a Masters student of Operations, Project and Supply Chain Management at the Alliance Manchester Business School. As such, this paper is heavily influenced by the Supply Chain Management literature, and takes the novel perspective of translating economic, political and social issues into issues presentable through the lens of supply chain management.

1. Introduction

This dissertation is a study of the barriers and enablers to functionality in a post-conflict agricultural supply chain, conducted with the intention of developing a preliminary descriptive framework which may inform future projects. This introductory chapter will explain the purpose of this research and its general structure.

Firstly, context will be given to the paper, some key concepts will be explained, and the body of literature supporting this research will be introduced. Then, we will discuss the value of an exploratory study in a post-conflict agricultural supply chain before finally defining the research objectives and presenting the structure of the paper.

1.1 Research Context: The Supply Chain Lens

Mentzer et al. (2001) develop a description of supply chain management as: "*the systemic, strategic coordination of the traditional business functions […] across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole*." This strategic coordination is achieved by a series of tools which enable the effective flow of goods through the supply chain by mitigating risks and overcoming barriers. The many contributions to the field include:

- **Buyer-Supplier Collaboration:** Methods that involve improving relationships between buyers and suppliers, improving collaboration across all actors in the supply chain and improving supplier capacity (Cousins et al., 2008).
- **Managing Stakeholders:** Methods for identifying and managing parties with legitimate, urgent or powerful claims in a transaction, including the creation of strategic business goals to cater to stakeholder needs (Mitchell et al., 1997).
- **International Operations:** The management of the issues inherent to operations that cross political and cultural borders, and overcoming the associated barriers to functionality (Pagell, 2005).
- **Risk Management:** Making strategic choices to mitigate risk by aligning management choices with risks and uncertainties arising from geographic, political or economic factors (Lee, H.L., 2002; Tang, C.S., 2006).

It is easy to see how such a selection of tools and techniques can be applied to a vast range of economic sectors. Unsurprisingly then, there exists a body of literature utilising the tools of SCM to create improvements and overcome barriers in the commercial agricultural sector, including:

- Improving efficiency in the agricultural supply chain (Aramyan et al, 2007),
- Reducing waste (Parfitt et al, 2010),
- Improving traceability of goods (Bosona and Gebresenbet, 2013),
- Aiding rural development and capturing new value (Marsden et al., 2000).

Equally, although less common, the field of humanitarian operations has benefited from the supply chain literature, with SCM principles being applied to humanitarian aid and crisis response (Pettit and Beresford, 2009), relationship management in humanitarian logistics (McLachlin and Larson, 2011) and uncertainty mitigation in humanitarian operations (Cozzolino, 2012).

While SCM is a mature field in the commercial world, the academic literature applying the SCM lens to humanitarian situations is still growing (Pettit and Beresford, 2009). Due to the slow speed with which the business literature trickles into other disciplines, there are many situations yet to be considered by the supply chain academics, including the exploratory research put forth in this paper.

This paper seeks to explore a situation as-yet not inspected by the supply chain lens: the agricultural sector in an unstable political context during a period of redevelopment after conflict. It is hoped that a detailed description of this situation could act as an informant to humanitarian donors, providing a documented insight into a specific example of a post-conflict redeveloping ASC as well as a framework which models this situation, possibly helping the donor holistically understand the needs of the entire supply chain as a necessary precursor to successful humanitarian intervention (Giordano, 2011).

1.2 Problem Statement

1. A detailed structural understanding of the supply chain, the needs of its actors, and barriers in its functionality is necessary for successful humanitarian intervention for a developing agricultural supply chain (Giordano, 2011).
2. SCM can be used as a framework when understanding the developing agricultural supply chain.[1]
3. Rebuilding food systems after conflict is key to reducing poverty and empowering the community to be self sufficient and reduce reliance on international donors. Rebuilding the private agricultural sector is equally important for this empowerment (Longley et al., 2006).

Based on premise (1) and (2), humanitarian organisations may benefit from an exploratory study of a post-conflict agricultural supply chain, and premise (3) provides an explanation as to why the agricultural sector is of specific importance. Premise (3) also provides a moral imperative to conduct such a study.

Therefore, having explained the possible benefits to the field of humanitarian operations, this paper will undertake an exploration of Lebanon's agricultural sector with the intention of generating a framework of the post-conflict agricultural supply chain by way of mapping the barriers and enablers to functionality onto a supply chain diagram in the hopes of providing practical value to future humanitarian reconstruction operations as well as to future academic work.

1.3 Research Questions

Empirical data collection will be used to answer the following three questions, proposed as the focal interest of this study:

Question 1: What post-conflict barriers affect the ASC?

Question 2: Which enablers can allow the agricultural sector to overcome these barriers or increase in functionality?

Question 3: Where in the supply chain are these barriers and enablers relevant?

[1] See Ming and Jingxu (2008) for an excellent example of a study of China's developing ASC

1.4 Research Objective

The ultimate objective of the research is to create a framework for the barriers and enablers afflicting a post-conflict ASC. This will be achieved by synthesising empirical answers to the research questions with a supply chain structure derived from the literature review. To this end, a series of sub-objectives have been derived to produce an informative, valuable and novel dissertation.

The first sub-objective is to confer a structure to the post-conflict ASC, which will act as a skeletal structure for the proceeding model. This will be done via a systematic literature review of studies carried out on developing agricultural supply chains and synthesising them to generate a generic map of the ASC.

The second sub-objective is to determine theoretical barriers and enablers from the literature. This will be done by completing a thorough review of academic studies documenting challenges to efficiency, flexibility, responsiveness, and food quality in developing ASCs. Combining these with the previously determined skeletal structure produces a preliminary model of barriers and enablers to the post-conflict ASC, utilising all available academic resources.

Since this study does not intend to simply synthesise existing literature, rather it seeks to produce a theoretical framework grounded in empirical evidence, the next sub-objective is to collect and analyse data. This will be done from a "blank slate" perspective. So, rather than testing our model, we will attempt to document barriers and enablers as they are perceived by actors in a post-conflict agricultural supply chain without imposing our preconceived ideas on the respondents. It is believed that this method will help overcome errors in the preordained theoretical model (Eisenhardt, 2016).

Finally, the literature will be revisited, in light of the empirical data. This will allow removal, augmentation or addition of barriers and enablers to the theoretical model, thus creating a framework of the post-conflict ASC firmly grounded in empirical evidence thereby achieving the research objective and answering the research questions.

1.5 Project Structure

It is hoped that a well structured research paper will provide clarity to the reader. The following structure has been selected in order to meet the research objectives and present the research findings in a clear, concise and structured manner (Fig 1).

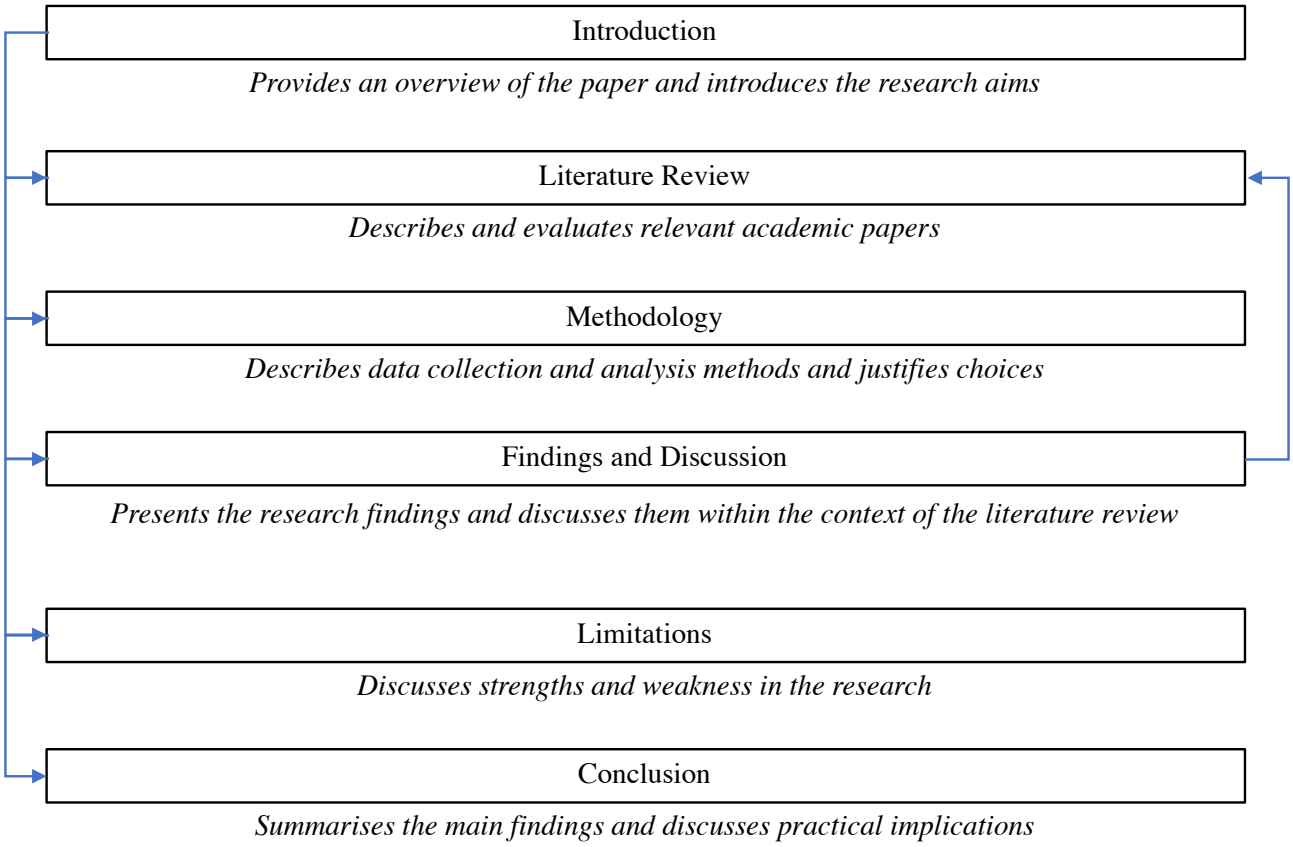


Fig 1: Project Structure

2. Literature Review

The aim of this literature review is to determine constructs to be used in the theoretical framework. Therefore, we will begin by defining the convention used when generating the foundational supply chain map of the developing ASC. We will continue with an inspection of previous studies done on the agricultural supply chain structure in a developing economy, which will involve comparing ASC maps from the literature, noting the differences and synthesising their studies, and ultimately creating a supply chain diagram that will be used as a road-map for the preceding discussion.

The literature will then be searched to identify barriers and enablers in the functionality of the developing agricultural sector, including those due to developmental, financial, and military factors. Since a holistic study of the barriers and enablers in a redeveloping post-conflict ASC has never been conducted before, this section will create a synthesis of studies by inspecting common theories and practices that describe developmental challenges of each supply chain actor in turn. These studies will be evaluated in reference to each other, noting discrepancies and disagreements between authors.

Finally, a detailed description of the post-conflict situation in Lebanon will be given. This will be used to justify using Lebanon as the focal case in our study, since it will be shown to be a typical post-conflict zone in need of economic and political reestablishment, thus implying a degree of transferability of the results of our research and the possibility of future generalisability of the developed framework.

To conclude the review, an attempt will be made to theorise beyond the existent literature by creating a theoretical framework grounded in the literature. This will be in the form of a rudimentary model of the Lebanese post-conflict ASC, noting the barriers and enablers where they are relevant. This model will then be used to inform the data collection and the discussion, which will then either accept, reject or augment the model.

2.1 Supply Chain Mapping Conventions

Creating a framework of the barriers and enablers to functionality in the agricultural supply chain requires a defined convention for creating a supply chain map. Establishing a supply chain diagram of the generic developing ASC, based on the academic research, will be the first step in achieving the paper's ultimate objective of generating a framework for the barriers and enablers to functionality, and therefore a convention for drawing a supply chain map is necessary.

The convention used in this dissertation is inspired by Gardner and Cooper (2003), who explain a focal cartographical concept of "generalisability". They explain that the supply chain map essentially organises all the relevant bits of information into a structured form for strategic purposes. To this end, an effective supply chain map may not look like the physical structure that it refers to, rather it offers a generalised impression of the structure, detailed with the use of predefined icons and symbols (Gardner and Cooper, 2003).

We will combine this concept with the literature reviewed below to generate the generic map of a developing agricultural supply chain, which will be foundational to the framework of post-conflict barriers and enablers. The map will be drawn according to the following convention (Fig 2.1), uniquely devised for this dissertation, based on the principles of Gardner and Cooper (2003).

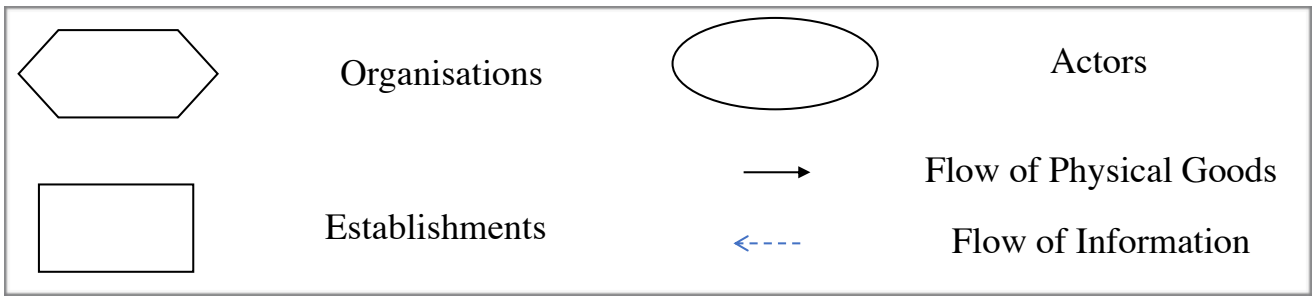


Fig 2.1: The Convention Used to Map the Supply Chain

2.2 The Agribusiness Supply Chain

"Where agriculture concerns itself with activities relating to farming, animal husbandry and fishing, Agribusiness includes the vast supply network encapsulating the entire industry. This reaches from the pre-farm inputs such as capital, machinery and fertiliser, through production, processing and distribution, to the final consumer."

- Chandrasekaran and Raghuram (2014)

A high-level view of the traditional ASC can be seen in Fig 2.2 (based on Ming and Jingxu, 2008).

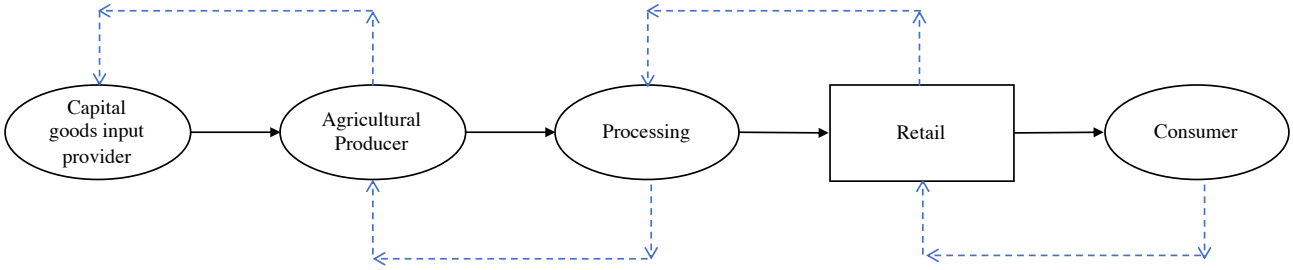


Fig 2.2: Low Resolution View of the ASC

Ming and Jingxu (2008) provide a dissection of China's developing ASC describing a chain of 5 nodes: (1) The Input Provider, who provides goods such as machinery, fertiliser, labour or capital. (2) The Agricultural Producer, such as the farmer or fisher. (3) The Processing section, which could involve cleaning, grading or any value adding activity. (4) The Retailer, who handles distribution to the customer. (5) The Consumer or final customer.

Since supply chain maps of the traditional ASC are rare in the literature, Ming and Jingxu (2018) do a good job describing the supply chain, focusing on the barebones relevant to their analysis of information sharing in China's agricultural sector. However, Chandrasekaran and Raghuram (2014) illuminate a number of shortcoming in Ming and Jingxu's model, such as its failure to recognise distinctions such as a separation between resource owners and producers that are often seen in agri-economies outside China.

With this in mind, a more detailed description of the *Agribusiness* supply network is given by Chandrasekaran and Raghuram's seminal work on the developing world's agricultural sector, which puts forward a complete inspection of India's developing Agribusiness industry (Chandrasekaran and Raghuram, 2014). Parts of their discussion will be considered too highly focussed for our study,

since their domain of interest does not extend beyond the Indian subcontinent. However, a summary of their descriptions of each supply chain actor is provided below, since they are generic and relevant to our study.

1. Inputs providers: The actors who provide the necessary inputs for agricultural production such as fertilisers, seeds and pesticides, and investments such as irrigation systems, power systems, machinery, and labour (Chandrasekaran and Raghuram, 2014).

2. Production: Production involves the combined interaction of 2 actors: The resources owners and the producers. In agrarian economies, the resource owners often lease their resources to third parties for production, for example the land owner will allow farmers to grow crops on his land for a percentage compensation. The success of production relies on a combination of factors including access to quality input providers, the working relationship between producers and resource owners, and environmental risk factors (World Bank, 2007; Chandrasekaran and Raghuram, 2014).

3. The Market for Direct Consumption: The output of the production stage can take one of two directions. One route is available for products such as eggs, fruit and vegetables, which move directly to the market for direct consumption. In developing economies the farmer will often sell this produce in what may be called “unofficial markets”. After having taken a small share for his own consumption, he will sell his crop through the unregulated market directly to the consumer. This is often achieved at roadside markets or bazars, where pricing mechanisms are governed by fair market forces, and the farmer will usually receive the full unit price for their produce, without taxation (Chandrasekaran and Raghuram, 2014).

The second route available to the farmer for the direct to consumer market is through the use of traders, who act as intermediaries between the farmer and the end customer. Traders often arrange bulk transportation of fresh produce between farm clusters and institutional buyers. In this case, the farmer is not guaranteed to see a fair price for his produce, since a large percentage of the profit can be absorbed by the intermediary. However, in the case of the developing agricultural sector, the producers are often short-term focussed, looking to profit quickly from their output, and so they opt to use traders for regularity and simplicity, sacrificing substantial profit margins (Chandrasekaran and Raghuram, 2014).

4. Processing: Produce that cannot be consumed through the direct-to-consumer market will be sent for processing. This stage is of paramount importance in the agribusiness supply network since the processing sector is often the largest sub-sector of the agribusiness and the sector which requires the most infrastructure (Chandrasekaran and Raghuram, 2014).

5. The Open Market: Processed food is then brought to the open market where it is bought by traders, distributers or exporters who may brand and package the produce or sell it directly (Chandrasekaran and Raghuram, 2014).

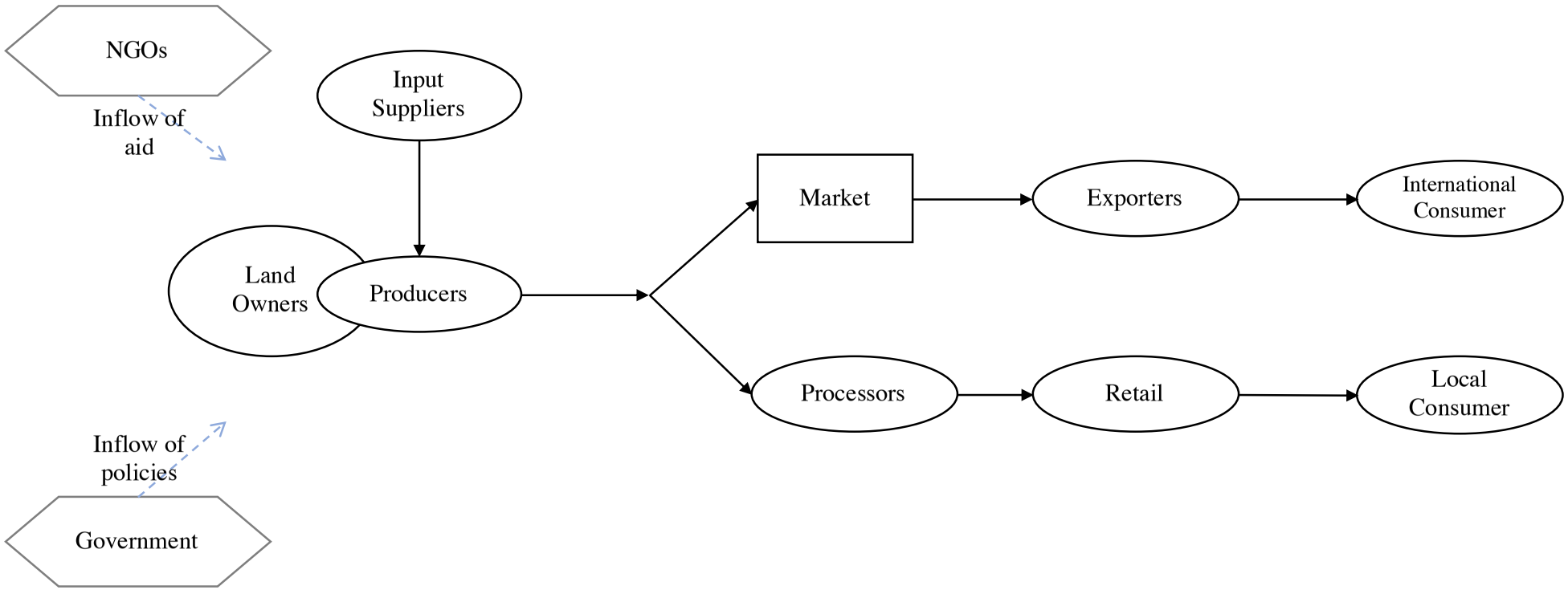
6. Retailers: Retailers provide the interface for the consumer to access the agricultural product. Traditionally, in the developing economy, there is a high prevalence of "Mom and Pop" type retail outlets, however there is an increasing global prevalence of large organised retail outlets such as supermarket chains in developing regions (Reardon and Gulati, 2008). Organised retail is seen to benefit supply chain efficiency, however they can often act in conflict with Mom-and-pop retail outlets (Chandrasekaran and Raghuram, 2014).

7. Consumers: Consumers provide the final destination of the agro-products and the ultimate source of financial input to the agribusiness supply network (Chandrasekaran and Raghuram, 2014).

8. Additional actors: Certain agribusiness supply chains have additional actors such as NGOs, the Government or enablers such as transporters, shippers, storage facilities and official or unofficial finance providers. The ability of producers, processors and retailers to operate can be limited, and so there often exists a combination of interveners to facilitate flow through the supply chain (Chandrasekaran and Raghuram, 2014).

A summary diagram has been created (Fig 2.3), based on a synthesis of the academic literature. We will use this map as a guide for in the next section, where we will identify barriers and enablers of goods flowing through the supply chain as mapped below.

Fig 2.3: A Map of the ASC (Based on Chandrasekaran and Raghuram, 2014)



2.3 Barriers and Restrictions in the Functionality of the Agribusiness Supply Chain

In this section we search the literature for barriers and enablers to functionality in the agricultural supply chain. Functionality is defined in this context according to performance in four categories: efficiency, flexibility, responsiveness, and food quality (Aramyan et al., 2007). Barriers are those factors which reduce capacity in any of these four categories across the supply chain, while enablers are factors which over come barriers or provide holistic improvements.

While literature is available that discusses the developmental challenges of individual ASC actors after a conflict, there is no literature studying how these challenges affect the flow of goods through the supply chain holistically. This section therefore searches the literature, focussing on models and theories which describe the challenges of each actor in turn, to reveal barriers and restrictions at each point in the supply chain.

