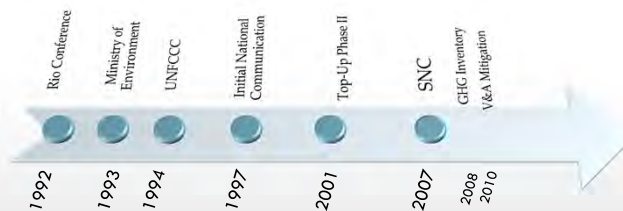


Impacts of Climate Change in Lebanon

Service of Prevention from Technological Impacts & Natural Disasters  
Directorate General of Environment

23<sup>rd</sup> of January 2009

GENERAL FRAMEWORK

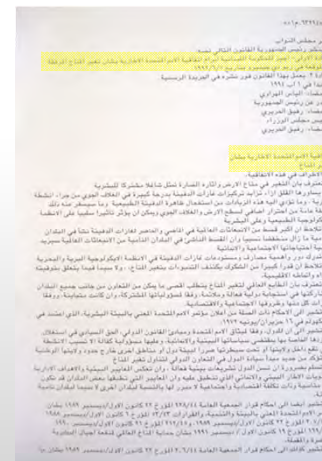


UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

- The UNFCCC (1994) sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change
  - Article 4.1: All Parties must provide to the COP information on its emissions & removals of all greenhouse gases (GHG National Inventory) & report on their activities to facilitate adequate adaptation to climate change & the achievement of the objective of the Convention

LAW 359 & UNFCCC OBLIGATIONS

- Lebanon Ratified the UNFCCC in 1994 by virtue of Law 359
- Lebanon, being a Non-Annex I country, has no GHG reduction commitments
  - Article 12.4 (Submission): ... each non-Annex I Party shall make its initial communication within three years of the entry into force of the Convention for that Party, or of the availability of financial resources. **The frequency of subsequent communications by all Parties shall be determined by the Conference of the Parties.**



## INITIAL NATIONAL COMMUNICATION



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## TOP-UP PHASE II



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## IMPACTS OF CLIMATE CHANGE

The INC focused on five areas of vulnerability

- ▶ Assessment of Bioclimatic Changes
- ▶ Water Resources
- ▶ Agriculture
- ▶ Terrestrial Ecosystems, Natural Habitats & Wild Life
- ▶ Coastal System
  - Physical Component
  - Marine Ecosystems
- ▶ Socio-economic

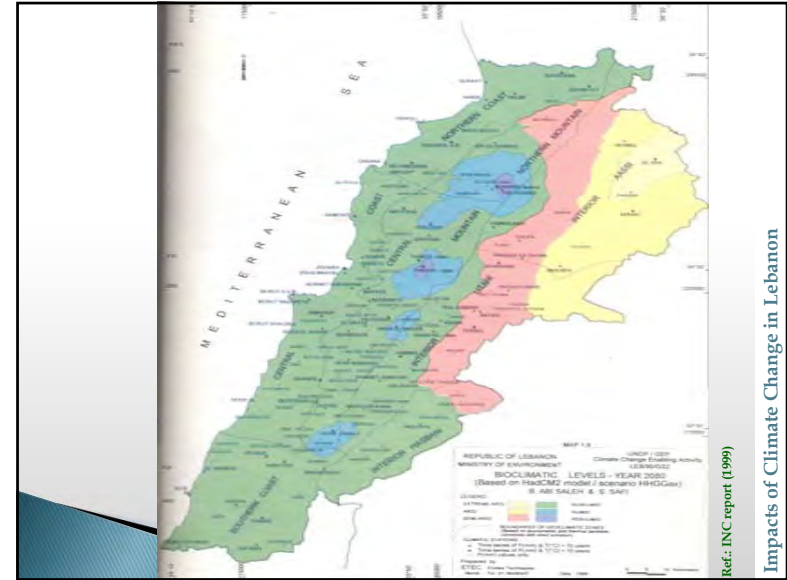
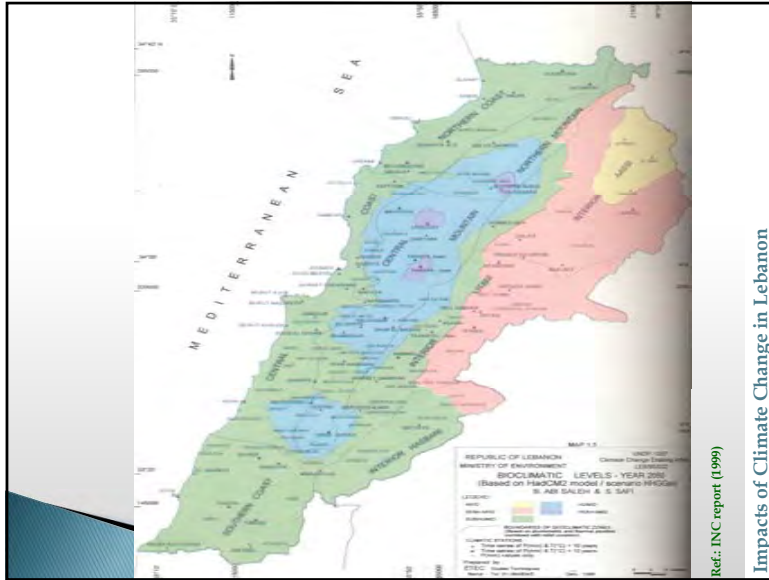
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## ASSESSMENT OF BIOCLIMATIC CHANGES

