AMERICAN UNIVERSITY OF BEIRUT

## EXPLORING ENVIRONMENTAL RISKS: FOREST FIREFIGHTING IN LEBANON

by
YARA ELIE ACAF

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submitted in partial fulfillment of the requirements
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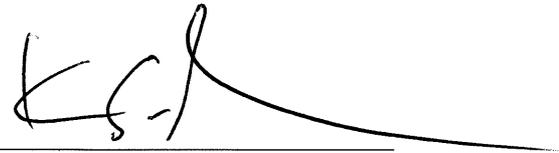
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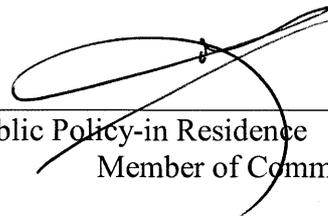
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AN ABSTRACT OF THE THESIS OF

<u>Yara Elie Acaf</u>   for   <u>Master of Science in Environmental Sciences</u>
<u>Major: Environmental Policy Planning</u>

Title: <u>Exploring Environmental Risks: Forest Firefighting in Lebanon.</u>

The question that this thesis studies is the following: how can Lebanon improve its forest fire management policies? In order to explore this question, the thesis analyses the current forest fire risk handling approach and highlights the areas that could be changed for an improved fire service. It focuses on how Lebanon organizes its human resources that provide forest fire services and briefly compares the case of Lebanon to other countries to choose a possible suitable option. It frames its analysis of the organization of under the theory of bureaucracy and the principal-agent model and situates it within the larger context of dealing with risks.

The thesis' methodology is qualitative and relies on desktop research of primary and secondary sources of data. In addition, this thesis includes one-on-one semi-structured interviews with key stakeholders. The main result expected after the analysis is a suggestion to the Lebanese government for an optimal forest fire service provision, and that is the shift of fire service provision to the military apparatus. Other results include the need for an improved legislative cover for forest fire management in Lebanon, cooperation and coordination between stakeholders and first respondents to fires, and exchange of technical data and policy papers between experts to transfer them to citizens.

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ABBREVIATIONS

AFDC	Association for Forest Development and Conservation
CEDRE	Conférence Économique pour le Développement, par les Réformes et avec les Entreprises
CDR	Council for Development and Reconstruction
CoM	Council of Ministers
GPS	Geographical Positioning System
IoE	Institute of the Environment
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoIM	Ministry of Interior and Municipalities
NGO	Non-Governmental Organizations
RDNRD	Rural Development and Natural Resources Directorate
UNDP	United Nations Development Programme
UOB	University of Balamand

CHAPTER I
INTRODUCTION

Forests are not only suppliers of goods. They are also providers of various services such as nutrient cycling, climate regulation, erosion control, biodiversity conservation, wastewater treatment, and recreation. In addition, forests mitigate the impact of climate change by being a carbon sink and offering forest-based fuels as a substitute for fossil fuels (El-Lakany, 2012). As such, protecting forests is essential to have sustainable livelihoods of communities and healthy ecosystems.

One of the main threats to forests is uncontrolled fires in large fields and land areas, also called wildfires or wildland fires. As defined by FAO (2010b), a wildfire is "any unplanned and/or uncontrolled vegetation fire" (FAO, 2010a). It includes "management-ignited vegetation fires that exceed the restrictions in the fire plan and require suppression actions". Depending on the vegetation cover of the burned area, the fire can be named forest fires, bushfires, or grass fires. In this thesis, we will use the term forest fires to indicate fires that occur in forests, which are "land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ." (FAO, 2010a).

Such fires may kill people, destroy homes, disrupt ecosystems and natural habitats, strip lands of vegetation and erode their soil leading to the loss of land value in extreme runoff cases, demolish infrastructure installations, diminish forest goods and services like wood products and tourism activities, threaten biodiversity, increase levels of air pollution, decrease the value of neighbouring watershed areas, and threaten public health mainly because of high levels of greenhouse gas emissions (Faour, 2004; IDAF, 2016).

In general, the public has the right to access forests and benefit from their resources equally. As such, forestry management is a public policy issue of concern to all citizens of a given country; and forest fire services have been, in the modern period, generally regulated and protected by public authorities. Governments have recruited and managed people bureaucratically into units for fire service provision.

Usually, fire departments provide fire prevention, suppression, and recovery services, but they may also be responsible of rescue and medical emergency response although the training and organization of the latter are separate to those of fire services (Perkins, 1987). The members of fire departments are considered as first respondents to emergency and natural disaster calls including forest fires and others like earthquakes, volcano eruptions, and tsunamis. The staff in fire service is mainly responsible for extinguishing fires, and are sometimes asked to help prevent and restore forested areas before and after a fire occurs. Their duties in emergency and crisis response is crucial, and a shortage in their numbers seriously affects efforts to mitigate the impacts of natural disasters and protect natural resources like forests. The senior staff in fire departments may influence the environmental policy-making process and challenge the national fire service approaches. They can do so by raising their objections to strategies used in fire-fighting and because of their experience in the field, their opinion should be considered valuable in revising and changing policies.

They are typically organized and divided institutionally into several sections according to the type of job: administration; service provision like the protection of lives and properties, prevention of disastrous events, and others; trainings for individuals to perform safety measures; and operations executing the tasks (Weichelt et al., 2018).

Public authorities, however, have not always been in charge of organizing national/local fire service. For example, in the US during the 18th century, groups of citizens volunteered for free to serve their communities and provide fire services. Such groups focused on protecting private property, and were funded by municipalities and more importantly private fire insurance companies (Johnston, 2001).

The subsequent shift of fire service provision from a purely volunteering service to a paid public one occurred with the increase in municipality authority and empowerment starting in the mid-19th century. Fire-fighters in the US had recognized that their duties concerned saving lives more than private property so they broke from the influence of private insurance companies. Their job increasingly required specific skills and professional training, and this helped the sector become a public service that later grew by creating associations and job unions (Ewen, 2010). Similarly, in Europe during the same period, municipal fire brigades started providing fire services after fire insurance companies pressured municipalities to form fire departments in order to save them a lot of money. Other factors also played a role in the shift of fire service provision from private to public. One such factor was the emergence of the steam engine technology that resulted in fewer personnel being needed. This meant that municipalities could now afford to establish their own fire departments and no longer rely on volunteers. Another factor was the realization by municipalities that the performance of firemen in their risky job could be improved by giving them paid incentives (Ewen, 2010).

By the 1980s, the trend of privatizing fire departments that had started in 1947, gained attention is the US, and many former fire-fighters in the public sector were the ones who established private fire service companies benefiting from their expertise in the field (Guardino et al., 1992). The fire service field is one of the most challenging to privatize since community members as well as public fire service employees and their

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unions resist such a shift. The unions are usually more insistent than employees on their refusal of privatization since they do not only fear losing their jobs, but also many union memberships (Johnston, 2001).

In Lebanon, unorganized groups of civilians started providing fire-fighting services according to need through Non-Governmental Organizations (NGOs) (Y., Malah, personal communication, March 14, 2019). The NGOs offered many services, but no particular organization was designated for fire service purposes only before 1939 when a Civil Defence Higher Committee was formed under the influence of the French Mandate. The committee was headed by the Minister of the Interior and members including the representatives of the French Higher Commissioner and Commander in Chief, people from the economic departments of the Chief of Police and Ministry of Finance. The meetings resulted in the establishment of establish a formal unit for fire-fighting under the Ministry of Defence- Army Command in 1959 by Legislative Decree No. 159 of 1959 and supported by a Law issued in 1956. Under the Army, the unit was made of a central directorate, a department in each Mohafaza, Civil defence schools, and departments for equipment and shelter management (Civil Defence: Big Responsibilities and Modest Resources, 2014). Later on, fire-fighting activities became affiliated and organized under the Ministry of Interior and Municipalities (MoIM) in 1967 and 1979 respectively, they were provided by civilians through.

A.   Research Question and Statement

Most research on forestry in Lebanon focuses on technical aspects, such as using forecasts to predict fire-prone forested areas, and developing more efficient techniques for extinguishing forest fires in a timely manner (see Faour, 2004; Samaha & Mitri, 2016). This thesis instead focuses on the political aspect, management and

organization of forest fires in Lebanon, and its relevant policy dynamics. Knowing that the risk of forest fires is the probability of fire occurrence in a certain forested area and in a given time interval, the thesis situates the topic within the larger context of dealing with the risk of forest fires and how impacts the decisions made on the ground (Mitri, Jazi & Antoun; 2013). The importance of this research lies in the provision of a better fire service in Lebanon, and subsequent decrease in the frequency and intensity of forest fire events in the country.

The thesis is an applied research that analyses the interactions among personnel and examines the legislation and practices in the forest fire sector in Lebanon. It also explores how Lebanon approaches the problem of employment in the fire service sector, and how it compares to other cases internationally. There is a discussion around the different beliefs on the best approach to mobilize human resources for vital services that keep changing, and the feasibility of this mobilization. The thesis suggests that each country has specific conditions that determine its policy towards employing people for such services and that Lebanon might benefit from considering another approach than the one its government is embracing.

The choice of having a mixed structure of government employees and volunteers in the fire service sector in Lebanon has proved to be challenging over the years, and this has become more apparent recently after volunteers started asking for their right to be employed by law. In fact, the relationship between employees and volunteers may be based on perceptions: employees question the professionalism, competence, and seriousness of volunteers, and volunteers see employees only caring about money and power (Gatson & Alexander, 2001). Since fire-fighters are those directly responsible of protecting forests from fires at all stages (before, during, and after fire), a lack in the number of people are ready to take on the job, becomes one possible reason behind the decreased service quality and increased forest fire frequency

and intensity. In fact, the fire sector in Lebanon is suffering from a shortage in human resources: there are approximately 620 government employees and 4818 volunteers in the General Directorate of the Lebanese Civil Defence (Respondent 1, personal communication, March 5, 2019). The thesis looks into the most optimal employment type in fire services in Lebanon under austerity budget policies and beyond.

The question that this thesis studies is the following: how can Lebanon improve its forest fire management policies? In order to explore this question, the thesis analyses the current forest fire management system and highlights the areas that need attention by suggesting some changes to the system. The thesis focuses on how Lebanon organizes its human resources that provide forest fire services and briefly compares the case of Lebanon to other countries to choose a possible optimal option that could suit the country more. It frames its analysis of the organization of under the theory of bureaucracy and the principal-agent model. This is within the context of considering forest fire events as risks that citizens and people in the field consider in

B. Research Methods

The thesis relies on desktop research of mass media outputs like newspaper articles as secondary sources of data, and primary sources and texts such official documents and documents/websites from relevant private organizations. In addition, research for this thesis included one-on-one interviews, as primary sources of data, with key stakeholders in relevant areas of Lebanon's public policy, fire service, and forest fire management. The units of analysis are the forest fire management sector and the human resources responsible for fire service provision in Lebanon, namely the fire-fighters. The interviewees are mainly fire-fighters who include the first responders as well as the heads of local and regional fire stations across the country.

The thesis uses qualitative methods to study the governing legislation and responsible stakeholders involved in forest fire management by using government reports and regulatory documents. It also studies the actions taken in forest fire management by civil society, industries, private sector, research centres, and individual citizens. The thesis investigates the history of the fire department in Lebanon by obtaining data from the official websites of ministries and the General Directorate of Civil Defence and meetings with fire-fighters. It relies on semi structured interviews that use open ended questions to support the documents collected mentioned above. The stakeholders interviewed are Dr George Mitri, one of the developers and the editor of Lebanon's National Strategy for Forest Fire Management, and Mr. Hisham Salman, the coordinator of the nature conservation program at AFDC. Other interviewees include an employee at the Forestry Department in the Ministry of Agriculture (MoA), and employees and volunteers in the General Directorate of the Lebanese Civil Defence including volunteer activist Mr. Youssef Malah. The interviews took place from September 2018 till March, 2019 in the offices of the Subject Matter Experts during their shifts for practicality reasons. The topics discussed include, but are not limited to, the development process of Lebanon's National Strategy for Forest Fire Management, contribution of local community members in official text development, challenges faced in executing environmental initiatives, environmental policy formulation criteria and process, organization of human resources in the Lebanese government, budget allocation in the public sector, all types of sources for project funding, and employment issue faced by volunteers at the General Directorate of Civil Defence.

The interview notes are the raw data used without any electronic recording and conducted in English and Arabic. Such one-on-one meetings reveal facts that texts do not mention, and give us analyses by professionals who might not have any other platform to express their expert opinion on these topics. The interviews required an

approval by AUB's Institutional Review Board (IRB) before being carried out to safeguard the protection and respect of participants. The approval was obtained on September 3rd, 2018 and the interview questions were exempted from further IRB review and oversight (see Appendix I for the consent form).

I use thematic analysis, defined as "a method for identifying, analysing, and interpreting patterns of meaning, or themes, in qualitative data", after coding the interview results (Clarke & Braun, 2017). The thematic analysis follows these steps: transcribing data, creating codes and themes, reviewing the themes, enlisting the final themes, analysing the data based on the themes (Braun & Clarke, 2006).

1. *Limitations*

The main limitation of document analysis is in the data collection phase since some material is not be easily accessible for the public. The limitations that are faced by interviews include any reticence from interviewees of telling the truth, and requiring a permission from the Director General for each field visit and interview at the General Directorate of the Civil Defence. In addition to transcribing the answers without missing any important information, allocating the adequate time needed for each question, and only being able to do few interviews because of practical constraints.