It is important to note that this section relies on a conceptual theory which relates regional socio-economic conditions to agricultural redevelopment. This meta-framework is necessary since it justifies using literature which discusses theories and practices in the general development of agriculture which is not necessarily specific to post-conflict redevelopment. The discussion therefore continues under the pretence that in regions with *relative political consolidation and security*, longterm development strategies which utilise secure development practices are possible (Krause and Jütersonke, 2005; Goodfellow and Smith, 2013). This allows us to draw comparisons between Lebanon, specifically as a post-conflict redeveloping economy, and other studies done in the developing world which do not feature the post-conflict context at the epicentre of their discussion.

2.3.1 Barriers and Enablers of Input Supply

For a successful agribusiness supply, it is essential that the farmer has access to affordable, high quality inputs such as seeds and fertiliser (Rosegrant et al., 2001). To this end, the link between input supplier and producer is of the upmost importance for the post-conflict developing ASC. Belt et al. (2015) propose that this link can be modelled using market mechanics. They argue that farmers should be considered as *active market participants*, with access to capital, needs and interests, and the ability to accept or decline offers for trade. Furthermore, if the farmer has a demand for inputs, this represents an economic opportunity exploitable by the input suppliers. The limiting factor is the ability for the farmer to access the necessary inputs. Interestingly, Belt et al. (2015) apply this model to describe the input supply of the most disadvantaged developing agri-

economies in sub-Saharan Africa. They argue that by enabling the farmer to access traders of fertilisers, seeds and necessary inputs, as well as allowing the farmer to access necessary finance, the input supply link can be sustainably developed. However, a paper from Giordano (2011) reveals that an aspect of the input supply is being excluded by Belt et al's (2015) market based model in the post-conflict development situation: An understanding of regional politics.

Giordano (2011) explains, by means of appeal to humanitarian donors acting as input suppliers in post-conflict zones, that the barriers of input supply are twofold. First, the donor must understand the input requirements of the supply chain. Second, the donor must understand the root cause of fragility in the region. This understanding is critical in differentiating between humanitarian aid programs and humanitarian reconstruction operations aiming to rebuild regional capacity. Once an understanding is gained of the conflicting interests in the region and the political processes which led to the initial instability, then the input supply can discern where and which inputs are required. The process of building a sustainable input supply therefore requires a substantial amount of restoration of civil order. Idris (2016) explains how this can be possible with their study regarding humanitarian donors seeking to improve cohesion and mitigate the regional devision caused by conflicts. They provide evidence in favour of involving community leaders in governance decisions and establishing legal entitlements for marginalised groups to guide social cohesion in a post conflict setting, thus enabling regional stability.

Therefore, the debate between Belt et al. (2015) and Giordano (2011) is a debate of whether the standard forces of market mechanics are sufficient to describe barriers and enablers for input supply in a developing context. Giordano (2011) will reject this as being overly abstract, stating that political context and the root cause of conflict must be considered. Therefore, this debate casts doubt on which set of barriers and enablers are present for input supply in the developing ASC. The potential options are summarised in Table 2.1:

Barriers	Enablers
Barriers due to market forces, such as lack of supply or lack of capital (Belt et al., 2015)	Enablers from market forces, such as capital lending schemes (Belt et al., 2015)
Barriers due to regional division, producing problems such as unwillingness of participants to cooperate (Giordano, 2011).	Social Cohesion Programs run by governing organisation or NGOs to overcome regional instability (Idris, 2016).

Table 2.1: Barriers and Enablers to Input Supply

2.3.2 Barriers for the Producer

Bosona and Gerbresenbet (2013), identify a series of logistics barriers faced by small scale agricultural producers in developing economies, based on work done by Gerbresenbet (2001) in Nairobi. Primarily, this work identifies the major inhibitor for the small scale agri-producer moving from a subsidence operation to a small-scale commercial operation as a two-pronged issue: (1) Poor physical connection between the producer and the consumer, at the level of infrastructure, and (2) Poor information connection, meaning that the farmer does not receive information on demand or market trading prices for his goods.

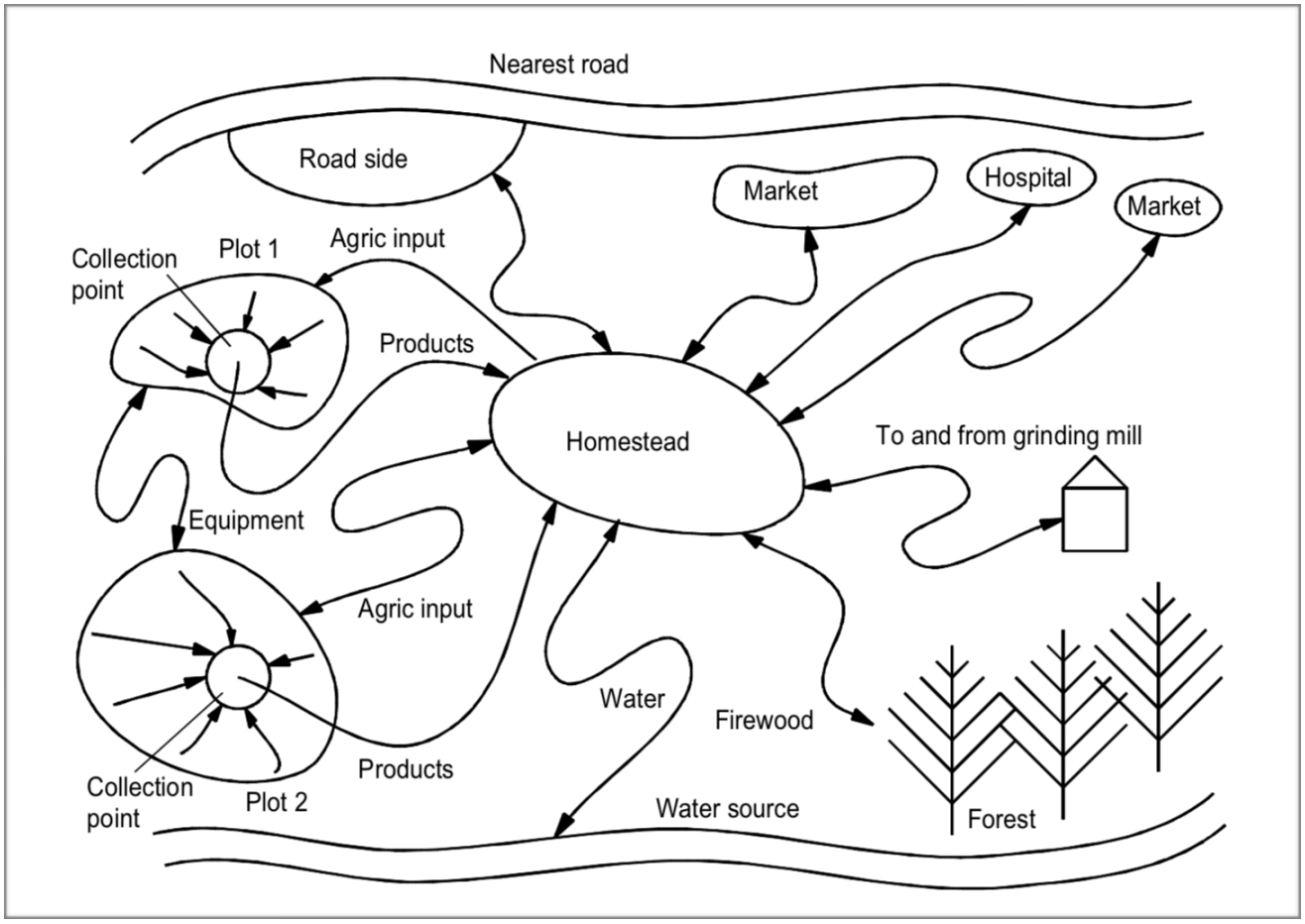


Fig 2.4: The Transport Needs of the Average Small-Scale Agricultural Producer (Gebresenbet, 2001)

At the level of physical transport, Gebresenbet (2001) maps the transportation needs of the average small-scale agricultural producer (Fig 2.4). The producer's capacity to meet their on-site transportation needs, for example moving harvested crops or distributing fertiliser and seeds, can be met with basic technology enablers such as tractors or working animals. The off-site transportation needs of the producer, such as transportation of goods to market or from a water source, requires a more systematic development of transport infrastructure and specialised transportation vehicles.

Gebresenbet (2001) proposes that due to the lack of development of key infrastructure and transport capacity upgrades, farmers are forced to transport their own goods to the next node in the supply network using either human or animal power. The constraints of this method include long transport time and drudgery on behalf of the farmers, resulting in limited transport capacity and a higher rate of spoilage, reducing the farmers commercial viability. A shortcoming with this argument is that it may be out of date. It has been argued that a lack of access to technology for the developing world is less of a barrier these days for developing countries, thanks to open access programs, resource sharing programs and the prevalence of foreign donors (Arunachalam, 2004; Miah and Omar, 2012). Rather, it is a lack of access to knowledge and education which prohibits developing nations from being able to utilise the technology available to them (UNESC, 2009).

The following exploratory study will reveal which barriers exist for agricultural producers in a post-conflict situation from the discussion summarised below:

(1) A poor physical connection between the producer and the consumer, at the level of infrastructure (Bosona and Gerbresenbet, 2013).
(2) A poor information connection, meaning that the farmer does not receive information on demand or market trading prices for his goods (Bosona and Gerbresenbet, 2013).
(3) Lack of transport technology (Gebresenbet, 2001).
(4) Lack of knowledge and education (UNESC, 2009).

2.3.3 Barriers and Enablers of a Functional Market

Giordano (2011) argues that humanitarian donors must understand their role in the post-conflict reestablishment of an economy's private sector by pointing to Longley et al. (2006) to explain that the necessary reestablishment of the agricultural economy is achieved *"through the (re)establishment of both public support and a dynamic but regulated private sector that provides appropriate and high-quality agricultural inputs and services."* Giordano (2011) further argues that this pivotal responsibility to rebuild the private agricultural sector may be overlooked by the humanitarian donor. To this end, reestablishment of a functional domestic and export market is key for redevelopment projects.

Barriers and enablers for developing the export market can be on the supply side or the demand side. Moïsé et al. (2013) details the supply side constraints of developing agricultural economies with the support of a case study in post-conflict Mozambique, concluding that a country's logistics

network and irrigation systems are the key enablers for agricultural export. High quality transport and infrastructure which conserve the quality of the produce was confirmed by the report to be the largest barrier for Mozambique to develop their agricultural exports. Harsch (2009) adds to this by documenting enablers in post-war Liberia, recommending that reduction of national debt, particularly through debt relief programs, is pivotal to allow effective transport and infrastructure reconstruction in a post-conflict scenario.

Moïsé et al. (2013), also touch on demand side barriers for a developing export market, although they do not fully develop this discussion. They propose that conformity of products to international standards represents a significant barrier for emerging agricultural exporters as well as international tariffs posing a significant threat for developing market. It has even been argued by agricultural exporters that stringent quality measures on agricultural products are an *intentional* barrier for developing nations who are unable to meet the quality standard, and are therefore a source of discrimination, providing a purpose-built barrier of entry and protecting the agri-export markets of developed nations (Jaffee and Henson, 2005).

This position is strongly challenged by Jaffee and Henson (2005), who provide a counter to Moïsé et al. (2013) by presenting their research findings on the challenges posed by quality standards on developing agricultural suppliers. They explain that food safety standards can impede a country's propensity for international export due to the stringent standard and high cost of compliance. However, they propose that these international standards can actually provide a significant enabler, stating that in certain circumstances these standards can be a source of competitive advantage and will enhance export performance in developing countries by obliging upgrades throughout the supply chain. The case study hopes to shed light on this debate, as an exploration will be made into the Lebanese agricultural export market to discover whether quality standards offer an insurmountable barrier for entry into the international markets.

Barriers	Enablers
Poor transport and logistics infrastructure resulting in the inability to match supply with demand Moïsé et al. (2013)	Debt reduction and international aid grants to allow reconstruction operations to take place (Harsch, 2009).
International Quality Standards may be an insurmountable barrier. Moïsé et al. (2013)	International Quality Standards may offer a competitive edge for those who can conform. Jaffee and Henson (2005)

Table 2.2: Barriers and Enablers of a Functional Market

2.3.4 Barriers for Retail

It is argued by multiple sources that a "supermarket revolution" has transpired in the developing world (Child et al., 2015; Reardon and Gulati, 2008; Altenburg et al., 2016; Tandon et al., 2011). Child et al. (2015) describe this revolution as the fast modernisation of food-product retail in the developing world.

Reardon and Gulati (2008) explain that the supermarket revolution poses a double-edged sword for the agrifood systems of developing countries. On the one hand, they can lower food prices for consumers, explaining their research showed a 15% and a 33% price reduction for rice and vegetables respectively in Dehli, India. They argue that this causes a decline in traditional retailers, especially in those that are unable to modernise to compete. Furthermore, Reardon and Gulati (2008) argue that supermarkets preference large and medium suppliers, and therefore pose a challenge to smaller farmers and processors. However, the authors also show that when farmers are involved in the supermarket-retail supply chain, they can earn as much as 39% more, drawing on research done in Indonesia. However, this profit increase is mostly reserved for those farmers with access to cold-chain facilities and equipment, who are the most likely to be selected as supermarket suppliers.

This pessimistic view of the supermarket revolution on local and small-scale agrisystems is not shared by all academics. Henson et al. (2007) argue that a key enabling condition for the success of modern retail in the developing world is their integration into the local supply chain. This often requires them to aid in the development of local infrastructure including capacity improvement for suppliers and infrastructure improvements such as road and cold chain storage facilities. To this end, Henson et al. (2007) further argue that the modernisation of retail is positive for the entire ASC.

Child et al. (2015) have a different outlook entirely, arguing against the assumption that giant retailers are able enter emerging markets, stating that the supermarket retail format that works well in the developed world cannot successfully be deployed in the developing world. They argue that this is because it relies heavily on the consumer's ability to to travel, to have free time, and to have home storage capacity for a large amount of agri-products. They conclude that the developing consumer does not often possess these characteristics.

In our exploratory study we will attempt to uncover which major channels of retail are available for the Lebanese consumer and reveal if the 'retail revolution' was a success in Lebanon. We will then try to qualify whether or not modern retail has enabled increased functionality in the supply chain.

Barriers	Enablers
The consumers inability to travel freely and store large amounts of food products at home means that retail modernisation is not possible. (Child et al., 2015)	Modernisation of Retail improves infrastructure and supplier capacity and therefore enables increased functionality in the Supply Chain. (Henson et al., 2007)

Table 2.3: Barriers and Enablers for Retail

2.3.5 The Agricultural Sector in Post-Conflict Lebanon

This section will discuss the cost of conflict on agriculture and explicitly justify using Lebanon as a focal case for our study. In terms of post-conflict redevelopment of the ASC, Lebanon provides a typical case. Historically, they have witnessed stable and successful growth: Since gaining independence from France in 1943, Lebanese agriculture was developing alongside the post-war development occurring in Europe and was a model of development in the middle east. However, 15 years of external and internal conflicts beginning in 1975 led to large scale destruction of infrastructure and the socioeconomic framework. Since a 1989 peace agreement, an increased optimism has led to an inflow of capital and a period of redevelopment in the Lebanese economy and agricultural sector. Today, in the most resource-rich regions of Lebanon, agriculture is thought to account for 80% of local GDP (Darwish et al., 2009).

Despite this relative stability and growth in recent years, there have been two major conflicts which have damaged the Lebanese economy and agricultural sector:

1. The 2006 Israeli-Lebanese conflict (Darwish et al., 2009).
2. The war in Syria and associated refugee crisis (Hamade, 2016).

These two conflicts provide the context of the study, along with the historical backing of the now resolved 15 years of war. To express the impact of these hostilities on agriculture, we will first examine the 2006 Israeli-Lebanese conflict. Darwish et al. (2009) exposes the difficulty in measuring the true effect of conflict on agriculture, firstly by explaining that physical damages as assessed by the Lebanese government at USD 1.144 billion (as shown in the following table) are an insufficient measure of the true cost of war to the sector (Darwish et al., 2009):

Sector	Total Damages (USD)
Transport (airports and roads)	484 million
Electricity (production and transmission)	244 million
Telecommunications	116 million
Water (conveyance, pumps, wells)	80 million
Industry (factories and warehouses)	220 million

Table 2.4: Financial Cost of the 2006 Conflict in Lebanon
(Darwish et al., 2009)

Darwish et al. (2009) further explain that measurements of the full effect of conflict on the agri-economy depend on the methodology used to make the measurements. For example, the FAO (2006) assess in detail the affect of hostilities and associated damage on agricultural infrastructure, categorised by crops, fisheries and livestock, and Darwish et al. (2009) present a criticism of this study along with the UNHCR (2006), UNEP (2005) and CDR (2006) studies for not incorporating indirect costs and other economic parameters. Ultimately, Darwish et al. (2009) conclude that there is a significant difference between the financial losses due to the 2006 Isreali-Lebanese conflict and the total economic losses, arguing that once all factors have been considered then the true economic impact to the agricultural sector is at least 4 times greater than the financial value given by damage reports. Our study hopes to add to the work of Darwish et al. (2009) by showing developmental barriers due to war, which will add to the economic cost. Darwish et al.'s (2009) study illuminates a future line of research in humanitarian operations by suggesting a study of the opportunity costs of the developmental barriers found in our study.

Secondly, Hammade's (2016) study of Lebanese agriculture shows us that overspill of a foreign conflict can have as much of a disruptive effect on the domestic agribusiness supply chain as local conflict by examining the effects of the current Syrian civil war. Hammade (2016) states that the areas most effected by this conflict are the Lebanese rural areas bordering Syria, known as Lebanon's most important farming and agricultural regions. While Darwish et al. (2009) will argue that the true total cost of conflict on agriculture is immeasurable, Hamade (2016) seeks to list some of the immediate and obvious effects of the Syrian conflict, creating a list of three major supply and demand challenges, without trying to quantify their cost for the sector:

(1) The increased cost to farmers at the input side of the supply network, since smuggling of cheap inputs from Syria has stopped.
(2) The difficulty at the opposing end of the supply chain, in reaching traditional export markets in the Gulf Council Countries, especially following the closure of the land road through Syria after the Syrian Opposition armed forces took control of the Naseeb crossing at the Syrian-Jordanian borders in the spring of 2015.
(3) The increased demand for food products due to the influx of refugees.

Hamade (2016) points to three factors which facilitated meeting the new supply and demand challenges: firstly the presence of low-wage Syrian agricultural labour, secondly a drop in oil prices reducing energy costs and thirdly a depreciation in the value of the euro aiding investment in agricultural machinery inputs. Equally important were the humanitarian intervention projects which led to an increase in food production and a rapid development of the supply network.

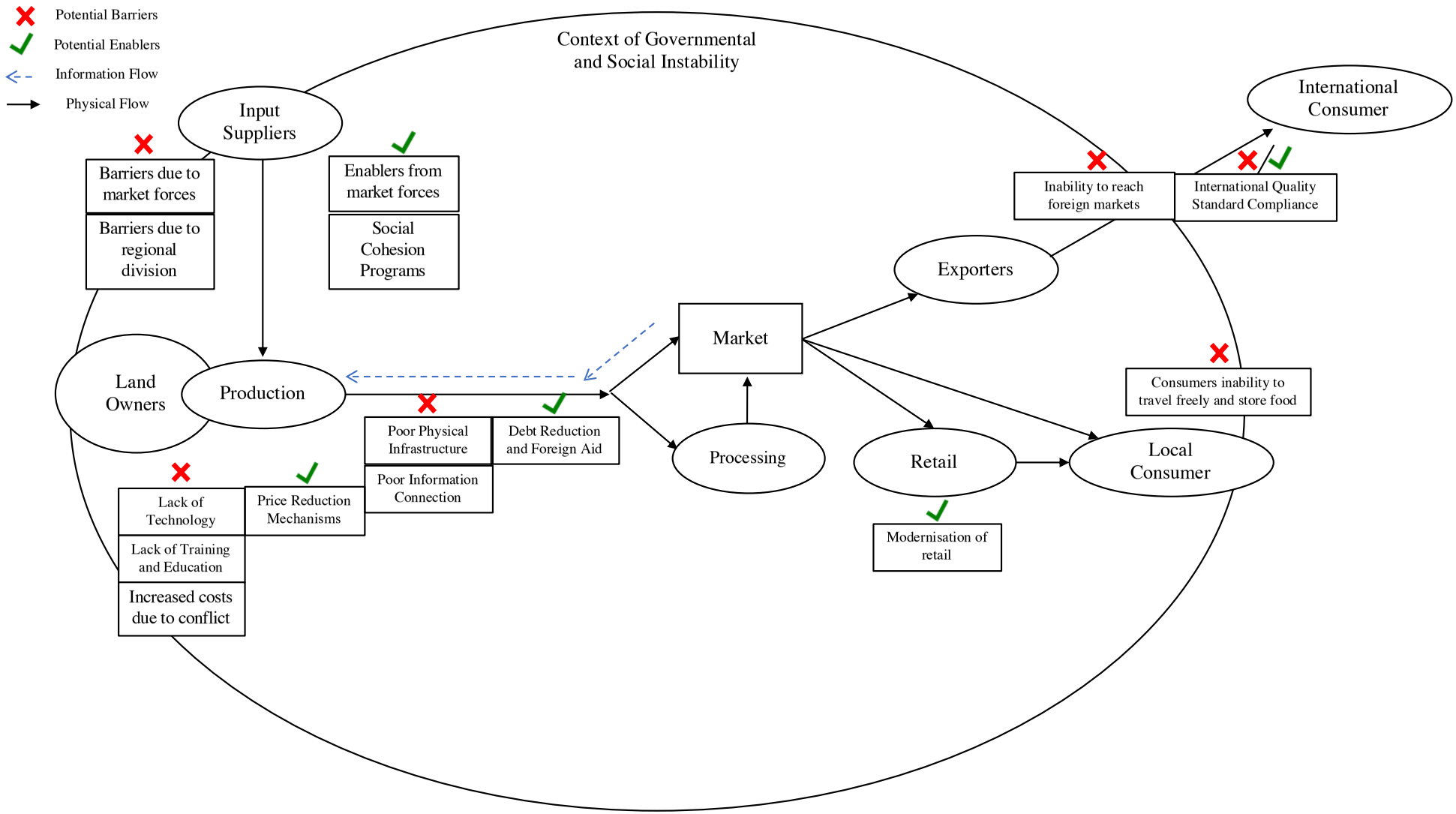
It can be seen from this discussion that Lebanon's agricultural sector presents an effective focal case for a study on the post-conflict ASC. As a post-colonial country, regaining internal peace after a series of conflicts, situated in an unstable region of sporadic conflict and associated supply chain risks, and requiring a combination of economic and political reconstruction, Lebanon is seemingly typical of a post-conflict zone and comparisons can easily be drawn with other regions studied in the post-conflict reconstruction literature, such as Mozambique (Schindler, 2010), Liberia (Cook, 2007) and Europe in the wake of World War 2 (Giordano, 2011). Therefore, the case of Lebanon has been adequately justified to provide the empirical evidence to ground this studies framework of barriers and enablers in the post-conflict ASC.

2.4 Synthesising the Literature: A Theoretical Framework for the Post-Conflict ASC

Based on the entirety of the preceding literature review, we are able to construct a rudimentary theoretical framework for the post-conflict agricultural supply chain (Fig 2.5). This framework features the supply chain map (Fig 2.3), with the addition of the potential barriers and enablers derived from the literature, creating a synthesis of the theories and models discussed above.

This framework will now be used to inform the case study, giving the researcher a basic understanding of the post-conflict supply chain, and will allow the interview data to either confirm, challenge, or supplement the predicted barriers and enablers detailed in this purely theoretical preliminary framework (Fig 2.5).

Fig 2.5: A Model of Barriers and Enablers Effecting The Lebanese Agricultural Supply Chain



3. Research Methodology

Having conducted a thorough literature review, this chapter will explain and justify the methodology that governs how the research question was approached. By reference to the research onion, given by Saunders et al. (2009), it is possible to trace our choices from research philosophy to research approach, research strategy to data collection choice, and time horizon to the techniques and procedure employed. Fig 3.1 gives an overview of these choices.

