

## **The Impact of losing the Forest Resources in Lebanon**

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### **ABSTRACT**

Lebanon includes wide forest diversity and the protection of these forests is crucial for the countries biodiversity. Subsequently, managing wisely the forests sustainability will lead to several benefits from different perspectives whether social, ecological or economical added value.

Awareness in this topic is needed for the citizens regarding the impact of destroying the forests resources on Lebanon's biodiversity. A non-organized plan in regard to deforestation can harm the biodiversity.

Ministries and Government initiative and guidance are important to boost this mission and set a suitable action plan accordingly. Understanding the importance of the forest resources and the consequences that will occur if not well preserved is the first thing to start with to be able to set a constructive strategy.

On another hand, finding out the root causes that are menacing the forests resources will also help in adjusting and improving ways to reach the desired goal in conserving the biodiversity.

## **1.0 INTRODUCTION**

### **1.1 Research Purpose**

The main objectives and hypothesis of this research are to analyze, create awareness and find solutions on:

-Direct and indirect risks emerging from certain root causes are threatening Lebanon's forests resources and impacting its biodiversity.

-Setting an action plan and committing to it will preserve and save Lebanon's forests and its resources.

In this study, we will be elaborating the following problematic: How does the destruction of forest resources impact Lebanon's biodiversity?

### **1.2 Methodology**

The analyses and reasoning that are enclosed in the study are acquired based on the proposition of:

-Labelling Lebanon's ecosystem<sup>1</sup> and its constitution.

-Finding rare species that are exposed to risk of menace.

-Categorizing the direct components that threat the forests, their main source and their effect.

-Set an action plan to be proactive in trying to prevent the main causes that affects negatively the Lebanese biodiversity.

-Assessing the efficiency and effectiveness of the action plan established, while finding sponsors that will be able to encourage and support this case study from both financial and managerial levels.

<sup>1</sup> National Geographic Society (Aug 15, 2011) - An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life.

## **2.0 THE BIODIVERSITY AND FOREST RESOURCES OF LEBANON**

In this part, a globally studied geographical and socioeconomical perspective of Lebanon along with a wide outline on the Lebanese forests and its fundamental resources will be highlighted, with a description of the habitation, the available vegetables and species.

### **2.1 Country Overview**

The Lebanese territory of 10,452 km<sup>2</sup> is known as a small country located on the East of the Mediterranean Sea and reputedly known by its landscape constituting beautiful mountains.

## **Lebanon land can be easily distributed as follows:**

- A zone defined by the coast determined as almost (13%) of the terrestrial accessibility
- Another section constituting the Mounts of Lebanon, that escalates from the North to begin with Akkar and spreads south to the cities of Sidon, Tyre, Nabatieh, Jezzine, Bint Jbeil. Qornet elSawda (3,087 meters) is the highest mountain in Lebanon while, Sannine (2,624 meters) comes in second place. This section constitutes almost (47%) of the Lebanese territory
- The Bekaa Valley, which has a percentage of (14) separates Mount Lebanon and Lebanon's frontiers.
- The Lebanese borders: Syria and Israel; occupying (19%) of the country.
- Finally, South of Lebanon, (7%) of the country

Moving into the environment climate is Mediterranean that has technically 4 seasons: winters are rainy with an annual rainfall of 820 mm in the capital, starting the season by October ends by May to welcome the summer season. On the coast, the temperature ranges from 120 degrees in Jan and 270 degrees in Jul.

Water is the most treasurable resource of Lebanon and falls in richness and abundance.

Most of the water paths dry before the ending of the summer season but the water reserved underground is estimated from 500 to 1100 mm<sup>3</sup>.

Shifting to the distribution of population it is projected to be around four million, but the most population lives in the city which makes only 10% of the population living in the mountain areas. This partitioned way is unproportionally distributed and has a big impact on the ecosystem: the human needs will be mostly concentrated in the rural area such as the consumption of water, electricity, the occupation of lands.

Moving into the religious parties it is clearly known that Lebanon include Christians, Muslims and Druze religions in its culture, it also includes sub religious parties that can reach up to 15 sects.

