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MINISTRY OF ENVIRONMENT

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Findings from the Consultation Meetings for **Lebanon's High Mountains Masterplan**

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AMERICAN UNIVERSITY OF BEIRUT
NATURE CONSERVATION CENTER
مركز حماية الطبيعة

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Acronyms

AFDC	Association for Forest Development and Conservation
AUB	American University of Beirut
AUB-IFI	American University of Beirut Issam Fares Institute for Public Policy and International Affairs
AUB-NCC	American University of Beirut Nature Conservation Center
BCI	Biodiversity Conservation Initiative
CNRS	Centre National de la Recherche Scientifique
FAO	United Nations Food and Agriculture Organization
IBA	Important Bird Areas
ICOMOS	International Council on Monuments and Sites of Lebanon
KBA	Key Biodiversity Areas
IUCN	International Union for the Conservation of Nature
LDN	Land Degradation Neutrality of Mountain Landscapes in Lebanon
LIBNOR	The Lebanese Standards Institutions
LMT	Lebanon Mountain Trail
LMTA	Lebanon Mountain Trail Association
MAB	Man and Biosphere reserves
MoA	Ministry of Agriculture
MoE	Ministry of Environment
NPMPLT	National Physical Master Plan of the Lebanese Territory
SDATL	Schéma Directeur de l'Aménagement du Territoire Libanais
SOER	Lebanon State of the Environment and Future Outlook
UFM	Union for the Mediterranean
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children Emergency Fund
USEIL	Union for Sustainable and Ecotourism Institutions in Lebanon
USJ	Université Saint Joseph
DMO	Destinations Management Organizations
SBR	Shouf Biosphere Reserve
EPA	Enlarged Partial Agreement

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Executive Summary

As part of the Land Degradation Neutrality for Mountain Landscapes project, funded by GEF (Global Environment Facility) and implemented by the United Nations Development Program me (UNDP) in Lebanon in partnership with the Ministry of Environment (MoE), the American University of Beirut – Nature Conservation Center (AUB-NCC) organized a series of expert roundtables in its offices in Beirut in August 2023. The four roundtables looking into: a. Water & Wastewater, b. Land Degradation, Solid Waste and Quarries c. Forestry, Agriculture and Land Use and d. Sustainable Tourism, were each moderated by a leading expert in the field. The participants represented various stakeholders and backgrounds and shared input on methodology, approach and priority areas to consider when developing the analytical framework for the project.

The first roundtable on Water & Wastewater revealed conditions, activities, and institutional gaps greatly affecting the vulnerability of high mountains. Activities such as tourism, grazing, agriculture, military operations and infrastructure were discussed, alongside their impact on the water sector. The experts agreed that small scale, precise studies must be mainstreamed ahead of all development projects to assess their environmental footprint, and make sure they respect the boundaries set by the masterplan. The discussions also focused on the importance of setting indicators to monitor the strategy conceived by the consultants across various themes, including land use, ground water level and soil erosion.

The meeting on Land Degradation focused on challenges faced, such as land use changes, loss of biodiversity, quarries, solid waste dumping and uncontrolled developments. Each challenge, however, was also associated with opportunities to enhance the preservation of the High Mountain Areas. Nevertheless, the discussions also brought up the issue of enforcement, with various participants raising questions regarding the feasibility of implementing complete or partial bans on certain activities, in line with current legislative and regulatory frameworks.

The third roundtable dealt with Forestry, Agriculture and Land Use. Two models for conservation were suggested by the experts for the Lebanese high mountains: 1. The designation of protected areas, following the six IUCN categories and 2. The designation of biosphere reserves, following the UNESCO model depending on land ownership. Experts highlighted the need to ecologically classify and assign a conservation status to vulnerable zones before engaging in restoration projects. They also emphasized the importance of enhancing agricultural resilience through greener production practices, coupled with improved post-production processes to ensure efficiency, waste reduction, and sustainable resource utilization.

The last consultation meeting tackled Sustainable Tourism policies, strategies, and initiatives. Participant input focused on the need for a comprehensive vision and strategy for the sector, where standards and regulations are mainstreamed across operations. The discussion also brought up policies to enhance economic revenues across various associated sectors, and tools to create better synergies with tourism in the high mountains without sacrificing sustainability. One final recommendation revolved around the need for studies to quantify the economic value of touristic services and their impact on natural habitats.

Background

The Lebanese high mountains are defined as areas above 1500 m in elevation. Several studies including the National Physical Master Plan of the Lebanese Territory (NPMPLT) produced in 2005, mapped out the Lebanese high mountains. Different additional resources covered these areas through research, maps, projects, micro-scale strategic plans, and protection policies.

Initially, the NPMPLT proposed specific urban structures and protection regulations for the high mountains. It also addressed the fundamentals of land utilization and administration, responsible exploitation of natural resources, economic expansion and efficiency, societal enhancement, improvement of living standards, and the preservation of the environment. Specifically, it declared areas above 1900 m as highly important and influential for water resources, flora and fauna. It also created the "Cedar and mountain trees corridor" as a form of protection offered to an area above 1500 m.

Other studies that provided a perspective on the state of the study area include: 1. A publication by Legal Agenda in 2018 that maps out the areas in Lebanon (including the high mountains) and categorizes them into planned, partially planned, unplanned, and exceptional. 2. A study produced by the United Nations Children Emergency Fund (UNICEF), the Ministry of Environment (MoE) and UNDP titled "Lebanon State of the Environment and Future Outlook" (SOER) published in 2020 dedicates a chapter to the environmental priorities, identified as haphazard: urbanization, solid waste, climate change and energy, and chemical management. 3. A research led by AUB-NCC in 2020 to valorize the ecosystem services provided by Lebanese high mountains and highlight the need to protect them. And 4. A study by Dr. George Mitri published in 2019 categorizes the type of lands existing in the study area from crop lands and range lands to large forests, with a specific distinction between elevations of 1500 m and 2000 m.

WATER AND WASTEWATER MANAGEMENT

Participants

Dr. Joanna Doummar (Moderator)	Associate Professor of Groundwater Hydrology at the American University of Beirut (AUB)
Dr. Ghinwa Harik	Research Associate at the Department of Geology at AUB
Dr. Nadim Farajalla	Program Director at the AUB Issam Fares Institute for Public Policy and International Affairs (AUB-IFI)
Dr. Maya Atieh	Independent Consultant on Climate Change, Water, and Food Security
Hanan Karam	Expert in Groundwater Forecasting and Risk Assessment at the Massachusetts Institute of Technology
Antoine Kallab	Urban Economic Development, Governance, Policy and Disasters Management Specialist, Associate Director of AUB-NCC

Context

The water and hydrology sector in the high mountains of Lebanon has been acknowledged and studied in different publications. The NPMPLT demanded a preferential use (vocations) on areas that are considered natural sites, specifying a national interest in the conservation of water resources, specifically on the mountains of Lebanon. It also provided studies on the current and predicted future use of water nationally and on water reservoir projects. A study titled "Assessment of Water Quality and Quantity of Springs at a Pilot-Scale: Applications in Semi-arid Mediterranean Areas in Lebanon" produced in 2022 shows quantitative studies for the area of interest, providing more recent and accurate data for the area of study.