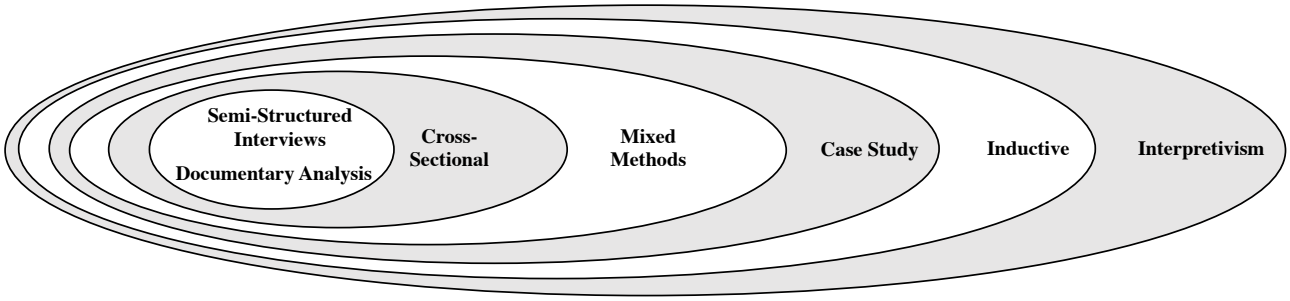


Fig 3.1: Methodological Choices
(Based on Saunders et al., 2009)

3.0 Declaration of Research Rigour

The research design detailed below is based on the research methodology framework given by Saunders et al. (2009) which is thought to be rigorous and appropriate for the study. It is the intention of the researcher to sufficiently describe the research design, data collection and data analysis techniques to allow for the replication of this research (Oliver, 2011). All procedures and strategies are justified by theories deemed trustworthy by the academic community, and all attempts have been made to sufficiently support any research choices and to insure the final conclusions are grounded in the data (Oliver, 2011).

3.1 Axiomatic Statement

The following axiomatic statement seeks to explain the role of the researcher's values and opinions in the research. Since these values and opinions influence the research questions and methodology, it is hoped that an axiomatic statement will make the reader aware of the core values motivating the project, and how those values may influence research outcomes (Saunders et al., 2009).

Therefore, the researcher considers the research topic important in virtue of its potential to inform humanitarian donors and therefore to help those in need. The desire to help others is a core component in the motivation of the research and choice of research question.

In addition, the research methodology and the data collection methods reflect the values of the researcher, who places greater importance on personal interaction with respondents than views expressed anonymously through questionnaires (Saunders et al., 2009).

3.2 Research Philosophy

As is common in academic research, this study does not fall neatly in to one philosophical domain (Saunders et al., 2009). The following discussion will summarise the broad ontological and epistemological choices of the research.

Firstly, with regards to the ontology, the research mainly considers its focal phenomena to be subjective. This reflects the researcher's view of the nature of post-conflict ASC. In agreement with Kant's Critique of Pure Reason (Kant, 1781), a true fact-of-the-matter does exist, but it is intrinsically unknowable. So, when studying the structure of the post-conflict agricultural supply chain, it is only possible to examine people's understanding and experiences of the supply chain, and not the supply chain itself (Saunders et al., 2009). However, it is argued that if there is a general consensus of the subjective then we can label it objective (Kant, 1781). Therefore, the research straddles a subjective ontology in terms of research methodology, but hopes to determine objective truths regarding the post-conflict ASC.

Epistemologically, the chosen philosophy reflects an interpretivist view point. The data collected during this study is inseparable from the thoughts and feelings of the actors, however the study of the actors experience of the supply chain is considered to be the study of the supply chain itself (Saunders et al., 2009). And so, in virtue of the heavily subjective nature of the research and the great need for interpretation, an *interpretivism* philosophy has broadly been adopted. This philosophy informs the following research approach.

3.3 Research Approach

An inductive approach was decided to be most suitable for the research. This is based on the research paradigm, since inductive approaches are usually adopted in the interpretivist philosophy. The inductive approach is also deemed appropriate since the research is attempting to build a theory. To this end, the research methodology will reflect an approach of *no theory under consideration and no hypotheses to test* (Eisenhardt, 2016). This will allow the research to limit the bias of preordained theoretical perspectives (Eisenhardt, 2016). The inductive approach also offers practical advantages, allowing the research design to adapt based on constraints such as lack of access to data or a limited time frame (Easterby-Smith et al., 2015). This approach will inform the research strategy and data collection choices detailed below.

3.4 Research Strategy

Since the research question demands descriptive type answers, an explanatory study is deemed the most appropriate (Saunders et al., 2009; Vega, 2017). The study therefore utilises a *case study* strategy. This is further justified by the paradigm, since case study strategies are seen in comparable research studies (Vega, 2017) such as:

- Walker and Harland's (2008) case study on e-procurement in the United Nations,
- Jahre and Jensen's (2010) case study on coordination,
- Schulz and Blecken's (2010) case study on horizontal coordination.

A single *embedded case study* is justifiable since it is demanded by the research questions and by the fact that the case of Lebanon provides an opportunity to observe a phenomenon that few have previously accessed and analysed (Saunders et al., 2009). A *single embedded* case study is further justified by the fact that the case meets three of the necessary criteria proposed by Yin (2009):

(1) The case represents a typical case,

(2) The study is intended to provide unique depth and insight into a novel field,

(3) The study is intended to be a preliminary investigation, laying groundwork for future research.

The context, case and embedded units of analysis of the embedded case study are summarised in Fig 3.2:

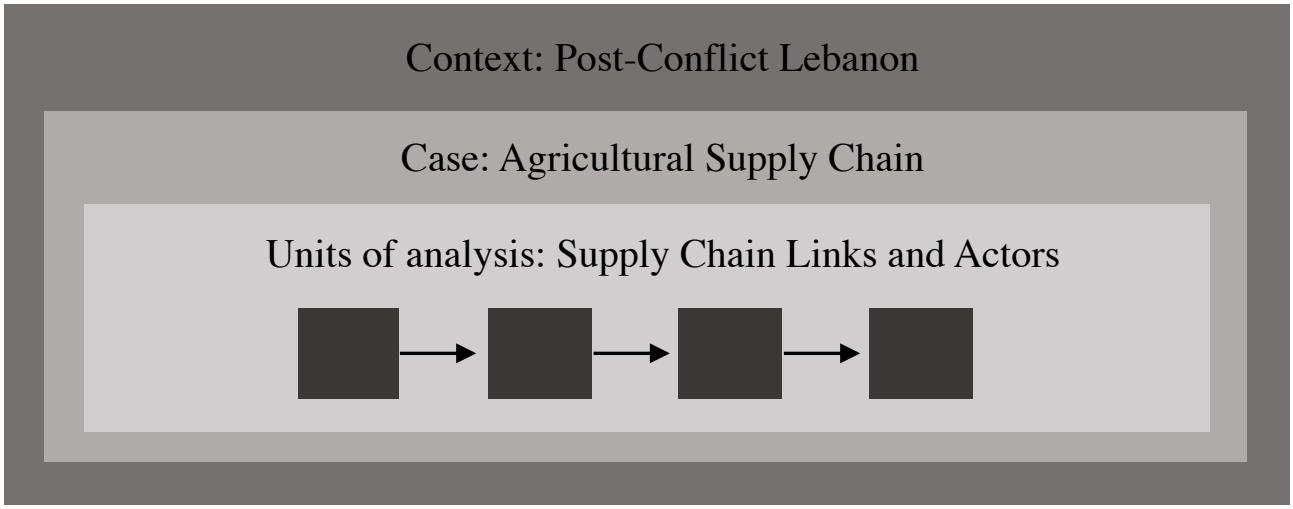


Fig 3.2: The Embedded Case Study Strategy
(Based on Yin, 2009)

3.5 Research Choices

A *Mixed-Methods* approach was used for data collection. Although the data collection was almost exclusively mono-method qualitative data, collected using a semi-structured interview technique, the collection of a small amount of quantitative data by documentary analysis was highly justified as a form of triangulation. It was decided that for a deep exploration of the research question, the qualitative primary data fell just short of sufficient, so this data is dovetailed with secondary quantitive data. Furthermore, the complementary quantitative data can be used to validate the qualitative data, since it allows the interview data to be cross referenced with documented sources. The use of mixed-methods is further justified by the research paradigm, since case studies in humanitarian logistics often employ a mixed-methods approach (Vega, 2017).

3.6 Time Horizon

The chosen time-horizon is c*ross-sectional*. This was deemed most appropriate in accordance with the time constraints and the research objective. Additionally, in the paradigm of SCM case studies, a cross-sectional time horizon is often employed, utilising interviews conducted over a short period of time (Saunders et al., 2009).

3.7 Data Collection Methods

A blended data collection method was developed for this study in order to overcome methodological concerns with the interview method in the research context of post-conflict Lebanon. This resulted in two separate methods being used to maximise validity and replicability and minimise the effect of respondent biases.

3.7.1 Semi-Structured Interviews

In the case study method, the interview is often the main data collection technique (Voss et al., 2002; Vega, 2017). The semi-structured interviews used in this study were approached like a conversation, involving open questions allowing the interviewer to explore the interviewee's area of relevant expertise (Fisher, 2004). The semi-structured interviews were approached with a script of open questions, seen below (Fig 3.3), however these questions were meant as a framework and were often abandoned in order to follow novel lines of questioning. This stopped the interviews from becoming restrictive, allowing the respondent to lead the direction of the interview (Fisher, 2004). This method yielded unexpected and highly useful explanatory data.

What barriers do you perceive inhibiting the work you do in agriculture?
What barriers due to conflict have you perceived effecting the agricultural sector?
What significant factors have enabled you to overcome these barriers?
What would you like to see in the future to improve functionality in the agricultural sector?
Is there anything else you think I should know about?

Fig 3.3: General Structure for Interviews

Interviews were organised in advance according to a sampling strategy developed for this study grounded in the theoretical model created during the literature review (Fig 2.5). This involved interviewing at least one participant from each node on the agricultural supply chain. However, this was not entirely possible due to the limitations[2], and accordingly agricultural experts were garnered from academic, political, financial and entrepreneurial backgrounds to act as respondents for the interviews, with snowballing used to generate further interviews. This was found to be sufficient to generate a complete picture of the agricultural supply chain, compiled from a range viewpoints. The full list of respondents can be seen in Table 3.1, with the use of pseudonyms for certain respondents as per their requests. Quality issues with this method include respondent bias and response validity (Partington, 2001). Measures were put in place in the research design to overcome these quality issues. Interviewee bias could be attributed to the religious, political or economic standing of the participant, however by conducting multiple interviews individual biases were mitigated and a synthesis of responses resulted in an overall less-biased conclusion (Burnard, 1991). Issues with validity were overcome by cross referencing interview responses across the respondents and with reference to secondary data collected by documentary analysis.

Respondent	Role	Interview Duration
Dr Daoud	Professor of Agriculture at LAU and advisor to NGOs agricultural projects in Lebanon	6 hours
Mr S	Manager of LAMA Food, exporters of high quality produce	1 hour
Mrs K	Director of a top 5 Finance Consultancy firm in Lebanon, specialising in small retail firms	1 hour
S. Ghafari	Land Owner and Banana Farmer	2 hours
Mme S	Agricultural Engineer from the Ministry of Agriculture, Lebanon	2 hours
Mr Issa	Co-founder of Arc en Ciel organisation, government policy advisor on Agriculture and Social Issues	4 hours
M. Beydoun	Land Owner, Exporter, Government Minister of *Ressources Hydrauliques et Electriques* (1990 - 1992)	2 hours
Elie Nasr	Retail Employee, Traditional Consumer	1 hour
Rana Abdou	Director of Agricultural Programme, Arc en Ciel	1 hour
Andrew Baschir	Manager of *Baschir's*: Producer of frozen foods.	1 hour

Table 3.1: Interview Respondents and Interview Times

[2] See **chapter 5** for a full discussion of the limiting factors

3.7.2 Documentary Analysis

An analysis of secondary data complimented the interview method. Documents were sourced either by web-search or given by interviewees to compliment their responses. The list of secondary documents used is given below, and key extracts from these documents is shown in Appendix 2:

1. Agriculture and Rural Development Programme. (2015) *Ministry of Agriculture: Strategy, 2015 - 2019*.
2. FAO and the Ministry of Agriculture. (2012). *Resultats Globaux du Module de Base du Recensement de L'Agriculture 2010*.
3. FAO and the Ministry of Agriculture. (2010). *Agriculture in Lebanon: Facts and Figures*.
4. IDAL. (2017). *Agriculture Sector: 2017 Factsheet*.

Only a small amount of data from these sources contributes to the final discussion, since the main function of the Documentary Analysis was simply to confirm, validate and compliment the information gained via interviews.

3.8 Data Analysis Method

The data analysis follows the procedure laid out by Miles and Huberman (2014), which features three steps:

- Data reduction
- Data display
- Drawing and verifying conclusions

This procedure was justified since the research attempts to answer the research questions inductively using mostly qualitative data. The data collection resulted in approximately 20 hours of poorly ordered raw data in the form of audio-recordings, taking place in three different languages. Since this mass of data is overly extensive for the purpose of our study, the situation further justifies the use of the *data display and analysis* method (Miles and Huberman, 2014; Saunders et al., 2009).

3.8.1 Data Preparation

The data was first reduced using summarisation techniques with the aim of transforming and condensing. This involved condensing the meaning of a large amount of audio-data into text data by drawing out the principal themes that emerged in each interview. Rather than producing direct transcripts, relevant data sections from the data-pool were identified according to the criteria of being related to our research questions and only these sections were transcribed to create a useful data subset.

At this point the data was anonymised in an attempt to achieve *confirmability* which assures that conclusions come solely from the data and not from the researcher's predispositions (Shenton, 2004). It may have been tempting to add more credence to the responses of a government minister over those of a Lebanese consumer, but since no criteria is defined to justify extra weight of some responses over others, all data was anonymised and compiled in a single document file.

Categories were then developed that could be attached to meaningful chunks of data (Saunders et al., 2009). Text data from the transcript were grouped according to two simple categories, naturally derived from the terms used in the literature review: Barriers and Enablers (Saunders et al., 2009), as summarised in Table 3.2.

Category Code	Category Name	Description
BAR	Barriers	Factors negatively effecting functionality in terms of efficiency, flexibility, responsiveness, and food quality across the supply chain. (Aramyan et al., 2007)
ENA	Enablers	Factors negatively effecting functionality in terms of efficiency, flexibility, responsiveness, and food quality across the supply chain. (Aramyan et al., 2007) Factors which overcome barriers.

Table 3.2: Data Analysis Categories

The complimentary secondary source documents were also categorised, which involved combing the documents to highlight units of textual data and designating them relevant to either Barriers or Enablers. These data chunks were then combined with the interview data to produce a categorised un-coded data file.

Table 3.3: A Description of the Codes Used

	Code	Role	Description
Initial Codes from the Literature Review	FIN	Financial factors	Price and cost factors Market forces Debt
	SOC	Social Factors	Social cohesion issues Religious / Political manifestations in society
	INFA	Infrastructure Issues	Destruction / reconstruction of physical infrastructure Physical supply link Issues Logistics and Transport
	KNOW	Knowledge and Education factors	Training Knowledge of prices and costs Supply Chain Visibility issues Information Flow
	TECH	Technology Factors	Use of technology Availability and Effectiveness
	GOV	Governance Issues	Governmental Factors Leadership issues
	MARK	Market and Sales factors	Barriers and enablers for domestic sales Barriers and Enablers for International sales Reaching Foreign Markets
	QUAL	Quality of Produce	International Quality Standards Factors affecting quality of Lebanese produce
	NGO	Non-Governmental Organisation interventions	Actions of NGOs Roles and Responsibilities Existent Programs
	CONS	Consumer Tendencies	Consumer behavior factors Buying habits Preferences and abilities
Additional Codes	CLIM	Climate Factors	Climate Change Yields
	MORT	Mortality issues	Effect of death from conflict on agriculture
	ILL	Issues with legality and illegal behavior	Actors subverting the law

Data analysis continued by creating a more hierarchical categorisation of the data with the use of coding (Saunders et al., 2009). A *directed content analysis* method was used to generate codes, which resulted in initial codes being developed from the literature and additional codes being generated as the analysis developed (Hsieh and Shannon, 2005). Sub-codes were also developed from the data (Saunders et al., 2009) since it became apparent that some interview data supported certain barriers while others negated them. Therefore POS and NEG codes, for positive and negative respectively, were developed and applied as sub-codes to the data, thus allowing the data to provide a measure of disagreement between respondents. The final codes used and their descriptions can be seen in Table 3.3, and the fully coded and categorised final data set used in the analysis can be seen in Appendix 1.

3.8.2 Data Display

By categorising and coding the data as described, summary diagrams and visual displays were constructed. A network diagram was used as the primary display method since they are an effective method for indicating key points and the links between them (Saunders et al., 2009) The diagrams are constructed using the method put forward by Verdinelli and Scagnoli (2013) featuring central themes with conceptual links to textual data taken from the transcripts. This diagram set each code, representing a Barrier or Enabler, as 'nodes' and positioned relevant data in relation to them. Thus the relation of each barrier, enabler and the causal links between them could then be assessed accordingly.

3.8.3 Drawing Conclusions from the Data and Answering the Research Questions

The data display method directly allowed conclusions to be drawn from the data. By displaying the data as a network of connected concepts, stories emerge from the data set. Perceived barriers can be traced back to their roots via the causal links, and an idea of the complexity and inter-reliance of factors can be gleaned. The theoretical framework constructed during the literature review (Fig 2.5) can then be examined in reference to the data, permitting an analysis of each concept in turn, thus grounding the theoretical model in empirical evidence.

4. Findings and Discussion

This section will present findings in the data and a discussion of how these findings answer the original research questions. At first, the findings will be presented in the form of a network diagram as described in **Section 3.8.2**, along with the frequency of occurrence of each code. These findings are then analysed and discussed with reference to the literature review and the research questions. **Appendix 1** contains the complete data-set, fully categorised and coded, which is the base document of the proceeding findings and analysis.

The discussion of the data will provide the answers to the initial research questions, restated here:

Question 1: What post-conflict barriers affect the ASC?

Question 2: Which enablers can allow the agricultural sector to overcome these barriers or increase in functionality?

Question 3: Where in the supply chain are these barriers and enablers relevant?

Barriers and enablers will be identified from the data, discussed thoroughly and then summarised. This discussion will follow the same structure as the discussion of theory in the literature review: each node of the supply chain will be assessed in turn, the empirically supported barriers and enablers will be listed, along with a discussion of their empirical evidence. Thereby, the research questions will be answered. The conclusion of this discussion is presented in the form of a framework for barriers and enablers in the post-conflict agricultural supply chain, which may be thought of as a summary of the answers to the research questions. This framework is the crescendo of the academic research done in this dissertation, and is intended to be the contribution of value emerging from this paper.

4.1 Presentation of the Findings

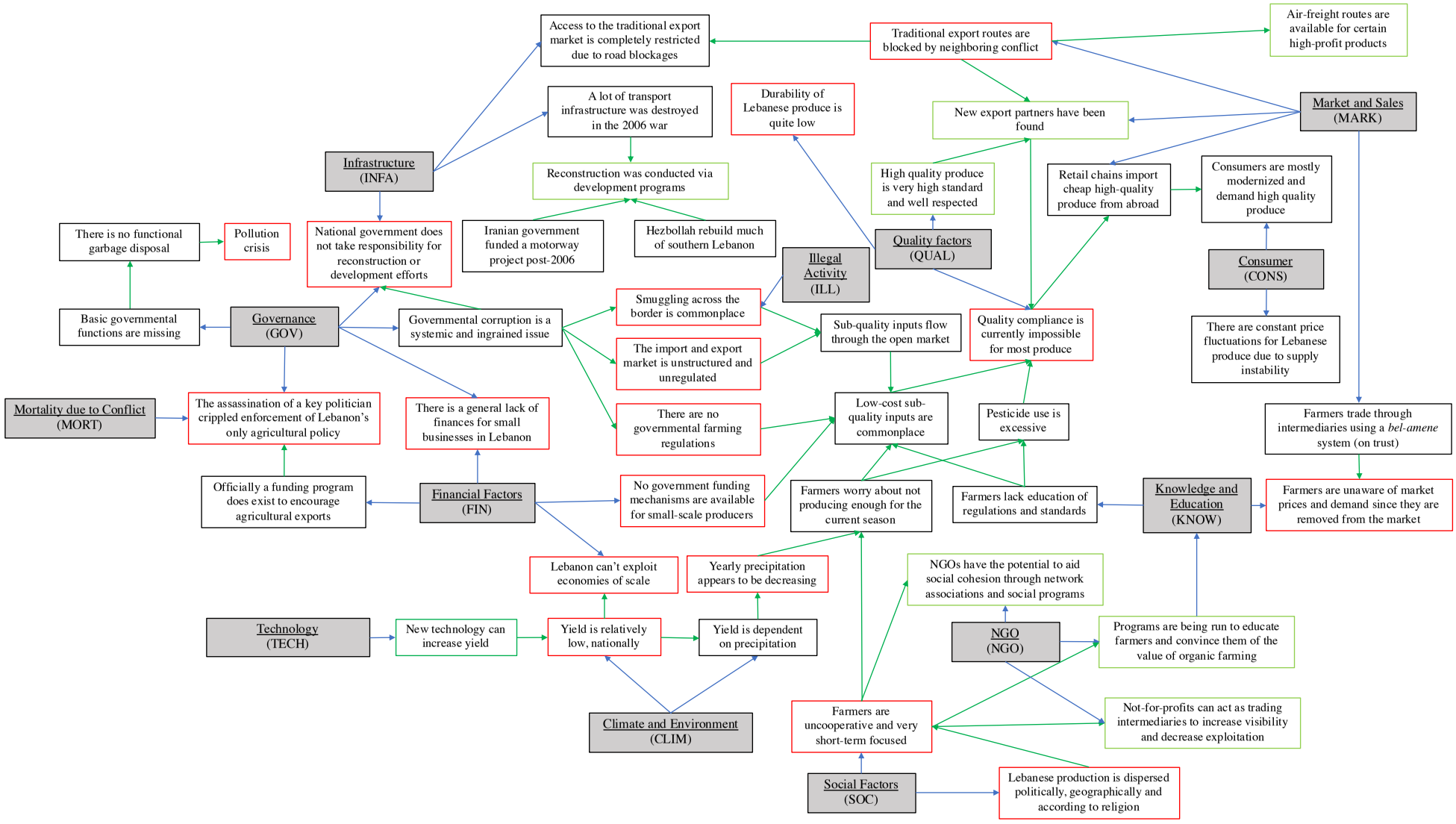
This section will first present the frequency of occurrence of each major theme as given by the occurrence of each code. This gives a measure of the most prevalent factors according to the interviewees, often indicating a repeated occurrence of the same concept (Table 4.1). It can be seen that governance issues are reported most frequently, followed by infrastructure and market factors.

Code	Description	Frequency of Occurrence
GOV	Governance Issues	47
INFA	Infrastructure Issues	26
MARK	Market and Sales factors	25
NGO	NGO intervention	22
KNOW	Knowledge and Education factors	21
SOC	Social Factors	14
FIN	Financial factors	13
TECH	Technology Factors	8
QUAL	Quality of Produce	8
CONS	Consumer Tendencies	5
CLIM	Climate Factors	5
MORT	Mortality issues	3
ILL	Illegal Activity	2

Table 4.1: The Frequency of Occurrence of Each Code

A deeper analysis of the data is seen in the network diagram used to visually represent our findings (Fig 4.1). The diagram was constructed following a similar method to Verdinelli and Scagnoli (2013), where each code from the transcript acts as a central concept and each unit of textual data is positioned with conceptual links drawn in blue arrows between the central node and the data units. Causal links between concepts, as described by the data, are drawn in green arrows. The result of this procedure is seen on the next page (Fig 4.1) and a full analysis and discussion of these findings can be seen in the following sections.