- ▶ The goal of the assessment is to identify the changes that would occur in the Lebanese climate
- ▶ The scenarios chosen were for the years 2020, 2050 & 2080
- ▶ The baseline scenario revealed that Lebanon has six bioclimatic levels
- ▶ According to data obtained from BIA, the annual average temperatures are following an increasing trend from 19.5°C in 1971 to 21.7°C in 2001
- ▶ Precipitation is following a decreasing trend

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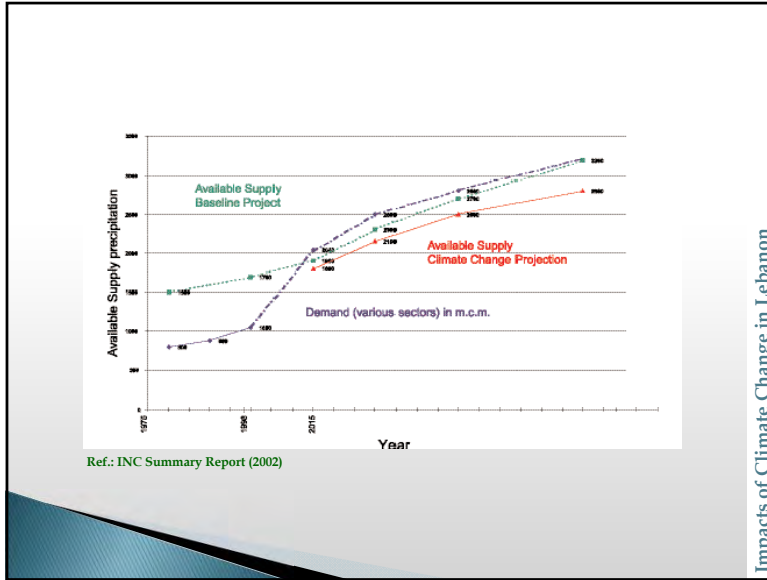
Bioclimatic level	Baseline scenario	Climate change scenario		
		Year 2020	Year 2050	Year 2080
Extreme arid	—	—	—	2,762
Arid	4,856	4,919	4,920	13,270
Semi-arid	19,321	23,838	23,871	15,223
Subhumid	45,166	49,575	50,652	60,757
Humid	25,903	19,728	19,442	7,470
Perhumid	4,522	1,765	1,115	0,518
Oromediterranean	0,232	0,175	—	—

Ref.: INC Summary Report (2002)

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- ## WATER RESOURCES
- ▶ The study tries to investigate the impacts of climate change on the water budget and vulnerability of hydro-systems and the community
  - ▶ Based on the scenarios, it is expected that water deficits will build up between 240 MCM to 400 MCM
  - ▶ The possible effects of sea level rise, such as sea water intrusion will impact the quality of coastal fresh water
- Impacts of Climate Change in Lebanon