"The importance of protecting the Lebanese High Mountains: A preliminary ecosystem services assessment" produced AUB-NCC maps out water density as the most essential provisioning service. It also provides statistics concerning catchment water and aquifers. Other studies include the Arab Climate Change Assessment Report (2017) which covers the projected decrease in precipitation levels in the area, and the SOER of 2021 which dedicates a chapter to Environmental Priorities, that includes a detailed analysis of water and water resources.

Summary of the Discussion

The discussion was moderated by Dr. Joanna Doummar - Associate Professor of Groundwater Hydrology at the Department of Geology at AUB. Dr. Doummar introduced the participants to the current context of water, groundwater and wastewater in high mountains. Throughout her presentation, Dr. Doummar highlighted the scope of the session and an overview of general challenges for water resources backed with scientific data including maps and hydrographs. The challenges listed include recharge variability, the multitude of aquifer systems (mostly two types of fractured aquifers with preferential infiltration and flow through conduits and dolines; sinkholes), flood water, the high reliability of water resources on snow melt, the potential impact due to climate change, the degradation of water quality, and its over abstraction.

The moderator mentioned that uncontrolled urban development may lead to adverse effects on natural resources and notably water resources (groundwater and surface water). Therefore, she proposed to have the discussion centered along the following four axes:

- Science-based evidence: Proper hydrogeological and geological understanding to guide urban development
- Available sectors: what are the potential risks on water and groundwater from current available activities? Is there a potential for the development of other sectors?
- Baseline and indicators: What are the current baselines of water availability and quality in the area? What are the indicators that can be used to monitor the impact of development on water resources? What are the developments that should not exist in the high mountains area?
- Policies and mitigation measures: Current and future policies and protection methods that will limit/guide the development of sectors with adverse effects.

The experts were engaged equally, and the discussion yielded important conclusions. The experts highlighted concerns about certain current practices and future ones and their potential impacts on water resources, especially in light of future anticipated climate change impacts on the area of interest.

Key Findings

Geological and Hydrogeological Elements Needed to Inform the Masterplan and Future Developments

The experts agreed that the current available information on spring catchment areas and river watersheds, as well as the knowledge on the vulnerability of the aquifers to contamination is enough to establish general guidelines for protection. One expert mentioned publications on snow melt and groundwater recharge as well as snow monitoring in areas above 1500 m that could serve as a support for the baseline report.

The participants also stated that the study area generates water for the entire country, and that due to its location (upstream to most of the rural and urban settings), the impact of climate change/ potential pollution of water resources on the high mountains will be witnessed downstream as well.

Finally, they reiterated that the current knowledge at country scale about the water resources and their vulnerability is sufficient to establish a hydrological/hydrogeological/and geological baseline for a master plan.

Identified Gaps

Knowledge on snow hydrology, notably snow accumulation, snow density, snow distribution, and melting rate is still lacking, which prevents having a proper assessment of the expected trends of climate change impact. Furthermore, some experts highlighted the absence of proper information at the catchment/watershed scale (feeding areas of particular ephemeral streams/infiltration area of wells or springs).

Recommendations

The experts proposed alternatives to address the scientific gaps:

1. Assess the vulnerability of areas at a catchment/watershed scale
2. Use existing or hydrological/ hydrogeological models
3. Use existing knowledge on overland flow and snowmelt or recommend further observation and monitoring

Available and Future Development Sectors/Activities

This session identified the major existing and future activities/developed sectors in the mountainous areas above 1500 m and discussed their potential adverse effects on water resources.

Tourism and ski resorts:
In addition to impacting snow density and enhancing snow packing, snow sports vehicles (snow-mobile) can contaminate the snow/snowmelt and consequently lead to the contamination of groundwater (also through the oil changing process). Additionally, during summertime, all-terrain vehicles (used in resorts) are also considered a problem by all the experts because they often go off road, and their oil changes may have a harmful effect on the groundwater.

Grazing, farming, and agriculture:
Although some experts viewed grazing as an activity with adverse impact on water resources, because of land use degradation and sources of pollution (manure), some others considered it as a natural process with minimal impact from moving pasture. Concentrated agriculture was considered by some experts as being a threat to water resources (quality: use of fertilizers, manure, or quantity: impacting the water cycle (evapotranspiration and recharge).

Military activities:
Some experts mentioned that many areas used by the army for military activities (explosives, detonation of unexploded material and military shooting) pose a high risk for water resources contamination.

Infrastructure and constructions:
In terms of infrastructure, while it was acknowledged that structures like roads were needed for the existing sectors, construction was regarded as a harmful activity that needs to be monitored and avoided (potential water quality impact; suspended particles and decrease of recharge area with increasing paved surfaces). It was also agreed that the presence of roads may lead to further development projects and higher urbanization due to the facilitated accessibility. With the lack of proper investigations, it was mentioned that other activities may have some adverse effect on water resources such as bottling companies (sustainable water availability and usage of a public good for industrial purposes), or hill lakes (limits recharge and may lead to land degradation) etc.

Identified Gaps

The experts were against the establishment of solid waste management sites and wastewater treatment plants above 1500 m. Thus, they agreed that small scale studies are needed to make such decisions, as regulations and planning are highly dependent on the geological/hydrological and hydrogeological nature of specific areas.

Recommendations

- Integrating a sewer network into the master plan for the existing infrastructure (houses, building, hotels, etc.).

- Existing rural settlements and any future ones should be planned based on sustainable water availability (domestic, touristic, or recreational).

- Three different conflicting recommendations regarding future developments and increase in urbanization:

    1. No sectors/activities should be banned; mitigation and regulation measures and preventive plans are rather proposed to reduce any adverse effect on water resources (circular economy).
    2. Non-essential activities should be banned from these areas between 1500-1900 m, as current and future activities such as industries, agriculture, large scale tourism, large scale agriculture are expected to have an adverse effect on the water availability and quality in the study area. In the himas and protected areas above 1900 m, all developing sectors should not be authorized.
    3. All developing sectors should be banned in the mountainous areas, as the lack of policy, mitigation measures, and reinforcement of protective measures can only lead to uncontrolled development and management and consequently impact water quality and quantity.

- Activities should be categorized according to the risk they pose on water resources (quality and quantity) to allow the evaluation of the impact of different developing sectors in relation to the master plan. The categorization can be on the basis of construction hazards/ emissions, operation and maintenance activities, type of pollutants (persistent non-persistent/treatable)/ effluents/ emissions.

- Should an activity be recommended in the master plan, mitigation measures should be proposed and enforced to make sure that the pristine nature of the water resources is not impacted (comparison to a baseline threshold can act as an indicator).

- Limiting the paved areas to 10-15% post-development to enhance recharge to groundwater.

Baseline and Indicators

The aim of this section was to identify indicators that can be used to monitor adverse effects on water resources from developing sectors in mountainous areas. The indicators that were mentioned include: land use and land cover for agricultural development and/or land degradation, ground water levels, soil erosion, precipitation and snow, water quantities, indicators for water contamination (bacteriological, heavy metals and chemical indicators).