Fig 4.1: A Visual Representation of the Research Findings as a Network Diagram



4.2 Discussion of the Findings

The intention of our research is to create a framework for barriers and enablers to functionality in the agricultural supply chain in a post-conflict setting. To this end, we have already theorised a model based on a synthesis of the existing literature (Fig 2.5). Our discussion will begin by assessing this framework based on the empirical data collected through the interviews making use of the network diagram constructed to display the empirical findings (Fig 4.1). The previously theorised barriers and enablers will be assessed in turn, and either accepted, rejected or amended based on the empirical data.

Alongside this, new barriers and enablers not predicted by the literature review, but emerging from the data, will be added to the model. This will create a final framework of the post-conflict agricultural supply chain, grounded in the empirical evidence and advancing beyond the boundaries of the present academic literature.

4.2.1 Barriers and Enablers of Input Supply

To remind the reader, it was theorised in **Section 2.2.1** that the barriers and enablers shown in Table 4.2 exist at the input supply of a post-conflict developing ASC.

Barriers	Enablers
Barriers due to market forces, such as lack of supply or lack of capital (Belt et al., 2015)	Enablers from market forces, such as capital lending schemes (Belt et al., 2015)
Barriers due to regional division, producing problems such as unwillingness of participants to cooperate (Giordano, 2011).	Social Cohesion Programs run by governing organisation or NGOs to overcome regional instability (Idris, 2016).

Table 4.2: Barriers and Enablers to Input Supply

We analyse these with respect to the data:

1. Some evidence was found relating to market forces, however it seems that Belt et al.'s (2015) proposal that input supply can be modelled in terms of market mechanics is insufficient. Our data shows that due to **governmental corruption**, the input suppliers are able to act outside of the regulated market structure, with a high prevalence of smuggling. We also found evidence proposing that since **no governmental funding is available** for producers, their lack of finances obliges them to use low-cost, low-quality inputs. Evidence for this is shown in Fig 4.2, showing a strand of empirical data lifted from the network diagram.

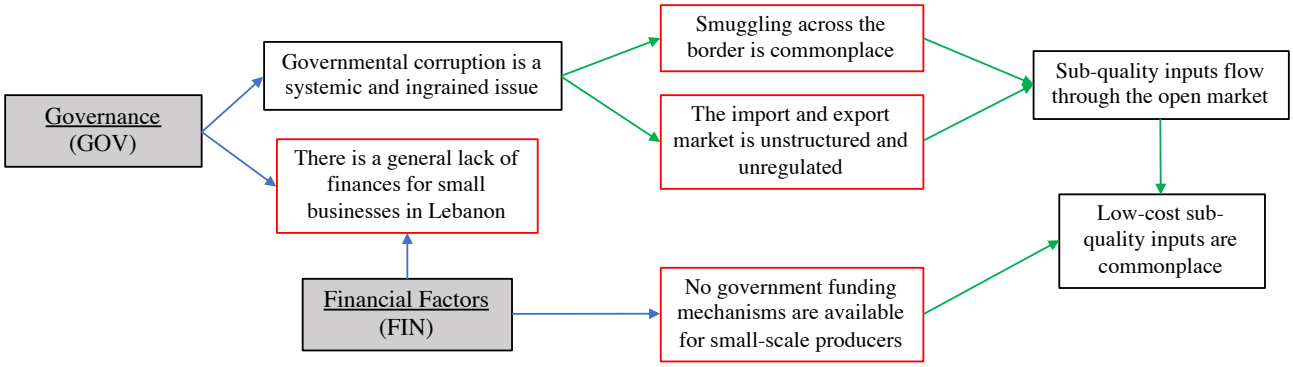


Fig 4.2: Data Stating the Effect of Governmental Corruption and Lack of Finances

2. As predicted by Giordano (2011), market forces did not sufficiently describe the barriers for sustained input supply. **Regional division** was found to effect the actors willingness to cooperate and evidence was found stating that NGO programs have attempted to overcome this division, by producing farmers network associations, however these have as-of-yet failed to overcome the indelible regional divisions (Fig 4.3).

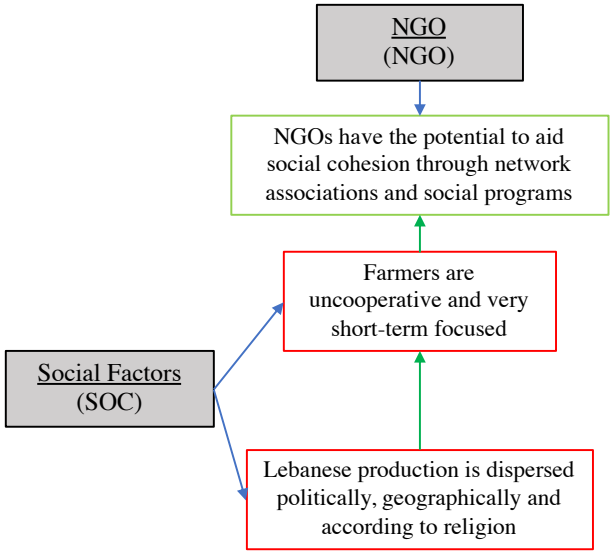


Fig 4.3: Data Presenting Issues of Cohesion

Therefore, our conclusion based on the data are threefold:

1. Capital lending schemes may act as an enabler for sustainable high quality input supply, however there is no evidence of it in Lebanon.
2. **Social Cohesion Programs** were insufficient to overcome regional instability
3. Strong evidence of regional division supports Giordano's (2001) claim that **regional division** and **unwillingness to cooperate** can act as a barrier to a functional and sustainable input supply.

4.2.2 Barriers for the Producer

The literature review proposed a series of barriers for the agricultural producer:

1. A poor physical connection between the producer and the consumer, at the level of infrastructure (Bosona and Gerbresenbet, 2013).
2. Lack of transport technology (Gebresenbet, 2001).
3. A poor information connection, meaning that the farmer does not receive information on demand or market trading prices for his goods (Bosona and Gerbresenbet, 2013).
4. Lack of knowledge and education (UNESC, 2009).

These will be assessed in turn:

1. Bosona and Gerbresenbet's (2013) claim that poor infrastructure provides a barrier for the producer, since they cannot access the domestic consumer, was substantially validated by the empirical data. However, the data suggests that this barrier was not insurmountable, pointing to **reconstruction and development of physical infrastructure** by foreign governments and regional powers: The Iranian Government and Hezbollah were both credited with aiding reconstruction of transport infrastructure according to the data, despite the national government's disorganisation and inability to lead infrastructure projects (Fig 4.4).

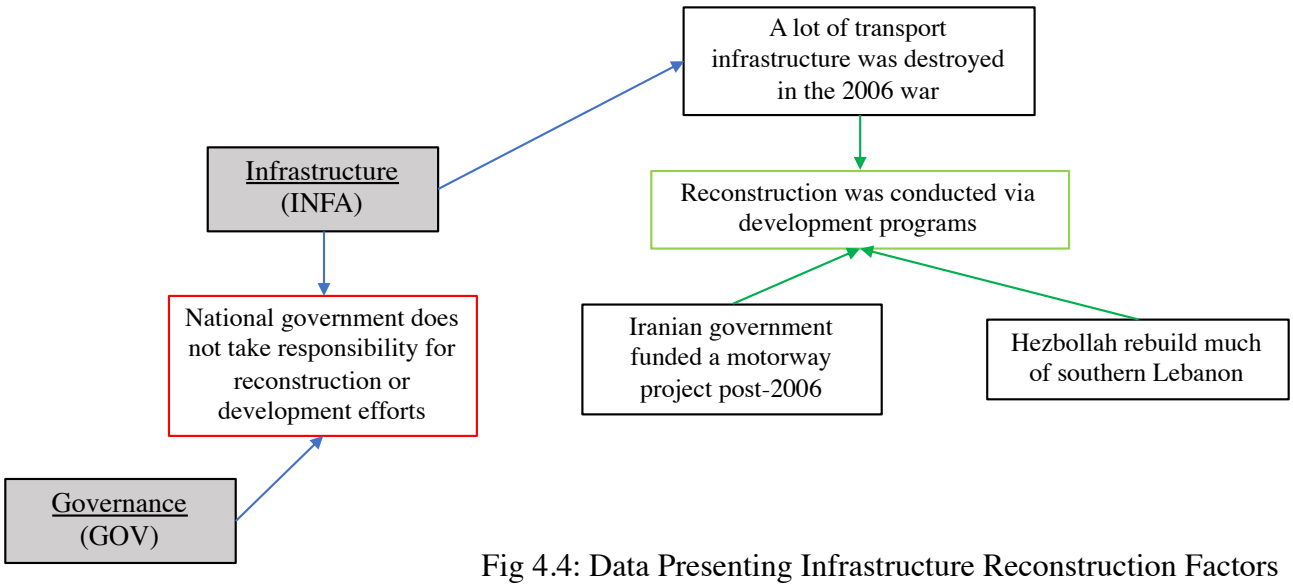


Fig 4.4: Data Presenting Infrastructure Reconstruction Factors

2. A **lack of transport technology** was rejected as a barrier according to the data, which proposes that even when the farmer operates without transport technology, **intermediaries** exist in the form of traders who assume responsibility of transporting goods to market.

3. The data strongly suggests that a **poor information connection** between the farmer and the market provides a barrier for the farmer, supporting Bosona and Gerbresenbet's (2013) claim. It was argued by the respondents that farmers do not know the trading prices for their produce or the demand. The existence of a trading system called "*bel-amene*", where farmers allow traders to sell their produce for them based on trust, means that farmers do not know what price their produce is being sold at in the market, or the actual quantity that is sold.

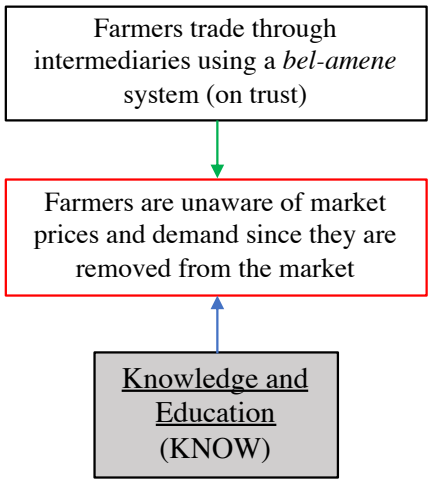


Fig 4.5: The problem of the "bel-amene" system

4. A **lack of knowledge and education** was heavily suggested to be a barrier for the agricultural producer. The data points to exploitation of the farmer, who has no knowledge of market prices or quality standards. This results in exploitation from upstream as the farmer is sold low quality inputs which will prohibit his produce from reaching the export market, as well as exploitation from downstream as the farmer does not receive a fair price for his produce from traders. The data even suggests that farmers can be forced to sell their produce for less than cost, due to lack of knowledge of market prices. The interview data shows NGO programs attempting to alleviate this barrier by providing training and education, but these were found to be in their preliminary phases, and their success is as-of-yet undocumented.

Our conclusion grounded in the data are threefold:

1. Destruction of the physical link between the producer and the consumer presents a barrier for the producer, and a substantial enabler was found to be **reconstruction projects** conducted by NGOs, foreign governments or regional powers operating in spite of inaction on the part of the national government.
2. **Traders** provide an enabler for the producer by handling transport and sales of produce.
3. **Lack of visibility** and a **poor information connection** is a significant hinderance for the producer, who is exploited upstream and downstream due to his lack of knowledge of market prices and regulations.

4.2.3 Barriers and Enablers of a Functional Market

Table 4.2 reminds the reader of the theorised barriers and enablers for a functional market from the literature:

Barriers	Enablers
Poor transport and logistics infrastructure resulting in the inability to match supply with demand (Moïsé et al., 2013).	Debt reduction and international aid grants to allow reconstruction operations to take place (Harsch, 2009).
International Quality Standards may be an insurmountable barrier. (Moïsé et al., 2013)	International Quality Standards may offer a competitive edge for those who can conform (Jaffee and Henson, 2005).

Table 4.3: Barriers and Enablers of a Functional Market

As previously discussed, significant enablers exist to negate the proposition that **poor transport infrastructure** prohibits goods from arriving at the market, in so far as it was described by Moise et al. (2013). Equally, the data validates the claim from Harsch (2009), agreeing that a plethora of interested parties can furnish reconstruction operations.

Secondly, the debate between Moise et al. (2013) and Jaffe and Henson (2005) as to whether **international quality standards** act as a barrier or enabler for a developing agrieconomy is resolved unanimously by the data in favour of Moise et al. (2013). Inability to meet international quality standards is presented as a crippling barrier for Lebanon's agricultural sector, with the data even suggesting that it is the single biggest attenuator for agricultural economic success.

The inability of Lebanon's agricultural products to meet necessary quality regulations for export to the EU or North America is due to a number of factors:

1. Lebanese producers use too many pesticides. According to the data, this is due to: A **short-term mindset** on behalf of the farmers, who are concerned with immediate yield, **Lack of visibility in the supply chain** since the farmers do not know where their produce is sold or how to increase sales, **Lack of knowledge of international regulations** and, A complete **lack of domestic regulations** due to lack of governance.

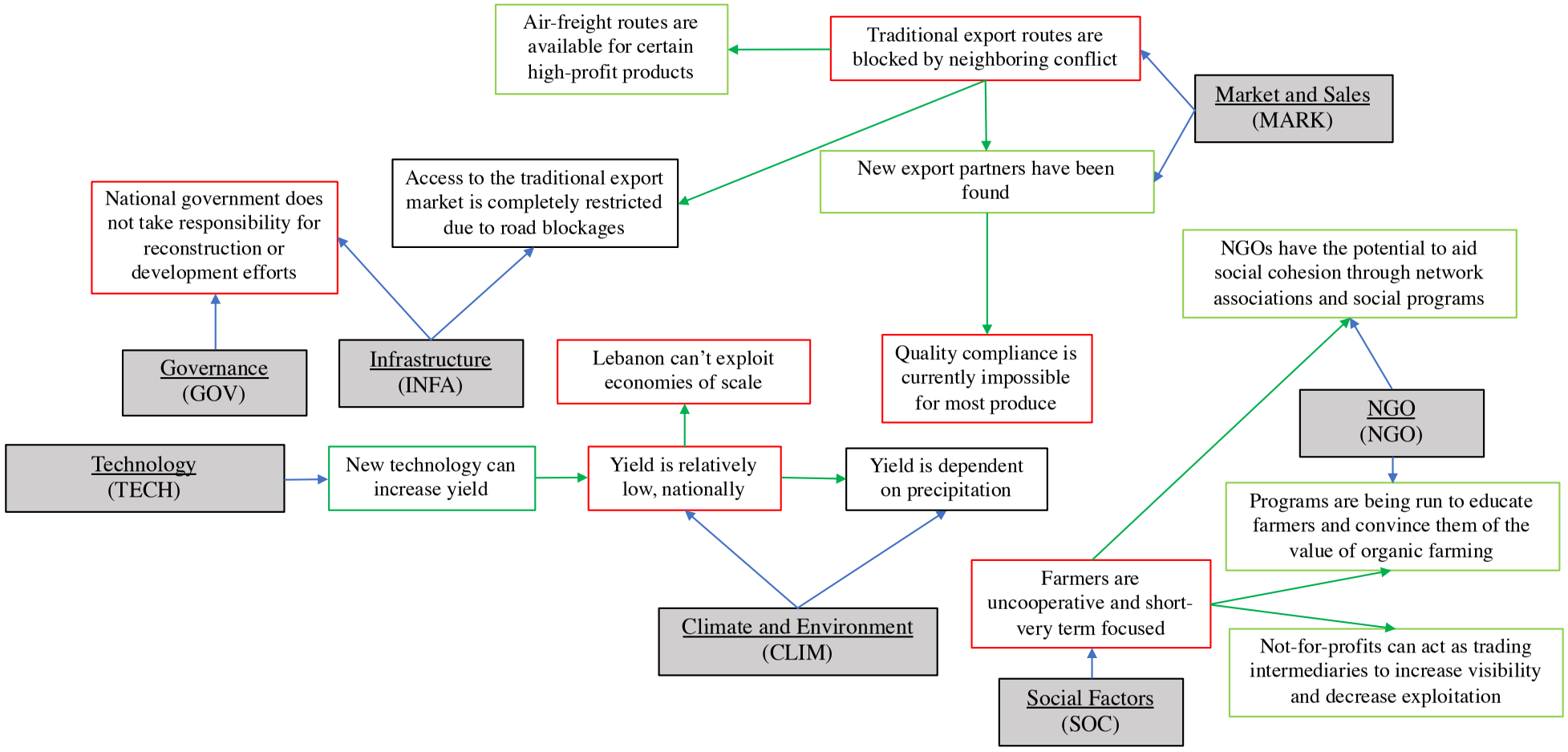
2. Lebanese **inputs do not meet necessary quality regulations**. The data argues that this is due to cheap sub-quality inputs being smuggled into the country by traders wishing to exploit farmer's fear of not producing a sufficient amount in a given season. This fear is further fuelled by climatic factors reducing yearly yield.

3. **Pollution** in Lebanon has caused soil and water conditions to be unsuitable to grow regulatory crops. This is due to an unresolved decade-old garbage crisis which has polluted the sea and subterranean water used for crops.

Enablers to these barriers can come from a governance level, with reestablishment of a functional government. However, the respondents seem to suggest that this is unrealistic for a post-conflict country surrounded by regional instability[3]. The data suggests more effective enablers at the social level, including **education and training for farmers,** a move to **Organic farming,** and methods which **increase visibility in the supply** chain, however the data also suggests that the effectiveness of these programs has always been limited by the difficulty of generating cooperation between the farmers. The empirical backing for these points is seen in the following lattice of data units lifted from the network diagram (Fig 4.6).

[3] Although some reports have shown successful post-conflict reestablishment of governance vis-a-vis the agricultural sector. See *World Bank (2009)* for example.

Fig 4.6: The Network of Factors Preventing Compliance to International Quality Standards



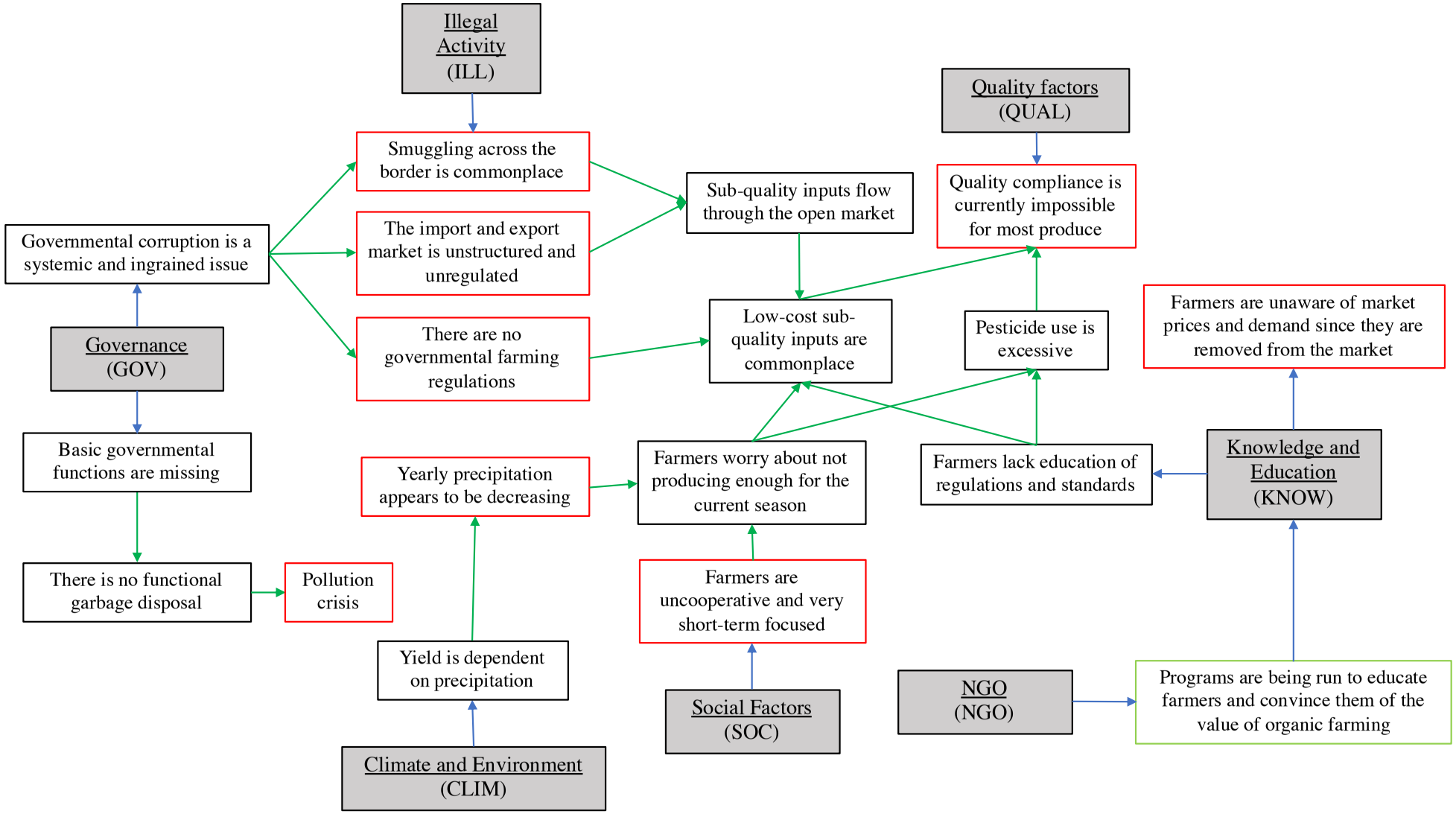
Some additional factors limiting functionality of the market were also found in the data, beyond lack of compliance to **international standards**.

Firstly, a **physical blockage of the traditional export route** due to the war in Syria inhibits access to key export partners. The data strongly suggests that this blockage is potentially crippling to the ASC. The effects of this blockage at the consumer-end of the supply chain ripple all the way upstream, resulting in a drop in prices of farmers produce, since the customer cannot be reached. **Lack of visibility** in the supply chain means that farmers are unable to understand the effect of the Syrian civil war on their profits and therefore seek to increase yield by increasing usage of pesticides and fertilisers, thereby further reducing the quality of their product and exportability. This produces a viciously cyclical effect, where farmers continue to increase yield as exportability plummets and profits fall, further decreasing exportability and spurring a drop in profit. This is a marked example of neighbouring conflict and general **regional instability** presenting a barrier for the ASC, and **lack of visibility** exacerbating these effects.

A number of enablers are present in the data to alleviate this barrier, although resolution of the Syrian civil war was generally seen as the only sustainable solution. **New export partners** have been suggested as an enabler, with the Lebanese government beginning to export to Russia, however **failure to guarantee quality compliance** limits effectiveness of this enabler. Secondly, **new routes** to existent export partners via air freight overcomes the physical barrier of the roadblock, however this is only possible for the highest quality premium produce, which currently represents a minority in the sector.

Secondly, it was discovered that Lebanon cannot exploit economies of scale and therefore cannot compete with other producers on the international market in terms of price. This barrier is thought to have multiple causes. Some respondents make the link with **climate change** reducing yield, stating that due to lower levels of precipitation are resulting in lower yields and lower quality produce. Other respondents point to a **lack of coordination** between farmers and **small lot-sizes of farms**, stating that if farmers could group together in a network, they could profit from economies of scale. However, a pilot project was tested by an NGO and our data suggests that a staunch **unwillingness of farmers to cooperate** and a mindset obsessed with short-term profits prevented a functioning farmers network. **Technology upgrades** were also discovered as a potential enabler to increase yield, with tools such as hydroponics directly cited. The empirical backing for these points is summarised in Fig 4.7.