Considering the educational level, the country offers the best educational programs across the Middle East region. In addition to the healthcare sector that is comparatively doing good in Lebanon, mentioning that the young people rate is high having an average of 25 years old as 55% of the total population. While the death age rate is nearly 67.

Jumping into the economic situation that is always considered as unstable in Lebanon, it is recognized that the Lebanese market is mostly concentrated on the private sector, nevertheless, being always attacked and downgraded because of the country's debts that continuously limits the growth and development of the country.

While examining the Agricultural segment, Lebanon keeps being productive in this fragment getting always progress in exporting specially to the Gulf nations, which allows and motivates locals to invest always more in the agriculture and developing new ideas that always opens new working opportunities.

## **2.2 Forests Ecological System**

The biodiversity<sup>2</sup> in Lebanon is directly affected by its geographical positioning vs the Mediterranean Sea. The biodiversity has been mostly affected in this region by the human species. Consequences are currently being visible in Lebanon's agriculture and landscape territories subsequent to the choice of deforestation that started 8000 years ago.

<sup>2</sup> Jul 20, 1998 - The number of species of plants, animals, and microorganisms, the enormous diversity of genes in these species, the different ecosystems on the planet, such as deserts, rainforests and coral reefs are all part of a biologically diverse Earth | Anup Shah.

## 2.2.1 Forests Allocation

Forests in Lebanon, represent almost 13.2% (136 500 hectare) of the entire side of the country, having also different types of lands designated as the woods and covering 11.2% (106 000 hectare). Starting to grow from the coast side until getting to reach almost 1900m where are located the top mountains.

Mixed forests<sup>3</sup> occupying 25 percent, Coniferous and Broadleaves was occupying 75 percent: those are the 3 principal Lebanese forest categories.

Subsequently, the 75 percent is partitioned into the following segments: Broadleaved shrub, grassland with trees, mixed shrublands and coniferous shrubs. Check the figure below for a more detailed overview showing the total percentage of the forest scope.

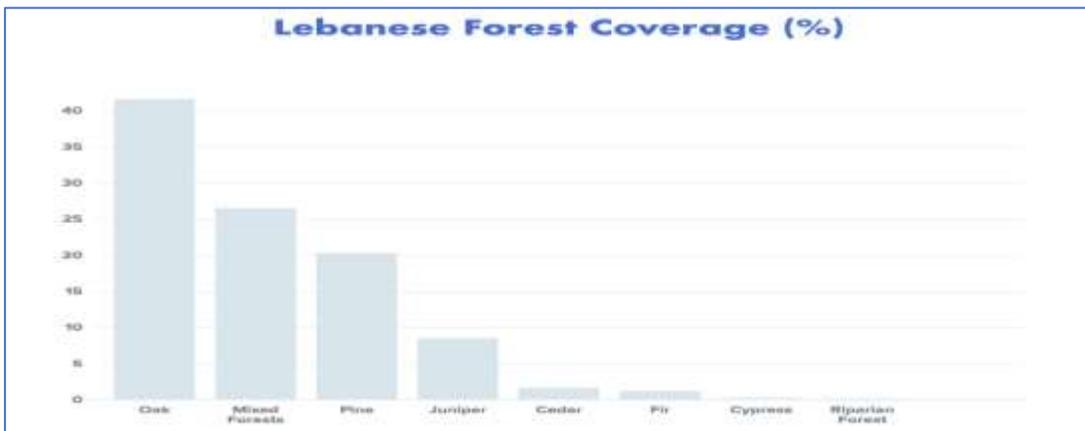


Figure 1. Total forest cover %

## 2.2.2 Forests Biological Diversity

Too many factors gave birth to this unique biodiversity: whether the geographical location of the country, or the very primitive practices adapted by the humankind, or simply the natural environmental changes that adapts with variations.

However, the location where Lebanon is situated on this planet earth explains the richness of its biodiversity as the Mediterranean east coastline is the most organic and pure area on the planet.