Identified Gaps

One expert claimed that choosing an indicator is not doable due to the lack of water quality data and a monitoring network. There needs to be a long series of data, where the water flow and quantity are recorded to measure the impact of developments over time.

Recommendations

The recommendation was to propose monitoring of water quality and quantity indicators in specific areas consistently should the master plan propose some specific developments upstream to water resources. The monitoring network can be coupled with a dynamic master plan, where incoming data can inform development while the pristine nature of water resources is preserved.

Policy and Regulators

The aim of this section was to identify the important role that the stakeholders and municipalities play in drafting the master plan, as well as ensuring its implementation.

Identified Gaps

The experts claimed that while there is policy for areas above 1900 m, the rest of the study zone with all the reported vulnerability to contamination remains unprotected.

Recommendations

Three essential recommendations were provided by the various experts:

1) To involve the community by spreading awareness about water and water scarcity in the high mountains and highlight the impact of certain sector development on these resources.
2) To create a clear distinction between zoning and a master plan, especially in areas with karst aquifers (Jurassic and Cenomanian ages).
3) To create a specific vulnerability map for the master plan with the current existing hazards.

Local Knowledge and Community Engagement

One of the experts shed light on the importance of the relationship between the community and water sources, and how it relates to the local heritage through storytelling. From this perspective, the local community would be the owner of the resources, so these mentioned societal indicators should be mapped out and championed. A different opinion claimed that the cultural aspect linked to water in terms of development should not be a decisive factor, as cultural practices may contradict with the master plan at large.

Identified Gaps

The experts pointed out that even if policies are set and regulations are issued, implementation and enforcement remain low. The lack of implementation is due to the lack of funding for the local municipalities, and the lack of impact of the central government. Furthermore, they claimed that the lack of science is not allowing the drafting of appropriate protection laws.

Important questions were raised when addressing operation and maintenance of development in the study area of facilities, wastewater treatment plants, water resources usage below safe yield: Do the municipalities have the personnel, the technical and financial means to operate wastewater treatment plants/solid waste disposal facilities/water supply networks, or the personnel to reinforce policies? To what extent can these activities be decentralized?

Recommendations

It was recommended to map all the society's key players within the study area, to ensure the inclusion of all representatives and thus the implementation of the policies, should future development take place. These representatives include religious leaders, governors, political leaders, civil society members, women groups, etc.

Conclusion

The roundtable produced various beneficial recommendations; it provided an in-depth discussion on water and hydrology in the high mountains through a lively discussion, an acknowledgement of lacking data, and a set of proposals both for the creation of the master plan, and for its implementation. The recommendations covered methods to produce beneficial and non-repetitive data that directly feeds into the study, multiple perspectives to consider when addressing the existing and future sectors, and methods to ensure community engagement and monitoring approaches. The recognized gaps play an important role in identifying the next steps for the study to cover the basis provided by the experts.

LAND DEGRADATION

Participants

Dr. May Massoud (Moderator)	Professor of Environmental Health at AUB
Farouk Merhebi	Director of Environmental Health, Safety and Risk Management at AUB
Sammy Kayed	Founder and Director of Triple Point and National Expert on Plastic Pollution with UNEP and the UFM
Samar Khalil	Environmental & Chemical Safety Officer at AUB
Dr. Lamia Mansour	Senior Environmental Expert at World Bank Group
Ralph Sbeih	Environmental Policies Expert and Co-founder of Plastc Lab
Lea Kai	Climate Change Program Manager at UNDP

Context

Land degradation, solid waste and quarries in the high mountains of Lebanon have been acknowledged and studied in different publications. Land degradation was flagged as a serious threat to the environment of Lebanon, with an estimated loss of $132 million yearly, according to the ongoing UNDP project 'Land Degradation Neutrality of Mountain Landscapes in Lebanon'. Climate change and its impact on land degradation and desertification has been discussed by a UNDP and MoE study in 2022. The NPMPLT discusses the risks posed on the high mountain areas through dividing them into man-made and natural risks that include landslides, erosion, forest fires, and land degradation, followed by recommendations for urbanization and construction.

As for quarries, they have been reported by different web sources including The961 under an article titled 'Quarries Are Destroying Lebanon's Mountains' in 2019 and earlier under ByTheEast 'Lebanese mountains are threatened by excessive quarrying' in 2018. In terms of data, quarry sites in Lebanon were mapped out in 2019 by Antoine Atallah, as for the methodology of quarrying in the Master Plan, the SOER published a table in their 2020 report dividing areas according to criteria, distance in meters and the type of land (sands, gravel and rocks).

Summary of the Discussion

The discussion was moderated by Dr. May Massoud professor at the Department of Environmental Health and director of the Interfaculty Graduate Environmental Sciences Program - AUB, who introduced the area of study, and the land degradation conditions present therein. The presentation covered activities affecting air quality, the hazardous exploitation of geological resources, the effect of climate change, and the mismanagement of solid waste and wastewater. To contextualize the target area for the experts, a map showing Lebanese high mountains was presented, along with a list of strengths and weaknesses prepared by Dr. Massoud. Main strengths include the low urbanization of the area, the potential for agriculture and water harvesting, and the availability of biospheres. While adverse weaknesses include the increasing exploitation of resources, the limited understanding of science and natural resources, and the fact that most sectors are driven by demand rather than supply.

The moderator proposed a set of questions to navigate the discussion among the experts, leading to the development of recommendations. The discussion was built on the following questions:

- Aside from the ones mentioned in the presentation, are there additional challenges for sustainable land management practices?
- What threats might climate change pose, and how can resilience thinking be used?
- What are the specific mountainous areas that are more susceptible to pollution and land degradation?
- How can mountains be managed sustainably to prevent degradation?
- What are the risks to a project's success?
- What monitoring and evaluation mechanisms should be put in place to assess the effectiveness of the master plan in preventing land degradation?
- What are the short-term and long-term goals in terms of land degradation you wish to see put in place?
- What are the potential alternative livelihood opportunities for local communities that can reduce pressure on the land?

Key Findings

Challenges and Climate Change Impact

The experts listed additional challenges that were not mentioned in the presentation such as land use changes, the loss of biodiversity due to that change, quarries, hazardous materials buried in the high mountains, solid waste dumping, and uncontrolled developments. Climate change was the most agreed upon threat for land degradation, with the impact on snow being a driver of land degradation. The experts stated that the decrease in snow density affects all sectors, especially through the shifting residency time. Early thawing of snow has caused a drought in summer, since it's happening in rain season when water is still naturally available.

Therefore, irrigation water for agricultural purposes is lost during the period it's needed most. According to the experts, this will ultimately cause the trees to migrate upwards, in addition to causing pest outbreaks due to evapotranspiration and humidity, which were previously naturally controlled through the low temperature. The tourism sector would also be affected through a shorter ski season due to the low density, causing the current ski slopes to move upwards on the mountains towards colder zones. Agriculture and the current crops would be endangered due to the lack of irrigation, lack of chilling time for fruits like apples and cherries, and the loss of long investment agriculture like orchards.

Identified Gaps

The experts agreed that the low availability of hospitals and medical centers coupled with the difficulty to reach the area of study would increase the climate induced illnesses, making them a prominent problem in the high mountains. They also identified a gap in the present studies regarding snow density and melting rate as a basis to measure the impact of climate change.