Many other challenges have risen during the research process of this thesis, one of them is focusing solely on the issue of the employment and organization in the fire service and not giving much attention to the other factors mentioned that could influence having sustainable forest fire management in Lebanon. A second limitation is not being able to cover the topic of government austerity in more detail to talk about its impact on the fire service sector in Lebanon and the fire departments' performances. Another limitation is not studying in depth the impact of sectarianism and corruption on

the suggestion of shifting fire services from voluntary to government employee status and from one organization to another. One last limitation is not thoroughly analysing the cases of each of the country's fire service human resource organization type in relation to all of their social, economic, political, environmental conditions.

C.   Structure

The thesis starts by examining the legislative body governing forest fire management in Lebanon, the different stakeholders involved, and the measures or initiatives taken in the field. Next, it introduces the history of fire service provision in Lebanon, analyses the relationships of the different actors related to the human resource management of fire-fighters, and the budget allocation process for fire-fighting. The thesis concludes by recapitulating the findings of the analysis that suggest to put fire-fighting services under the responsibility of the military. It also compares throughout its analysis the situation of fire service provision in Lebanon to other countries, which are France, Tunisia, and Chile, to conclude the most appropriate case that could have a bearing on Lebanon's case.

CHAPTER II

EMPLOYMENT TYPES IN FIRE SERVICES: A COMPARATIVE AND THEORETICAL APPROACH

A.   Introduction

How governments organize their human resources to provide services to the public defers according to several conditions like the type of service (temporary, seasonal, long-term, or year-long), number of citizens that ask for the service, number of people applying to the job, sources of funding for salaries of people (usually from taxation), and control over employment decisions (usually political control) (Yahiaoui et al. 2015). In the case of fire prevention and suppression services, additional factors may be the environmental conditions of the country (like drought and climate), the forest fire season period, and the total surface area covered by forests. In addition, existing environmental laws, signed international environmental agreements, and how public policy is shaped in each country, also determine the extent of the need for the fire service and the type of employment of its members.

Despite fire services being a necessity for survival, they are only required during disasters and in cases of emergency. This dynamic nature of the service creates major controversy around the type of employment and hours of labour that fire-fighters should put in and whether they should be on home call and not necessarily present at the fire department, or physically present at the fire department in case of an emergency. Thus, regarding fire events, the structure of the fire departments depends on the stage of the fire, and fire departments generally have more unpaid personnel than paid employees before fire events occur to reduce their labour costs. In the case of large forest fires, fire departments ask for help from community members and other fire stations, and if the service is given by the government, public sector appointees from

other governmental departments are also recruited. The extra volunteers are usually trained beforehand during pre-disaster periods to prepare for the forest fire season and the public sector employees are chosen from areas that require them to be physically prepared, like from the military (Mansour, 2015).

In some cases, countries have tried several types of human resources organization over the years and have found the most suitable one after trials and fails. The general trend that is especially followed in large cities is based on moving towards volunteers and employees at the same time to ultimately reach departments run by paid fire-fighters (Perkins, 1987). In the UK for instance, volunteers are given the role of fire prevention since they are considered lacking the equipment to take on fires (Carvalho et al., 2006). An honourable mention is the seasonal fire-fighters recruited only during the hot summer months and forest fire seasons, especially in Mediterranean countries.

B.   Comparison of Human Resource Organization for Fire Services

Individuals in the fire sector can either be employees in a private business, paid employees or volunteers in the public sector, and paid employees or volunteers in the military apparatus. In other terms, some of the main types that are used in organizing the body responsible of fire services include having all volunteers, government employees and volunteers at the same time, private companies taking over under the form of privatization or contracting to do the job, or the military is in charge. The following paragraphs define these types and explains some of their characteristics by giving examples of countries from around the globe such as France, Tunisia, and Chile. These countries were selected because, on the one hand, they represent a range of formats in terms of their human resources' employment; and, on the other hand, they are

similar to Lebanon in term of their public policy process, climatic conditions, Gross Domestic Product, and financial expenditure on national defence services.

For example, France is one of the countries studies in this thesis since it is the leading country that has a military system for fire services and Lebanon has already been influenced by France's public policy since the French Mandate in the country. In addition to the fact that France has the same Mediterranean climate, like Lebanon, in its Southern areas and most of its forests (74%) were privately owned in the year 2000 and the same (60.3%) of forests in Lebanon during that same year ("France", 2006). Tunisia had 6.8% of its land covered by forests in 2005, close to the 13.29% in Lebanon and has a Mediterranean climate in its Northern part ("Tunisia", 2006). Moreover, Chile is the leading country in voluntary fire-fighting activities and has a Mediterranean climate feel in the centre of the country. Most forests in Chile (73.1%) were privately owned in the year 2000 ("Chile", 2006), and both countries also spent similar amounts on national defence per capita in 2017: 289 USD.in Chile and 396 USD in Lebanon ("Country Comparison Lebanon vs. Chile", 2018). The following table displays some basic data on each of the mentioned countries, in addition to the criteria that are similar to the case of Lebanon:

Table 1- Basic data of France, Tunisia, Chile, and the criteria that are similar to the case

of Lebanon

Country	Size (km²)	Population (million)	Forest Cover	Similarities to Lebanon
France	643,801	66.99	28.27	-Public Policy System -Climate (Southern France) -Forest Ownership
Tunisia	163,610	11.8	6.8	-Forest Cover -Climate (Northern Tunisia)
Chile	756,950	18.3	21.5	-Climate (Central Chile) -Defence Expenditure -Forest Ownership

1. *Volunteers in Fire Services in Chile*

Volunteering is "any activity in which time is given freely to benefit another person, group, or organization" (Wilson, 2000). However, volunteers can also benefit either by getting slightly paid for their services, or by building connections in the field for potential future job opportunities. In the case of fire services, "the manifest purpose of any volunteer fire department is the rapid, effective delivery of the public good of fire protection" (Perkins, 1987). The drivers behind fire-fighters volunteering are mainly linked to solidarity like the feeling of friendship and belonging to a group, rather than altruism. In addition to leisure from fire-fighting related activities like preparing for competitions and fundraisers, training together as a team, and telling jokes (Perkins, 1987). The same motives apply in Lebanon and some fire personnel prefer to volunteer in the fire stations inside their communities since it feels more like home (Mansour, 2015). However, some members admit that their ultimate purpose from volunteering in

the fire department is to get a stable employment there in the future. One can distinguish between two types of volunteering in fire services. The first includes active or pure volunteers who aim at the only goal of fire protection, expect no return for their time and effort, and are all equal in terms of their required duties (Perkins, 1987). The second type is citizen volunteers who offer their support in case of emergencies that fall outside the capabilities of the fire departments. The latter civilians however, were not previously welcomed by some volunteer urban fire departments under the claim that they were outsiders who did not have enough knowledge about the system.

The fire-fighting job is considered heroic and fire-fighters are encouraged by their communities to give their best (England et al., 2014), especially because their service is risky, they define the identity of the community, and empower people to fight disastrous events (Simpson, 1996). However, in some cases like Lebanon, the authority of the fire department is not taken seriously because of the fact that it depends on volunteers who are sometimes viewed as amateurs (as discussed in Chapter 4) (Mansour, 2015).

It is known that fire and rescue services are expensive in terms of capital and labour requirements, thus many countries have been clinging to their volunteering fire departments and saving a lot (England et al., 2014). In fact, one of the main reasons behind volunteering being greatly used in the fire sector is because it saves money for a service that does not require a large personnel all the time. Speaking of the financial aspect, volunteer fire departments get their financial sources through fundraising events or from the local government, which are both uncomfortable for volunteers, especially the second option since it threatens their department's autonomy (Perkins & Benoit, 2004).

Countries that rely solely on volunteers for their fire services can be found in South America, like Chile and Peru. Chile is prone to many natural disasters like earthquakes, tsunamis, volcanic eruptions, and floods, and forest fires. Forest fires in Chile are the main challenge faced by fire-fighters and are mainly due to the increase in eucalyptus and pine trees in deforested areas, in addition to increases in temperatures marking the hottest summer in Chilean history in 2017 (Rice et al., 2017). The number of forest fires have increased from 5,200 fires per season between 1990 and 2000 to more than 6,700 fires during the 2015-16 fire season, according to a report by FAO (Hersher, 2017). This is supported by further studies like one done by the University of Chile that show that the country suffers from more than 1000 forest fires per year (Rice, et al., 2017). One of the most memorable forest fire events that occurred in Chile is the 70 blazes that hit the South and Centre of the country in January 2017 and killed 11 people (Rice et al., 2017).

Chilean fire-fighters for example are called *Bomberos* and they are all volunteers by law after European immigrants established the first volunteer fire-fighting group in 1851 in the port city of Valparaiso (Lancaster, 2014; Rice et al., 2017; Brushlinsky et al., 2018). There is currently a fire department in every city in Chile and all departments are members of the Chilean National Fire-fighters Council established in 1972 (Long, 2014). Based on need, almost 51 000 volunteer fire-fighters covered their duties in more than 300 fire departments across Chile in 2017 (Brushlinsky et al., 2018).

It is considered exceptionally prestigious to volunteer as a fire-fighter in Chile and people usually have to earn their spot after several years of trying. "There's a tradition among the families of firemen that when you're born, someone in the force agrees to be your godfather, and when you turn 18, they give you your first helmet or

uniform to welcome you into the force.", said a former fire-fighter in Chile (Long, 2014). Chileans have trust in their volunteer-based fire service proven by their famous expression "on the firemen's payday" meaning something that is far from happening (Egan, 2002). In fact, fire departments are the number one trusted institution by people in Chile and fire-fighters in Valparaiso stated that 99.9% of surveyed citizens expressed the credibility of the fire department for four years straight (Rice et al., 2017).

On a more financial note, the fire-fighters do not get paid and the head of any fire department in Chile is not paid either. The drivers, messengers and secretaries are the only ones who get paid in Chilean fire stations (Long, 2014). The main funding sources for fire departments are from communities and, since the mid-20th century, the government gives a budget to the Head of Department who usually spends the annual state budget on buying new equipment and infrastructure (Egan, 2002; Long, 2014). In addition to the subscription fees of volunteer fire-fighters who pay for their training and equipment themselves (Chile: Fighting fires for free, 2010). "This is the only institution in Chile in which you have to pay to serve," says Miguel Reyes, president of the Junta de Bomberos, the national fire-fighters' association, and fire-fighters only receive a yearly donation from funds that they divide upon themselves as a thank you from their communities (Long, 2014). Those who support volunteer fire service provision, including Chilean fire-fighters themselves, insist that volunteers should not be paid since they should be able to do their job based on their own motivation and not based on a pay check. Plus, they much rather that funding goes on modern equipment rather than salaries, especially in communities that have difficulty funding paid departments. However, they leave their jobs to be on call so they must take more time than they should, they do not always get easy permission from their employers to leave the job for an emergency so that they do not depend on that.

Chile has one of the strongest economies in South America, but people and fire-fighters in particular refuse this change saying that not anticipating money is motivating (Chile: Fighting fires for free, 2010; Rice et al., 2017). As a European security expert at a United Nations office in Santiago stated "They do a very good job despite being volunteers, and they are well equipped" (Egan, 2002). The question here is that how they are well equipped if every large fire event requires donations and help from other countries like the US. During the 2014 great fire for instance, many fire equipment did not work and roads to reach burning forests were not prepared (Bonnefoy; 2014). At some point, the Chilean Army and National Guard were ordered to preserve order and assist with the evacuation of residents (Rice et al., 2017).

2.   *Government Employees and Volunteers in Fire Services in Tunisia*

Unlike having only volunteer personnel, the combination inside the organization between nonpaid and paid personnel has most likely developed from an all-volunteer fire department that could not either keep up with the increasing emergency calls, or recruit enough volunteers from the area (Perkins, 1989).

Like mentioned previously, some volunteers give their time in the fire department in hopes of getting promoted to professionals someday, meaning they will benefit from the salaries and amenities of a government employee. Being an employee at the government brings many benefits that attract some people to apply for a job there rather than in private companies. Some of these advantages include a long-term employment, good healthcare, opportunities for promotions based on seniority, and retirement compensations (Yahiaoui et al. 2015). This is one reason behind some people gladly giving their time and effort, and even risking their lives to become fire-fighters.

Many countries find mixing their firefighting personnel between nonpaid volunteers and paid employees to be the most optimal method to avoid over relying on volunteers, who have other occupations, and decrease spending money on staff that is not needed on the daily basis. The recruitment of volunteers in public fire departments definitely decreases the budget required for salaries and pensions if individuals are paid employees instead. Nonetheless, one issue that most people tend to ignore is that training, enlisting, and managing volunteers also has its cost on the government, that is if the individuals are not required to cover the fees (Duncombe & Brudney, 1995). This administrative cost can sometimes be higher than that of paying employees because of many reasons. First, the number of citizens willing to volunteer in public organization is not very high, particularly in urban areas, and the competition between local governmental departments to recruit them is fierce. Second, volunteers work for fewer hours than paid employees and are generally less professionally educated, thus they require more training and a larger number to keep up with the same level service. Third, their turnover rates are higher than paid staff (Duncombe & Brudney, 1995). It depends on each fire department it to decide if this mixed employment is suitable for its budget according to a quick cost benefit analysis.