Although the Lebanese surface size is comparatively small relatively occupying less than 0.01% of the planet earth façade, Lebanon encloses a unique biodiversity encompassing 1.15% of the whole world plant subdivision and 2.67% for the section comprising the reptile all over the world along with the warm-blooded vertebrates and vertebrate animal kinds. It is also projected that Lebanon has up to 9,000 fauna and flora species.

The floral diversity is available at a high density in Lebanon and the Mediterranean region: 82% available in land, 11% in the sea and 7% in the unsalted waters. (MoA, 1996).

The Animal existence in Lebanon varies between their presence in 46% on terrestrial occupancy; 16% in the pure waters and 38% in the salted water. (MoA, 1996).

To protect the overall biodiversity and try as much as possible to save the forests resources, Lebanon has founded several natural reserve zones:

- the Valley of Qannoubine as a cultural landscape
- Arz el Rab cedar forest<sup>4</sup>
- A possibility of creating a new national park in the North zone and approved in 2009 by the Council of Ministers
- 4 designated wetland by Ramsar (Ammiq, Deir Al Nourieh, Palm Islands Nature, Tyre Beach)
- 15 other sites elected by the Birdlife International institution
- Other sites are under the shield of the Ministry of Agriculture and Environment.

### **2.2.3 Species Importance**

The forests resources and the natural biodiversity is of an ultimate benefit to the Lebanese country and its people providing ecological goods and an ecological wellbeing in the culture of the country that can affect Lebanon in many ways:

<sup>4</sup> Horsh el-Rab (Forest of the Cedars of God), with its 375 trees, is the smallest yet oldest and most beautiful cedar forest in Lebanon.

In the tourism sector, always known in Lebanon as a great destination to have to explore its beautiful outdoor destinations that can attractively being accessed in any time of the year with a different color in each season, which enriches and elevate the economic situation.

While also profiting of the organic food in the agriculture sector and plantation of fruits and vegetables to be sold in the market, even the plants that can be used for the production of medicine take part in evolving the country economically. The forests resources also play a big part in allowing a more unified cultural spirit allows friends, families to gather in nature and enforce people and society unity to connect with human species and natural species.

In addition, the forests resources<sup>5</sup> can be of an asset in providing ecological functions such as: carbon storing; nutrient cycling; water resources that are being filtered and delivered into the market and are being rentable, although the amount of water that is available in Lebanon can be much more useful if well controlled and structured and to be able to gain of its utmost advantage; air distillation; maintenance of the local environment and climatic change.

These above-mentioned benefits should be well valued whereby the MOF and MOA should put some more efforts in conserving and at the same time taking honest advantage for the improvement of the economic and social situation for a better future in Lebanon; perceiving that the forest resources covers a big part in all aspects political, social and economic. While planning and setting an action plan to boost the tourism sector in addition to a study about the forest fire control that can determine the total cost needed for the startup and creating awareness about its value in presenting numbers and effective studies explaining the output of investing in such a program.

<sup>5</sup> Forests resources | Forests provide an array of benefits to human societies above and beyond their pivotal roles as habitat and environmental regulators in natural ecosystems (Jun 5, 2020) Encyclopedia.com

## **3.0 PROTECTING THE LEBANESE BIODIVERSITY AND FORESTS FROM THREATS**

### **3.1 Threats**

This section highlights the vital motives threatening the forests resources and biodiversity. At first, the most critical and crucial threat is directly related to the transformation of the forests into other industrial or inequivalent use is definitely leading to a menace to the forest's resources. Second, the surplus in hunting and collecting species can be definitely harmful when not keeping a balance in consuming the natural resources.

Third, the existence of strange and dangerous species and their expansion is part of the threat. Fourth, and most importantly the influence of the water pollution on the environmental resources.

It is forbidden to cut trees for any kind of usage at any place at any time only if the MoA allows and gives the authorization after careful examination to do so; with an exception to the briquette of charcoal fabrication that has the green light in using trees for the production but with definite rules and regulations assigned by the MoF stating all the terms including the fixed season where it is allowed to using resources for production.

The presence of several non-timber forest products (NTFPs) <sup>6</sup> is abundant but abandoned with no control from the MoA and MoF: people on an individual level are collecting these products such as medicinal plants and plants that secrete essences.