Recommendations

- Create corridors for biodiversity
- Include mapped out breaks between forests to allow for the growth and the natural shift of the trees
- Create accessibility points for fire and health emergencies
- Diversify the livelihood of the residents of the area and focus on ecotourism/retreats
- Research local water catchment methods and attempt to map them out and replicate them throughout the high mountains to fight the summer drought

Solid Waste, Wastewater and Air

Solid waste on the high mountains is mostly organic, which the experts thought would make it more manageable, especially on a development scale. The high mountains have several open dumps that need remediation through viable and long-lasting solutions. An expert stated that 30% of the lands on the high mountains have no authority over them, thus they could serve as grounds for a sorting facility in a decentralized system. This was refuted by a second expert who claimed that a sorting facility on the high mountains would not be financially sustainable due to the weak profiles and external intervention, claiming that a decentralized system would produce more informal dumps.

One expert claimed that in his experience, community support, especially that of an influential body (church, mosque, political figure) allows for more action to take place. Therefore, any program needs both municipal support and societal agreement. The experts showcased the importance of having septic tanks in new developments, and the dangers of old buildings that allowed for cesspools. They pointed out the presence of treatment centers for wastewater, and that there are efforts to revitalize 11 of the 28 centers that exist.

Identified Gaps

The experts highlighted the lack of the necessary infrastructure which hinders municipalities from providing effective services, along with weak financial and managerial systems in place. They identified financial disability as the major problem preventing municipalities from funding workers and maintenance of ongoing facilities, even though they have the technical know-how.

Recommendations

- It was suggested that small-scale composting facilities be used for organic solid waste. Regarding the residue, it was suggested that links be made to other master plans for potential neighboring landfill sites.
- It was advised to maybe switch from cesspools to septic tanks for wastewater and to look at other master plans for local treatment facilities.
- Potentially allow for sorting facilities on the lower areas, so the mountainous areas producing most of the water resources for said lower areas remain protected.
- Find the catchment areas of the rivers from the existing studies.
- Apply social sanctions by creating highly interactive societies.

Quarries and Air Quality

The experts had two opinions regarding quarries: one that claims we should not allow for them entirely, and another that thinks they should be limited through legislation and planning. They both used the existing master plan (NPMPLT) to show that quarries were not allowed in high mountains, yet they still exist. International examples cited in the discussion show that quarries are only fought through public resistance.

The impact of quarries was further discussed, with societal and environmental aspects in mind. Air quality was the focus point, as it is essential according to the experts to preserve and mobilize it. The experts agreed that there is an opportunity for wind projects on high mountains, where wind energy should be promoted more than solar energy. One expert pointed out that wind plants don't always cover the area of production, but are rather made for secondary areas, so it would be of vast importance to prioritize the area of production before benefiting anywhere else. A question was thus posed: can high mountains become the new source of energy?

Solar water pumping created a disagreement amongst the experts. Most of them disapproved as it does not limit water consumption, thus creating a wide difference of availability. The experts claimed it should be institutionally bound, monitored or stopped all together. It was agreed that solar water pumping would be great for water establishments, even greater for saving power in water pumping, but that for households, it threatens abuse of power.

Identified Gaps

Quarries in Lebanon are produced and maintained by the politicians and not the private sector, therefore the experts believe that public opinion may not have the weight it usually would. It was also identified as a root problem since decision makers are directly part of the problem.

Recommendations

- Consider Quarries within the land use planning system.
- Mobilize the community against the impacts of quarries through public awareness campaigns.
- Define rehabilitation criteria in a way that considers the environment.
- Install water meters and controlled pumping measures to areas with solar water pumping.

Management and Legislation

The experts collectively agreed that there should be two approaches to the master plan, a bottom-up and a top-down approach according to what works and when. To allow for better management of created programs or facilities, municipalities could consider having a union according to area but not necessarily bound by geographic proximity. The experts agreed that the master plan should not be dependent on the creation of new forces (committees, ministries, etc.) as it would make the process harder. From the list of concerns, they mentioned dumps created over the water sources which affect both surface and ground water for both the high mountains and the lower areas benefiting from them.

Identified Gaps

The master plan, according to the experts, can only work if it feels inclusive to all the influential parties in society due to the lack of legislation backing it. This could be problematic as it needs to bound politicians, municipalities, the private sector, non-governmental organizations, and civil society.

Recommendations

- Push for official decrees and legislation that fully support the implementation of the master plan.
- Limit construction permits on the high mountains as they legally allow for pollution throughout the construction period.
- Zoning should be done according to the water resources in an effort to preserve and rehabilitate them.
- Implement a zero-tolerance policy for petroleum.
- Produce a management plan for river basins.
- Lobby for the return of the urban planning ministry, as it was the implementing force of any master plan.
- The master plan's implementation should be a responsibility divided between the existing committees according to their specialty, organized through the MoE.
- Create an annex with action items that need to be done on the course of the next 10 years to ensure the implementation of the master plan, so when political circulation occurs, the previous incomplete work would be continued.
- Create an action plan roadmap specifically for ministries.
- Create committees consisting of volunteers for each biosphere or protected green space.
- Work alongside the press by giving them correct and accurate information to allow them to follow up from a legal perspective.

Conclusion

The recommendations cover a wide spectrum of sustainable development strategies. They suggest creating biodiversity corridors and forest breaks, establishing emergency access points, and promoting ecotourism for economic diversification. Efficient water catchment methods are proposed to tackle summer drought. Waste management ideas include composting, aligning with landfill plans, preferring septic tanks, and exploring local treatment facilities. On another hand, protecting water sources through sorting facilities, identifying river catchment areas, and fostering interactive communities is advised. For Land use planning, experts proposed the integration of quarries with environmental awareness and rehabilitation criteria. Water management involves installing meters and controlled pumping, especially in solar-powered areas. In total, the roundtable produced great recommendations for the production of the master plan.

LAND USE PLANNING

Participants

Rhéa Kahale (Moderator)	Biodiversity expert at Université Saint Joseph (USJ) and Founder of Biodiversity Conservation Initiative (BCI)
Siham Salman	Forest Management and Planning Expert at Association for Forest Development and Conservation (AFDC)
Manale Abou Dagher	Senior Researcher at AUB-IFI
Dr. Fadi Asmar	Project Coordinator at the UN Food and Agriculture Organization (FAO)
Dr. Salma Talhouk	Professor of Landscape and Ecosystem Management at AUB
Sarah Lily Yassine	Landscape Architect and Urban Planner at International Council on Monuments and Sites of Lebanon (ICOMOS)

Context

Forestry, agriculture, and human activities in Lebanon have been studied and organized in different laws, such as the protected areas, forests, grazing, and quarries laws. Different maps were also created for these topics, including Lebanon's map for grazing lands, the map for suitable areas for quarrying, and the reforestation suitability map created in collaboration with the Centre National de la Recherche Scientifique (CNRS). There are also maps for land ownership in high mountains, owned by the Lebanese Army and available for purchasing.

Additionally, a study about "The importance of protecting the Lebanese High Mountains: a preliminary ecosystem services assessment" was conducted by AUB-NCC back in 2020.