Tunisia falls under this example and has a mixed structure for fire services in its National Office for Civil Protection. Tunisia suffers from forest fires, especially in the North, because of its Mediterranean climate known for hot and dry summers. It loses, on average, 1799 ha of burned areas per year (Belhadj-Khedher et al., 2018). The goal of the office in Tunisia is the intervention required by any accident or disaster that might harm people, the environment, properties, and national security. It is a financially independent public institution supervised by the Ministry of Interior and is considered an internal security force. One of the tasks of the civil protection office, as declared by the second chapter of Law No. 121 of 27/12/1993, is extinguishing fires intended to

burn the remains of crops, pastures, grasses and grasses and destruction of materials and waste. Its structure has a unit for training and volunteering and a National School for Civil Protection. The conditions for people to enter the office include age and school degree conditions. (National Office for Civil Protection, 2019).

3.   *Private Companies in Fire Services*

Other than the public sector, private companies take over fire service provision under the form of privatization or contracting. The fire service is privatized or contracted by the State to private companies (payment is according to the government's taxing rules), or between the citizens and companies in the form of subscription (payment is according to the size and value of the property) (Guardino et al., 1992).

On one hand, the concept of contracting a private company to take the role of the government in some service provision is supported by the New Public Management movement that encourages, among other things, outsourcing of personnel in governmental institutions so that the latter can save costs on salaries and long term amenities for employees. Contacting has its own issues, mainly dealing with negotiations that are very time consuming, but it remains less undesirable than privatization since the ultimate decision in policy remains that of the government (Lane, 2013). On the other, the case of privatisation is defined as a private firm owning, operating, and providing a service that was previously controlled by the government (Johnston, 2001). In other words, "privatization is a policy aimed at reducing the governmental intervention in the socio-economic life through the sale of a State-owned firms to the private sector" (Rahhall, 2012). In the text of the Lebanese Law 228, privatization is defined as "transferring the public project by a legal procedure, totally or partially, or transferring its management, totally or partially, to the private sector,

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including the concession structure or similar modern structures designed to implement and manage economic projects over a certain period" (Law 228, 2000). Generally, countries turn to privatization in order to reduce government spending, and keeping the same service quality, because of cuts in State funding or increases in service running costs (Guardino et al., 1992; Johnston, 2001). Some believe that privatization is the most suitable approach to economic prosperity, while opponents insist that it paves the way for the powerful to control the middle working class of society, or developing nations on a larger scale. If the firm reduces the salaries of its employees, service quality might be reduced because staff motivation is reduced and people might no longer be ready to risk their lives for their job. In case the company gives the same, or even a higher salary, it usually cuts the healthcare and pension coverage for its employees. This becomes a social issue since minorities do not get the same opportunities to get jobs at such companies (Johnston, 2001). Moreover, there is no guarantee of consistency in the business domain since competitive companies might come up, the owners or managers of the company might change, the business might fail, which decreases the reliability that the community has on these firms. In addition to the economic aspect of privatization, social and political interests play a key role in the shift (or not) to private fire services. Communities might lose their connection to the government in case of privatization and how it is the duty of the State to provide some services to the public "based on their citizenship, not their ability to buy", including fire services (Johnston, 2001).

It is important to note that some private companies create their own fire departments and hire private fire-fighters to ensure their fire protection, examples include private companies or businesses in Austria and Brazil. Their fire stations are called industrial fire brigades and they are commonly found in specific high risk institutions like airports, chemical factories, and nuclear power plants. This option

seems to be operating well and might just need the support of larger fire service

departments in case of huge emergencies (Scandella, 2012).

4. *Military in Fire Services in France*

Like elaborated previously, fighting services in the public sector may be

delivered by employees or volunteers, and the case of the military being in charge is no

exception. The leading country that has members of the military providing fire services

is France, and other countries have been following its example like Belgium, Brazil, and

China. The French people admire their fire-fighters, and the relationship between the

latter and their society is very rigid since most of them are part of the community that

they serve (Boullier & Chevrier, 2000).

French fire-fighters or "pompiers" are in some cases from the military, like the

Army in the Paris Fire Brigade (sapeurs-pompiers that can professionals after serving as

volunteers for at least 5 years) and Navy in the Marseilles Naval Fire Battalion (called

marins-pompiers). In other regions of France, fire-fighting is provided by civilians that

outnumber the military personnel on the national level: there are volunteer (79%) and

employee (16%) fire-fighters, and is almost 5% of total fire-fighters in France for the

year 2018 and they are under the Civil Defence and Security Directorate of the Ministry

of Interior (de l'Intérieur, 2018).

The French military-based fire services are under the authority of the Ministry

of Interior and its Department of Civil Defence and Public Safety, responsible of the

protection of citizens against any threat at the national level by implementing any policy

that ensures their safety. The department has zonal and local Fire and Rescue

Departments, the local ones having 30 to 60 fire stations each, to prevent and fight

forest fires and is in charge of training the fire department officers. The daily financial

business of the local fire and rescue departments is done by local authorities, but the departments still follow national rules in their organization, the fire chief is chosen by the local Chairman and the Minister of Interior for example (Boullier & Chevrier, 2000; Peuch, 2005).

The case of France is interesting because despite having several employment and management systems for fire-fighters in different areas of the country, yet big cities depend on the military for fire services. This is partly due to the fact that fires are only emergencies and they do not necessarily require a department comprised of personnel only specialized in fire-fighting, especially since fire emergencies are less numerous than other types of emergencies. In 1999 for instance, fire departments in France responded to less than 10% of fire emergencies out of other types of emergency calls (Boullier & Chevrier, 2000). It is not by chance that countries like France choose their soldiers to be the providers of fire, the military lifestyle brings discipline, particularly after many reforms in the organization of the fire service are published. For example, volunteers have to get to the fire station to gear up and then leave for the emergency call, they are no longer allowed to meet their colleagues at the scene without passing by the fire station to get ready first (Boullier & Chevrier, 2000).

C.   Bureaucracy and Human Resource Theories in Governmental Departments

Under the framework of bureaucracy and the principal-supervisor-agent model, this thesis studies the human resource organization in the fire service sector in Lebanon and investigates the interdepartmental relationships and the interactions between the personnel of different employment type. Thus, it is essential to consider first the theory of bureaucracy, the principal-supervisor-agent model and their influence on the dynamics inside governmental departments.

The leading scholar supporting the bureaucratic theory as being the most optimal method to organize public institutions is Max Weber. He defines bureaucracy as an administrative structure developed through rational authority where the exercise of control is based on knowledge (proved by the trainings and examinations needed to be employed) and where everyone applies the legislative rules that govern her/his actions (Weber et al., 2013). Under this traditional governance of governmental organizations, as explained by Weber, people are categorized into two groups and their relationship is characterized by hierarchy, which is the product of long-term contracts between them. Since the government is a large-scale organization that requires many levels of hierarchy, decisions and commands get disseminated and each public department might work according to its own vision. It hence brings the issue of trust that the government has in its own agents and their loyalty to its goals (as discussed in Chapter 4) (Lane, 2002). Bureaucracy is based on public bureaux being the providers of goods and services, budgets being allocated from taxes and based on the demand of the bureaux (allowing taxpayers to set the satisfaction of the service by measuring their willingness to pay for it since they are the ones financing the salaries of the agents), and the organization being regulated following the bureaux (Lane, 2002).

To explain the bureaucratic behaviour and employment relationship in the public sector, the principal-agent model, mainly focuses on efficiency in output production and a relationship between the different actors that is free of information asymmetry (Lane, 2002; Leruth & Paul, 2006). The principal-agent model generally classifies the government as the principal and the public servants as the agents who provide a public service in the organization, and adds the requirement of having the right agents in the right position for public policy implementation. The model is based on introducing the concepts of out-contracting, public-private partnerships, tendering and bidding that increase competition between private institutions to win contracts with

the government, decentralization, and deregulation (Lane, 2002). These concepts however have not been free from criticism. For example, contracting a private company for a certain service provision brings into attention the issue of trust that the government should put in the private company so that the latter recruits the adequate staff for the job and manages them in the most suitable manner.

The principal-agent theory goes further and adds one more actor in the equation, and that is the supervisor of the agent for the principal. The principal-supervisor-agent theory is more rational in studying institutions because the relationship between the principal and agents is complex (Vachris, 2004). This hierarchy is present in the public sector, but it has proved to decrease the efficiency of the organization since knowledge in dispersed over many levels of people and decisions experience many phases of unnecessary opposition and questioning. In this thesis, the principal is the decision making unit, meaning the General Directorate of the Lebanese Civil Defence, the agents are the volunteer fire-fighters, and the supervisors are usually the bureaucratic chiefs, or government employees, whose roles fall between those of the principal and the agents'. The assessment of the overall output of the organization is on two main levels. On one hand, the supervision of the agent happens from two different aspects and each has its own issues. First, at the legislative level, there are usually several authorities that control the actions of the agents and this is problematic since having many rules that contradict sometimes may confuse the agent. Second, at the budgetary level, conflicting goals regarding the allocation of budgets rises in governmental institutions that get their funding from the various ministries and other sources, thus limiting their agents' activities (Vachris, 2004). On the other hand, the performance evaluation of the department, or organization, in the public sector is challenging since managers do not have the incentives to improve themselves because their promotions and benefits increase automatically over the years on the basis of seniority. Plus, the decisions that

managers take are not solely their responsibility and this blurs the lines of performance

evaluation (Moe, 1995). Governmental departments focus anyway to increase their

autonomy and independence from any political instability and simultaneously, so

legislation takes control over these agencies to make sure that current and future

bureaucrats cannot take control over the system (Vachris, 2004).

Furthermore, these relationships between the different actors inside one

governmental organization, which influence the overall dynamics of the organization,

may be analysed under the framework of the Human Resource Theory or Organizational

Behaviour Perspective. Drawing from the discussion of the principal-agent and

principal-supervisor-agent models, this thesis studies the interactions in the Lebanese

Civil Defence between the agents, mainly volunteer fire-fighters, and their supervisors,

usually bureaucratic employees, and the principals or decision makers. The thesis also

draws the links between the actors' interactions and their different types of employment

inside the organization, which are complex since supervisors may be volunteers

sometimes and people having different employments types may take various kinds of

positions.

In governmental organizations, like in any other organization, the structure that

defines the relationships between the numerous actors may be threatened by

fragmentation. Fragmentation is characterized in horizontal relationships by agents

having different goals and little room for cooperation and in vertical interactions in

terms of budget control and authority. This actor-based fragmentation can be seen as:

several groups of epistemic experts (people having the same beliefs) clashing, needing

specific actors to appeal for specific audiences, and conflicts between leaders and the

team (Graham, 2014). To avoid fragmentation in the relationships inside a public

agency, the human resource theory adds to the classical bureaucratic concepts that

incentives that satisfy at least the basic needs of agents should be given to them as a

motivation to deliver the service smoothly (Lane, 2013). Some studies show that organization may develop their personnel's Public Service Motivation (PSM) by either hiring people who already have high PSM, or increasing PSM in their existing staff (Gailmard, 2010). To focus on increasing the motivation and enthusiasm of the personnel, the human resource unit at the organization should cover four aspects: flow management of the workforce, performance boost by offering incentives of all kinds, involvement of employees and volunteers in the decision making process, and development opportunities on the individual level (Bredin & Söderlund, 2011). In doing so, however, some organizations that have mixed personnel might increase conflict between employees and volunteers. For instance, monetary incentives can only be given to employees so organizations rely on the intrinsic motivation in the volunteers to serve. Organizations also put effort to involve volunteers more in decision making and self-development by offering them free training sessions (Björklund & Ngan, 2011). Having a mixed workforce between employees and volunteers adds to the challenge of avoiding fragmentation since each has its own needs, duties, and goals (Björklund & Ngan, 2011). Many scholars have stated the challenging aspect of managing employees and volunteers that work together for different reasons. First, if both paid and unpaid staff share the same responsibilities, their priorities might clash. Second, volunteers think that employees taken on the more striking responsibilities leaving them with labour demanding ones, while employees believe that volunteers get the most interesting responsibilities (Wilson & Pimm, 1996). These factors impact the coordination between employees and volunteers for the sake of the organization's goals. On another level, the relationship between the organization's principals and volunteers is more flexible than that between the principals and employees, which also creates tension between personnel.

D.   Conclusion and Final Thoughts

This chapter introduces the different employment types that fire-fighters have in many countries to better suggest the most suitable one that Lebanon can have. It also presents the theory of bureaucracy used in this thesis to analyse the relationships of the personnel providing fire services in Lebanon (as discussed in chapter 4). The next chapter is an empirical analysis of the legislation that governs forest fire management in Lebanon, the stakeholders or key players in the field, and some of the main measures taken to get closer to a comprehensive plan in dealing with forest fires.

CHAPTER III

LEGISLATION, STAKEHOLDERS, AND MEASURES TAKEN IN FOREST FIRE MANAGEMENT IN LEBANON

A.   **Introduction**

A sustainable forest fire management approach should not aim to eliminate all types of forest fires, rather to reduce the number and intensity of extreme forest fire events. That is because not all forest fires are harmful to ecosystems and some are part of the normal equilibrium of the area. Thus, countries should not seek Lebanon is no exception, and experts realize that the goal is to decrease the extremeness of forest fire events not to eradicate them (H. Salman, personal communication, September 6, 2018). The following chapter discusses some of the challenges faced to reach a sustainable forest fire management approach in Lebanon. To do so, the chapter investigates the legislative context, stakeholders of different backgrounds, and measures followed or practices taken for a successful sustainable of forest fire management in Lebanon. Later on, the next chapter emphasizes on the bureaucratic structure of the General Directorate of the Lebanese Civil Defence, the relationships between its personnel, and the thesis concludes their connection to the overall forest fire service.