Moreover, global warming is a result of some human undertakings, mostly when burning hydrocarbon to generate energy. In addition to the greenhouse effect that is a threat too in global warming when blocking the Earth's warmth from evading into the space.

All of the above-mentioned threats are mostly related in affecting the weather change, which on its turn, Global warming is to be considered as a direct to the resources of the forests, to the forests themselves and to the whole biodiversity.

<sup>6</sup> NTFP | It's any product other than timber that is naturally produced in forests and can be harvested for human use without cutting down trees. Think food items, such as nuts, berries, mushrooms and seeds, or non-food items such as oils, perfumes and medicinal plants, Malcom Gore (Nov 7, 2018)

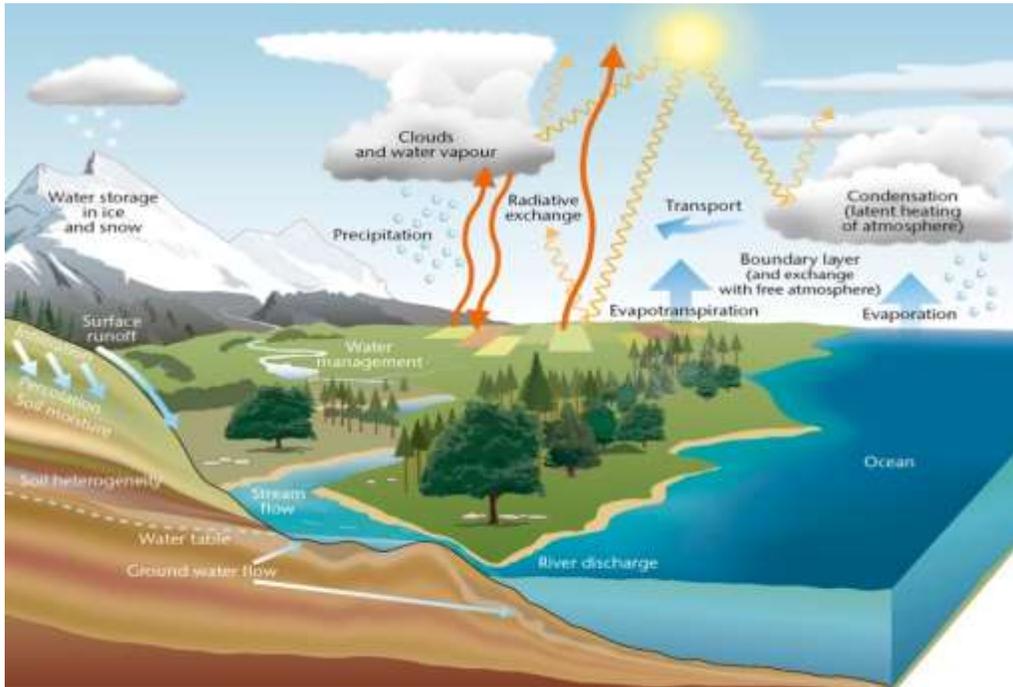
### **3.2 Deterioration and Loss of forests and other environmental surroundings**

The urbanization is one of the major threats affecting the Lebanese biodiversity and forest. When growing in the construction of habitation, ipso facto there will be a radical change in the real type of land use sometimes deteriorating the agriculture parts. As stated and unchanged by the MoF since the 19s', when application of unauthorized urban extension of the littoral in invading or removing sands and the destruction of agricultural areas, and forest fires are all under the same segment, considered as a trigger in the depreciation of the environment, leading also to the breakup and degeneration of all species types. A large amount (4,300 ha) of agriculture lands in Lebanon were damaged between 2006 and 2009 as a result of the forests wildfire. Subsequently, in this short term, the decrease in the volume of forests was clearly distinguished, consequently to the loss of important forests resources and therefore leading to people losing their jobs or investors getting into depreciation.

Lebanese water is also in danger instigated by global warming, showing an alert in the agriculture segment. In fact, global warming can lead to a direct threat to water resources when there will be a warmer world, the evaporation process will happen faster not within the normal range, sucking up much more water from the sea, the lakes, the vegetation and the soil.