Summary of the Discussion

The third roundtable dealing with forestry, agriculture, and human activities was moderated by Ms. Rhéa Kahale – Founder of the Biodiversity Conservation Initiative. The moderator launched the discussion after introducing the experts to the main challenges faced by Lebanon's High Mountains.

These areas are highly exposed to urbanization, quarrying, and asphalting, although construction is relatively limited to the coast, causing diversion of stormwater recharge, increase in groundwater pollution, destruction of landscape and biodiversity habitats, leading to extensive damages in mountainous natural resources.

However, the Lebanese high mountains are characterized by the presence of diverse habitats of ecological value like nature reserves, Himas, protected forests, and other internationally designated ecological sites such as Key Biodiversity Areas (KBA), Important Bird Areas (IBA), bird bottlenecks, UNESCO Man and Biosphere (MAB) reserves, etc.

Urban land use is mainly sporadic due to the harsh climatic conditions for human settlements located at the borders of our study area.

Agriculture is limited to rangelands, croplands, forests, and woodlands, and is affected by higher climatic risks and climate extreme events in an increasing trend with climate change impacting production and profitability.

Impact of natural and man-made risks are: forest fires, pest outbreaks, soil erosion, forest fragmentation, quarries, grazing practices, overexploitation of forests. While the related economic activities are: farming, forestry, winemaking, agri-food processing, and wood for heating.

To further guide the experts and get the most of their inputs, Ms. Kahale centered the discussion on the below questions:

- What is the impact of climate change on forests in the high mountains? What are the main priorities and entry points that should be targeted in the master plan to increase the adaptive capacity of the forest?

- What is the impact of climate change on the agricultural sector? What are the main priorities and entry points that should be targeted in the master plan to increase the adaptive capacity of the agricultural sector?

- What is the impact of unsustainable human activities (grazing, quarries, forest fires, and tourism)? What activities should be regulated or forbidden?

- What are the priorities to be considered in the legal framework?

Key Findings

Challenges Related to Natural Landscapes

The experts agreed that the master plan shouldn't be focusing on the forest sector only, it should be about the natural landscapes. Grasslands and rangelands are as important as forests, therefore each landscape should be treated based on its characteristics.

Two models for conservation were suggested by the experts, based on land ownership, and sometimes a combination of the two models can be used to protect the lands:

Protected areas, following the six IUCN categories (strict nature reserve, wilderness area, national park, natural monument or feature, habitat/species management area, protected landscape/ seascape, protected area with sustainable use of natural resources) for public lands;
Biosphere reserves, following the UNESCO model, when the majority of the lands are privately owned.

Areas that aren't considered protected areas by law should be ecologically classified and assigned a conservation status (KBA, IPA, Hima, Natural Park, etc.), before making any restoration. Once an area has a status, human activities like grazing, construction, and others can be organized at the local level. Water availability can also measure the level of protection. This is an action to be considered first in the coming 10 to 15 years.

Speaking about restoration, the experts clearly stated that reforestation/afforestation aren't the only options for restoration, the concept of natural/ecological restoration should be adopted instead. For example, when restoring a watershed, the impact of restoration isn't limited to the watershed only which is the upper part of a river, but it also covers the lower parts and ecosystems. Resilience to climate change is based mostly on natural water availability, so they recommended focusing on watersheds and making sure that they are contributing to ecological restoration and not only to domestic use. Furthermore, water should be treated as a scarce resource. As such, irrigation in reforestation should be prohibited, given that replacing a dead planted tree costs less than irrigating it.

Identified Gaps

A mapping of overlays of property boundaries and typologies is needed. In addition to mapping the areas in need of natural restoration and conservation, thus avoiding conservation to the areas that are already protected by law. But since ground mapping shouldn't be included in the scope of the master plan, a simple and faster solution would be to classify the lands and identify which are protected and which are not.

Concerning biodiversity conservation, species and ecosystems should be protected before it is too late. Then comes the role of research and science at a second level. Science and research won't promote resilience. There is no time to define which species should be protected, no time to say what the problem is. Once the area is classified ecologically, it gets protected locally.

Genetic diversity isn't a priority now, especially since we know the behavior of one species in response to climate change, but we don't know the behavior of the whole ecosystem.

Reforestation and afforestation should be banned above fog line. "How to determine the location of the fog line and if it will still exist with climate change?" are two questions raised by the experts.

Recommendations

- Avoid using the terminology of "forestry" and "reforestation/afforestation". Use instead "natural landscapes" and "natural or ecological restoration".

- Conservation is about the whole landscape and not individual species. A strategic environmental assessment should be done instead of an environmental impact assessment. Think about the ecosystem services and avoid having a pristine natural layer.

- Integrate the cultural values of the areas to be protected within the ecological landscape to ensure the community is engaged in the protection strategy (Example of Jabal El Sheikh which is a network of Roman temples and Marj Bisri, where it is said that Jesus crossed).

- Create zoning based on the level of protection related to the ecosystem and water availability. Guidelines in each zone can be defined at a later stage with the involvement of the local community (Example of the biosphere reserves).

- Mapping of potential zones for landscape restoration.

Agriculture and Grazing

The experts' recommendations for fostering more resilient agriculture are divided into two key facets. The first involves a change in production practices, coupled with tailored guidelines for marginalized regions, while the second focuses on enhancing post-production processes to ensure efficiency, reduced waste, and sustainable resource utilization.

Change in production practices

Resilience to climate change starts with stopping agricultural practices at the borderlines or switching to more resilient species.

Farmers in the high mountains above 1500 m should have a "Highland Farmers" identity, having another status than the typical farmer. They are part of these agro-ecological landscapes, especially since highlands are marginal lands for agriculture, and thus have a role in the mitigation measures for climate change. Therefore, they should be classified as contributors to nature conservation.

Post harvesting practices

Post-harvest cost is another area to look at, especially with the heat waves that are occurring frequently and affecting production. Planning should be done at a micro-scale, where solar energy-

operated agricultural refrigerators can be inserted in strategic locations accessible to all farmers, in addition to planning key stations for trade points and trade routes since access to the market is a challenge.

This way, farmers above 1500 m are connected within the same identity, fighting the weather conditions, storms, benefitting from trade routes, trade points, and micro-refrigerators. Agriculture should be regulated to be organic, with no use of pesticides leading to soil contamination and thus water pollution. In addition to reviving nature-based techniques instead of using machinery. This can also be beneficial to get certification and labeling for the high mountain products. With marketing, Highland Farmers can promote agritourism in the high mountains.

On another hand, grazing should be treated under the agriculture and farming sector, and not be stated under human impacts. Urbanization is making grazing lands smaller; therefore, shepherds are moving upward searching for wider lands.

The Lebanese grazing law is being applied by the shepherds. Shepherds abide by the law and pay the necessary fees for using the lands, but religion and land belongingness play a role in the good practices of grazing, obliging shepherds coming from a different village and from a different religion to pay more for the lands, this is being done through middlemen and at a higher cost. So, without the right planning, the law cannot be efficient. Shepherds on these high altitudes can be classified under the Highland Farmers and can be beneficial for ecological restoration like reseeding.