For the purpose of this chapter, it is essential to differentiate between a policy and a law to better understand the management context of forest fires. On one hand, a forest policy is "a set of orientations and principles of actions adopted by public authorities in harmony with national socio-economic and environmental policies in a given country to guide future decisions in relation to the management, use and conservation of forest and tree resources for the benefit of society". Moreover, a forest policy statement "describes the objectives, priorities and means for implementation of the forest policy". On the other, a law is "a set of rules enacted by the legislative

authority of a country regulating the access, management, conservation and use of forest resources" (FAO, 2010b). The main difference between a policy and a law is that a policy is not legally binding and can give general visions and goals, while a law is legally binding and specifies the roles that should be taken. Figure 1 is a clear illustration on the relationship between policy, strategy, law, and actions plans (FAO, n.d.):
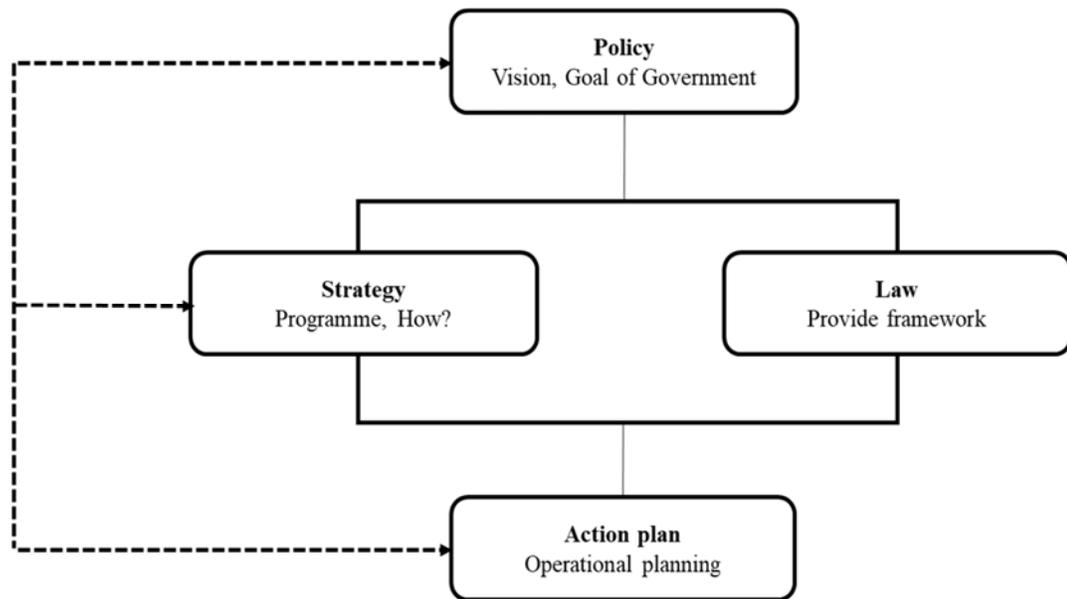
Figure 1- Relationship between policy, strategy, law and action plan (FAO, n.d.)

In the environmental science field, international environmental laws are mostly soft, meaning they are non-binding, and based on promises and political commitments rather than on sanctions in case they are not implemented. Conventions on forestry usually result in soft laws and agreements, and use terms such as "encourage" and "should" rather than "must" in their texts. The literature explains policy implementation as "the actions by public and private individuals (or groups) that are directed at the achievement of objectives set forth in prior policy decisions". In other words, it is "a

new understanding of how the system succeeds or fails in translating general policy objectives into concrete and meaningful public services" (Van Meter & Van Horn, 1975).

It depends on the country how it governs and protects its environment, and Lebanon has some hard laws issued for that. Until now, "Lebanon lacks the implementation of a national forest policy", which is the responsibility of different stakeholders rather than the government alone (UOB, 2016). There is however, a National Strategy for Forest Fire Management in Lebanon, governing regulation, and an informal action plan followed by the employees at the Ministry of Agriculture (MoA) that is based on checking high risk areas for forest fires and setting the priority of interference based on the biodiversity importance also (Respondent 6, personal communication, March 14, 2019). In most cases, implementation takes place after the associated legislative framework are set and funds assigned, and some of the measures taken to do that in Lebanon are considered here in the chapter.

B.   Legislation Governing Forest Fire Management in Lebanon

The main laws that Lebanon follows for forest management are the 1949 Forestry Code by MoA and its amendment Law No. 195 of 2000 for basic forest management, as well as Law 85 of 1991 and its amendment Law No. 558 of 1996 for forest protection. In addition to several scattered documents, like the decision 433/1 of 2010 by MoA for regulating forest and other wooded land harvesting (UOB, 2016). Regarding the 1949 Forestry Code, the articles focus mostly on forest protection against tree cutting and on forest investment conditions with some articles dealing with forest fires, which are mainly found in the section of "various other topics". The latter articles cover the pre-crisis phase in specifying the time and place where fire ignition is not

allowed (Articles 101 to 106), few measures that should be taken during (Article 108)

and after a fire incidence (Article 109), and what party takes responsibility for such an

event (Articles 107, 112, and 113) (MoA, 1949) (see Appendix II for the articles on

forest fire in the 1949 text). The document does not tackle all aspects of the forest fires

issue, its attention is rather on the prevention phase by displaying the conditions of

when and where fire ignition is banned. It also does not include the detailed sanctions of

intentionally and accidentally starting a fire. The law is being renewed however because

its content is still the same since the French Mandate period in Lebanon and new terms

and definitions are being added to it. This process of improving the law has been going

for two years and takes time because the process of discussions is very detail oriented

and based on many experts' opinions and the approval requires many signatures of

decision makers including the Council of Ministers (CoM) members and the President

of the Republic (Respondent 6, personal communication, March 14, 2018). This is a

clear demonstration of how bureaucracy stands in the way of needed documents to be

updated and released, but it still remains one of the best laws on forestry (Respondent 6,

personal communication, March 14, 2018). Concerning the 1996 Law No. 558, the

articles specify the duties and tasks of the Forestry Department at the Rural

Development and Natural Resources Directorate (RDNRD), the activities that are

banned in protected forests, and those responsible of taking care of them. The articles

mention briefly how fire is prohibited at least 1,000 meters from the boundaries of the

protected forest (Article 16-4) and the subsequent sanctions in case a fire event happens

(Article 23). The text does not explore more the conditions that start a forest fire, the

body responsible of interference, and how are they supposed to intervene in case of a

fire. It briefly goes through all kinds of violations that might happen in a protected

forest and threaten its welfare without emphasis on forest fires specifically. Finally, the

2010 Decision 433/1 mentions in its first article that "fire sources and ignition are

forbidden within the limits of forests and a distance of less than two hundred meters

from the limits of forests and inhabited places" (UOB, 2016). These rules are more

about forestry management in general and there is not one legal text that addresses

forest fire management in particular. Many sources however, state that a draft law on

forest fires is currently being prepared, but the fact is that the 1949 Forestry Code is

being updated as mentioned previously, including the articles about forest fires but no

new law on forest fires being developed (Lebanon Voluntary National Review on

Sustainable Development Goals, 2018; Respondent 6, personal communication, March

14, 2019). A specialized legal text on forest fires could however definitely increase the

seriousness of the issue among decision makers, executers, and citizens; leading to a

more sustainable forest fire management plan.

Finally, in an attempt to protect forests after fires, especially the areas burned for

land change purposes, Law 92 of 2010 law prohibited the exploitation of burned

forested areas, complimenting the National Strategy for the Protection and

Rehabilitation of Forest Wealth in Lebanon, implemented by the Ministry of

Environment (MoE) in collaboration with the United Nations Development Programme

(UNDP) (Abla, 2014). This is one example of a legal text that could actually help in

restricting any intentional forest fires by giving the MoA the authority to refuse giving

any permit that could change the land use of a forest after its fires (Respondent 6,

personal communication, March 14, 2019).

During my interview with Dr George Mitri (personal communication, September

10, 2018), he pointed out that the main challenge keeping Lebanon from attaining a

sustainable forest fire management is not the fact that forestry laws barely mention

forest fires. Rather, it is when the law legislates what is against a sustainable forest

management that protects the forest against such fires. He further gives the example of

Law No. 85 of 1991 mentioned above that prohibits cutting pine trees like Pinus brutia,

which need proper pruning and thinning for fire fuel biomass reduction, meaning that more fires could happen in some of these forests because of the thick biomass accumulation (El-Lakany, 2012; UOB, 2016).

C.   Stakeholders Responsible for Forest Fire Management in Lebanon

In Lebanon, the responsibility of forest management and its law enforcement, including fire issues, is distributed between several actors, either from the public, or private sector. These include MoIM, MoE, MoA, municipalities, Association for Forest Development and Conservation (AFDC) and other NGOs, Council for Development and Reconstruction (CDR), Urban Planning, land owners and users, Ministry of Power, Ministry of Education, Ministry of Public Works, and Civil Defence. However, the MoA through the Forest Protection Service of its RDNRD is the official body in charge of the forestry sector in Lebanon (UOB, 2016). The responsibility of the MoA is mainly in the pre-crisis phased before a forest fire occurs by preparing and protecting forests from fires, like giving pruning and charcoal permits and forestry management in general. The ministry is also supporting the increased awareness on the benefits that people can get out of forests, either economic or ecotouristic among others, so that the feel that they want and need to protect forests more. During the forest fire event, the MoA's role is represented mainly by the job of forest guards, monitors, and heads of centres (all government employees at the MoA) in each of the approximately 25 forest centres in almost all Cazas across the Lebanese territories. These personnel have the authority of releasing a violation statement and detaining of any equipment used against the law and one of their duties is to intervene during the first 20 minutes of a fire event while waiting for the Civil Defence fire-fighters to arrive. Their role is not limited to that, and they are also in charge of guarding any illegal hunting activities, mainly hunting for marine resources. The low number of the staff and them having numerous

and varied responsibilities makes it challenging for them to do it all. In addition, there is a doubt that these forest guards, since their work location is far from any monitoring, are actually doing their jobs. Some fire-fighters admit that they have never encountered forest guards on the field (Respondent 5, personal communication, April 19, 2019). After a forest fire event, the MoA's role is to refuse changing the land use of the burned land and in some cases, to ask for its restoration (Respondent 6, personal communication, March 14, 2019). In summary, the forest guards, police, and municipality guards of MoA and MoIM are the ones in charge of policy execution in the field, while the minister and the staff at MoA formulate the policies (FAO, 2010a; UNDP, 2014).

The fact that responsibilities in the forestry sector, especially in forest fire management, are distributed between many ministries and agencies, makes it easier for one party to put the blame on others for their lack of commitment. Moreover, their jobs overlap and a lack of coordination between them leads to conflicts in fulfilling their tasks even if their goals are the same. As stated by G. Mitri (personal communication, September 10, 2018), the loss of interest or the lack of seriousness in discussing the issue may not be the driver behind the lack of implementation, but the follow-up after the text has been published is. Many stakeholders showed their interest in the national strategy, including UNDP's Country Director in Lebanon Mr. Luca Renda who insisted on their commitment for the implementation phase of the strategy (UNDP, 2014). For now, the Presidency of CoM is in charge, thus the need for a monitoring and coordinating entity that specifically makes sure that the application of the national strategy is done according to the official texts, each party knows its tasks and is completing them, and everyone is held accountable for not sticking to their goals. That is especially needed under the CoM since the already existing national committee for fire monitoring, which includes representatives from the Civil Defence and several

ministries, is not meeting on the regular. Over time, communication between the ministries and the Civil Defence has improved and this is apparent in the meetings and workshops on forest fires. This not through committees and meetings however, but still in a formal way and because of common projects that require all parties to coordinate. (Respondent 6, personal communication, March 14, 2018).

In France, however, specialists from different fields are consulted on technical details needed to improve the fire service, and experts include forecast engineers from the National Weather Forecast Board, biologists and physicians from fire research centres, and consultants from other fields. They all join their efforts together and coordinate for the best response to fire emergencies and they communicate with the Headquarters staff who are always ready in responding (Peuch, 2005). Moreover, the French also give attention to on site prevention measures like publishing fire risk areas each summer or early spring and at the start of each fire season so that forest guards, policemen, aircraft officers, and fire officers are alerted. In some instances, many fire-fighters are sent to high risk forested areas for monitoring, fire trucks go through forests for check-ups, outdoor barbecues are strictly banned, and planes filled with fire retardant fly over high risk forests (Peuch, 2005). This is not the case in Lebanon nonetheless: the trainings are not mandatory for volunteer fire-fighters, there are no specific training sessions on forest fires, fire-fighters can take charge of emergency calls based on seniority rather than team leadership skills. Plus, fire departments do not consider the expert advice of professionals in other sectors, overlook fire forecast software and fire risk maps and do not place much attention on these tools that can help prevent large forest fires, do not organize regular monitoring activities in high risk areas on the local level (discussed more in chapter 4) (Respondent 6, personal communication, March 14, 2019). The blame is not on the system that fire-fighters are

in, but sometimes on the lack of communication between experts and scientists and policy makers in forest fire management and the first respondents on the ground.

Other than on the level of policy making, the first respondents on the field need support in their fulfilling their duties (as discussed in Chapter 4), making this the second reason for an incomplete forest fire management in Lebanon next to the poor legislative cover.