Fig 4.7: The Network of Additional Factors Affecting the Export Market



To conclude, the barriers and enablers for a functioning export market are complicated and interweaved, however the data has allowed us to inspect the root causes of reduced export functionality. This allows us to go beyond the literature, which suggests simply that international quality standards are a barrier for export, by inspecting the underlying insurmountability of this barrier, as well as other contributing factors. The above discussion is summarised in Table 4.4:

Barriers	Enablers
Physical blockage of the transport route.	Resolution of foreign conflicts.
General lack of governance and regulations.	Identification of new transport routes.
Excess pollution resulting in sub-quality produce.	Identification of new export partners.
Use of sub-quality inputs resulting in sub-quality produce.	Farmer's cooperation networks.
Climate Change.	Quality increases such as a move to organic farming.
Low yield.	New Technology to increase yield.

Table 4.4: Empirical Barriers and Enablers to Export

4.2.4 Barriers for Retail

In the literature review we attempted to theorise regarding the various channels of retail available and the effect of modernisation of retail on the supply chain. This is summarised in Table 4.5:

Barriers	Enablers
The consumers inability to travel freely and store large amounts of food products at home means that retail modernisation is not possible. (Child et al., 2015)	Modernisation of Retail improves infrastructure and supplier capacity and therefore enables increased functionality in the Supply Chain. (Henson et al., 2007)

Table 4.5: Barriers and Enablers to Retail

From the data we can confirm that a modernisation of retail has taken place in Lebanon, as predicted by the authors Reardon and Gulati (2008), Altenburg et al. (2016) and Tandon et al. (2011). Observation and interviews reveal evidence of multinational supermarket firms populating Lebanon with horizontal integration across the country's largest retailer giants. However, data suggests that this has not acted as an enabler for the domestic upstream supply. It is proposed that the previously discussed barriers, such as failure to guarantee **quality regulations** and general **instability** in Lebanese supply has resulted in modern retailers abandoning Lebanese supply in favour of imports. In fact, our data revealed that Italian apples can be found in Lebanese supermarkets at a lower price than their domestic counterparts. This represents an inability or unwillingness for Lebanese retail giants to improve capacity and increase functionality of their domestic suppliers, as was proposed by Henson et al. (2007). Instead, we see a very similar situation to that documented by Reardon and Gulati (2008) in other developing nations, where modern retail acts at the expense of the domestic producers and in conflict with traditional retail channels. The empirical backing for this claim comes from the data set, presented in Fig 4.8.

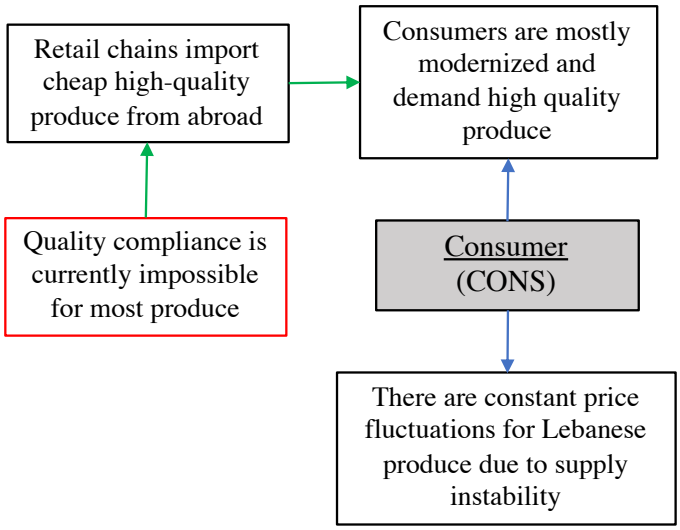


Fig 4.8: Data on Retail and the Consumer

4.3 A Framework for the Post-Conflict ASC

We can now create a synthesis of the literature review with the findings of our study to go beyond the current literature and extend the body of knowledge on post-conflict agricultural supply chains.

Fig 2.5 presented a theoretical framework for the post-conflict ASC, featuring barriers and enablers grounded in the literature review. Fig 4.10 on page 49 takes the initial framework, rejects its elements that are not supported by the empirical evidence, and makes augmentations based on our research findings as discussed in the previous section, thereby developing a framework to describe the barriers and enablers to functionality for the post-conflict ASC, grounded in empirical evidence from the case study set in Lebanon.

The framework can be understood according to this key (Fig 4.9), based on the convention established in **Section 2.1**, with the addition of some necessary indicators, where barriers are summarised in red, enablers in green, information flow is shown with a blue arrow, physical flow with a black arrow, and a yellow arrow is used to point out areas where barriers have an effect. Key points are also noted numerically on the framework and discussed below.

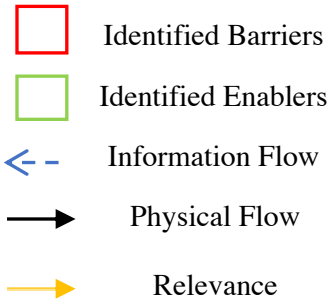


Fig 4.9: Framework Key

(1) With regards to the input supply, this section of the framework attempts to summarise the discussion presented in **Section 4.2.1**, noting **lack of regulations** and the **lack of border control** associated with smuggling and lack of governance as the most prevalent barriers. Compared to the theoretical framework constructed by synthesis of the literature (Fig 2.5), the final framework has replaced "Barriers due to market forces" with the more specific and empirically grounded **lack of funds for high quality inputs**. Equally, "Barriers due to regional division" was replaced with the more specific **unwillingness to cooperate and to act fairly and sustainably**, based on the empirical data. Furthermore, the enabler of **Social Cohesion Programs**, which was suggested in the literature review and the data, was neglected from the final framework. This is based on an unfortunate lack of empirical data relating to its success at improving input supply.

(2) Here, the framework seeks to graphically apply the discussion from **Section 4.2.2**. Barriers to the producer are listed as **polluted water and soil** and the effects of **Climate Change**. Neither of these barriers were foreseen in the theoretical model, so their addition is seen as a significant addition to the literature's understanding of production barriers in the post-conflict setting. Furthermore, a move to **organic farming** and possible **technological upgrades** are added to the framework as enablers, in agreement with the empirical data. Finally, since it was concluded that **poor physical infrastructure** is not generally a barrier for the producer, due to the prevalence of foreign donors and reconstruction efforts happening even in the context of complete governmental negligence, this barrier has been removed from the final framework.

(3) It was previously discussed that the empirical data was insufficient to support the inclusion of NGO Social Cohesion Programs as an enabler for sustainable input supply, since they have as-of-yet been unsuccessful at increasing cooperation between actors. However, the data is adequate to support an argument that NGO training programs can potentially improve the producer's understanding of international quality standards, standard market trading prices and methods for improving yield. Therefore, **NGO training programs** have been included as an enabler as an 'information input' source.

(4) Intermediaries are a complex issue mentioned in the literature and further investigated in the data analysis. While we have seen evidence of them acting as an enabler to producers in **Section 4.2.2**, by providing transport and acting as a market link to producers who otherwise would be restricted to retail in their immediate community, we have also discussed them acting as a barrier to functionality. The data shows that market intermediaries restrict visibility upstream for farmers, limiting farmers ability to understand the market and offering exploitative and unfair prices for farmer's produce. For this reason, **intermediaries** are added to the framework as a "Bar-abler": Sometimes a barrier, sometimes an enabler.

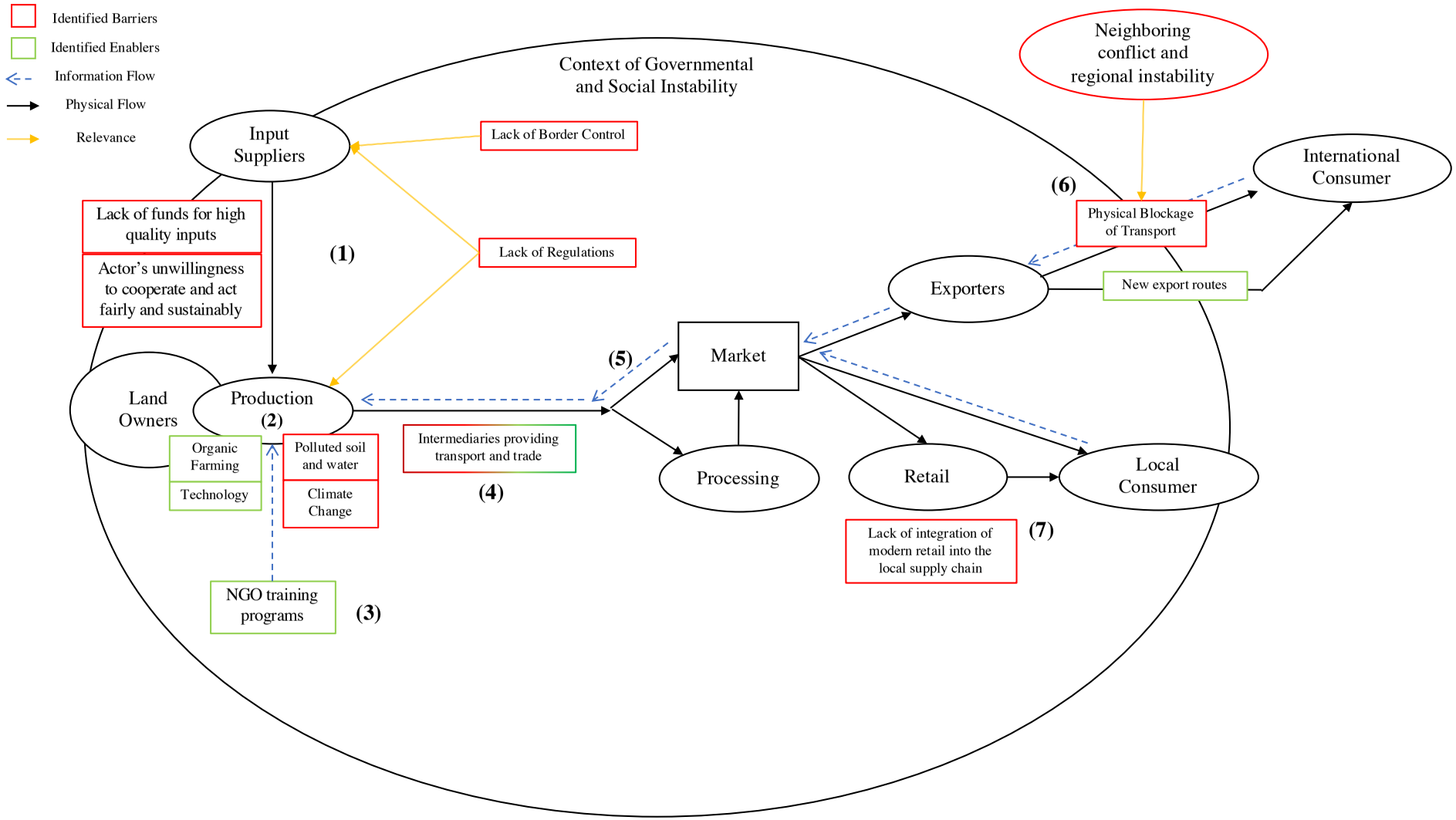
(5) The lack of an **information link** between consumer and producer is a barrier shown in the framework as an information flow arrow. Enabling the information flow along the supply chain would act as an enabler for functionality, giving farmers knowledge of market prices and customer demand thus allowing them to adjust their output to match customer expectations, and thereby increasing sales. The construction of this information link, and how it can be established initially, is a topic for another paper, however the reader may be interested in Ming and Jingxu's (2008) paper on the agricultural sector of rural China where they suggest

establishing a central information service to provide the information link between farmer and consumer. The applicability of this service outside China is a topic for future research.

(6) The link between the exporter and the international market is the key factor in enabling functionality of the private agricultural sector. The final framework has established specific barriers for export, and added nuance to the general "inability to reach the foreign market" barrier from the literature (Fig 2.5). It is seen that a **physical blockage of the trade route** is a large barrier to export, which is associated with regional instability, in accordance with the data discussed in **Section 4.2.3**. Furthermore, the enablers of **new export routes** and the possibility of **new export partners,** as identified in the data, have been added to the framework.

(7) Modernisation of retail was described in the literature review to be a positive improvement for the developing ASC when properly integrated into the local supply chain. Our findings confirmed that **lack of integration of modern retail,** including local supermarket chains and international retail firms, reduces the competitiveness of Lebanese produce in the domestic market. Supermarkets are seen to sell foreign produce at a lower price than domestic produce, due to lack of import regulations and the ability of foreign suppliers to utilise cost cutting mechanisms like economies of scale, which are currently unavailable for the Lebanese producers. The data set suggested that **protection of Lebanese products at the policy level** and **increased import tariffs** of agricultural goods could help encourage integration of modern retail into the local ASC and boost functionality upstream, however these enablers remain theoretical and unfortunately lack the sufficient empirical backing to be included in the framework. An avenue for future research could include a study specifically focussing on barriers to integration of modern retail, possibly generating some recommendations for the sector.

Fig 4.10: A Framework Describing Barriers and Enablers in the Agricultural Supply Chain, grounded in data collected in Lebanon



4.4 The Application of our Framework: A Comparison with Other Similar Studies

Having established the above framework (Fig 4.10), we will now discuss its potential use and applications. The intended use of a framework is to provide a starting point for a comprehensive appraisal of a system (Leon et al. 2012). The application of our framework (Fig 4.10) can be explained by drawing comparisons with applications of similar conceptual frameworks made for humanitarian intervention in the developing world.

Firstly, the framework attempts to meet the standards given by Lie (2008), who explores how frameworks can be used to guide humanitarian intervention in HIV prevention in Africa. Lie (2008) explains that the purpose of a framework is to frame a situation through the use of carefully selected concepts. Our framework has selected **the supply chain structure** and **barriers and enablers to functionality** as its two core concepts, chosen in light of their ability to provide a novel and effectual insight into the post-conflict agricultural sector.

In agreement with Lie (2008), the framework then seeks to deal with the complexity of a post-conflict economic system by providing a loose conceptual lens that can be held up to a humanitarian problem and impart an immediate understanding of the situation, without being too restrictive or relying too heavily on a single theory (Lie, 2008). The role of our framework is thus to organise the humanitarian donor's initial reasoning and instruct them *"where to look in reality"* (Lie, 2008) when they arrive at any relevant humanitarian crisis.

A second comparable study is given by Bui et al. (2000), who propose a framework for assessing and characterising individual disaster situations. Their framework is presented in a tabular form, where a humanitarian actor scores a disaster situation according to four criteria, thus producing a general identification of a specific disaster which can be used to inform the humanitarian donor on the Information Networking Requirements for successful intervention in the crisis. Their framework is quite general, seeking to provide information on a vast range of disaster situations, in comparison to ours which specifically sets out to inform post-conflict reconstruction of agriculture. However, Bui et al. (2000) provide a **proof of concept** for our framework in that they show how the immediate actions of humanitarian donors may be informed by a generic framework applicable to a relevant humanitarian crisis, thus reducing apparent complexity into a compartmentalised and structured framework through which the situation may be understood.

With regards to the application of the framework, Kovác and Spens (2007) provide a similar study that establishes a framework for disaster relief logistics, derived from qualitative data collected by a review of academic and practitioner journals. In the same spirit as our framework, Kovác and Spens (2007) seek to *provide practitioners with a tool for planning and carrying out humanitarian logistics operations* by means of a pictorial framework (Fig 4.11). The intention of Kovac and Spens (2007) is that a humanitarian aid organisation may be guided by their framework, utilising its simple presentation when making initial managerial decisions. In exactly the same way, our framework (or a more advanced version of it resulting from further studies), is intended to provide humanitarian actors with a clear and comprehensible device that imparts an immediate understanding of the barriers and enablers affecting the post-conflict agricultural supply chain, thus helping inform their initial decisions.

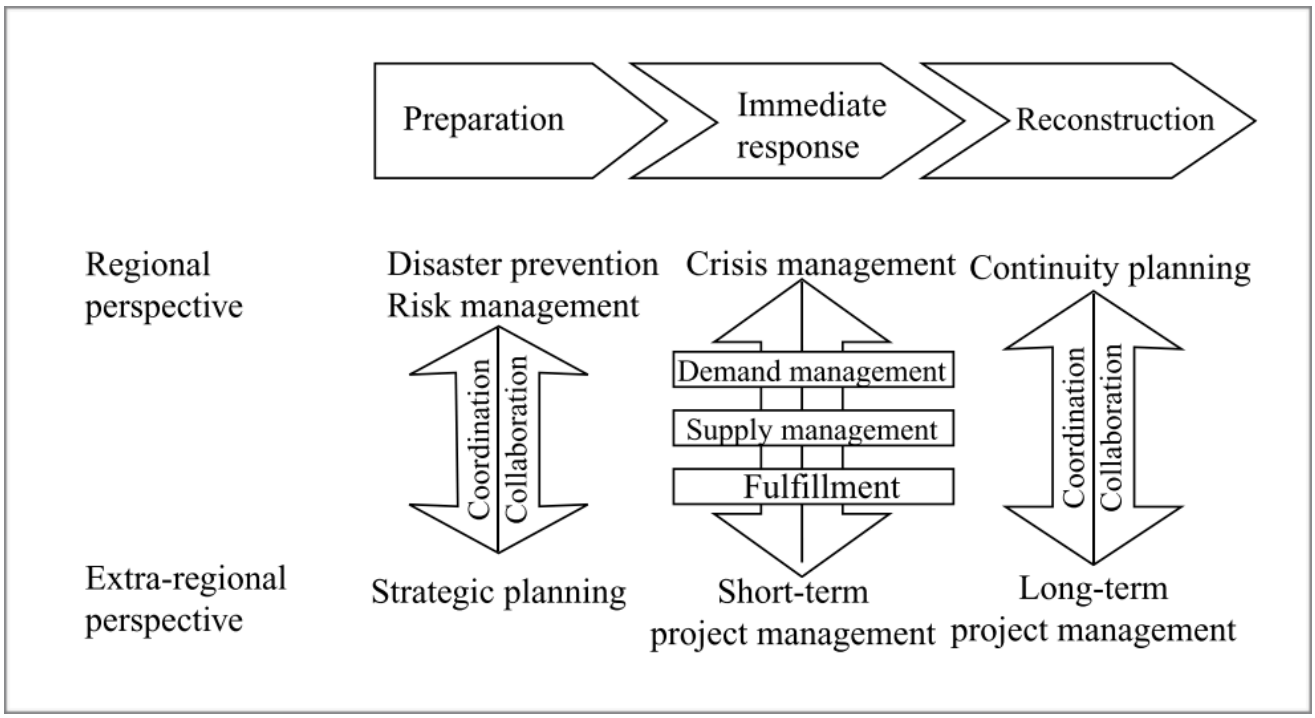


Fig 4.11: A framework for Disaster Relief Logistics
(Kovác and Spens, 2007)

5. Conclusions

To conclude our study, this chapter will summarises the main research findings, discuss limitations with the work done and suggests avenues for future research.

5.1 General Summary

In light of the potential gains of reestablishing the private sector post-conflict, including improved social cohesion, poverty reduction and sustained peace (Longley et al., 2006; Pretty and Hine, 2001), and in light of the importance of local food systems to a national economy (Giordano, 2011), this paper details a novel exploration of the post-conflict ASC through the lens of an SCM understanding. To this end, three research questions were chosen which were thought to be adequate in motivating a full exploration of the post-conflict ASC:

Question 1: What post-conflict barriers affect the ASC?

Question 2: Which enablers can allow the agricultural sector to overcome these barriers or increase in functionality?

Question 3: Where in the supply chain are these barriers and enablers relevant?

These questions are broad and generic and it was accepted that their full resolution would be a formidable task and verification of the final results may be outside the scope of a single masters dissertation. With this in mind, the dissertation began by sweeping the academic literature, which provided a decent base of generic answers. However, there was discovered to be a lack of previous studies done using SCM terminology in post-conflict agriculture, where the functionality issues of the post-conflict sector are expressed as supply chain issues. Therefore, the extant literature on barriers and enablers was translated and synthesised with the developing agribusiness supply chain literature to provide a generic preliminary model for barriers and enablers in the post-conflict ASC. This provided an informant when deriving the research methodology and during the subsequent discussion.

The dissertation then proceeded by locating a case which would provide empirical evidence to resolve the disagreements in the literature and ground the research in empirical evidence. This case was found in Lebanon, which was chosen due to the fact that it is an excellent example of a post-

conflict ASC, with all the defining characteristics, and due to the researcher's comparatively good access, which is relatively novel in the academic community. The study then continued by conducting interviews and observations to produce a data set of qualitative data whose analysis could provide answers to the research questions, using Lebanon as a generic example.

Creating a simple list of identified barriers and enablers as a means of answering the research question would be simplistic and misrepresentative of the complex and diverse problems plaguing the post-conflict ASC. Therefore, and for the benefit of informing humanitarian donors and future researchers, the paper cumulates the author's understanding with the collected empirical evidence by creating a framework in the form of an annotated supply chain diagram (Fig 4.10). It is believed that this framework sufficiently answers the original research questions and meets the objective of documenting the post-conflict ASC in a manner that may be useful for humanitarian intervention.

5.2 Key Findings and Implications

It was found that many of the post-conflict agricultural barriers and enablers documented in the literature in nations like Mozambique (Bozzoli and Brück, 2009) and Kenya (Gerbresenbet, 2001) were also found in Lebanon. This implies that the framework generated in this study, grounded in Lebanon, is potentially transferable to other regions and gives hope for future research that may attempt to further generalise our results.

It was also evident that some of our other findings were previously undocumented in the academic literature, to the best of the researcher's knowledge. While studies have been done detailing barriers to sustained agricultural export in the developing world (Rahmat et al., 2016), one of the more remarkable findings from the data is the new depth of understanding as to why post-conflict agri-economies may struggle to be competitive in the export market, and to meet international quality standards. The data has added a rich contextual understanding to these barriers as well as presenting empirical data on some possible enablers which have been trialed in Lebanon. Included in this is the barrier of the ingrained social issue of **lack of cooperation** between the actors. The data suggests this is partly due to historic regional divisions, but it may also be symptomatic of a society ravaged by conflict. One respondent in the data suggested that even members of the same family will attempt to exploit each other and cooperation is almost impossible to achieve between neighbouring lots, even before religious, political and ethnic differences are introduced at the national level. Since compliance to international quality standards requires compliance at each step of the ASC (Rahmat et al., 2016) some respondents felt that without key cooperation between actors, enablers like

increasing supply chain visibility and **exploiting economies of scale** will be completely impossible to overcome.

In the case study an abundance of barriers to functionality across the supply chain were revealed, and potential enablers were also identified, as reflected in the framework (Fig 4.10). However, it is with great sadness that we report all documented pilot projects to improve functionality by means of improving cooperation between actors have been unsuccessful up to this point, even eleven years after the official end of national conflict. One section of the data even suggests that the barriers to functionality run so structurally deep, especially those rooted in social issues and governmental corruption, that the Lebanese agricultural sector, and the wider economy, may never recover from the conflicts. However, reports of the successful agricultural reconstruction projects in Mozambique (Bozzoli and Brück, 2009) and Rwanda (Musahara and Huggins, 2004) give optimism for the future, implying that the barriers documented in the post-conflict ASC framework are surmountable in Lebanon and elsewhere that the framework is applicable.

5.3 Weaknesses and Limitations

This section discusses some of the complications, weaknesses and data collection limitations in the reported research. Firstly, we will note that certain issues affect all masters dissertation research projects: parsimony on the part of the supporting academic institution and lack of time on behalf of the researcher. In the interest of parsimony, the data collection was limited in breadth, and analysis methods were limited to certain simple methodologies. However, it is believed that the resources available for the research, including academic support and mentorship as well as technological resources, were perfectly adequate for the amount of collection and analysis required for this study.