Identified Gaps

Further studies and research are needed to identify how borderlines production can be made more resilient, given the increasing threats and vulnerability.

Recommendations

- Create a “Highland Farmers” identity for the farmers above 1500 m.
- Provide a guide to marginal crops for farmers planting on the borderlines.
- Lands owned by the Wakef should be protected with no exceptions and very limited investment interventions. Cultural heritage and emotions should be integrated into the protection.
- Post-harvest facilities such as micro-cooling storage for agricultural products and trade routes and locations.
- Identify rangelands for grazing and set restrictions and regulations for conservation and protection.
- Create a transparent system for grazing rights with no discrimination and middlemen.
- Identification of clear grazing routes by the Ministry of Agriculture.
- Reviving Nature based solutions in High Mountains.
- Creating smart agriculture.
- Designate the agro-sylvo-pastoral system as a high Mountain identity.

Human Activities

This section will cover human activities in the High Mountains: quarries, forest fires/wildfires, and tourism.

Concerning quarries, all experts agreed that the quarries law isn't being applied, especially when related to the limited investment period of the quarry after which comes the construction of terraces to ensure sustainability for agricultural practices.

Again, reforestation isn't always the solution to rehabilitating terraces created after a quarry, especially since not all the lands invested in quarries were forests or agricultural lands. In addition to the unavailability of soil and water for irrigation. Other alternatives for closed quarries can be geo-education, climbing activities, etc.

There is a conflict between the economic benefits of the landowner exploiting or protecting it. The example of the Shouf Biosphere Reserve (SBR) was mentioned to explain the economic benefits of conservation which are higher than simply exploiting the natural resources. A suggestion would be to make the lower residents pay extra taxes for the conservation of the high lands that are considered a source of water supply for them. The high mountains ecosystem services assessment study done by the AUB-NCC can be used as a starting point to define the importance of conserving the lands and what economic impact this can have.

Moving to forest fires or wildfires, most of the fires start from agricultural lands, during the weekend or early week (based on a study done by FAO). This is explained by the people who visit their hometowns on weekends, where they maintain their agricultural lands, remove weeds, burn them, and the wind spreads the fire, especially during the autumn season. What is being burned is the excessive wood produced that we are not using, and which should be cut.

For this matter, cutting trees, trimming, charcoal production and grazing activities shouldn't be considered damaging activities since they are helping remove the excess production and preventing fire spread. Example of MoA permitting to cut Pinus brutia that regenerates from forest fires and can overgrow the other species available in the forest and change the landscape.

To prevent forest fires and wildfires is long-term forest management and planning. Cleaning forests is needed and should not be limited to trimming but should also include the removal of excessive biomass. Thinking at the micro level, and knowing the risk of biomass disposal, it is suggested to have several accessible local outlets for biomass disposable areas as a service in the high mountains.

Finally, tourism in this area should be regulated under the concept of access to landscape and benefits sharing. This concept is mentioned in the convention on biological diversity under access to resources and can be extended to access to landscapes. Tourists accessing the Lebanese high mountains to enjoy landscape scenery, photography, hiking, or whatever activity should have to pay. This way, the landowners who preserved their lands will be compensated.

Another point related to tourism is noise pollution in this area and the impact it has on health and biodiversity.

Identified Gaps

A stakeholder study is needed to understand what is happening on the ground when it comes to quarries and to open the floor for negotiations.

Creating red zones for quarries where no negotiations are allowed is an action that wasn't approved by all the experts. Red zones are designated based on potential hydrological and geological danger. Another suggestion was to assign some level of protection to these areas and let time and local negotiations dictate the direction and success of the defined area for protection. Here the three issues to be considered during planning were listed as an argument: spatial issue, operational issue (about sustainable practices), and legal issue. The last two issues aren't attainable, so there is room to work on the spatial issue only (Example of the protected areas that are successfully present till nowadays after the Lebanese war, are the ones that were based on local negotiations like the SBR and Tannourine Cedar Forest Reserve).

The starting point of all forest fires is agricultural lands due to an excess of biomass production. Questions about cutting the trees and changing the Lebanese mindset that cleaning the forests isn't a crime, of course, if done in a planned and sustainable way.

With the problem of absenteeism of landowners and the need to clean the lands, it was suggested to have an occupation tax, in addition to looking into the opportunity of how to invest in abandoned lands.

Recommendations

- Quarries laws should be applied. There should be room for negotiations to ensure the best practices.
- Mapping of suitable areas for quarrying activities depending on geology, hydrology, biodiversity, etc.
- Rehabilitation of quarry sites should be done by reintroducing the damaged site to its environment.
- Cleaning forests, not only trimming trees to remove excessive biomass leading to fire spreading.
- Having local micro-outlets for biomass disposable areas service.
- Applying the concept of access to landscape and benefit sharing in the tourism sector.
- Controlling noise pollution.
- Promoting forest-based jobs.
- Master plan should be based on the priority areas and the local needs.

Legal Framework

- Propose changes to existing laws (forest management code).
- Map natural noise level and create regulations for noise pollution.
- Any urban developments should be integrated in landscape restorations.
- Establish a means (platform) to ensure that all laws, regulations, and decisions are easily accessible to the local communities.

Conclusion

The main focus should be on inventing and defining an identity for the Lebanese high mountains. This identity should be grounded on the environment knowing that the high mountains are the central water supply for the whole country. Laws and regulations should be identified and catered around this identity. Zoning for protection purposes should follow, along with thinking at the micro level for solutions to make law application easier.

The recommendations related to natural landscapes, agriculture and grazing, and human activities are:

- Look at the existing related laws and propose changes/negotiations to cater to the identity of the high mountain area.
- Consider ecosystem services when doing the landscape layers and avoid having a pristine natural layer.
- Zoning and identifying the ecological and cultural value areas and giving them a status of protection based on land ownership. This can be applied to landscape restoration, agriculture and grazing, quarries, and tourism. Regulations and guidelines will follow and can be led by the local community.
- Landscape restoration should be focused on the agro-sylvopastoral system. Bringing back the human being to the center of the landscape with all its concerns.
- The environment should be a priority and not the private benefits of the lands.
- Ideally, there shouldn't be urban development in this area since it represents the water supply of the country. Urban development should be allowed minimally. Regulations to constrain construction need to be enforced.
- Create a "Highland Farmers" identity for the farmers above 1500 m benefiting from post-harvest facilitations.
- Create a transparent system for grazing rights with no discrimination and middlemen.

SUSTAINABLE TOURISM

Participants

Dr. Jad Abou Arrage (Moderator)	Lecturer and Expert of Tourism and Eco-tourism
Ali Taleb	Co-founder of Akkar Trail
Dr. Lilianne Barakat	Vice-president of ICOMOS
Souheir Mabsout	Program Director at Lebanon Mountain Trail Association (LMTA)
Omar Sakr	Executive Director at LMTA
Pascal Abdallah	Founder of the Union for Sustainable and Ecotourism Institutions in Lebanon (USEIL)
Antoine Kallab	Urban Economic Development, Governance, Policy and Disasters Management Specialist, Associate Director of AUB-NCC

Context

Over the past 30 years, tourism in Lebanon was studied and featured in a lot of policies, strategies, and initiatives.