D.   Measures Taken for Forest Fire Management in Lebanon

1.   *Lebanon's National Strategy for Forest Fire Management*

On October 2, 2007, 200 fires burned more 2000 ha of Lebanese forests and other wooded lands, the equivalent of 12 million trees and of an area that was "approximately equal to three times what has been reforested in the country during the past 17 years" (Asmar et al., 2008). This event pushed the Prime Minister to appoint an inter-ministerial committee called "National Executive and Technical Forest Fire Prevention and Forest Restoration Committee" through the Decision No. 118/2007 (Asmar et al., 2008). This forest fire event is believed to be one of the main drivers, but not the only one, behind the interest in forest fire management in the country leading to the publishing of the national strategy. On another level, Lebanon had already signed international treaties, like the Kyoto Protocol, the Stockholm Convention on Persistent Organic Pollutants, the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa; that entered into force on February 11, 2007; May 17, 2004; December 26, 1996; March 15, 1995 respectively. These put extra pressure on Lebanon to abide by the international deadlines of its goals that relate to forestry and forest fires.

The management of forest fires is elaborated in "Lebanon's National Strategy for Forest Fire Management", which aims at controlling fire occurrence and expansion by implementing regulations and sanctions, yet allowing sustainable fires to happen. It includes five components known as the "Rs" standing for Research, Risk prevention, Readiness, Response, and Recovery (MOE/UNDP/GEF, 2015). The strategy was approved and adopted by the CoM by virtue of Resolution No 52 on May 13, 2009 as an update to "The Work Plan to Combat Forest Fires" (Asmar et al., 2008).

The strategy is the result of a cooperation between MoE and AFDC under a project named "Towards Developing and Implementing a National Strategy for Forest Fire Management in Lebanon" in collaboration with the MoA and the International Union for Conservation of Nature (Asmar et al., 2008; El-Lakany, 2012). Regardless of the fact that, as Dr Mitri has stated to *The Daily Star,* "Lebanon has a very well developed strategy, clear objectives, clear roles and responsibilities", the national strategy has simply not been implemented (Azhari, 2017). This issue is existent even after the establishment of the Common Operations Room grouping together people from numerous ministries and agencies, like "Interior, Agricultural, Environment, Defence, and Information ministries, Civil Defence, Army, Internal Security Forces" (Azhari, 2017). The Minister of Agriculture also insisted on the assessment of all initiatives and projects that are taking place for a revision and better implementation of the national strategy (UNDP, 2014).

The strategy's text details the missing gaps in the field, the stakeholders that are and should be involved, their exact roles, and the measures that should be taken in all three phases and on the level of each of the five Rs as follows. Research is needed to understand the root causes and trends of forest fires in order to better manage them. Risk prevention can be done by sustainably managing fuel to mitigate the fire, or by silviculture to protect the forest from fires. Readiness to be able to control fires or

prevent them by preparing the appropriate infrastructure. Response to fires within 20 minutes and have the efficient intervention needed by technicians assisted by equipment. Recovery to increase the burned forests' resilience to fires, restore the ecological health of the forest ecosystem, and support individuals and communities affected. It is clear that the strategy has an all-inclusive presentation of the implementation framework for the strategy (see Appendix III for some of the recommendations that can be inspired by the national strategy's text). The strategy development process also took into consideration the special case of Lebanon and the text was only guided by international organizations' concepts, but not influenced by its foreign editors, knowing that its main editor was Lebanese (G. Mitri, personal communication, September 10, 2018).

Lastly, the strategy is more of a practical text that does not give insist on the crucial need for a strong policy in the field. It focuses on following a plan with clear goals and roles, but does not present a policy supporting the existing legislation. It does not precisely address the gaps in the current forestry laws and does not suggest a policy framework for sustainable forest fire management. Plus, it does not emphasize on the existing weaknesses of the current system, but on what should be done in the future, which could be a better way for a practical text to be executed. It focuses on Mediterranean countries in its examples, which might be the closest case to Lebanon's, but what does not seem to be working in Lebanon needs a new perspective. It still remains however the most reliable text that specifies the roles of each stakeholder and some statistics on forest fires and that is a breakthrough in the field that sets the road map for new initiatives and policy agenda.

2.   *Initiatives since the Adoption of the National Strategy in Lebanon*

It is important to note first that international donors usually direct their funds towards projects of reforestation and fire warning systems for readiness for instance, since the activities of such projects are easily noticeable by citizens. This leaves vital components of sustainable forest fire management, like prevention, slightly more neglected from the funding aspect especially that MoA gets general funds for its forestry department and not for particularly fighting forest fires so funding is divided on many different projects. In addition to the fact that the concept of climate change was not kept in mind while developing the strategy since the intention was to focus on national priorities and climate change just fell into them (G. Mitri, personal communication, September 10, 2018). That is knowing that some terms like climate change and sustainable development for example grab the attention of international donors. Some of the initiatives or projects in Lebanon that aim to achieve the goals of the national strategy and some of their results are presented.

First, every few years since the strategy has been developed and published, the Institute of the Environment (IOE) at the University of Balamand (UOB) and the Department of Ecosystems at MOE, collaborate to publish the State of Lebanon's Wildfires report. The most recent 2016 report shows that local residents (49.62% of respondents) are the first to report a fire, followed by Internal Security Patrols (36.92%), verifying once again the necessity of having volunteers on site from the villages close to fire prone forests since they are the first to reach the site and know it more than others (Samaha & Mitri, 2016). The report provides some important and exclusive data sets and analysis on technical records, like fire occurrence and burned areas, fire season months and peak months, causes of fires, and the used intervention gear and resources.

Second, another example by UOB is an early fire danger detection and forecast for all regions in Lebanon, which was launched in partnership with the Lebanese Reforestation Initiative as part of the "Wildfire Risk Management project for Firewise-

Lebanon", aiming at "preventing and reducing wildfire risks and their negative economic, social, and ecological impacts on local communities" (IOE, 2016). This tool helps in the prevention phase and they are easy to handle by local volunteers in villages who monitor such events specifically in the summer season (H. Salman, personal communication, September 6, 2018). This is one preventive tool that can be easily used by local authorities, like municipalities, by regularly checking the online forecast and taking small preventive measures.

Third, the interesting part in a practice guideline booklet of 2014 is a chapter entitled "Best Practices Guidelines to Engage Communities in Developing Action Plans for Wildfire Risk Management Activities". It involves local communities, including women, in their seven-step plan: municipal leaderships, roundtable discussions, plan drafting, plan validation, plan implementation, plan evaluation, transferability and replicability (IOE, 2016). This is a vital issue that the strategy might not have given enough attention to by not directly including locals in draft meetings but considering them represented by NGOs. The process of developing the national strategy was in fact through a workshop organized by MoE and AFDC to discuss a plan for the strategy and another one in October 2008 to discuss the draft, during which locals were mostly represented by NGOs and not as independent citizens.

Fourth, AFDC presents in its publication on fire awareness specific measures that should be taken before, during, and after a forest fire occurs. This is under the project "Prevention of Natural Disasters with Building Alliances for Local Advancement, Development, and Investment" (BALADI-Plus). These include establishing watching towers near vulnerable forests during forest fire season, equipping locals with the vehicles and tools necessary to fight a forest fire, specifying the location of the nearest water outlet to a prone area, putting plans for intervention in case of a forest fire occurrence, avoiding burning wastes and biomass near forests, monitoring the

area where the fire occurred for few days, and assessing the plan followed to improve it (AFDC, 2012).

Fifth, the General Directorate of the Lebanese Civil Defence publishes every summer on its website a short list of guidelines for the public, entitled "Preparedness and Awareness on Forest Fires". The directorate occasionally issues announcements to alert citizens in case weather forecasts show high temperatures and it has recently published the fire risk index and wildfire risk across Lebanon (Civil Defence, 2018).

Some of these projects provide the technical and scientific data needed to understand the situation and dynamic state of forest fire trends, fuel combustion characteristics, an efficient forest fire hazard detector, the factors that impact forest fire trends, and numbers and statistics on their management conditions in Lebanon. Other procedures guide the public by giving easy instructions on how one should act in all different phases of a forest fire. Nevertheless, no report analyses the politics behind forest fire management in the country and the nature of the relationship between the on-the-ground personnel.

E.   Conclusion and Final Thoughts

In conclusion, this chapter investigates three main factors that could influence a successful forest fire management in Lebanon.

First, Lebanon is missing a concrete forest fire law that governs its management, while having other laws that contradict with a sustainable management approach makes it more challenging. Having said that, Lebanon should be influenced by the cases of other countries, like Algeria and Cyprus, that may be pioneer in one or more aspects of forest fire management (JRC, 2017). Cyprus is similar to Lebanon in its topography, hot and dry summers, and the fact that most of its forest fires are caused by humans (MoA,

2018). This is also the case in Algeria since carelessness and cigarette buds are of the main causes of forest fires (Dimitrakopoulos, Mitsopoulos, 2006). In brief, the case of Algeria is interesting because its Law 84/12 of 1984 is supported by several decrees that specifically deal with forest fire issues, like Decree 87/44 of 1987 on the prevention of forest fires and Decree 87/45 of 1987 also on the coordination of matters related to forest firefighting. Cyprus tackles the topic of forest fires in its 1967 Forestry Law in more detail than Lebanon does in its 1949 Forestry Law. It specifies the duties of citizens in assisting any fire extinguishing event, the sanctions that one may get in case of not only causing but also leaving a forest fire burn, and the responsibility of a private forest owner in case a fire occurs in their land (Republic of Cyprus, 2003) (see Appendix IV for a summary on forest fire management characteristics, like the authority, legislation, strategy, and main strengths, of Algeria and Cyprus compared to Lebanon).

The second factor that may impact the forest fire management approach in Lebanon is that all stakeholders lack cooperation and coordination of their activities to save time and achieve goals in forest fire management in Lebanon. For instance, the implementation of the national strategy is in part due to the lack of such coordination since the Civil Defence has never been approached with the strategy text (Respondent 4, personal communication, March 5, 2019). The third factor is that despite the many initiatives taken in Lebanon to control forest fires and mitigate their impacts, there still remains many challenges in politics, policies, and organization that halt a sustainable forest fire management plan.

Other than the three main challenges to a successful fore fire approach presented in detail in this chapter, the technical sensitivity of firefighting is another issue that should be highlighted. For instance, helicopters have to stay at a certain height from the fire since their blades create winds that help fires to spread, this distance decreases the

effectiveness of the water released to stop the fire (Y. Malah, personal communication, March 14, 2019). The fire-fighting plans are indeed more complex that the public knows and practical assistance is needed. In addition to the concern of the first respondents' on technical challenges, stakeholders express their concerns on the lack of recent data on forest fire trends and causes: 61% of fire causes in 2016 are unknown (Samaha & Mitri, 2016). Moreover, experts also worry about the lack of awareness among people in having personal responsibility towards forests, and the lack of capacity building of citizens and municipalities to fight forest fires and their role in checking fire risks and doing some basic monitoring activities. These local activities can make a difference in prevention from forest fires, especially since municipalities have the authority to manage its lands and 18.3% of land affected by fires are Machaa (owned by the community and managed by the municipality) in 2016 (Samaha & Mitri, 2016; Respondent 6, personal communication, 2018). One more challenged can be added to the mentioned challenges faced to reach a sustainable approach for forest fires and that is the employment issue and overreliance on volunteers in fire services.

Accordingly, the next chapter focuses on the human resource management as a key factor slowing down a successful sustainable forest fire management strategy from being implemented in Lebanon. It analyses the relationships among the staff in the general Directorate of Lebanese Civil Defense under the concepts of the theory of bureaucracy. The chapter also looks into the budget process for the directorate.

CHAPTER IV

HISTORY, ACTORS, AND BUDGET OF THE FIRE SERVICE IN LEBANON

A.   Introduction

The study of the challenges for forest fire management in Lebanon in the previous chapter should be complemented by a closer look of the human resource in charge of this management on the ground. This is essential to better understand the fire service system in Lebanon and its link to forest fire regimes and natural resource conservation. The following chapter covers the history of fire service provision in Lebanon and the organization of its department, the relationship between the personnel responsible of providing the service, and analysis of the details of its budget allocation process. It also notes some of the challenges faced by people in this side of the field of forest fire management throughout the analysis. The chapter tries to contextualize the case of the Lebanese fire service personnel under the framework of bureaucracy and the principal-agent model mentioned previously. That is by applying the theory to the bureau of the General Directorate of the Lebanese Civil Defence and testing some of its principals by examining the interactions between levels of the hierarchy. The study relates these relationships to the type of employment of the personnel and tries to prove an exception to the rigidity of the commands in the system.

B.   History of Fire Service Provision by the Civil Defence in Lebanon

Since forestry is a public good, there is no doubt that the government in Lebanon is in charge of providing fire services to the public through its General Directorate of

Civil Defence and under the patronage of MoIM. Under the Decree 50/67, the Civil

Defence in Lebanon is part of the country's national defence system and is the sole

responsible of fire service provision (Mansour, 2015). The following timeline displays

some important milestones in the history of the General Directorate of the Lebanese

Civil Defence (Mansour, 2015; Civil Defence, 2016):

1939	• Formation of Civil Defense Higher Committee
1945	• Established as part of the Army • Delivered first aid during WW1
1959	• Directorate under the Ministry of Defense by Legislative Decree No. 159 • Training on rescue and relief, and fire fighting tasks
1974	• First practical unit offering fire fighting services
1979	• Agency put under the Ministry of Interior by Law No. 79/6
1994	• Public Directorate by Decision No. 15
2000	• General Directorate by Decree No. 4082 of year 2000

Figure 2 - Important milestones in the history of the General Directorate of the

Lebanese Civil Defence

In 2014, Law 289 amended some of the articles of the Legislative Decree No.