Equally, the research was limited in time, with a short three month timeframe designated to collect and analyse data. In response to this, the research methodology adopted a cross-sectional time frame, which allowed a snap-shot view of the current situation. Given more time, a longitudinal study would allow a deeper understanding of underlying themes, as would be beneficial in future studies. Moreover, a more generous time allocation would allow verification of the results. Ideally, it would be possible to repeatedly conduct the study over multiple cases and synthesise the findings, therefore improving validity of the conclusion and increasing transferability of the results, however this was not possible given the time constraints.

Furthermore, since the data collection took place in a fragile social, political and economic context, certain related factors posed a variety of limitations. Firstly, access was a big issue. Many of the farmers and agricultural producers are Syrian refugees or vulnerable populations heavily affected by conflict, living in rural and often unstable regions of Lebanon. This posed significant limitations on the researchers ability to interview agricultural producers, as was necessitated by the research questions. In response to this limitation, a snowballing technique was used which eventually lead to a farm owner who could provide data on agricultural production, however he was not necessarily representative of the typical agriculture producer, being a developed and modernised land-owner with political ties. Less limited research would enhance understanding around the production node of the supply chain, to gain a more representative understanding of food production in a post-conflict setting. In spite of this shortcoming, balance was found through academics and politicians who could relay an accurate account of marginalised producers, on behalf of those actors unreachable by the researcher.

Additionally, the researcher had to be aware that the research project was to some extent a form of intervention (Goodhand, 2000). This meant that the researcher, like an aid agency, had to be aware of how the data collection methods might affect the interviewees. Due to political tensions, especially between religious groups, it was often deemed prudent not to discuss previous interviews with new respondents, since disagreements may limit the participants willingness to continue the interview. This even limited the interviewers ability to present agreements or contentions with points being raised, possibly limiting the depth of investigation of the data collection.

Equally, the issue of self-presentation raised ethical issues and limitations for the research. Since the researcher has Lebanese heritage from a particular religious and social demographic, it was sometimes prudent to avoid discussions of certain social issues, and even to completely avoid self-presentation as Lebanese, in order to avoid potential dishonesty or hostility from the respondents. This raised ethical concerns, in spite of the fact that the interviewer identifies as an impartial academic observer he is unlikely to be perceived by certain respondents as neutral or altruistic (Goodhand, 2000), and as such it was necessary at times to be very mindful of self-presentation and to insure that the respondents understood the nature of the project as purely academic. However this further limited certain discussions and lines of questioning, due to the necessity of maintaining the desired impartial and academic discourse.

5.3.1 Generalisability of the Framework

A limitation of this research is the generalisability of the results and the ultimate success with which the research questions were answered. The research questions demanded generic answers of barriers and enablers effecting the post-conflict agricultural supply chain, however the answers supplied in this paper are firmly grounded in evidence from Lebanon. When revisiting the academic literature which documents studies elsewhere in the world in the light of our findings, many comparisons can be drawn and we see the same phenomena occurring in Lebanon as elsewhere in the world. This suggests that at least some of our results are transferable and generic, however the researcher must admit that some parts of the framework may not apply outside of Lebanon. To this end, the framework developed in this paper is deemed preliminary and represents the first steps in developing a similar framework in the future that may be transferable. However, a current limitation in our findings is their firm empirical grounding exclusively in Lebanon.

5.4 Recommendations for Future Research

This section makes some proposals for future research. As discussed above, the most interesting avenue for future research would go about testing the applicability of the framework developed in this study to other similar cases. This would involve studies following a similar methodology to the one developed here, applied to different regions and different conflict zones. It is hoped that this dissertation will have methodological merit for those studies, since certain methodological concerns in post-conflict supply chain explorations are considered and discussed here. It is also hoped that this study provides academic value, since we have intended to lay a foundation on which others may build. The hope of the researcher is that future studies may result in a more generalised framework of the post-conflict agricultural supply chain, which may act as an informant to aid agencies and those wishing to positively influence redeveloping economies.

More focussed areas of future research are also identified as gaps in the extant literature, exposed by our study. This includes a deeper understanding of the effect of the modernisation of retail on local food systems and on a competitive private sector, as well as the need for documented evidence relating to effective social cohesion programs in a post-conflict setting and their effect on agricultural production. Ultimately, a paper making recommendations on overcoming the barriers revealed in this study and other similar studies, based on rigorous research, would be of the upmost benefit to the global humanitarian community interesting in post-conflict reestablishment of agriculture.

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Appendix

Appendix 1: Interview Data Set: Anonymised, Fully Coded and Categorised

market since the conflict in Syria, for example Russia and europe. But Lebanon cannot comply to the strict quality standards. So they cannot often export to EU or Russia.

Lebanon is not able to conform to the quality standards, due to instability. They cannot guarantee compliance.

Equally, there is too much pesticides and fertilizer, because the farmers want higher yield for more profit, and this stops them from being able to export to EU. (low precipitation result in a need for fertilizer).

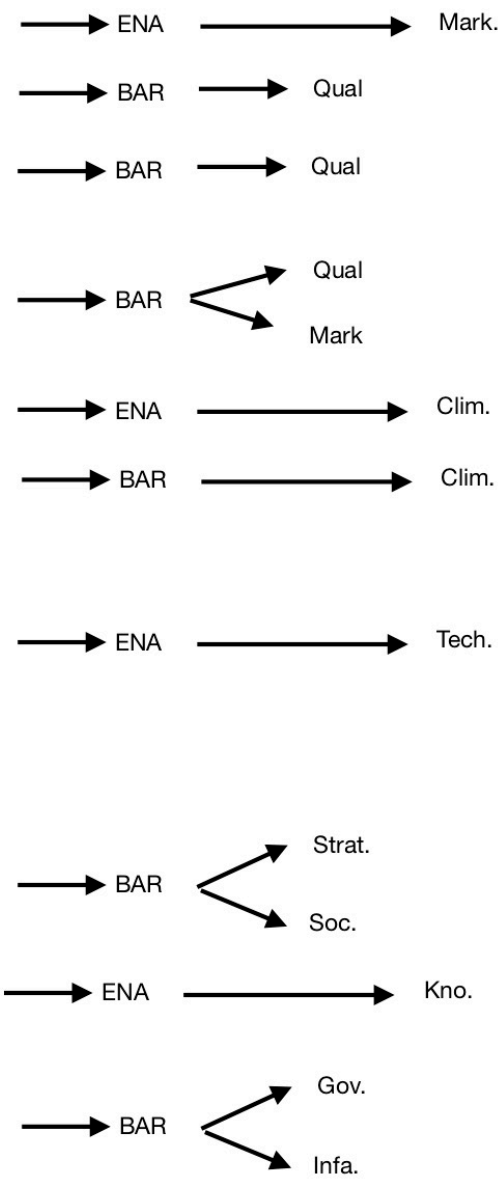
When precipitation is good, we have a high yield. When precipitation is bad, like this year it is very bad, the yield is very low. 52% of the irrigated land is irrigated by pumping of ground water. And 48% comes from surface water.

There is a need to move to a more intensive system, to increase yeild in a small area, using technology like hydroponics. New varieties of seed are needed. Also a move to organic products would allow the export of more products at a higher price.

Usually the new technology is introduced through the agricultural companies, who supply all inputs. These are Lebanese companies who import from europe, china and india. They dont have a long term strategy so they are always trying to sell more fertilizers and pesticides than is necessary.

LARI exists to conduct research to identify new potential for technology upgrades. Corruption and religion stops different governmental organizations from working together, or from working with private sector. Lebanon is very undeveloped, but it was taken over by a political class who are not interested in development. Now there is a muslim majority in power and they are not progressing the country. (at this point he made me stop the recording, however he said that a balance of power between christians and muslims helped the country be progressive and cater to all needs, now there is a majority muslim government who are not interested in creating progress for the country, and only cater to a small portion of the citizens)

The role of NGOs in development. The NGOs dont create systematic change. They have a beduin mentality, they have a postive effect as long as they are there, but then they move on.



Interview Data, Anonymised and Coded

	Category	Code	Sub-Code
Destruction of hydraulic infrastructure. Destruction of irrigations networks especially in the south. Largest irrigation scheme in lebanon, 4000 hecters irrigated. Oranges and bananas. Bananas now are exported to syria and Jordan by car. Pumping station was destroyed, it is now rebuilt. The crop is the same, the yeild has not improved. Due to the change in the export market the crop changed. Oranges are grown less and bananas are grown more. Because in Syria they cannot cultivate banana so they import bananas (cavendish).	→ BAR	Infas	
		Dest.	
The Israelis targeted the irrigation pumps, so they could say that Hezbollah caused the destruction of the pumps, to turn the population against Hezbollah. Almost a form of propaganda. However, it did not work. (he did not want to talk about political history).			
There is not precise statistical data.	→ BAR	Know.	
		Gov.	
before the war in Syria the labour was Syrian workers crossing the boarder to work. Now the Syrian labourers + family live in Lebanon, so labour has increased. This was a benefit.	→ ENA	→	Lab.
The problem now is exportation. The war in Syria has blocked the road between Lebanon, Jordan and the gulf. This has heavily influenced the export of agricultural products. Every day they hope the road will open.	→ BAR	Infas	
		Mark.	
The Lebanese products are disguinshed in the arab world. Very appreciated. Lebanon has surplus of a agricultural products, but no way to export. Only the premier quality can be exported by airplane, since it is so costly.	→ ENA	→	Qual.
	→ BAR	Infas	
		Mark.	
No problem with import of seeds and fertilizers because lebanon is open. Syria often imports through lebanon since they have a trade embargo.	→ ENA	→	Mark.
War 2006 destroyed roads and bridges and physical transport networks.	→ BAR	→	Infas
After war, exports out of lebanon stop, so foreigners go to other markets. The instability in the Lebanese agricultural supply (due to stop starts due to conflict) mean that lebanon looses its customer export base.	→ BAR	→	Mark
"readaptation" to the new conditions takes time. The government tried to find a new			

They look for low hanging fruit to help, without planning for the long term.

There is a huge problem with garabage in lebanon that is not being solved, due to government corruption. This garbage problem is creating pollution which is effecting agriculture and national health.

NGOs provide training for farmers on how to use fertilizer and pesiticides, but they dont usually provide financial support. They do provide infastructure or machinery.

If lebanon wants to grow in GDP they need to improve agriculture. Lebanon can be and agricultural economy. Lebanese products are very high quality, and are preferable to other products. They have low durability and very high quality. Climate change is meaning that the quality of fruit is declining.

Export companies do not get fruit from farmer directly. There is an intermidiary who brings the farmers produce to the local market (in most cases). Not a developed retailer (Like spinneys). All the traders go to this market to buy from the intermediaries. The food then goes to a factory.

In the Producer factory they then seperate fruit and veg by quality, selecting the primary quality. They then do cleaning and packaging. Farmers are traditional.

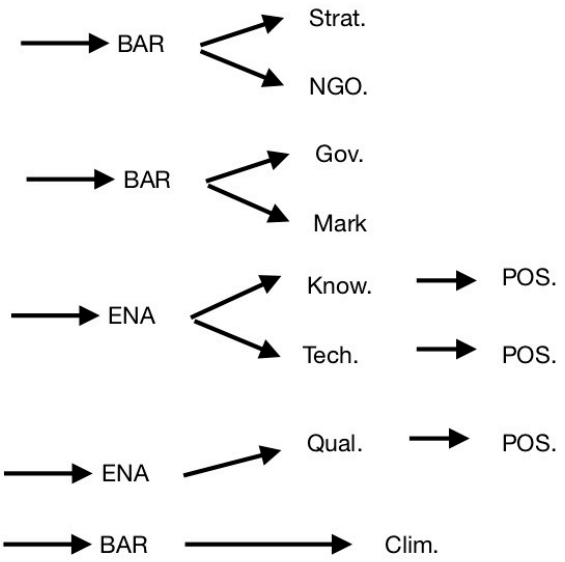
Producer focusses on only primary quality veg since they are exporting by air. There are also firms who export secondary quality products en masse to the gulf by air, for sale in local markets in the gulf.

Producer works with carrefore and modern retailers to supply primary products. The secondary products dont end up in carrefore.

The highest quality Lebanese products are not desirable in europe because they are not as durable.

Farming in lebanon is not modernized. So they dont use seed variants and technology (such as excessive cooling technology) that prolongs life cycle and increases durability, like they do in europe. This is a barrier for export.

There is only one factory in Lebanon that has the technology to cool cherries to increase their life cycle and durability.

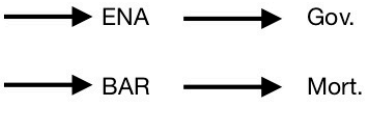


The exporters of secondary products could not increase price to accommodate increased cost, and so they went bankrupt.

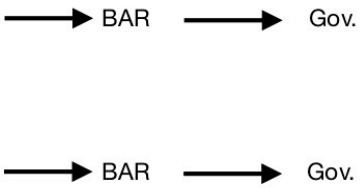
High quality export companies now have far more competitors, since more firms have moved in to their market of premium quality exports.

Post war reconstruction is halted by new conflicts and instability. The war with Israel stopped reconstruction efforts from the previous war with Syria in 1999.

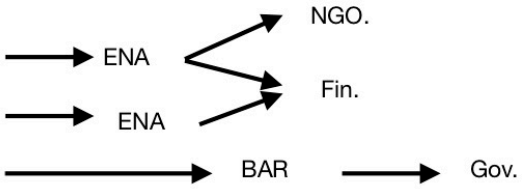
Hariri private company: solidaire. Construction company that bought lots of land after the war for reconstruction. Reconstruction stopped when Hariri got assassinated.



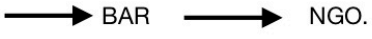
Solidaire (the construction section of IDAL), very controversial and corrupt. The intention of the program is to rebuild lebanon, including in terms of agriculture. However farmers were negatively effected by the program, since it just aided a certain section of the population. Shop owners (retail) were coerced into selling their businesses to facilitate modernization and development of retail. Hariri's programs were heavily to the benefit of Syria. People mostly disadvantaged by rebuilding efforts were small business owners.



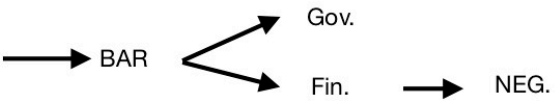
Financial aid for small companies comes from private sector, not from the government. Private multinational companies offer grants and give small capital grants. There are no government initiatives.



Humanitarian Foreign aid does not help the private sector in Lebanon and the cause must help their agenda. Eg directly aiding refugees.



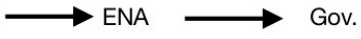
Business licences are very selective. Its very hard to start a business, since the agencies that provide the licences are owned by the elites and they restrict competition by restricting access to trading licences.



There is no agricultural policy like the CAP (common agricultural policy)

In lebanon the gov does not support farmers

2 crops subsidies: wheat and tabacco. Wheat subsidies from ministry of economy and trade. Tabacoo: national board under the ministry of finance



Export subsidies from IDAL - still running (very good thing)

The ministry of agriculture in Lebanon campaign for a certain target. Recently Lebanese apples has been a target for propoganda. The regions that the apples are grown is a politcly delicate region, and the ministry wants to be seen to support these regions. To that end, they organized an apple trade agreement with Russia specfically for these apples.

→ BAR → Gov. → NEG.

→ ENA → Gov. → POS.
→ ENA → Mark.

The government does not support agriculture, except where it will benefit their political cause.

→ BAR → Gov. → NEG.

The agricultural sector works independently, without government aid.

→ BAR → Gov.

The government has run a program in the past which benefited the agricultural sector. The program: IDAL.

→ ENA → Gov.

Created in the early 2000s, it was a private organization that is now public. It was started by Rafiq Hariri (the prime minister at the time) with the aim of supporting all Lebanese exports, including agricultural products. For example, fruit exports were given incentives. This helped grow the export market, since efforts were made to increase exports to benefit from the extra profit. The program also insisted on high quality export products. And then Hariri got assassinated a few years later and the program lost its drive. IDAL is now much less effective.

→ ENA → Gov.

→ BAR → Gov.
→ BAR → Mort.

Dont believe the government rhetoric, the minister of agriculture doesnt actually know about agriculture. They are given the position based on their religion, because power HAS to be distributed evenly. This means that the minister of agriculture is not an agricultural expert.

→ BAR → Gov.

Agriculture can result in a high income for the country.

When the Syran conflict happened, 30% of agricultural exporters went bankrupt. This was due to the massive increase in cost of transportation, since the road became dangerous and then completely blocked. Barrier: transportation cost and being unable to afford that cost.

→ BAR → Mark.
→ BAR → Infa.

The exporters of high quality products were resilient, since the foreign customer is willing to pay more and could accommodate the price increase associated with increased transport cost from the war in Syria.

→ ENA → Mark.
→ ENA → Qual.

GAFTA - great Arab free trade agreement
EU association agreement

Structural problems! High cost of production because lack of economies of scale, small holding sizes. 30% of total land.

Agricultural labour force is mostly Syrian

Consumer affected: price fluctuations

Difference between smuggling (there is no tax) either way: means lack of inspection.

Post conflict:
Data + emergency plan
Distribution of seeds and seedlings (distribution of input) - rebuilding farmers and capacity
Land reclamation post war + hill lakes (like a resevoir) water harvesting
Governance problem: lack of irrigation (managed by ministry of water and irrigation)

Steering committee with EU donors (ross program)
Sometimes donors work with NGOs, sometimes with Ministry (USaid for example works with NGOs, possibly to avoid the politics)

Role of NGO
NGOs are very close to the local communities
NGOs work with ministries often
Ministry allows NGOs to carry out projects
Passive vs active

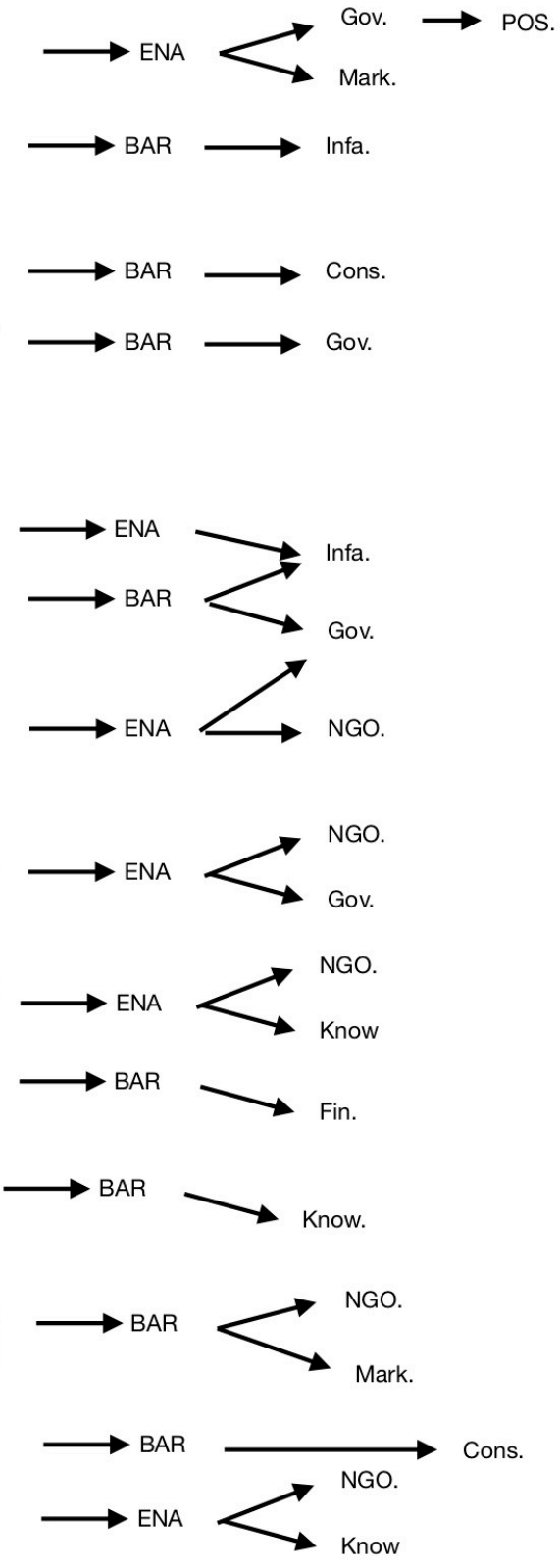
NGOs aid mostly in training and support (soft assistance)

Economic growth stunted due to pressure from refugees, job competition etc.
NGOs help with food and shelter, not big assistance.
Historically the agri labour force is Syrian
No consumption surveys.

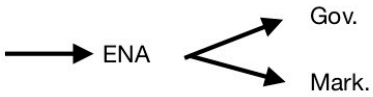
Most important crop: olive
WFP give food to Syrian refugees (like food stamps) - providing products from syria.
World food program distributes food to Syrian refugees, but they import this food, often from Syria! So it doesnt benefit the Lebanese agricultural economy.

Consumer tends to buy more and stockpile

Introducing new varieties + good use of fertilizers and pesticides + tranfering technology to the farmers

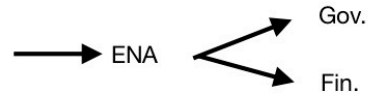


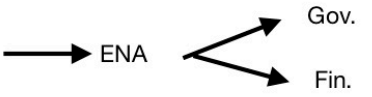
Participate in trade fairs to negotiate trade deals.



Future of agriculture in Lebanon:

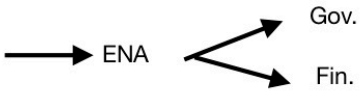
The government should increase invest in agriculture
AGRI is an important sector!
Not just social supporting small farmers
Very limited budget goes to agri.
Rationalize expenditure and increase investments
Agriculture is more a hobby, commercial farmers are a minority, they are attempting commercial techniques.



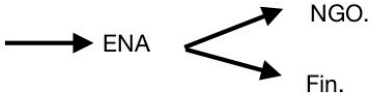


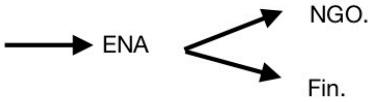
Agroprocessing vs agriculture
50 billion is spent in the EU

Mckenzie: future of the Lebanese economy.
Legilization of the medicinal crops + cash crops



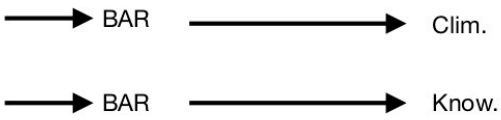
Very important that outside actors know about the political situation
Take in to account risk mitigation. Use risk mitigation strategies.
Volume is low in Lebanon. Logistics and trust issues need to be considered.
Most important issue for development.
Improve quality of product. Very important.
Very difficult issue.





Standards for agro-quality. HACCP.

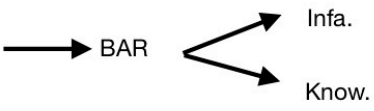
Farmers are scared of having 0 return. Due to global warming, new insects and diseases, they must spray pesticide out of fear. Short term mindset means lack of screening of new products.



What role do the NGOs play in development of Lebanese agriculture
Effects of 2006 war + Syrian refugee crisis on Lebanese agriculture. Is redevelopment needed?
Development / redevelopment

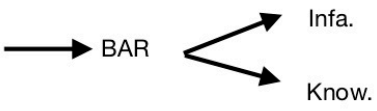
War: effect on demand

Cannot reach consumer due to war zone
Apple trees cut down! Inventory too high
No connection between producer and consumer

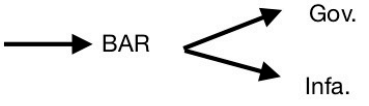


Stakeholder analysis of stakeholders

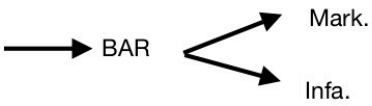
Farmers bear most of the risks. If route to market is blocked, the farmer cannot receive compensation for his crop. He will immediately give up farming during wartime and do something else (driving, fighting etc)



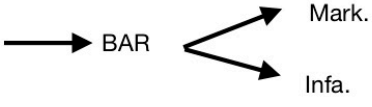
Vegetables get smuggled in to lebanon from syria. Smuggling en masse from syria can be cheaper than production in lebanon because lebanon does not profit from economies of scale. Costs for inputs are also higher in lebanon. Lebanon cannot compete even in the domestic market with imports from syria (smuggled).