This will directly impact the supply of water drinking and agriculture. In addition, in the contrary, when the excess of warm gets down, the amount of rain will highly increase in excess even the snow drops will expand abnormally leading to fatal thunderstorms. These changes will impact citizens in noticing more likely water shortage. Lebanon is not ready for the climate change consequences; specifically, in terms of water resources because of mainly the old infrastructure of Lebanon<sup>7</sup>. Lebanese households may not be able to afford water and wastewater purchasing service in the coming future.

<sup>7</sup> will scupper remaining international donor goodwill towards Lebanon, potentially sabotaging efforts to mobilise at least US\$11bn in promised concessionary financing for Lebanon's infrastructure from other countries EIU, Lebanon faces up to major infrastructure challenges, October 19th 2018



How Climate Change directly impacts our water (Source: UK Met Office)

### 3.3 Threats Source

The threats that are warning the forest resources are coming from certain grounds leading to this common environmental problem. These sources are coming from a cultural, economic and political point of view.

### **3.3.1 Legal and Political reasons**

The Lebanese governments lack a lot of leadership in taking the resolution of executing projects. This instability is due to many obstacles coming from the mismanagement in political commitments to thrive for a better environmental program that can develop the wellbeing of the country.

Legally, all the constructive outlines are developed; the only missing point is to put words into action. Both ministries of agriculture and environment are not being able to reach a common ground in establishing a long-lasting unified agreement. From another perspective if we get to look more into the funding of the municipalities related to the environmental care, we can understand how much their financials are undegraded and not well financed; meaning that their employees are also underpaid which will lead to a low level of motivation leading to a low level of productivity.

Even the properties identities are unclear; some amendments are being made sometimes by bribing the law entities to alter the characteristics of a land to be able to use it for their own advantage without taking into consideration the zoning norms of each territory and its fundamental use that can be delicate or easily disposed to fire.

### **3.3.2 Economical reasons**

In order to feel growth and development in the biodiversity of the country, we need to start creating a sense of inspiration to the people and employees that are responsible of supervising and managing the country environmental resources.

These staff should be praised and be motivated financially in providing those incentives or salary raise or other benefits and morally by developing their personal and technical skills in offering them external training plans to boost their managerial skills. In addition, hiring a new generation that can add value and making sure to employ competent and expert matter employees will definitely advancement to the sector.

### **3.3.3 Social reasons**

The lack of knowledge and the shortage in providing awareness to the Lebanese people can be an important route cause. Many topics should be taken into consideration and promoted on many platforms, whether in companies, in ecotourism activities, over social media, paper-based media or through TV broadcasting educational programs. The topics to be considered could be as follows: causes of forest fire and its impact on forests deprivation; the advantages of the forest resources - on the damaging role of fire in forest degradation - global warming<sup>8</sup> effect on the earth and the humanity – pollution impact on water – pollution impact on the survival of human being.

## **4.0 ACTION PLAN NEEDED TO PRESERVE LEBANON'S BIODIVERSITY AND FORESTS**

### **4.1 Engagements preventing threats**

A vital national arrangement is required for the country's woodlands, the oak and pine backwoods are particularly in danger and activities are required rapidly to deal with these assets with a drawn-out

<sup>8</sup> Forests' role in climate change is two-fold. They act as both a cause and a solution for greenhouse gas emissions. Around 25% of global emissions come from the land sector, the second largest source of greenhouse gas emissions after the energy sector | IUCN (2016). *Making the Case for Forest Restoration: A guide to engaging companies*. Gland, Switzerland: IUCN.

view. Planning reforestation endeavors and making them increasingly compelling is part of the action to be taken. This country level development plan should include the municipalities, even the private sectors, NGO's and donors.

More grounded and remunerating motivations are required for the forest seeding by both private and civil proprietors to save ecological administrations. Putting drafts and plans into implementation should start immediately in applying the National Land Use Master Plan.

Moreover, unauthorized hunting should be strictly forbidden therefore, sanctioned if not following the rules. Educating people more and more about the pros and cons of the threats impacting the environment will help getting to a better outcome.