50/67 and the main tasks of the Lebanese Civil Defence were specified as reorganizing

its structure; tenuring workers, contractors and volunteers; and applying public safety

standards. It is currently responsible mainly of securing the protection of the environment; avoiding, confronting and limiting the risks to public safety in cases of natural disasters; ensuring the application of the laws and regulations in force regarding all of the department's tasks; and implementing the official decisions in accordance with the legal and regulatory provisions in force (Civil Defence, 2016). It is noticeable that in the new amendment, there is emphasis on tenuring the volunteers and other part-time personnel in their jobs, and this has served in later years as a strong argument for those asking for their right to be tenured (discussed in the next section). This brings back the fact previously stated about volunteers sacrificing their time for the main goal of securing a job eventually.

Currently, there are 21 regional fire stations across the Lebanese territories and more than 218 local stations. The latter are established according to the need of residents in the area, the number of residents, and the availability of potential equipment funds. These units are established by a decision from the Minister of Interior and Municipalities, sometimes because of the demand of municipalities. The staffing, ranking, and conditions of employee appointment in these stations are based on a decree by the CoM upon the proposal of the Minister of Interior and Municipalities and after a study conducted by the Research and Guidance Department (Respondent 1, personal communication, March 5, 2019).

The General Directorate of Civil Defence in Lebanon is organized according to the Legislative Decree No. 3741 entitled "Organizing the General Directorate of Civil Defence and Determining the Staffing and Recruitment Conditions for Some of Its Job Positions". The decree text, published on December 18th, 2018, is still in progress of being fully implemented since there are currently not enough people to fill the gaps in job positions while waiting for the latest tenuring law to enter into force (Respondent 1, personal communication, March 5, 2019).

The employees are appointed by the government for administrative or operational jobs in the Civil Defence body. The candidates have to pass examinations under the supervision of the Civil Service Council for administrative positions, and those applying for operational positions have to go through trainings in collaboration with the General Directorate of Internal Security Forces (Respondent 1, personal communication, March 5, 2019). One concern of volunteers expressed by Waleed al Hashash, the head of the fire station in Tariq al Jdideh, is that the exams might not including subjects related to the tasks of the Civil Defence because they will be prepared by the Civil Service Council (Lebanon restructures its Civil Defence force, 2014). These government employees may be permanent, contractors, or temporary. First, the permanent employees usually have a specific job that is always needed, like that of the Director General, رئيس دائرة "Head of Unit", رئيس قسم "Head of Department", writer, editor, member, رئيس مركز "Head of Fire Station", and doormen. They benefit from healthcare, social benefits, education, hospitalization, and scholarships throughout their service time under the Cooperative of Government Employees. The permanent employees follow the Legislative Decrees 112 and 47 of 12/06/1959 and 29/06/1983 and their amendments for getting their pension or permanent payment salaries respectively once they retire. Second, the contractors are bound by a contract that specifies the employee's rights and duties and usually have a job that is not needed at all times like that of a journalist, translator, and legal consultant. Third, temporary employees fill the positions of technical assistants, under the general system for temporary employees specified by the Legislative Decree 5883 of 10/11/1994. For the end of service of contractors and temporary employees, their rights are preserved by the National Social Security Fund (Respondent 1, personal communication, March 5, 2019). There are not many positions that require full-timers in the departments of the Civil

Defence and members are not only government employees, but mostly part-time volunteers. This explains the larger number of volunteers than that of employees. The fire stations are usually headed by government employees, but volunteers may sometimes be appointed such positions depending on the available personnel in each area (Respondent 1, personal communication, March 5, 2019). The difference in the amenities that the permanent employees benefit from compared with those of the rest of the staff proves once again that volunteers and contractors might offer their services in hopes of getting employed. The latter are particularly interested in doing so when they know that there are open vacancies and a need for staff, like the case of the General Directorate of the Lebanese Civil Defence.

1.   *The Civil Defence Employment Debate in Lebanon*

Many volunteers in the Civil Defence have been asking for their right to be employed for many years after the last recruitment for employees in 1986. They have been promised by many political parties and decision makers that they will be tenured in their jobs, get paid the salaries that they should have taken in previous years have they been employed, and benefit from all services that are offered for government employees. In 2014, after many protests, the law that ensures the employment of volunteers was issued in the parliament but its application by the CoM was still on hold. The Law No. 289 of 30/4/2014 entitled "Civil Defence System and Regulation" stated that volunteers in the Civil Defence are eligible to apply for government jobs if they have volunteered for three consecutive years since 2014 (Respondent 1, personal communication, March 5, 2019). The law had many gaps, nevertheless, that disqualified a large number of volunteers: 70% of volunteers only get exchange compensation after they retire, 20% get retirement pension, and 10% are not allowed to do the exams because they have exceeded the age requirement in accordance with the Internal

Security Forces rules, which is above 51 years of age. This issue was later fixed in 2017 when the Member of Parliament Hadi Hobeish submitted a proposal to amend the second part of Article 4 of the 2014 law, allowing volunteers to undergo a limited match no matter their age and giving 80% of volunteers their retirement pension and only 20% exchange compensation. For Law No. 289 to enter into force, it needed decrees, but this seemed to be challenging after a 2016 public finances CoM meeting in which the Minister of Finance Ali Hassan Khalil detailed the economic situation stating that there were no funding sources in the government to spend on employing new personnel and any additional expenses will put the country in even more fiscal deficit. One of the main volunteer activists, Mr. Youssef Malah stated at the time that one simple solution is to increase the tax on the shelters that are one source of finance to the Civil Defence (A., F., 2016, February 7). In 2016 also, the Minister of Interior and Municipalities Nihad Machnouk signed a decree to employ contractors in the Civil Defence, but did not include volunteers. He later fixed that on March 1st, 2018 during the celebration of International Civil Defence Day and included volunteers in a newly signed decree (Annahar, 2018, March 3). The Prime Minister Saad Hariri promised in 2018 to approve the regulatory decree that will get the law into force, but many volunteers did not believe these promises anymore. Currently, the second decree concerning volunteers is being discussed and its approval will allow volunteers to finally be employed. Y. Malah (personal communication, March 14, 2019) goes further and states in our interview that the argument of having a large number of volunteers, more than the government needs to employ, is not valid. That is supported by the fact that most of the budget of the General Directorate of Civil Defence in Lebanon goes in fact to the equipment and not salaries (Respondents 2 & 3, personal communication, March 5, 2019). Moreover, any donor funding for projects is not for the direct benefit of human resources through employment of volunteers and payment of salaries, but in the form of new equipment,

machinery, gear, and protective uniforms (Respondents 2 & 3, personal communication, March 5, 2019). Malah insists that volunteers should get their employment rights even if in other governmental departments like the Army, General Security, Internal Security, State Security, and Customs (Saad, 2014). This is a crucial statement especially for those saying that the fire-fighting services are a necessity for emergencies but are not needed at all times, and that employing personnel in that sector as full-timers may be a misuse of resources. The argument supporting employing the volunteer fire-fighters, even if in other governmental departments, is the following: fires are an emergency and basic human need, the urgency of the situation might cost enormous amounts of money and numbers of lives in seconds. In other terms, not having a prepared personnel leads to disasters.

It is important to note that many of the activists have heard from parliamentary sources that their issue will not be solved until the Director General since 2011 Raymond Khattar is replaced by someone related to the President of the Republic, and have stated their disapproval of this discourse (Achkar, 2018; Y. Malah, personal communication, March 14, 2019). This is a clear example of the interference of political and personal preferences in the organization and management of public institutions in Lebanon, but it is not the scope of this thesis to look into it in detail. However, it is essential to point out that during this battle of the volunteers to get the employment opportunity, sectarianism halted the agreement between decision makers. Many sources report that Maronite minister Bassil refused to issue the employment decree because 90% of the beneficiaries are Muslims, then Sunni Prime Minister Hariri stated that from this 90%, 70% are Shiite. During my interview with volunteer activist Mr Malah (personal communication, March 14, 2019), he insisted that he had never heard of that and that refused it completely stating "we are not slaves of sects, we are in service for the country". This statement is part of a mutual support between the volunteers and the

General Directorate of Civil Defence, which has published several supportive messages to the volunteers in 2016 stating that they have the right to fight for their demands based on the law.

C.   Actors in Fire Service Provision of the Civil Defence in Lebanon

1.   Relationships between Actors of the Civil Defence in Lebanon

This section assesses the theory of bureaucracy from the perspective of relationship dynamics between the members based on their employment type and position in the hierarchy and monitors the unity of command that the fire-fighters receive from their supervisors and the central administration.

Following the principal-supervisor-agent model of bureaucracy, the principals in the thesis are the decision makers in the agency, the supervisors are mostly the mission supervisor and heads of stations, and the agents are the first respondents or fire-fighters. The following chart illustrates the principal-supervisor-agent model and the respective employment type of each (Respondent 1, personal communication, March 5, 2019):
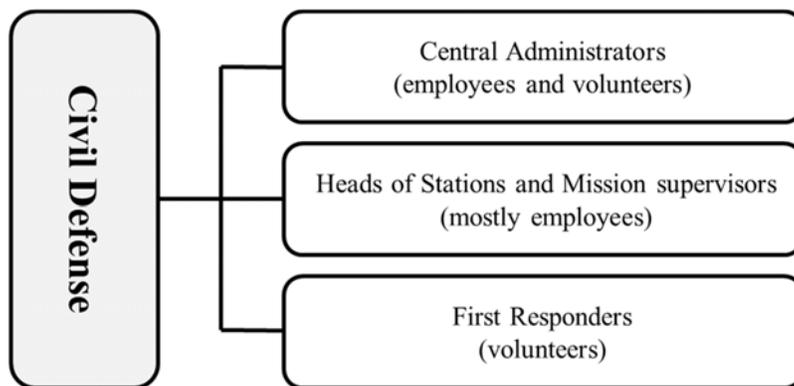
Figure 3- Hierarchy and respective employment type of members of the General Directorate of the Lebanese Civil Defence

First, the General Directorate of Civil Defence in Lebanon is highly bureaucratic and hierarchical in its structure, as expected to be the case in any governmental organization. Its employees fall under the following hierarchical order, from those having higher power to lower as follows (Respondent 1, personal communication, March 5, 2019):

1. Director General

2. مصلحة الديوان "Court Unit"

3. شؤون الضمان "Social Security Affairs"

4. Equipment, Machinery, and Supplies Management Unit

5. Technical Unit

6. Service and Operations Unit

7. Personnel and Training Unit

8. Eight Regional Units

In one of his televised interviews, Mr. Malah stated that there is mutual respect and appreciation of efforts between all fire-fighters regardless of their employment type and that the volunteers have acquired their skills from the colleague employees. This response came after people pointed out the tension in the relationships between full-timers and part-time unpaid volunteers, especially after the release of a decree that tenured the temporary employees and left out the volunteers in 2016. The evidence to this discourse of harmony, one thinks, is the statement of one official at the Civil Defence who insists that mission supervisors are logically chosen according to their expertise (Respondent 4, personal communication, March 5, 2019). However, on the

ground by the fact that the mission supervisors are chosen based on seniority not on expertize nor employment type (Respondent 5, personal communication, April 19, 2019). From my visit to a fire station, it is clear that fire-fighters coordinate between each other and discuss decisions that they have to take, rather than obey to orders from the Head of Fire Station or the one employee in the operations department as one expects in a hierarchical institution. The one taking charge most of the time, or mission supervisor, is chosen based on seniority, and the person trained to derive the fire truck. Some decisions may be taken on the ground and a system has been going in the station that the most experienced immediately takes urgent decisions, but not before consulting the team (Respondent 5, personal communication, April 19, 2019). This allows for a freedom on the field and puts trust and responsibility on the first responders knowing that they are able to act according to the need. Decisions in emergencies such as forest fires can be influenced by many factors, including risk aversion. It has been proven that managers or supervisors in charge of fire-fighting tend to choose strategies on the ground that have less risk on the staff even if the service quality is expected to be better if they follow the riskier option (Hand, Wibbenmeyer, Calkin & Thompson, 2015). This situates this thesis in the larger discourse of risk response present in many sectors and events such as the fear from terrorist attacks and impact the decisions made on the ground.

Second, in addition to the hierarchical order, commands are also a characteristic of bureaucracy, and it is interesting to state that the central administration in Beirut receives all emergency phone calls from the entire country, gives orders to the stations closest to the emergency site, and monitors the movements of the first respondents through the Global Positioning System (GPS) (Respondent 4, personal communication, March 5, 2019). The question to be asked here is how much do orders get through these hierarchical layers and remain the same? In theory, this limits the freedom of the

members on site to shift from the unity of command, a pillar of bureaucratic thinking, and forces them to stick to the original guidelines because their movements are monitored. Nevertheless, the operations room in Beirut in fact uses the GPS system only for time and speed limit monitoring: the fire-fighters do not get any commands from the operations room during their mission, they just get a warning alter on if they exceed the speed limit driving to the scene or they get questioned if they leave their station late (Respondent 5, personal communication, April 19, 2019). Other than that, the first responders benefit from their autonomy as a team from any upper level commands.