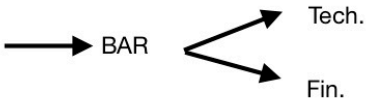
Syria cant grow banana plants. Bananas from the farms are sold in the local market, they're not in the supply chain of any modernized retail.



There is not a lot of land for agriculture in Lebanon, so Lebanon cannot be competitive in exports using only traditional farming methods.

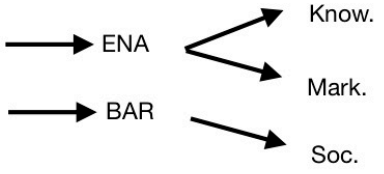


Farmers grow with traditional methods, not high tech growing. High technology is every expensive, and not available for Most farmers.



Land in Lebanon is divided by fruit. Different regions can only support certain fruit types.

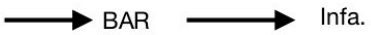
Farmers are experimenting with new agriculture like Lychee and avocado, to diversify as a form of risk mitigation since everyone is has started growing bananas and the price is going down



The farmer just sells straight to the trader and the trader will take it to market. All farms work like this.

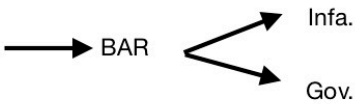
There is good visibility in market prices, so the farmers get a good price for their fruit, since they know the value of fruit.

The problem is apples. They dont have storage capacity to store them. The "apple crisis" is a real thing.



The agricultural sector in Lebanon does not have a future. Lebanon cannot overcome the barriers.

Lebanon building development limits agricultural potential. Only 5% of Lebanese land is being used for growing crops. If the government could help, agriculture could improve in lebanon. A huge portion of the land is being used illegally to grow illicit crops like



hashish that do not benefit the Lebanese economy. If the government could use that land for growing crops then it could boost agriculture in lebanon, but they cant because that is hezbollah territory.

The government is talking about legalizing the hash crop as a cash crop, But it has an associated risk since it could result in an over supply and it wouldnt be profitable.

Input supply of natural fertilizer comes from the gulf. Lebanon is over populated and they have to import to meet the demand for food. Lebanon cant compete with the cheap imports, this a big barrier for the agricultural sector.

International aid helped rebuild infastructure very qucikly after the 2006 war.

The wheat and the tobacco gets subsidies, but there isnt much production of wheat. So tabacco crop in the south, in the Shia region, recieves aid from the Shia government, even though they dont actually produce. Its cheaper to import cigarettes from overseas, so the government grants just get pocketed by the Shia leaders in the region, and import the tabaccoo, so on paper they have a tobacco output, but its actually imported cigarettes.

IDAL is no longer running, the farmers dont like to use IDAL because its so unreliable.

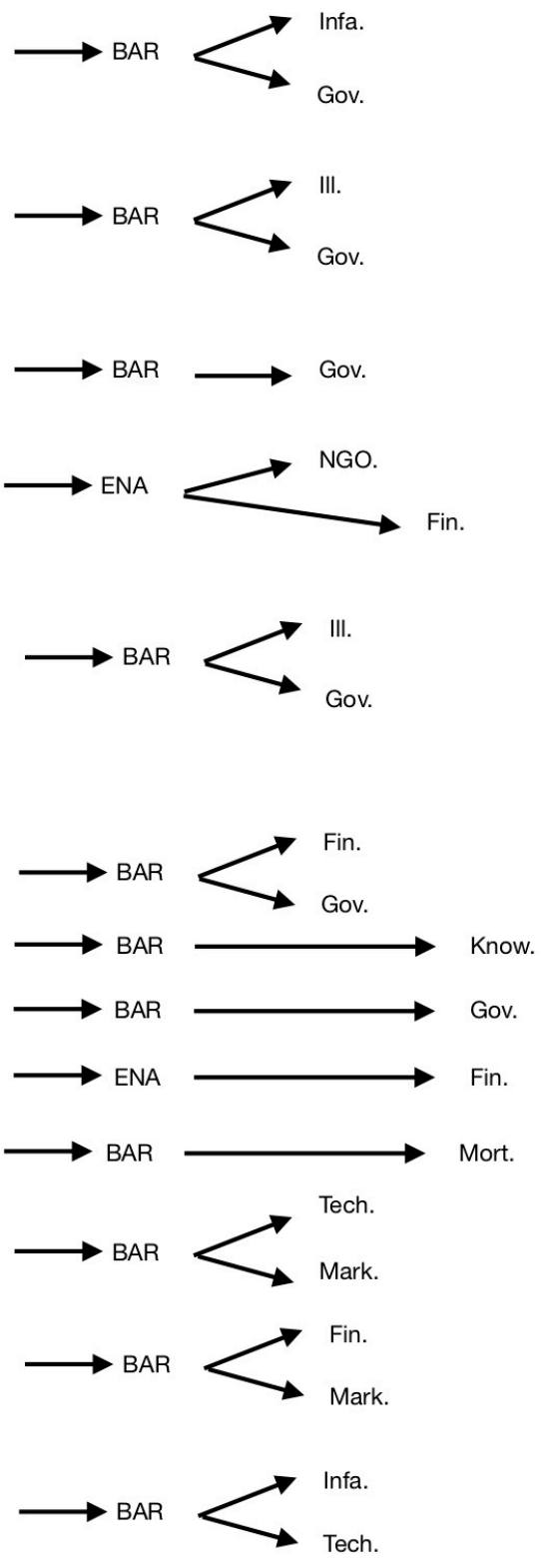
IDAL spinoff gov program provides training.

Governance is the big issue. They need to increase the budget for government agricultural projects.

It's all political issues. Hariri started IDAL to help lebanon initially, but since his assassination it doesnt help any more due to corruption.

They cannot export fruit, apples in particular. Since they dont have tech, and neighbouring war is blocking trade routes.

It cost a lot of money to rebuild after the 2006 war, and now they have capacity again but they cant reach the market. Physical infastructure rebuilding has left them with a huge excess of capacity, it was a bit of a waste of money. The product cant reach the foreign market (due to barriers) and it cant be sold on the domestic market. The war in syria has blocked the route for refrigerated trucks.



All exports from lebanon are being blocked by the Syrian war.

Let's hope that this war will end soon.
Lebanonis going backrupt because of this war.

The climate in lebanon means that the fruit in lebanon is very high quality. Quality is not an issue for Lebanese fruit.

Electricity is a huge problem. It would save money to solve the issue but corruption means that electricity problem is not solved. Eg. Power stations dont get built because the private companies who supply electricity are owned by the politicians and their families.

Biggest barrier is political stability. There is no political stability because of religion and war in the area. The religions all have allegiances with other world powers, and this means they are controlled by outside powers, so the leaders dont serve the population and the country.

Pollution is a big barrier for exports since polluted water means that products cannot meet international standards.. And pollution is a result of government corruption.

There is no visibility in prices for the farmer.

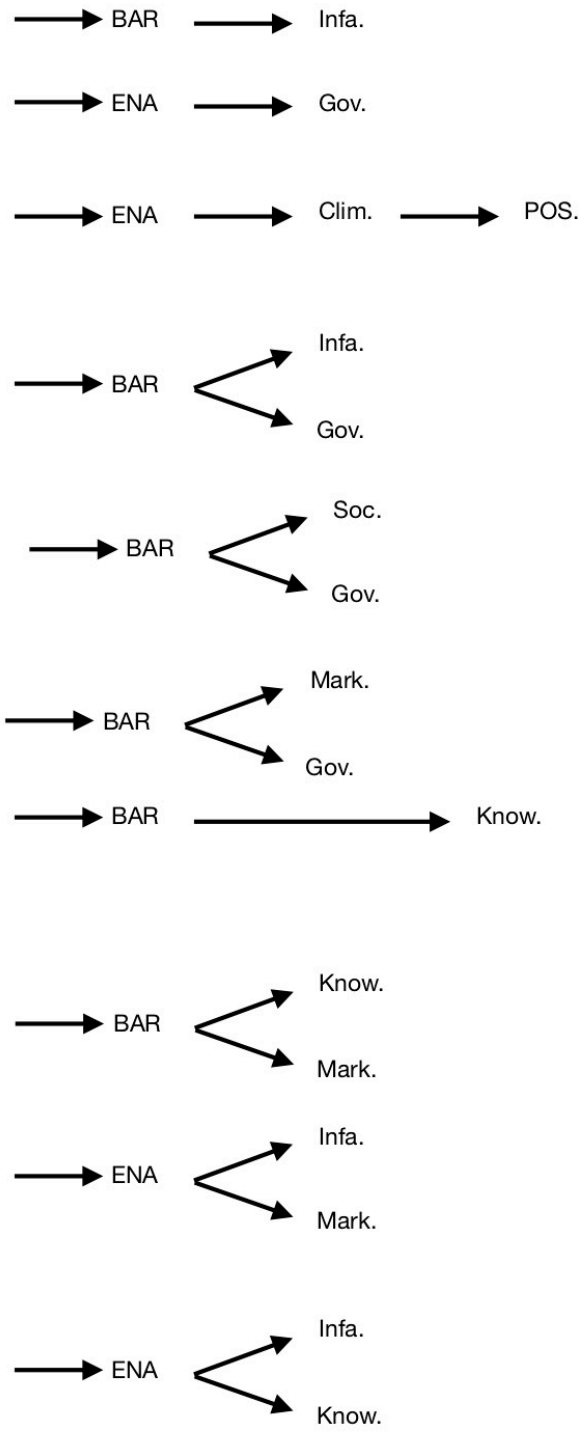
Apple crisis: the price of the product is very low. There is a lot of production and the supply is higher than the demand because of many factors.

Many producers plant the same variety at the same time (lack of horizontal coordination) => big production that goes to the market at the same time

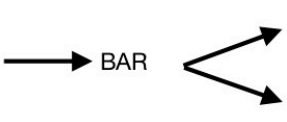
NGO project 1: allows storage of the product so it can be sold out of season, or sold in intervals.
Export market needs a certain quality of fruit, project allows sorting and grading of fruit for export (enabler).

NGO Project 2: Improve tech. Long storage for apples, potatoes, grapes etc. and grading + sorting. pre-cooling, which cools the product quickly to improve storage quality, with humidifiers. Farmer can also monitor his product online improving information link across supply chain.

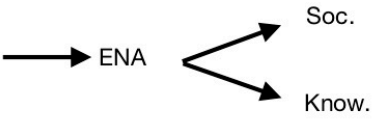
Aim is to target many small farmers, solve apple crisis.



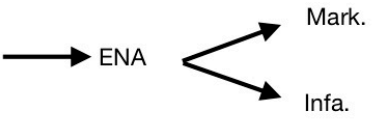
The middlemen/traders benefit from the apple crisis by buying apples at a very low price. Last year, traders increase price of goods by 500%. Interviewee argues that this is **exploitation** and an unjustified price increase. Sometimes the traders pay less than cost for the apples.



Arc en Ciel as an NGO aims to help the farmer in terms of improving cost transparency along the supply chain. They also want to become the input supplier and producer in the supply chain, offering these services to the farmer in a sustainable, moral and environmental way.

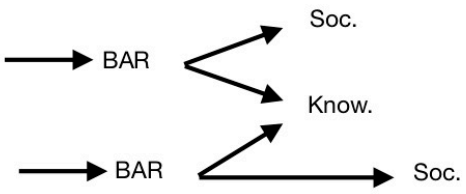


They are attempting to solve supply demand imbalance by introducing new products such as apple chips, and finding new export markets this involves helping farmers meet specifications for export market.

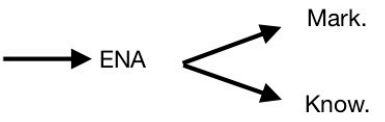


Farmers use unnesccesary pesticides and non-regulation fertilisers. This is because of subquality input suppliers who exploit farmers desire to increase yeild (open market is actually a barrier?)

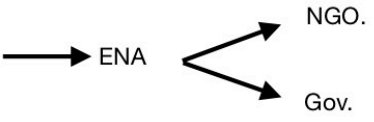
The farmer in lebanon is very hard to convince to change his ways, they think they know it all. To convince the farmer you have to “insure the commercialisation process”. This involves giving the farmer a lot of services as an incentive to adopt better practices. <- incentive



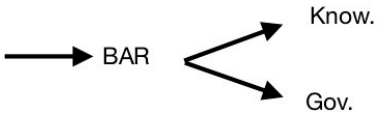
Incentive vs penality. The aim of the NGO is to influence public policy and strategy, alongside the ministry. So that they can impose legal penalities to oblige the farmer to conform to international standards. But this must be done alongside the government!



The lack of good practices dont just affect Lebanons ability to export. The high use of pesticide and fertilizer result in high rates of cancer in the Lebanese population. The ministry of health is not publishing correct figures! They publish fake numbers to make it seem like less of a problem! Air pollution and sea pollution are a huge problem.



If the government was working properly there would be no need for Arc en Ciel or other NGOs to work.



So the aim of the NGO is to do the job of the government, in order to convince the government of the value of changing legislation. This has worked in the past Eg. with their mobility program where they worked

with the social ministry to change the law for the benefit of mobility impaired Lebanese.

There is not a technology barrier, the famers have access to the technology. The problem is with the conventions (the farming methods employed by farmers) and the cost of production. There is foreign agricultural supply chains out-competing the domestic supply chain. And there is no protection for their local producers. They have free trade with arab nations, so products can enter without taxes and fees, and so its cheaper to buy Syrian products in lebanon than Lebanese products. They also have EU products entering lebanon freely, but lebanon cannot sell to the EU! Lebanon can export to EU in theory, but they cant meet the EU standards.

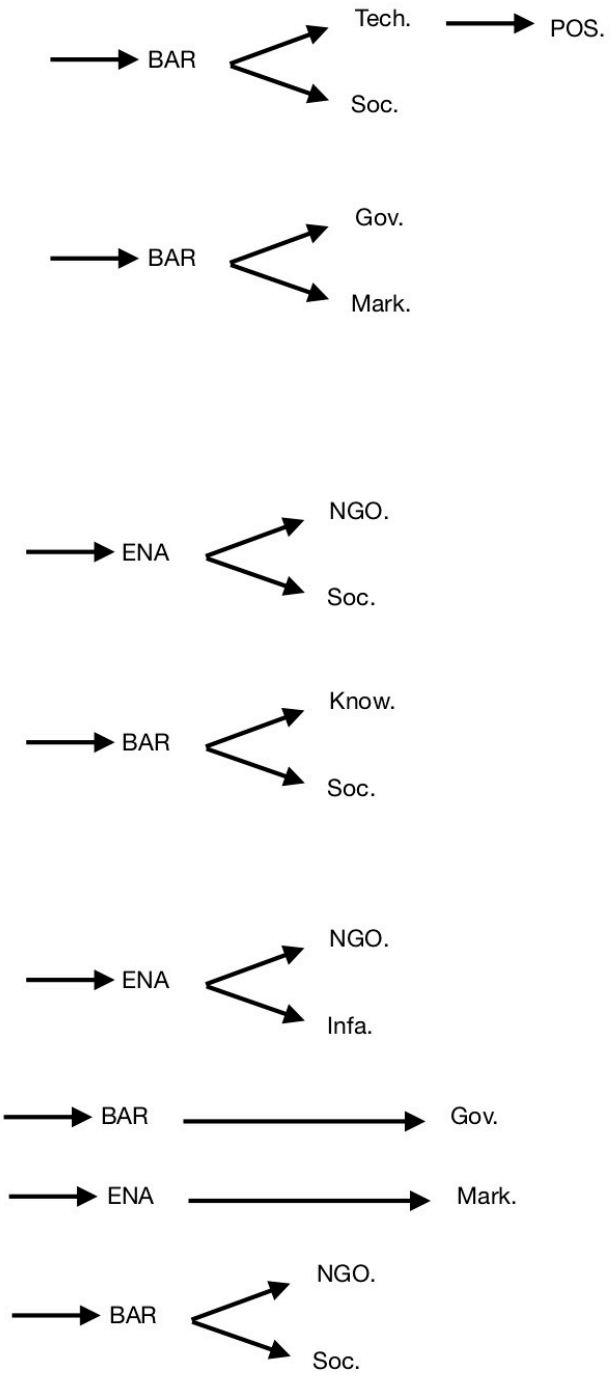
Cost of production is very high in lebanon. This means that Italian apples in lebanon can be cheaper than local products! (Or Egyptian potatoes). Lebanon has small farms, however NGOs want to put farmers into a network so they can benefit form economies of scale, in buying inputs and in sales.

Retail: farmers currently sell to traders working in halls. There is very little transparency in sales amount and price. This system (*Bel amene* - with confedentiality) means farmers give their product with trust to the trader, and trust that they wont exploit them, but they do. But this is the only system available for the farmers.

After the 2006 conflict, NGos did a lot of projects in the south, rebuilding orchards, rebuilding irrigation channels and equipment to help Co-ops. They also helped rebuild roads and infrastructure. Rebuilding of roads and bridges is mainly done by the government and Hezbollah. The Iranian government helped build a motorway. Foreign donors also helped. The official Lebanese government does next to nothing in terms of rebuilding.

NGO Project 3: Trying to provide an avenue of sales for farmers (new supply chain direction), Providing a new avenue of sales didnt work out due to lack of co-oporation with farmers. Farmers attempted to exploit the situation and charge a higher price to the NGO. NGO they did not have enough selling points, they could not sell all the production, so it wasn't cost effective. It did not work out, but the idea was very good, they will try the project again.

Before the big civil war, there was no production in Lebanon, people preferred to



trade and Lebanon was a service economy. This is not possible now, since the Lebanese economy tanked, so they have to start producing themselves since they have little buying power. This means that all the development of Lebanese agriculture is new.

There is so much conflict in Lebanon, even between neighbours and brothers, which makes horiztonal integration almost impossible.

Enabler: verticle integration. Arc en Ciel tries to do vertical integration to insure commercialisation of the products and information flow on prices and demand. They are trying to modernise retail so they can take 100% of key suppliers output and make sure that it can be sold at market.

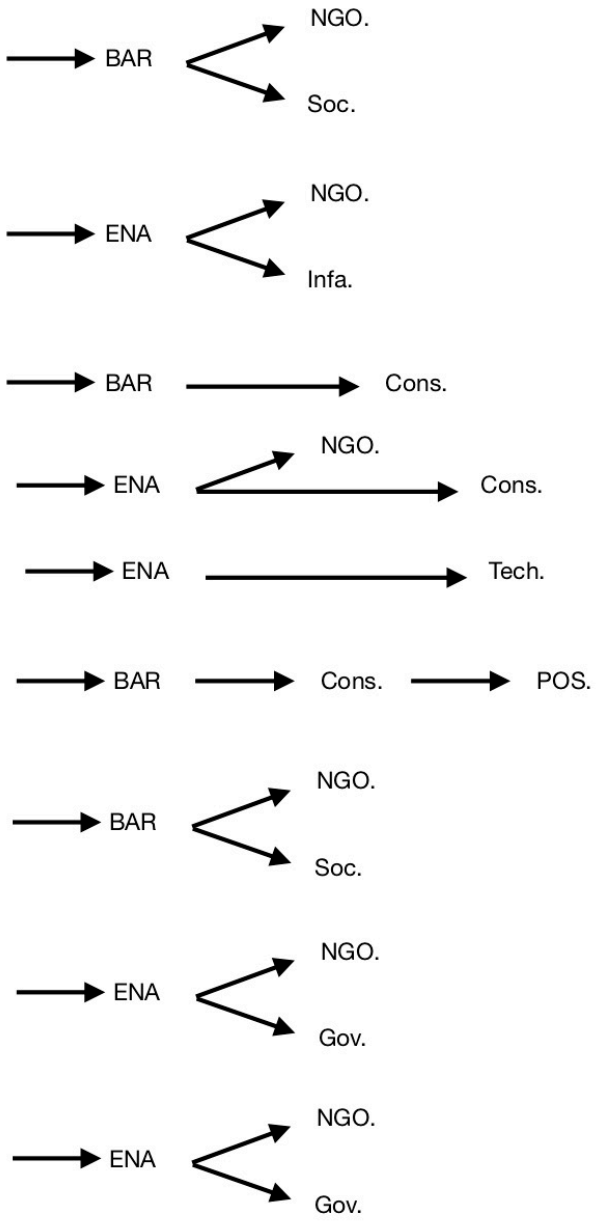
The Lebanese consumer has an old fashioned mentality and it is hard to sell them new products. However, if products can be introduced properly, with proper marketing, the consumer can adjust their buying habits.

Enabler: improve technology. Reduce costs of high tech products and provide specialised technology to meet the specific needs of the Lebanese producer, to increase production.

Things that are not a barrier: people dont buy based on political allegiance eg. They will buy from muslim regions if they are christian etc.

The key to changing the system is to change the behaviour of the players. The farmers, traders and retailers all act in their own interests and in Lebanon it is worse than in other places. In Lebanon there is 0 cooperation between players, they only look after themselves. So to change the behaviour of the players, and get the whole system working better, you have to offer a combination of incentive and penalties to motivate different behaviour. This means changing government legalisation

NGOs act to create changes to legislation by running pilot projects, to demonstrate positive change, collecting data to quantify the change, then pushes politically to change legislation. This is very difficult.



Appendix 2: Key Extracts from Secondary Data Sources

Appendix 2.1

Key Extracts from: Agriculture and Rural Development Programme. (2015) *Ministry of Agriculture: Strategy, 2015 - 2019*.

Table 1: GDP per activity at constant prices (in billions of LBP)

Description	2007	2008	2009	2010	2011
Gross Domestic Product (GDP)	44 093	48 117	53 075	57 300	58 436
Agriculture and Forestry	1 282	1 160	1 215	1 334	1 469
Annual change	*-3.17%*	*-9.52%*	*4.74%*	*9.79%*	*10.12%*
Livestock and livestock products, fishery	841	847	899	871	891
Annual change	*11.69%*	*0.71%*	*6.14%*	*-3.11%*	*2.30%*
Total of agriculture production	**2 123**	**2 007**	**2 114**	**2 205**	**2 360**
Annual change	**2.21%**	**-5.46%**	**5.33%**	**4.30%**	**7.03%**
Percent of GDP	**4.81%**	**4.17%**	**3.98%**	**3.85%**	**4.04%**

Source: Central Administration of Statistics (CAS)

Table 2: Agriculture trade balance - agricultural and food products exports and imports (in millions of LBP)

	2010	2011	2012	2013
Agriculture and food products export	**816 794**	**932 379**	**969 878**	**1 141 994**
Annual change		*14.15%*	*4.02%*	*17.74%*
Agriculture and food products import	**4 254 569**	**4 757 316**	**4 931 635**	**5 173 678**
Annual change	*11.81%*	*3.66%*	*4.91%*	
Agriculture balance	**-3 437 775**	**-3 824 937**	**-3 961 757**	**-4 031 684**
Annual change		*11.26%*	*3.58%*	*1.77%*

Source: Lebanese Customs

Table 3: Ministry of Agriculture annual budget during the past five years (in billions of LBP)

	2009	2010	2011	2012	2013
Annual Budget	41	78	88	100	67
Annual change		*+90%*	*+12.8%*	*+13.6%*	*-33%*

Source: Ministry of Agriculture Accounting

Table 4: Agricultural labour (Agricultural Census 2010)

Number of farmers (holders)	**169 512 (8.6% females)**
Average age of farmers	**52 years (55 for females)**
Number of permanent family agricultural labour	**165 600**
Number of seasonal family agricultural labour	**239 000**
Number of hired permanent agricultural labour	**51 050**

Source: Ministry of Agriculture Statistics

Geographically, Lebanon offers a strong diversity where there are 40 different homogeneous regions presenting distinct socio-economic and geopolitical characteristics. The Bekaa and the North of the country cover 67 percent of agricultural land, mostly held by large commercial farms, while the South is rather characterized by small farms mostly in remote areas.