After the end of the Lebanese war in 1990, a National Tourism Strategy was elaborated in 1996 focusing on the rehabilitation and management plans for main cities, coastal areas, and mountains. Hence, it was only implemented in Beirut. From 2003 till 2016, the Cultural Heritage and Urban Development Project was implemented with the aim of rehabilitating and improving the basic infrastructure of the major touristic cities and archeological sites in Tripoli, Byblos, Baalbeck, Saida, and Tyre.

In 2004, the NPMPLT was published with general and specific recommendations on territorial development and land use planning. It is considered as a baseline for the current high mountains' master plan. Also in 2004, a plan was done on Integrated Tourism and Development in the Republic of Lebanon, however, it was not implemented. Between 2005 and 2008, the LMT Project was implemented and the LMTA was founded, which influenced the shift towards nature-based tourism in Lebanon and had a big impact on the development of the trails sector and hiking culture.

From a business perspective, this led to the emergence of alternative accommodation facilities such as guesthouses and camping sites, in addition to the Diyafa Program that focused on supporting and classifying alternative accommodation in rural areas. The Cultural Religious Tourism Project 2014-2016 mapped and rehabilitated more than 2,000 religious sites, and an interactive website was created but it was not linked to the tourism market.

Among the first strategies that defined rural tourism and set eight strategic objectives with the Ministry of Tourism was the National Rural Tourism Strategy 2015-2019, which was partially implemented by different stakeholders. In 2017, Visit Lebanon initiative lacked funding and stopped due to the recent crises facing Lebanon. The Mediterranean Ecotourism Network was created in 2018 and included nature reserves from Lebanon and the Mediterranean countries with the objective of promoting ecotourism. The Lebanon Economic Vision published in 2018 had a controversial plan for tourism development focusing on coastal tourism, medical tourism, and ultra-luxury ecotourism; it was not implemented due to the recent crises. In 2022, Lebanon

became a member state of the Enlarged Partial Agreement (EPA) on Cultural Routes, and part of 3 cultural routes: “Ummayad Route”, “Phoenicians’ Route”, and “Routes of the Olive Tree”. Recently, in 2023, a National Sustainable Mountain Tourism Strategy was published focusing on mountain areas located above 500 m. The strategy determined seven strategic objectives with their action plan and the role of different stakeholders in implementation. This strategy was endorsed by the Ministry of Tourism and the MoE. Its implementation will depend on the level of cooperation between the public and private sector.

Current efforts related to or affecting the tourism development in Lebanon in the past 3 to 5 years:

- Regional clustering efforts and establishment of Destination Management Organizations (DMOs) in Shouf, Jezzine, Deir El Ahmar, Batroun, Kesrouane, and Jbeil.
- Standardizing trails’ design, establishment, management, and maintenance (LMTA with LIBNOR).
- Updating the legal framework and classification of guesthouses by Le Passport Culinaire (in process).
- Discussions on the guiding profession: new categorization and law update.
- Updating the nature reserves management plans.
- USEIL, the first union of professional institutions in alternative tourism in the Middle East, working on revising the laws in Lebanon. Currently working on local guide, and ecotour operators’ law with the Ministry of Tourism.
- The first Mountain Guide and Outdoor Activities university diploma at Antonine University will start in the fall of 2023.

Furthermore, a law to protect Lebanese high mountains above 1,900 meters is currently being debated. While it is not directly related to tourism, it will significantly contribute to the high mountains master plan.

Summary of the Discussion

The fourth roundtable’s topic was tourism strategies and planning in the Lebanese high mountains above 1500 m.

Tourism policies, strategies, and initiatives in Lebanon covering the past 25 to 30 years were presented by the moderator at the beginning of the discussion, followed by the current efforts related to or affecting tourism development in Lebanon in the past 3 to 5 years.

The discussion structure was based on the below questions:

- How can tourism contribute to sustainable territorial development in Lebanon’s mountain areas, considering economic, cultural, and environmental factors?
- What actions should be implemented to ensure sustainable tourism practices while preserving natural and cultural heritage in mountain areas?

- How can a master Plan for Mountain Areas in Lebanon address tourism challenges and needs from infrastructure, land use, investment, and stakeholders' involvement perspectives?

- What product development approach and market dynamics can be adopted to attract tourists year-round to mountain areas, avoid over-tourism, and benefit local communities economically and socially?

- What synergies and complementarities exist between tourism and other economic sectors in Mountain areas?

Key Findings

As per the experts, the main challenges affecting the tourism sector are related to law enforcement and the imbalance between the social, economic, and environmental sectors when it comes to economic benefits generated from tourism.
Another challenge is the informal aspect of most of the tourism businesses in rural and mountain areas operating without specific rules and regulations. The latter is affecting the quality of their services and their sustainability.

Sustainable Tourism

The experts confirmed that tourism can contribute to the sustainability of the development of the high mountains based on the involvement and engagement of the local communities in the management of their regions. A good example is the SBR, where the strength in grouping small initiatives under the umbrella of the reserve contributed to the sustainable and long-term development of the region compared to the impact of scattered initiatives happening in other regions.

In addition to the engagement of the local community, the clustering of service providers and/or municipalities on a geographical basis, who are willing to work together also plays a major role in the sustainability of tourism. Thus, creating territorial clusters for the management and marketing of tourism, as done by the DMOs that emerged in the last two years.

Conversely, current Lebanese laws don't have implementation clauses. This is where the role of the local community is highlighted. Supporting activities or initiatives on the micro level or small scale can have a big impact. We don't have the tool to activate this on the national level.
The protection of the natural and cultural heritage is key to the sustainability of tourism in Lebanon, and it is also at risk. Here also comes the role of small initiatives done by the private sector to minimize the risks.

No physical infrastructure should be present above 1500 m, but activities organization is needed. It is recommended to use solar panels, composting, and other options in order to protect groundwater in any tourism infrastructure or facility in mountain areas. Speaking of services, it is suggested to have "Refuge de haute Montagne" or High Mountain huts, but the challenge is to secure their proper management and maintenance. Some activities should also be banned in this area such as the offroad activity.

Example of Akkar trail as a case study
In a study done by the Lebanese University in 2019, Akkar was the second most desired tourism destination for the domestic market after Shouf.
Akkar preserved its nature until COVID-19, when it became a destination for types of nature lovers and enthusiasts in small and large groups, being the only accessible hiking destination

when nature reserves were closed. Before that, Akkar was not even known and explored by its residents. Some municipalities got involved in the establishment of trails during and after the pandemic. Non-formal tour guides and hiking groups started organizing events for a large number of people in Akkar resulting in negative impacts on the region, especially on flora. In Qammouaa, bungalows were constructed randomly without standards and no proper linkage to the sewage network leading to the contamination of the groundwater. The introduction of offroad activity in Al Ezer Forest harmed the plants and mushrooms on site.

Akkar Trail members estimate that the cost of environmental degradation due to unplanned and mass tourism in the region is higher than the generated income. There is no balance between the economic, social, and environmental aspects. This is something that should be studied in a scientific way in order to assess the potential impacts of tourism and try to reduce them by limiting the number of visitors in respect to the carrying capacity. A better organization of their access to natural sites with the ban of certain activities such as offroading and wild camping is also needed.