2. *Support to the Civil Defence in Lebanon from Others*

It is essential to talk about how the Lebanese Civil Defence depends on other public entities for support during forest fire events and other emergencies: the fire stations can ask for support from the Army and Police in case they need it and these partnerships are mainly to transport the injured and deceased and clean the scene (Mansour, 2015). During forest fires in particular, the Head of the Regional Stations may ask for help from the Army that can help in getting into topographically challenging and dense forested areas since very few of them are prepared by fire breaks and although members of the Army have no training, but they can help in holding the water hoses. (Respondents 4, personal communication, March 5, 2019) (Y. Malah, personal communication, March 14, 2019). That is especially seen in Lebanon because of a lack in the needed number of volunteers in the Civil Defence in Lebanon (Y. Malah, personal communication, March 14, 2019). Mr. Hisham Salman (personal communication, September 6, 2018) pointed out during our meeting that local villagers also volunteer to help out in fire extinguishing as much as they can with their minor experience and poor equipment. Their help is of huge impact since they know the safe

and short roads of their villages more than the Civil Defence volunteers, and the Civil Defence body lacks in human resources and can always use some help (Respondents 1 & 5, personal communication, March 5, 2019). In fact, in 2016, those involved in fire suppression across Lebanon were: Civil Defence (1180 people), Army, Internal Security, MoA, NGOs, local residents (1042 people). Locals being almost as numerous as the Civil Defence fire-fighters, proving their vital role in forest fire interference and the crucial need to train and equip those (Samaha & Mitri, 2016). For example, on Friday 6 August, 2010 alone, fire-fighters were called on fire 81 calls across Lebanon and asked for the support of the Army (Army, Civil Defence combat fires across Lebanon, 2010).

The overdependence on volunteers has been shown to be problematic in fighting forest fires, like the case in Chile. Even the highly trusted all-volunteer system in Chile has been questioned, especially after the great Fire of 2014 in Valparaiso that left 15 people dead and 2500 homes destroyed by the flames (Rice et al., 2017). Despite its original cause not known, it is believed that trash and biofuel accumulation are the main reasons for it being such a strong fire and strong winds helped it spread. At the time, a representative from the United Nations' program on resilient cities argued that Chile's fire-fighters should be paid and some claims of corruption emerged with some saying that 70 000 USD from funds for fire departments were missing (Long, 2014). Another instance is the 2014 Valparaiso fires where residents of the Upper Hills resisted the help from fire-fighter as a way to express being upset from not being usually supported and not having a fire station in their area (Rice et al., 2017). The volunteer fire-fighting companies have seen some competitive, but also voluntary companies take place because of unsatisfactory services given by the existing companies in some areas.

One main difference between the examples of Chile and Lebanon is that the supporters of volunteer fire service provision state that volunteers should also be called professionals even if fire-fighting is not considered as their career, since they receive all of the professional skills and training needed, similarly to that given to paid fire-fighting employees. They are not amateurs just because they do not get paid for their services. In this thesis, I use "professional" fire-fighters to refer to those that get paid and take this as their career. However, many Lebanese fire-fighters admit that they joined in hopes of getting a permanent job at the government, as mentioned previously. The volunteers in Chile go further and pay for their own training, while the Lebanese General Directorate of Civil Defence pays for the training and uniform of the volunteers. This might explain why many Lebanese fire-fighters do not attend training sessions, maybe if they paid for them, they would know the worth and attend. As seen in both countries, volunteer fire-fighters occasionally ask for support from the military because of the extremity of the fire event and them not being numerous or equipped enough to cope with it. If the exceptional sense of volunteering is assumed to be what is stopping Chile from providing its fire service by the Army, what is stopping Lebanon then?

This is a major issue in Lebanon especially because volunteers are neither asked to attend mandatory training sessions (Respondent 5, personal communication, April 19, 2019), nor to pass examinations other than the basic of having good health (Respondent 1, personal communication, March 5, 2019). Thus, their professionalism can be easily attacked by those claiming that fire-fighters that do not take fire-fighting as a career are not considered competent enough (Respondent 1, personal communication, March 5, 2019). In fact, one of the main negative stereotype that the Lebanese citizens have on fire-fighters is that they always arrive late to the site ignoring the fact that the team has to prepare a quick plan for its interference, especially in the case of large forest fires (Mansour, 2015; Y. Malah, personal communication, March 14, 2019). Moreover,

volunteers are not restricted by fixed schedules because they are the only people able to provide fire services so they should have the freedom to take rest at home sometimes and called from there if needed (Mansour, 2015; Respondent 4, personal communication, 2019). However, this can be taken advantage of and many volunteers might lose discipline and not show up to their stations. One can ask here if the strict bureaucratic management of organizations that imposes a certain schedule and fixed working hours should still be followed in the case of volunteers, or if giving them the choice opens the door for them to take on more responsibility.

On another note, fire-fighters in Lebanon are not specialized in fighting forest fires and that is a major concern for efficiency and specialty in accomplishing their duties. The issue is that there is no specific function for each of firefighting and forest fires should have specialized people for that purpose only since fire-fighting in the wild is different from that in closed buildings and it is worth it in Lebanon since the fire season is expanding and is easily reaching six months per year, it covered the months of May through November in 2016 (Samaha & Mitri, 2016). Lebanon can be influenced by the case of France for instance and its fire service sector that is characterized by its training scheme, specialization in forest firefighting and prevention, communication between the different departments, and intervention strategy. In fact, more than 50% of fire-fighters in France are trained for forest firefighting, especially those in high risk areas (Peuch, 2005). Trainings are different for volunteer and employee fire-fighters, are given according to the position of the individual ranging from an ordinary team member to a chief commander, and to the tasks assigned like fire specialist and aircraft officer (Peuch, 2005; Scandella, 2012). For example, in the Valabre Castle Training Centre in Southern France, special training in forest firefighting techniques are given and 3D technologies are used to help officers visualize the scene and practice their response and intervention strategies (Peuch, 2005).

D.   Budget Allocation in Fire Service Provision of the Civil Defence in Lebanon

The sources of funding of fire departments are usually of more than one of the following options: the country's government, local authorities, communities, and the private sector (also called outsourcing) (Scandella, 2012); and they are needed for the payment of salaries and wages, operation of equipment, maintenance, trainings, and awareness sessions. In Lebanon, public expenditure, including that of fire services, is funded by ministries and foreign sources (J. Chaaban, personal communication, 2019). The foreign funders' support to the Civil Defence is in the form of equipment (Respondents 2 & 3, personal communication, March 5, 2019). In addition, municipalities eventually contribute in funding the local fire stations in some areas (Respondent 1, personal communication, March 5, 2019).

First, the Lebanese government has been in debt since the 1990s and can often only afford to pay the operation and salaries of its institutions. The process to get the funding starts at the level of the Minister of Finance after he sends the government's budget plan and general orientations to all ministries asking for each ministry's required budget for the current year. Every department at the MoIM prepares its budget for them all to be combined in a budget proposal that is based on current needs and previous year's figures and sent to the Parliament for official discussions. Both the Director General and the Head of the Administrative Unit of the Civil Defence take part on the discussions (Respondents 2 & 3, personal communication, March 5, 2019). The final decision is in the hands of the Minister of Finance and Minister of Interior and Municipalities, unless they disagree on the budget and the CoM has to interfere (Lebanese Ministry of Finance, 2018). Thus, the budget of the Civil Defence is released on a yearly basis yet remains almost fixed, which implies that there are is no competition with other departments of the MoIM to get funds (Respondents 2 & 3,

personal communication, 2019). In addition to revenues from the government, the Civil Defence also gets a share of the taxes on shelters from the municipalities as mentioned previously (Y. Malah, personal communication, March 14, 2019).

Second, the CDR accepts foreign funding after it reports the details of the transaction to the Prime Minister and the CoM passes a decree for the Parliament to approve on it (J. Chaaban, personal communication, 2019). One might think that international donors give attention to reduce corruption in their projects as much as possible, but the fact is that they usually rather avoid that by giving their funds through NGOs rather than the Lebanese government and CDR, for instance (J. Chaaban, personal communication, 2019). Because of little or no intervention of foreign actors in the process of the financially supporting the Lebanese government and its departments, corruption and misuse of the funds are expected. Indeed corruption can get to foreign funds, especially since help is sometimes given to Lebanon in the form of loans through international conferences, which get the country in even more fiscal deficit. The most recent conference, CEDRE (Conférence Économique pour le Développement, par les Réformes et avec les Entreprises), took place on April 6th, 2018 in France. It resulted in 10.2 billion United States Dollars (USD) in loans and 0.86 billion USD in grants for Lebanon. In return, the Lebanese government pledged to implement some fiscal sectoral and structural reforms (CEDRE, 2018). Lebanon's Minister of Finance stated after the CEDRE conference in 2018 that the country will face a budget deficit of 8 trillion Lebanese Pounds (LBPs) if current spending keeps being carried out, and urged the government to reduce its expenditures (Azar, 2018, February 20). Most of the loans given at CEDRE are form the World Bank ($4 billion), the European Bank for Reconstruction and Development ($1.35 billion), and the renewal of a $1 billion credit line from Saudi Arabia (Irish, 2018). Some opponents to Hariri have stated that this conference serves his clientelism to gain a good political reputation among voters before

the elections scheduled on May 6th, 2018. More recently, the discourse of government austerity is being seriously brought up and many politicians have been hinting that reduction in the salaries of government employees might be the only solution for economic stability in the country. Despite the fact that no final decision can be made before the national budget has been studied and released, citizens are concerned and many public employees have organized protests against any decision of that sort. This is similar to when protesters against government austerity measures filled the streets of Paris on March 14, 2017 after fire-fighters declared their disagreements of many measures, including the fact that many professional fire-fighters are being replaced by civilians (Lantier, 2019).

E. **Conclusion and Final Thoughts**

This chapter checks the influence that bureaucracy has on fire service provision in Lebanon by focusing on one organization, and that is the General Directorate of Civil Defence. Based on a brief analysis of the structure of the department, it is clear, like in any other public institution, that bureaucracy characterizes the relationships of the members and the execution of their tasks. The theory of bureaucracy is also apparent in the process of law implementation and getting government funding since many decrees, approvals, and signatures are needed for a law to get into force.

Despite bureaucracy being a rigid system, a closer investigation of the interaction between individuals from several hierarchical levels proves that there is opportunity for these first respondents to add their input on decisions. This calls for interest in more research of governmental departments on the micro level since this flexibility may not be present in all public institutions. The analysis inspires the idea of employing the volunteers under military forces and shifting the fire service provision

from an independent entity to one that is under the Army for many reasons. First, the Army already supports fire-fighters in their tasks if they need it because of shortage in the number of volunteers. Second, the overreliance on volunteers hurts the trust that citizens have in their fire service sector. Third, the volunteers could get their right of being employed and still have the same duties that they joined to do.

On the level of interactions between departments not individuals, the financial relationships are dominant. Results show that the budget does not show any tension between the agency and other departments in the ministry since it is prepared based on previous years' budgets and remains almost the same. It implies that not much can be done regarding the monetary aspect of management of the Civil Defence and explains the complexity and long-time that is needed to issue the employment decrees and details of volunteers.

The next and final chapter concludes this thesis by recapitulating the main conclusions reached by each chapter. Furthermore, the chapter recommends some reforms in policies in Lebanon for a better handling of forest fire risks and service. It supports the recommendation by arguments that study the specific case of Lebanon and suggests a practical plan to execute the recommendation by specifying the sources of budget for the new option.

CHAPTER V
CONCLUSION AND POLICY RECOMMENDATIONS

This thesis presents a new approach to discuss environmental policy: it connects bureaucracy and the analysis of human resource relationships inside government organizations to natural resource conservation. It studies the structure of the personnel in fire services and its influence on fire service quality. Previous forest fire studies and policies do not tackle the human resource aspect in detail and focus more on the technical data needed in the field.

The thesis uses official documents supported by the thematic analysis of semi structured interviews to investigate the case of the General Directorate of the Lebanese Civil Defence and links it to forestry policy and forest fire management in particular. The thesis starts by examining the factors that may challenge the implementation of a sustainable forest fire management plan in Lebanon. It focuses next on one of these factors, which is the employment status of those providing fire services in the Civil Defence Department because an improved fire service performance leads to quicker response to fires, more effective extinguishing, and better assessment of the causes of fires. It takes all along a comparative approach by examining examples of policies utilized by other countries in managing their government employees, volunteers, and private contractors; and links them to the case of fire-fighters in Lebanon.

The many factors that have led to an incomplete execution of a sustainable forest fire management plan include contradicting legislative texts, lack of cooperation and coordination between actors; technical challenges; insufficient research on forest fires including historical numbers, statistics, and trends; lack of awareness, connection to

forests and preparedness for fires among residents close to forests. This thesis focuses on employment in fire services: the literature shows that countries have generally shifted their staff management methods in fire departments over the years according to their evolving needs. My interviews support the conclusion that the current employment system of fire-fighters in Lebanon is not the most efficient. In fact, most countries use several types of human resource management at a time in the fire service sector, and the type of fire-fighter employment depends mainly on the size of the area and the number of its inhabitants. Lebanon currently has employees and volunteers at the same time in its fire departments, but some fire stations lack the needed staff so volunteer take full charge.

A. Future Research

Further research can numerically support the recommendation of this thesis by carrying out a Cost-Benefit Analysis (CBA) that compares between two scenarios: having volunteers and employees responsible of providing fire services, or putting the military in charge of delivering fire services in Lebanon. Future research can also focus on the implementation aspect of the recommendation and public administrators can prepare a detailed reform plan that takes into consideration the step by step measures needed for this addition to the government. Moreover, more research can dig into the influence of politics and sectarianism on employment in Lebanon and link it to the case of firefighters.

This thesis is also a starting point for further research on the organizational aspect of public services and how they should be studied as entities on the micro level and reconsidered in some cases. Future research can look into agencies that need more than their current budgets to function and try to suggest a solution that reforms their

internal structure and that does not require putting more pressure on the government.

Other research can duplicate the method used in this thesis to analyse the allocation of

fire services and other social services provided by environmental NGOs for instance, in

hopes of reaching a conclusion on the reforms needed to successfully manage natural

resources.