Political Actions	Economic Actions	Social Actions
<ul style="list-style-type: none"> <li>• Be able to put action plans into implementation while amending and enforcing the country laws and regulations pertaining to the environment</li> <li>• Amendments of the policies related to land zoning and</li> </ul>	<ul style="list-style-type: none"> <li>• Motivating people that are working for a better environment in Lebanon by increasing salaries or giving incentives</li> <li>• Include expert matters and fresh blood that are familiar</li> </ul>	<ul style="list-style-type: none"> <li>• Create awareness to change bad practices and behaviors effected by citizens</li> <li>• Authorize and enforce national participation in the global warming problematic</li> </ul>

<p>natural resources</p> <ul style="list-style-type: none"> <li>• Develop and implement an efficient legal framework containing effective rules and regulations such as the National Forest Program</li> </ul>	<p>with all the actualities related to forest resources</p> <ul style="list-style-type: none"> <li>• Introduce the management working on the Lebanese biodiversity to attend new trainings and enhance their technical skills</li> </ul>	<ul style="list-style-type: none"> <li>• Create environmental reforestation activities for Lebanese citizens and volunteers to participate in</li> <li>• Create environmental safety program for the agricultural production markets to enforce aromatic and medicinal plants</li> </ul>
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		<p>promot ion</p> <ul style="list-style-type: none"><li>• Deliver seminar s about environ mental decision s taken to involve people, having their opinion and improve the level of engage ment in enhanci ng the culture of environ mental and biodiver sity safety</li></ul>
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## **4.2 Existing Donor Actions**

### **4.2.1 USAID Accomplishments**

Current USAID speculations are not aimed at woodland and biodiversity preservation. There are various undertakings that attempt tree planting exercises related to different assignments.

Districts get awards that are in certain cases used to plant trees; youth gatherings may likewise have field trips that give direct experiences nature's traits, or a water treatment plant assists with cleaning city squander water before it is come back to a conduit along these lines ensuring human wellbeing downstream, yet in addition other living plant and creature life forms.

Different contributes serve to give help to little ventures like ecotourism business that rely upon, and expand on, the need of a spotless and solid condition to draw in customers and to cause their organizations to develop.

### **4.2.2 Additional Donor Undertakings**

Agence Francaise de Developpement is financing almost one million euros to create and reinforce Lebanon's program in supporting biodiversity preservation implementations, advancing social improvement, offering help to the ecotourism unit, and financing the management and employees working on these projects.

The Italian and Spanish are the most collaborators in developing the National Forest Fire Management Strategy. The UNDP likewise has a executed some awards programs for NGOs.

### **4.3 Evaluating the Conservation Activities**

#### **4.3.1 Environmental legal policies and procedures**

Existing laws likewise do little to support land and ecological stewardship, in certainty there are more motivating forces to clear the land and, in the process, crush the living spaces than there is to safeguard and ensure the scene. Urban development wherever is empowered with almost no respect to a reasonable and balanced zoning (and in this manner, arranging) procedure.

There is no focal body that plans, arranges and regulates exercises on the Lebanese scene, despite the fact that a national groundbreaking strategy exists. Nobody service or divisions inside services are answerable for actualizing it. Subsequently, openings and exercises that would enormously advance and upgrade woodland and biodiversity protection are not embraced, or in the event that they are, are done as such with no coordination and in an exceptionally inadequate way.

The Green Party of Lebanon, formally enrolled in 2008, can possibly affect the ecological area in Lebanon. It is not yet clear in the event that it very well may be a powerful hall for actualizing existing enactment, authorizing new approaches, and being a backer and supporter for increasingly practical regular assets the executives through the MOE, the MOA and in the regions.

#### **4.3.2 Municipalities in collaboration with NGOs**

Tree planting is presumably one of the most pervasive and glaring models. The MoA, the MoE, NGOs, regions and the private segments are all planting trees.

Every one of these elements does their own tree nurseries to deliver the seedlings. What isn't so heavenly is the follow-on upkeep and post planting care that is an outright need in the Lebanese condition.