Example from the LMTA
During the past 15 years, LMTA contributed to the development of the long-distance trails concept and the hiking culture in Lebanon. LMT became the first nature-based tourism practiced in Lebanon between June 2020 and December 2021 based on a study done by the Lebanese University. Hiking is considered a slow tourism, knowing that its impact on the environment is minimal compared to other activities. This cannot hide the fact that hiking has become a mass tourism activity, and a lot of random hiking trails are being created nowadays with the main objective of developing the regions. Therefore, LMTA took the lead in creating trail standards in Lebanon under the USAID-Trade Investment Facilitation project, to ensure the sustainability of the trails and their surroundings.

Tourism is very intersectoral. The economic income of the village depending on tourism should not be only focused on the tourism sector to avoid economic dependency. There is a need to empower the other economic sectors in the village to diversify their incomes and create synergies with tourism. Another thing is to avoid cultural gentrification and to ensure stable jobs.

Concerning legislation, all the experts agreed that both private and public sectors have a role in sustaining tourism, but policies and laws modernization and enforcement are needed firsthand. Plan A is law enforcement, but with the current situation in Lebanon, it should go along with Plan B. The latter is based on small initiatives offering bottom-up solutions in the regions to reduce negative impacts of tourism. Every region should make an effort to fill the gap in terms of resource management and protection, and to promote sustainable tourism in the absence of a national solution. This could be somehow ensured through the DMOs model which is a form of decentralized management and marketing of tourism.

The high mountains master plan will suggest recommendations, which, without the approval of the Council of Ministers and detailed regulations, cannot be implemented by the municipalities and ministries. In the case of unclassified lands, the master plan can be a tool for the municipality to use in lack of regulations.

There should be no room for exceptions when applying the laws, and the community should be engaged in enforcing them.

Identified Gaps

No studies were done to calculate the economic value of ecosystem services, namely tourism and recreational services, compared to land degradation and biodiversity loss due to tourism activities in mountain areas.

The effect of trampling on the hiking trails is also something to be explored in Lebanon and studied in a scientific way inside and outside nature reserves.

There is a need to have systematic data collection through the DMOs which can eventually feed a National Observatory for Rural Tourism (proposed as a main objective in the rural tourism strategy for Lebanon and the Mountain Tourism Strategy).

Recommendations

- Regional clusters involving the private sector and municipalities, and engagement of the local community are essential to make the transition towards tourism sustainability.

- Establish nature-based tourism that can be controlled and necessitates minimal investment, to avoid destructive infrastructure. For example, defining camping zones with eco-friendly services (recycling, solar panels).

- Encourage snow-based tourism (snowshoeing, back-country skiing, cross-country skiing, and when possible, snowmobile only on pre-designated paths) which is functional with no need for infrastructure.

- The terminology to be used is “sustainable tourism” and not “ecotourism” unless the master plan aims to enlarge the surface of the protected areas and focus on offering pure ecotourism services inside reserves only.

- Zoning and applying the concept of carrying capacity on hiking trails and natural sites. (LMTA will be installing devices to measure the number of hikers on certain trail sections in order to calculate later on the carrying capacity). Limiting the number of visitors can be done through pre-booking and other effective visitor management strategies.

- Establish a lighting guidance to respect the dark sky policy and to keep sky tourism and star gazing potential in high mountains, which should be considered as an innovative product, especially in areas such as Tannourine.

- Propose a system to limit transportation via cars in the high mountains and ensure shuttle buses from and to villages.

- Reduce the seasonality factor and work on promoting tourism during the off-season and shoulder seasons, and control the number of visitors during the high season.

- Create a national strategy for sustainable tourism to define sustainable development of the tourism guidelines for each stakeholder: government, municipalities, nature reserves, NGOs, operators and guides, academics, etc.

- Create an ethical national charter with guidelines and labeling for the tourism actors, then in each region, the DMO can define its own guidelines in line with the national charter.

- Work with donors to avoid funding tourism-related projects with high negative impacts and encourage a transition towards sustainable tourism interventions in line with the current efforts of the national NGOs and some private sector initiatives. This can be supported once the master plan is published and used as a reference.

Conclusion

Tourism laws and regulations should be modernized and enforced. Sustainable tourism is questionable in the high mountains, especially with the uncontrolled practices and activities impacting the environment. Key actions revolve around implementing zoning regulations in the high mountain in general, and the tourism sector specifically, with a control of allowed and not-allowed activities, as well as a determined carrying capacity for the permissible activities.

Two scenarios can define tourism in the high mountains:

The first one is to promotion of pure ecotourism. This approach would be based on enlarging the surface of the protected areas in the high mountains, with full preservation.

The second approach is nature-based tourism under a sustainable vision and charter, based on mixed protected and unprotected areas. Such approach would require strict enforcement methods to ensure the sustainable management of resources through mainstreamed standards, labels and certification.

In the case of Lebanon's High Mountains, the second option is perceived to be more practical, especially given the availability of ski resorts and private lands, as well as the difficulty of imposing large protected areas and ensuring their preservation on the long run.

Learnings and Way Forward

The four expert roundtables generated key recommendations, concerns and priority areas for the envisioned Lebanon High Mountains Masterplan, with a focus on the water, land use, land degradation and tourism sectors. The experts highlighted the need to reinforce the implementation of existing and upcoming laws, policies and regulations without overlooking the needs of local communities. The participants also agreed that zoning strategies will play an important role in determining the type of activities, accepted levels of environmental disturbances and conservation targets across the territory. To ensure the feasibility and success of these strategies, discussions touched upon the importance of involving communities and stakeholders in the planning and implementation phases, alongside adopting engagement approaches that responded to the local needs and highlighted the shared benefits of the masterplan. The role of research, evidence and academia was also referred to in validating the masterplan and acquiring the support of the scientific community.

Nevertheless, it was clear that one recurring topic dominated the four workshops: the crucial role of water management. Water preservation in Lebanon's high mountains is directly connected to the areas' prosperity and the protection of its biodiversity. It is therefore an essential measure to sustain food security and public health in the area. It is also a crosscutting pillar for the various economic activities in these zones, such as snow-based sports, tourism, agriculture and environmental development.

All experts, across disciplines, called for an environmental and governance strategy centered around the sustainable management and preservation of water resources. They further agreed that any viable sustainability and development strategy cannot succeed if aquifers, lakes, soil and habitats are exposed to continuous and unmonitored practices leading to their pollution. As the country's institutions become more vulnerable, Lebanon's High Mountains Masterplan cannot deliver the expected results without a solid water management strategy upheld by a coalition of communities, private actors, municipalities and foreign agencies.

Looking beyond the High Mountains region, the clean storage of water at high altitudes across existing dams, lakes and aquifers fulfills the water consumption needs of Lebanon's urban centers, which host today 90% of the country's population. These areas serve as Lebanon's water reservoirs and should be considered as the country's most valuable natural resource. Lebanon's mountains are therefore key to sustaining livelihood across the nation, notably in the face of growing climate threats.

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