## AGRICULTURE

- ▶ The assessment was limited to four crops: citrus, olives, apples, and sugar beet
  - ▶ The assessment reveals that geographical relocation of these crops except for sugar beet to higher altitudes
  - ▶ This necessitates terrace building, artesian wells digging and plantation of new, more adapted crop varieties
- Impacts of Climate Change in Lebanon

## TERRESTRIAL ECOSYSTEMS, NATURAL HABITATS & WILD LIFE

- ▶ The main goals of this study are to identify terrestrial species and ecosystems that may be particularly sensitive to climate change, assessing the degree of vulnerability to climate change and the main aspects that may be impacted
  - ▶ The degree of vulnerability for each category of terrestrial ecosystem was given either high or medium or low, according to the extent of the displacement of a vegetation zone outside its usual bioclimatic zone
- Impacts of Climate Change in Lebanon

- ▶ The expected changes in the distribution of vegetation communities may lead to the disappearance of certain vegetation associations and their replacement by others
  - ▶ According to the climatic scenario, there may be a 300 m upward shift in the year 2020, 486 m in 2050 and more than 700 m in the year 2080. This would push the tree line in the year 2080 in both Horj Ehdén and Arz El Shouf nature reserves to around 2500 m
- Impacts of Climate Change in Lebanon

- ▶ The Tyre sandy beach is the only remaining significant sand dune habitat in Lebanon for many plants and animals that are unable to thrive except on sandy substrates
- ▶ It is considered to be highly vulnerable to sea level rise and is classified as "critical"
- ▶ There is a risk that the sandy beach narrow may even disappear with its indigenous fauna and flora

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## COASTAL SYSTEM: PHYSICAL COMPONENT

- ▶ The assessment aims to assess the impacts of climate change on the physical aspects of the coastal system, and vulnerability of components affecting the quality of life of the coastal community
- ▶ Calculations show a relative sea level rise of about 4 mm and land loss between 7 to 16 mm
- ▶ This increases flooding and resource deterioration, which amounts to financial losses of about 75 million USD

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## COASTAL SYSTEM: MARINE ECOSYSTEMS

- ▶ The main objective of the work is to assess the Lebanese marine ecosystems vulnerability to the impacts of climate change mainly to sea-level rise and water temperature increasing
- ▶ In Jounieh Bay, in January actual temperature is 17.79°C, while the projection of water temperature is of 19.02°C, in 2020, 19.59°C in 2050 and 20.67°C in 2080

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## SOCIO-ECONOMIC IMPACTS

- ▶ The goal is to assess socioeconomic impacts of climate change till 2080, stressing on: public health cost and economic, consequences, trend of diseases especially for most vulnerable people and regions
- ▶ Impact on tourism is variable: ski season will be shorter, sandy beaches will be eroded and inundated
- ▶ Agriculture will know high cost production leading to lack of competitiveness

Impacts of Climate Change in Lebanon

- ▶ Direct effects will arise from increases in the frequency and severity of heat waves and other extreme weather events
- ▶ The most significant impacts are likely to come indirectly through the effects of climate change on the distribution and prevalence of infectious diseases, water quality, food security and sea level rise
- ▶ Diminishing of precipitation will increase air pollution and consequently increase acute respiratory illness mainly in the suburbs of Beirut

## SECOND NATIONAL COMMUNICATION

- ▶ The SNC will update the V&A component
- ▶ Thematic areas include:
  - Agriculture
  - Energy
  - Industry
  - Terrestrial ecosystem, natural habitats & wildlife
  - Water resources
  - Coastal resources
  - Waste & Wastewater
- Public health
- Tourism
- Gender
- Human settlements/urbanization/infrastructure
- Food security
- ▶ All of the above will be assessed with **their impact on financial services, insurance and associated economic services**

*THANK YOU FOR YOUR ATTENTION...*

*FOR FURTHER INFORMATION:*

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Weblink: <http://www.moe.gov.lb/ClimateChange/index.html>