Legitimate consideration can guarantee a 92% endurance rate following three years; ill-advised consideration can bring between 4 to 10% endurance rates.

A national methodology for tree planting, appropriately actualized, could move Lebanon a huge way in its reforestation exertion. Without it, it will take any longer and cost considerably more.

The legislature has a severe arrangement for planting local species. Be that as it may, there is little control on seed sources/provenances and no coordination about who is planting what and where, nor is there much sharing of data about what is succeeding and what isn't.

Planting trees is a very work escalated and ready with photograph open doors for the government official or contributor. NGOs like USAID<sup>9</sup> and regions are the best implementers of preservation exercises in the nation. What's more, they ought to be. They are the place the activity is. Be that as it may, they are continually battling with subsidizing and labor issues.

They are likewise out contending straightforwardly for giver reserves. Some are more effective than others, however in practically all cases, there is next to no coordination among their exercises which brings about huge wasteful aspects, clashes and lost chances.

### **4.3.3 Volunteers input**

Contributors who are attempting to have any kind of effect in the green side of the earth area sidestep the administration/service association and work legitimately with nonprofit organizations or potentially districts so as to achieve their assignments successfully.

This spares exchange time, yet frequently brings about powerful economies of scale too. However, as noted above, there is little coordination and even mindfulness among givers of what every one of the others is doing.

This thus forestalls a powerful way to deal with (for this situation) woodland and biodiversity preservation exercises, brings about a discriminatory appropriation of speculations and less natural mindfulness among the Lebanese populace.

## **5.0 CONCLUSION**

Despite many obstacles Lebanon is encountering, several achievements were put on table to increase and foster the Lebanese culture and awareness about the importance of biodiversity and a better greener Lebanon.

Involving Lebanese people in this wakefulness is a must, because despite many inputs coming from the government or municipalities or even NGO's, if the country citizens are not cooperating and coping with the change, all the analyses and achievements won't be significant.

Alternatively, if both the people and environmental managements work in solidarity, a big difference will be significantly identified. All go green organizations will feel the urge of establishing action plans when the people reclaim their need in conserving the nature of their own country.

<sup>9</sup> USAID's support to Lebanon's forestry sector started in 2008 through a two-year partnership with USFS to promote conservation of forests and biodiversity in Lebanon. ... This project is part of the nearly \$5 billion dollars in assistance that the US has provided to Lebanon since 2007, Executive Bulletin - Dec 12, 2018

Putting plans into execution will be more taken seriously with a high level of motivation when sensing the engagement of the society. With still many attempts the forests are still at high risk in Lebanon, although many attainments were issued in year 2000 expecting the best to come:

- The 440-km Lebanon Mountain Trail was propelled, offering novel open doors in the year of 2008 for regular and social legacy preservation and country vocations. While the Lebanon Mountain Trail Association was authoritatively enlisted in November 2007 as an NGO, despite everything the LMT needs official government acknowledgment and assurance. This will require a purposeful exertion by many districts and government offices, just as grassroots help, to shield the path hallway from undesirable exercises and advancements over the long haul.
- On May 2009, AFDC in a joint effort with the five national organizations delivered Lebanon's first National Strategy for Forest Fire Management.
- The Environment Framework Law was finally permitted by the Parliament of Lebanon (Law 444/2002).

- The “National Land Use Master Plan” was being organized and prepared with extensive analysis and research by the CDR from 2002 till 2005 when it was officially accepted by the Council of Ministers formally appearing in the Decree 2366/2009.
- After several requests since 2001, coming from the MoE asking for reorganization in its internal structure, The Council of Ministers announced in the Decree 2275/2009 the approval on the restructuring demand.
- The first Lebanese party (Green Party of Lebanon) focusing on Green beliefs and supporting the sponsors that supports the environment (1000 members) was finally formally and legally registered and launched its operation in 2008.
- After many claims on the Hunting Law in Lebanon, the parliament generated a new Hunting Law in favor of the environment sustainability in the Law no. 580/2009.
- The UNESCO nominated two new reserves in Lebanon: Jabal el Rihane and Jabal Moussa.

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