Appendix 2.2

Key Extracts from: FAO and the Ministry of Agriculture. (2012). *Resultats Globaux du Module de Base du Recensement de L'Agriculture 2010*.

FIGURE 1.2- Répartition du nombre des exploitants agricoles par Mohafaza (En %)

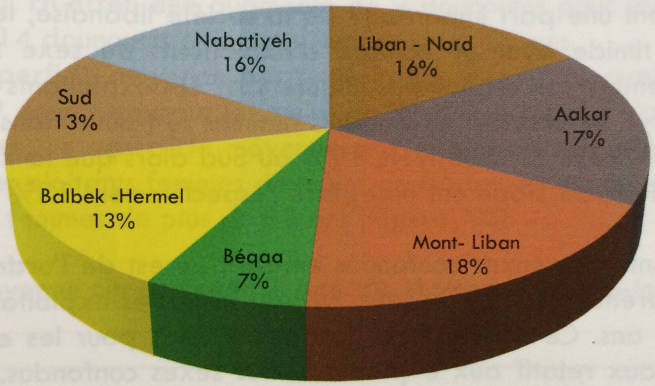
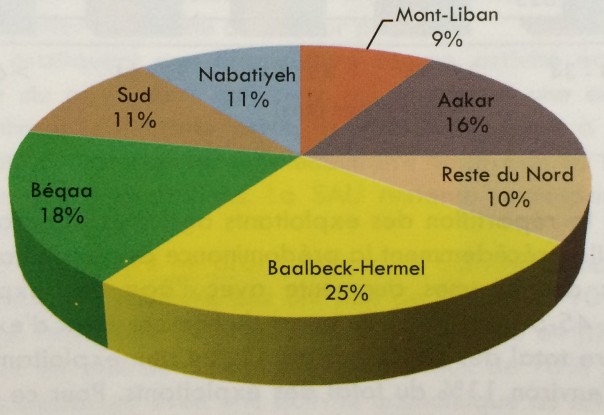
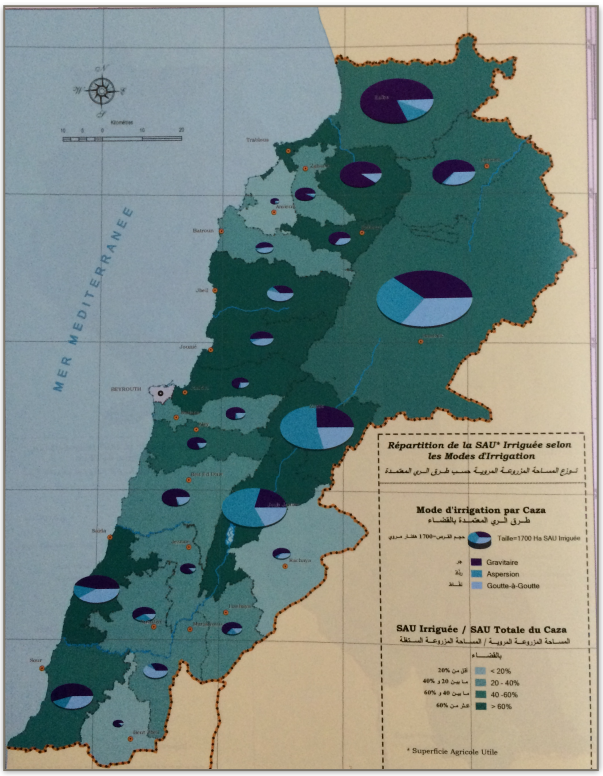
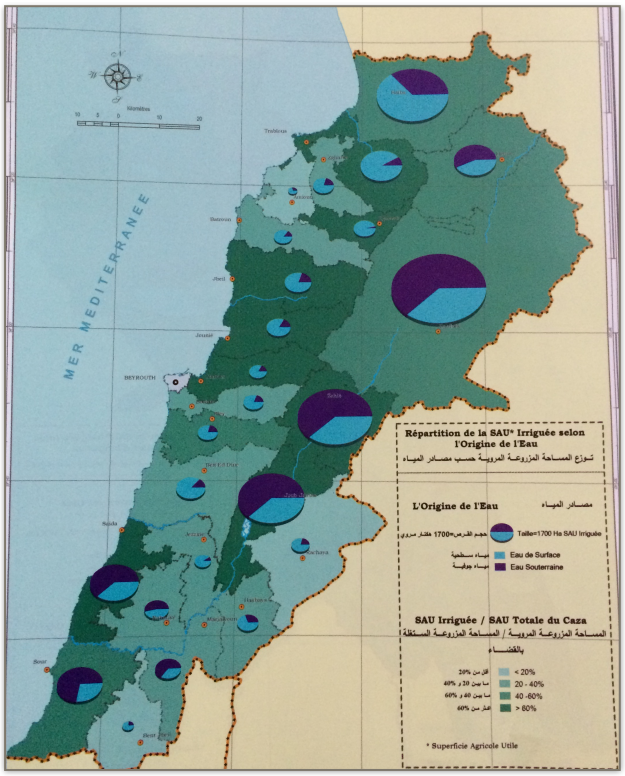


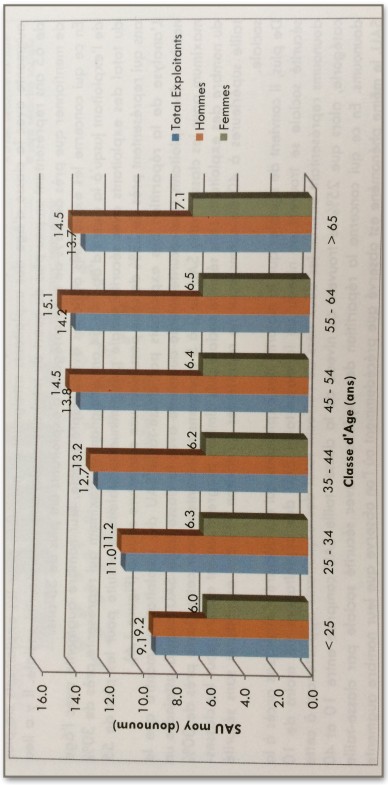
FIGURE 1.3- Répartition de la SAU des exploitations agricoles par Mohafaza (En %)




MER MEDITERRANEE
Répartition de la SAU* Irriguée selon les Modes d'Irrigation
Mode d'irrigation par Caza
Taille=1700 Ha SAU Irriguée
Gravitaire
Aspersion
Goutte-à-Goutte
SAU Irriguée / SAU Totale du Caza
< 20%
20 - 40%
40 -60%
> 60%
* Superficie Agricole Utile


MER MEDITERRANEE
Répartition de la SAU* Irriguée selon l'Origine de l'Eau
L'Origine de l'Eau
Taille=1700 Ha SAU Irriguée
Eau de Surface
Eau Souterraine
SAU Irriguée / SAU Totale du Caza
< 20%
20 - 40%
40 -60%
> 60%
* Superficie Agricole Utile


MER MEDITERRANEE
Répartition de la Superficie des Cultures Permanentes et Saisonnières
Superficie des Cultures Permanentes et Temporaires
Taille= 5000 Ha
Cultures permanentes
Cultures temporaires**
SAU* / Superficie totale caza
< 15 %
15 - 25 %
25 - 40 %
> 40 %
* Superficie Agricole Utile
** Y compris les différentes successions de cultures


Total Exploitants
Hommes
Femmes
Classe d'Age (ans)
< 25
25 - 34
35 - 44
45 - 54
55 - 64
> 65
SAU moy (dounoum)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
9.1
9.2
11.0
11.2
12.7
13.2
13.8
14.5
14.2
15.1
13.7
14.5
6.0
6.3
6.2
6.4
6.5
7.1

Appendix 2.3

Key Extracts from: FAO and the Ministry of Agriculture. (2010). *Agriculture in Lebanon: Facts and Figures*.

3. Number of agricultural holdings by size of holding

Mohafaza	Size of holding in hectares of UAA				
	< 1	1-6	6-20	20-50	> 50
	Number of agricultural holdings				
Mount Lebanon	26 710	4 218	200	33	17
North	21 157	6 105	325	33	16
Aakkar	18 105	9 184	756	61	14
Bekaa	6 965	4 170	995	264	122
Baalbeck-Hermel	9 598	9 960	1 640	292	79
South	16 662	4 770	556	99	24
Nabatiyeh	19 668	6 251	394	53	16
Lebanon	**118 865**	**44 658**	**4 866**	**835**	**288**

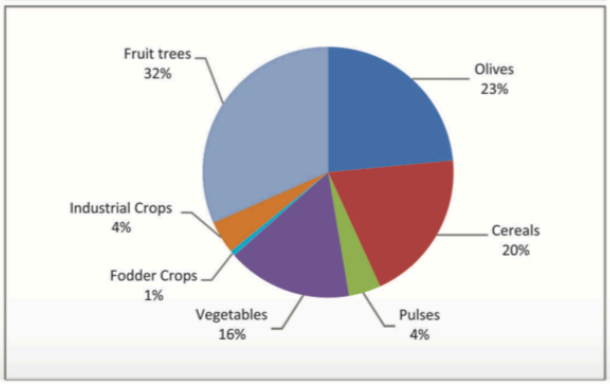
About 70 percent of holdings have an average area less than 1 ha, 26 percent have between 1-6 ha and only 4 percent have more than 6 ha.

4. Utilized Agricultural Area (UAA) by size of holding

Mohafaza	Size of holding in hectares of UAA				
	< 1	1-6	6-20	20-50	> 50
	UAA (ha)				
Mount Lebanon	8 205	7 451	1 734	950	2 247
North	7 597	11 182	2 894	856	1 537
Aakkar	6 923	18 579	6 961	1 745	1 145
Bekaa	2 398	9 576	10 286	7 695	11 696
Baalbeck-Hermel	4 075	22 566	16 025	8 567	6 393
South	5 709	9 599	5 311	2 793	2 210
Nabatiyeh	7 211	12 250	3 659	1 416	1 559
Lebanon	**42 117**	**91 202**	**46 870**	**24 020**	**26 786**

About 18 percent of the total land area is located in holdings with less than 1 ha, 40 percent between 1 - 6 ha, 20 percent between 6 - 20 ha and 22 percent in holdings greater than 20 ha.

5. Distribution of major cropland in Lebanon



6. Cropland by type (ha)

Mohafaza	Total crop land	Temporary crops	Permanent crops	Greenhouses
Mount Lebanon	19 753	2 077	17 151	525
North	23 862	2 695	20 690	477
Aakkar	38 863	20 602	16 688	1 574
Bekaa	44 687	32 035	12 566	86
Baalbeck-Hermel	54 012	30 143	23 650	219
South	25 546	4 764	20 154	628
Nabatiyeh	25 478	10 156	15 029	293
Lebanon	**232 200**	**102 471**	**125 928**	**3 801**

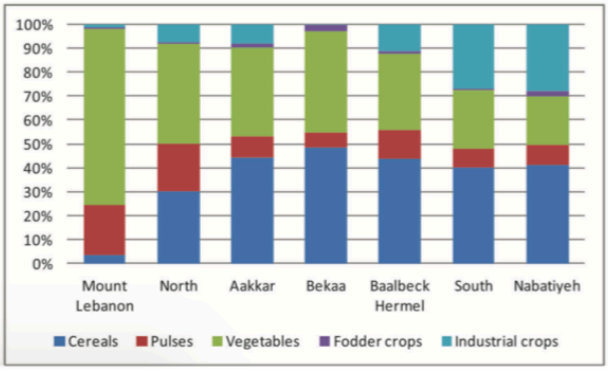
The total cropland area is 232 200 ha (including successive cropping) of which 54 percent are under permanent crops, 44 percent under temporary crops and 2 percent under greenhouses.

7. Major temporary crops by groups (ha)

Mohafaza	Cereals	Pulses	Vegetables	Fodder crops	Industrial crops
Mount Lebanon	72	430	1 539	0	36
North	815	529	1 130	19	203
Aakkar	9 141	1 794	7 657	305	1 705
Bekaa	15 593	1 942	13 518	873	109
Baalbeck-Hermel	13 205	3 530	9 704	210	3 494
South	1 897	393	1 165	23	1 285
Nabatiyeh	4 201	836	2 064	189	2 867
Lebanon	**44 924**	**9 452**	**36 776**	**1 620**	**9 699**

Around 44 percent of the total area under temporary crops is cultivated with cereals, 36 percent vegetables (of which 16 percent tuber crops, 20 percent leafy and other vegetables), 9 percent pulses, 9 percent industrial crops, and 2 percent fodder crops.

8. Distribution of major temporary crop groups by mohafaza

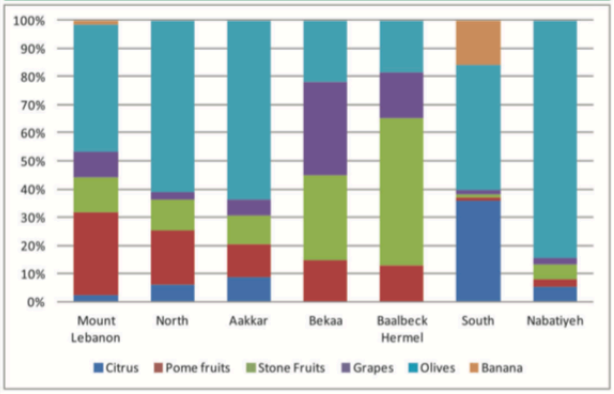


9. Major permanent crops by groups (ha)

Mohafaza	Citrus	Pomefruits	Stonefruits	Grapes	Olives
Mount Lebanon	286	3 491	1 505	1 070	5 392
North	1 225	3 838	2 215	479	12 213
Aakkar	1 378	1 786	1 629	892	9 945
Bekaa	2	1 761	3 565	3 945	2 629
Baalbeck-Hermel	13	2 873	11 908	3 629	4 205
South	6 362	200	187	279	7 841
Nabatiyeh	728	354	706	315	11 422
Lebanon	**9 994**	**14 303**	**21 716**	**10 609**	**53 647**

Around 43 percent of the total area under permanent crops is cultivated with olives, 17 percent stone fruits, 11 percent pome fruits, 8 percent grapes, 8 percent citrus, and 2 percent bananas.

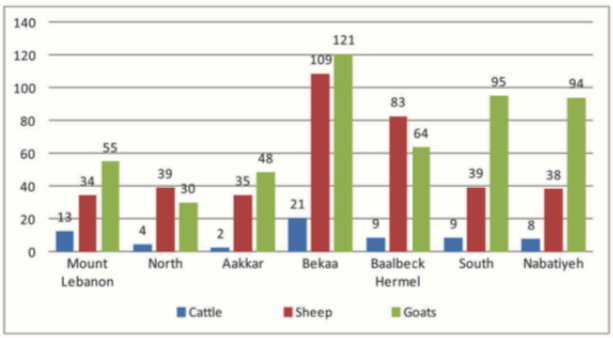
10. Distribution of major permanent crop groups by mohafaza



11. Agricultural holdings with livestock by main types

Mohafaza		Cattle	Sheep	Goats
Mount Lebanon	No. holdings	705	357	505
	No. heads	8 891	12 295	27 802
North	No. holdings	1 524	368	1 073
	No. heads	6 693	14 383	32 198
Aakkar	No. holdings	4 482	764	649
	No. heads	11 150	26 477	31 419
Bekaa	No. holdings	913	827	831
	No. heads	18 761	89 884	100 271
Baalbeck-Hermel	No. holdings	1 261	1 215	1 665
	No. heads	10 874	100 538	106 034
South	No. holdings	569	186	368
	No. heads	4 839	7 321	35 023
Nabatiyeh	No. holdings	956	377	756
	No. heads	7 360	14 447	71 114
Lebanon	No. holdings	**10 410**	**4 094**	**5 847**
	No. heads	**68 568**	**265 345**	**403 861**

12. Distribution of average number of livestock heads by holding



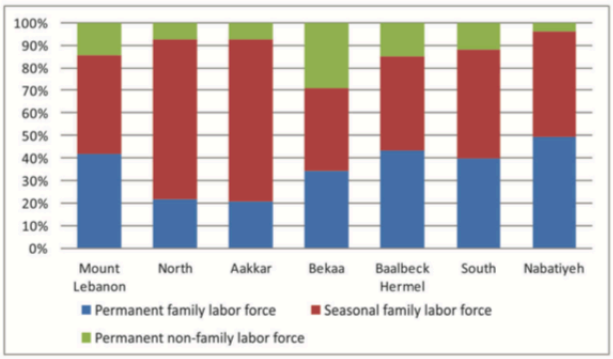
The total number of holdings with livestock is 15 800 holders (9 percent of the total) of which 10 percent are women. The total number of cattle is 68 568. The number of sheep and goats reached 265 345 and 403 861.

13. Modern poultry production by type

Mohafaza	Number of holdings	Broilers (1000 birds)		Laying hens (1000 birds)	
		No.	Capacity	No.	Capacity
Mount Lebanon	311	9 579	1 679	589	639
North	246	6 226	1 348	87	95
Aakkar	500	14 493	4 312	718	1 087
Bekaa	209	1 700	327	910	1 154
Baalbeck-Hermel	359	5 588	1 125	1 342	1 649
South	189	5 007	894	61	54
Nabatiyeh	191	2 390	500	50	89
Lebanon	**2 005**	**44 982**	**10 185**	**3 757**	**4 768**

The total number of holdings with modern poultry is 2 005. About 12 500 holdings have traditional poultry production with a total number of chickens estimated at 412 000.

14. Distribution of agricultural labor by type of labor



About 216 643 people (family and non-family) worked full-time on farms. Seasonal family labor reached 239 007 people, and the seasonal non-family labor force was of 6.7 million days.

Appendix 2.4

Key Extracts from: IDAL. (2017). *Agriculture Sector: 2017 Factsheet*.

SECTOR OVERVIEW

MAIN GEOGRAPHICAL FEATURES

Lebanon's moderate climate, rich soil, and abundant water resources provide it with the key factors of agricultural production. The country is endowed with the highest proportion of agricultural land in the Middle East with **64.3%** of total land area.

According to the latest figures of the Food & Agriculture Organization (FAO),

64% of Lebanese territory is covered by agricultural areas

14% of the total area of Lebanon is considered arable[1]

Rainfall in the country remains relatively abundant at an average of

2.2 billion m^3/yr significantly higher than the regional average

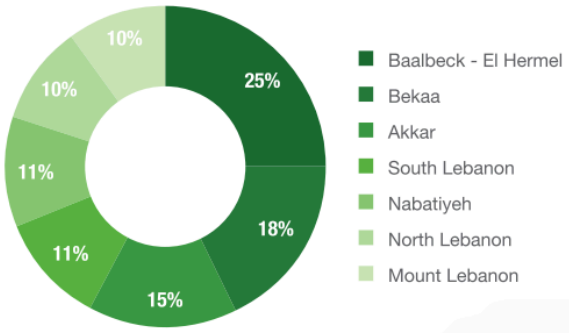
The country is also rich with water resources

The climate is moderate overall and is suitable for the cultivation of a wide variety of crops that would normally grow in both cold and tropical countries.

Major regions for crops, meadows and pastures include the Bekaa plain (where more than 40% of the land is cultivated), the North, particularly in Koura and Akkar, and the South with the coastal region from Sidon to Tyre (where intensive agriculture is also present in greenhouses) **(Figure 1)**. Mount Lebanon and Nabatiyeh are also important agricultural zones, albeit with lower shares of cultivated land due to their rough landscape.

The majority of agricultural holdings are concentrated in North Lebanon and Bekaa with 31% and 20% respectively **(Figure 2)**. The Bekaa holds the highest number of livestock heads by agricultural holding **(Figure 3)**.

Figure 1: Cultivated Land by Mohafaza **% Share | 2010***



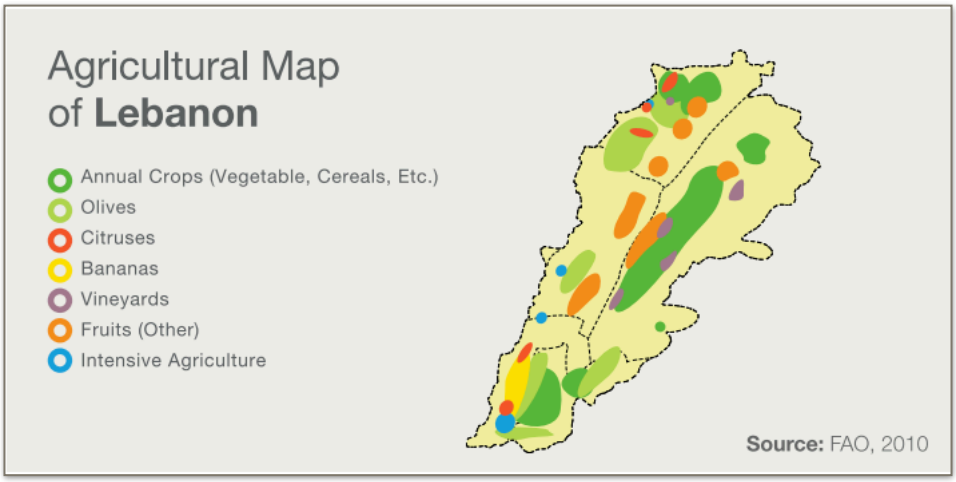
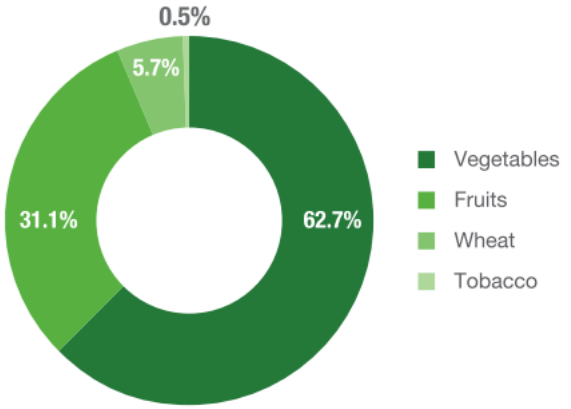


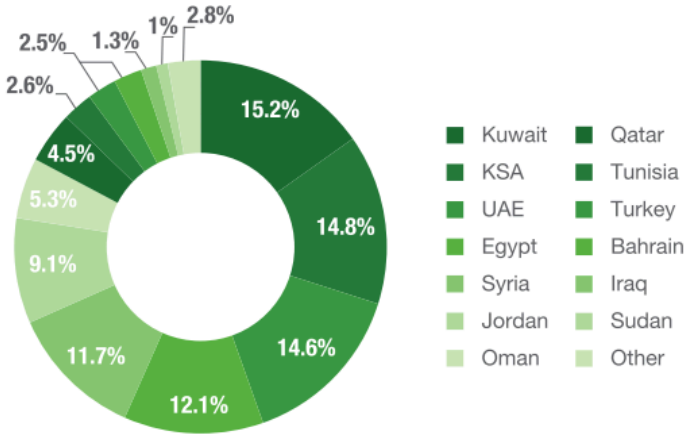
Figure 4: Crop Output by Subsector **% Share | 2014***



Source:
*Latest available figures - FAO, 2014

EXPORT DESTINATIONS

Figure 7: Lebanese Agricultural Crop Exports by Destination **% Share | 2016**



Source: Lebanese Customs, 2016

Appendix 3: Collection of Contextual Observations from Lebanon

A Picture Showing Small Lots Sizes and Farming Technology

A Picture Showing Small Lot Sizes and Further Uncultivated Land

Pictures Showing an Intermediary Trader

A Picture Showing Traders Selling *bel-amene* at the Market

Pictures Showing Traditional “Mom-and-Pop” Retail