In her study on the role of the Civil Defence in disaster management in Lebanon,

Hiba Mansour (2015) suggests that the government should increase its budget to hire

more fire-fighters and execute the recent employment law that allows active volunteers

for more than three years to become employees if they pass their exams. Moreover, the

Disaster Management Office should coordinate between the Civil Defence and the

Army and Internal Forces, and the Civil Defence should restrict its activities on fire-

fighting and rescue services only.

From my perspective, however, and based on the literature and my interviews, it

seems appropriate to suggest shifting the responsibility of fire-fighting services in

Lebanon to the Army. Since the fire service in Lebanon has been organized like this for

many years, a drastic reform of the system seems unrealistic and impractical.

Accordingly, this thesis suggests that the Lebanese government recruits volunteers, who

are already serving in the General Directorate of Civil Defense, in the military so they

receive the desired employment benefits and still get to do the tasks they already have

joined for.

This shift of fire services to the military could increase the trust that

communities and organizations have in the fire service sector since, although volunteers

are respected for their efforts, they are often criticized for not having the leadership and

personnel skills needed to protect others and their properties. Citizens can trust the

system more if the personnel is made of full timers. Having the military in charge of fire

service provision could also avoid adding stress on the government to allocate a larger budget for fire services, especially in the current economic situation of the country.

Although communities generally respect volunteers and appreciate their effort, they still often criticize the volunteer structure for lacking the requisite leadership and professional skills needed to protect people and their property/livelihood. The public can trust the firefighting system more if the personnel comprise full timers. Assigning the military to lead on fire service provision also allows the Lebanese government— under major pressure to cut public expenditures—to avoid adding allocating a larger budget for fire service.

In fact, Lebanon is no exception to the situation of other developing countries that are pressured to privatize their public services and reduce their government expenditures to pay off their debts to donors, mostly international organizations and developed countries. This is illustrated by the promises that Lebanon has made to cut its government's expenditures and pay off its public debt at the Paris I, II, III, and CEDRE conferences. Lebanon has a high public debt of around 150 % of GDP and has been forced to cut its expenditure on public services, like fire prevention and suppression services, leading to fewer employment opportunities and amenities for government employees (CEDRE, 2018).

The argument pertaining to the added economic burden is important since Lebanese politicians have been relying on a discourse lamenting the lack of fiscal funds and burden of the country's national debt in delaying the implementation of the law that allows volunteer fire-fighters to become government employees. The debate around this employment law entering into force seems to focus on fighting corruption and "giving the public its money back" to get the needed fund. The topic of corruption is beyond the scope of this thesis and my suggestion seems to be a more realistic and practical

proposition that could enter into force relatively sooner. However, it is important to note that the distribution of the budget and expenditures are not based on equity in Lebanon, but on clientelism (Salti & Chaaban, 2010). In shifting the fire service to the military, not only does the overdependence on volunteers disappear, but possible conflicts between staff of different employment type is also eliminated. Moreover, the service can still remain in the hands of the government rather than under the control of a private company.

My suggestion can be challenged however by the sectarian nature of the public sector in Lebanon. While this thesis does not explore this in detail, it is important to note that people are appointed in their jobs at the government based not only on their skills, but also on their sect and religion. The military apparatus in Lebanon is comprised of four branches (Army, General Security, State Security, and Internal Security Forces) and, although not formally stated, the head of each branch is known to be politically affiliated to a political leader and linked to religions. Currently, the head of the Army is a Maronite related to the President of the Republic Michel Aoun, the head of the State Security is also a Maronite affiliated to president Aoun, the head of the General Security is a Shiite affiliated to Hezbollah, and the head of the Internal Security Forces is a Sunni linked to Hariri.

The question here is if fire services are to be given by the military, is there any possibility that sectarianism will not affect the employment and assignment of positions process? Based on the dominant sectarianism system in the country since the mid-19th century (Makdisi, 2000), it is only logical to assume that, like any other government agency in Lebanon, discrimination according to sects is most likely to take over the management of human resources in fire services.

In more practical terms, volunteers are recruited into a newly established department for fire-fighting under the Ministry of Defence and they get their salaries from the budget that is already specified for newly recruited personnel in the ministry, such as the Army. The current employees at the Civil Defence are moved to the new department at the Ministry of Defence but get their salaries from the MoIM until they retire.

APPENDIX I
CONSENT FORM

The interviewees are asked to read carefully the following consent form before agreeing to participate in the study.

This survey is for research purposes only and takes part in a Master's thesis at the American University of Beirut (AUB). The ultimate purpose of the research study is to inspect the reason behind some strategies and initiatives that manage climate change induced forest fires in Lebanon, in order to assess the situation in the country and hopefully achieve beneficial recommendations.

Subjects that are recruited are specialists in the field of forest fire management in Lebanon and are above the age of 18 years old. There are no criteria for their inclusion in the research other than their approval and good knowledge in the field that would benefit the purpose of the study. The interviewees will be contacted by email or phone call according to the invitation script.

The participants in this study are simply asked to give their opinion and the data they give will remain confidential. They have the full right of refusing to participate, stopping their participation, or skipping any questions that they find inappropriate or that they are not comfortable answering. These acts will not cause them any penalty or loss of benefits, and will not affect their relationship with AUB.

Their names will be used in the research project as a reference after securing their consent; however, they have the right to ask for any piece of information that they have shared, to remain anonymous and it will remain as such.

The time needed to carry out the interview is approximately 30 minutes it will occur in private settings at the offices of the respective interviewees. During the interview, I will only type or write down some notes without recording our meeting and the interviewees will be kindly asked to refrain from criticising specific people or parties by name.

This study does not present any physical or emotional harm risk on the respondents other than the usual daily life ones. The study will be carried out without deception and will not adversely affect the rights and welfare of subjects. No direct benefits are presented to the respondents except for the satisfaction in participating in a research study and the nurturing of their general knowledge on the topic. The overall population will benefit from the outcomes of the study that aims at reducing forest fire risks across Lebanon and find the gaps to fill them. They will also be aware, and hopefully knowledgeable, about the topic that threatens everyone without exception and will threaten those who are not currently impacted by it in the future.

The collected data will be stored for up to 3 years in the office of the primary investigator Prof. Makdisi in a locked closet. The interviewees will not be paid for participating.

For any questions or comments regarding this research study, the interviewees may contact me at yea02@mail.aub.edu or the primary investigator Professor Karim Makdisi at km18@aub.edu.lb. They may also contact the Institutional Review Board (IRB) office at AUB, in case of other questions about their rights or concerns, at irb@aub.edu.lb.

APPENDIX II

THE ARTICLES THAT ARE RELATED OR IMPLY TO FOREST FIRES IN THE 1949 FOREST CODE ARE *UNOFFICIAL TRANSLATION*

- Article 3: A Forestry Department shall be established in the Ministry of Agriculture to ensure the enforcement of the provisions of this Act on State forests and to examine and enforce measures for the protection and rehabilitation of other forests.

- Article 28: In the minutes of tenders and the list of general and special terms and the decisions of leasing with satisfaction, the following shall be stated: 5- the conditions of use of fire.

- Article 101: It is prohibited to set fire to and move outside the houses and buildings intended for investment within and outside the forest boundaries on less than 200 meters of the mentioned boundaries.

This prohibition shall be applied from 1 July to 31 October and shall also apply to private forest owners. It shall also include the manufacture of coal, distillation of tar and gum, and generally all industries requiring fire, subject to the provisions of Articles 102, 103, 104 and 105.

  - Article 102. Houses, investment buildings and stone-built shelters located within forests or 200 meters from which fires are set on fire for family needs or industrial needs must be during the period between 1 July and 31 October, surrounded by an expanse of land 25 meters wide. Every bush or grass and every tree in which gum if it sees the interest of forests is necessary and must always keep this space in good condition does not put some of the fuel.

- Article 103: During the same period, the use of fire in shelters, tents, constructions, workshops, plants and temporary structures in the forests, however, shall not be permitted in the same area except for cooking food. The stoves must be surrounded by an opening of 25 meters in accordance with the conditions prescribed in the preceding article.

The Forestry Department may exceptionally authorize the use of fire during the above-mentioned period for the burning of minerals in forest investment or in the 200-meter area from these forests, provided that each stove is surrounded by an opening according to the conditions set forth above and with a proposal to be appointed by virtue of the licensing decision.

The manufacture of coal and tar during the same period is within the conditions imposed by the Forestry Department and this interest may prevent this work temporarily or permanently if it deems necessary.

- Article 104: Privileged railway or tramp companies passing through forest lines or passing within 200 meters of their borders shall leave no grass or grass plants in the lines between the date of the first of June and the first of November.

They must otherwise create along the sections of these lines trenches 20 meters wide from each side takes away each fork and when necessary every tree in which gum is always kept good condition and all at the expense of the company and its responsibility.

- Article 105: The use of equipment used for fire on roads that pass through forests or 200 meters of their borders requires, in the period mentioned in the preceding article, a license from the Forestry Department.

- Article 106: No one shall burn thorns, grass, straw and other plant based on its market without a license from the Forestry Department in the territories less

than five hundred meters from the forests from 1 July to 31 October and less than 200 meters from 1 November to June 30 unless otherwise authorized.

- Article 107: In all cases, the fire-thrower shall be civilly liable for damages caused to others without the consequent responsibility of the State.

- Article 108: If a forest fire occurs, representatives of the Forestry Service, security officers and representatives of the administrative authority shall have the right to use all persons, animals of pregnancy, traction, transport and equipment as required by the case.

- Article 109: Grazing is prohibited for ten years on the whole area of burned or cut forests.

- Article 110: In forests that are the property of the State or the owners of municipalities and villages, no industrial establishment that uses fire or requires the establishment of a warehouse of fuel in the forest or less than five hundred meters may be established without a license from the Forestry Department.

- Article 111: The forests mentioned in the previous article may not be built without a permit from the Forestry Department, any building or any tent that was covered or composed of inflammable materials in the forest or less than 200 meters from its borders.

- Article 112: If a licensed ignition or an ignition according to legal conditions caused a fire in the neighbouring property, the fire-thrower shall be liable for all damages, unless such damages result from measures taken to protect a forest from fire.

- Article 113: The State shall not bear the slightest financial responsibility for the partial or total destruction of a forest owned by individuals, municipalities or

villages following measures by the administrative authority to take them during

fire control to prevent it.

APPENDIX III

RECOMMENDATIONS INSPIRED BY LEBANON'S NATIONAL STRATEGY FOR FOREST FIRE MANAGEMENT

1. Research: develop a network for sharing information between research institutions, develop an environmental curriculum in universities and schools, improve the data collection process, equip the working body with the human and financial support needed, and include the local communities and their knowledge in the management process. This is focused on the level of research to know the ecology and causes behind fire regimes in order to prevent and solve them.

2. Risk prevention: develop fire risk maps, involve local inhabitants next to fire hazard areas in the process, focus on areas that are prone to ensure sustainable practices that do not cause fires, organize awareness campaigns, specify appropriate sanctions in legislations, and develop regulations that prevent the occurrence of uncontrolled fires.

3. Readiness: prepare the appropriate equipment, establish the infrastructure needed, monitor the weather and forest areas that are prone to fires, prepare these areas with breaks and roads for intervention in case of a fire and for decreased spreading of the fire, regulate these fire tracks so that they do not get abused by fire setters and urban settlements, divide the roles of the various stakeholders beforehand to avoid overlapping, and provide effective training for stakeholders and firefighters on site.

4. Response: focus on legislation implementation, prepare the appropriate equipment like helicopters with belly tanks, monitor fires to prevent reoccurrence, organize plans to intervene in fires to supress and control them, and divide clear roles to each authority.

5. Recovery: assess the fire event, fund the communities according to their needs, prohibit grazing for 10 year in the burned forest area, restore the area to avoid post fire damages to the ecosystem, encourage reporting, estimate the damage, and manage the wood debris after the fire in the most suitable manner to the area.

APPENDIX IV
TABLE SHOWING THE AUTHORITY, LEGISLATION, STRATEGY, AND MAIN STRENGTHS, OF ALGERIA AND CYPRUS COMPARED TO LEBANON.

Country	Main Authority	Principal Legislation	Management System	Strengths Compared to Lebanon
Algeria	General Directorate of Forests (Direction Générale Des Forêts DGF) (Ministry Of Agriculture and Rural Development)	Law 84/12 of 1984	Decrees that follow the law and 2075 committees for forest fire prevention	Prevention measures: maintaining forest walls and trails, executing many silviculture related activities, updating the existing plans concerning implementation of firefighting, organizing operational coordination and local citizens' committees
Cyprus	Department of Forests (Ministry Of Agriculture, Rural Development, and Environment)	Forestry Law of 1967	Integrated Action Plan on Combating Fires in Rural Areas including: prevention, detection and reporting, pre suppression, suppression, measures	-Legal text tackling forest fires more detail. -Cyprus Forest Service for formulation and implementation of forest policy and legislation. -A hotline for forest fire reporting, forest fire breaks and roads for better reduction of fire expansion, and silviculture activities like thinning and pruning. -Specialized brochures for forest visitors, performers of agricultural or other work in or near forests, people permanently or periodically resident in forest or suburban areas. -Cyprus Forestry College

| Lebanon | Forest Protection Service at the Rural Development and Natural Resources Directorate (Ministry Of Agriculture) | Forestry Law of 1949 | Lebanon's National Forest Fire Management Strategy of 2009 | A comprehensive and cross sectoral strategy |

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