Nexus sectors in Lebanon

Current status, Policy objectives and interdependencies in the context of Climate Change adaptation and mitigation efforts.

1st Multi-Stakeholders Consultation Meeting on the Water-Energy-Food-Ecosystems Nexus in Lebanon

August 24, 2022

Lea Kai

Manager of Climate Change Projects

Ministry of Environment - UNDP

Outline

1. Most recent climate change risks and impacts in the region and Lebanon

2. Climate impacts on water and agriculture sectors

3. Lebanon's NDC and related mitigation and adaptation priorities

4. Gender responsiveness of climate policies

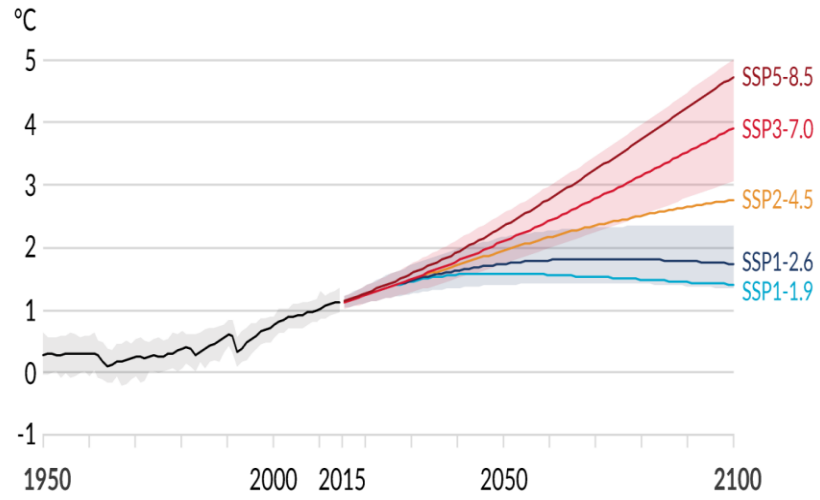
5. Other relevant initiatives

AR6 Results:

Temperature

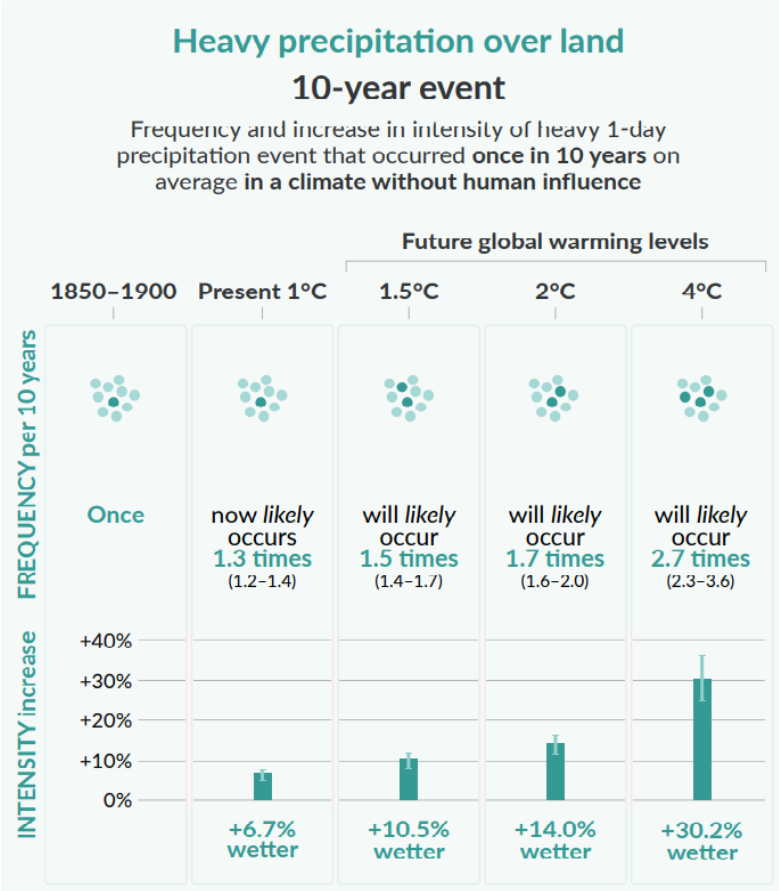
According to the latest AR6 report by the IPCC, new climate scenarios have been developed that project future climate patterns in the absence of climate policy. Global temperatures are expected to reach a max of **2.4** and **4.4** by mid- and end-century under the **SSP5-8.5** (worst case scenario) and **SSP2-4.5** (business as usual scenario).

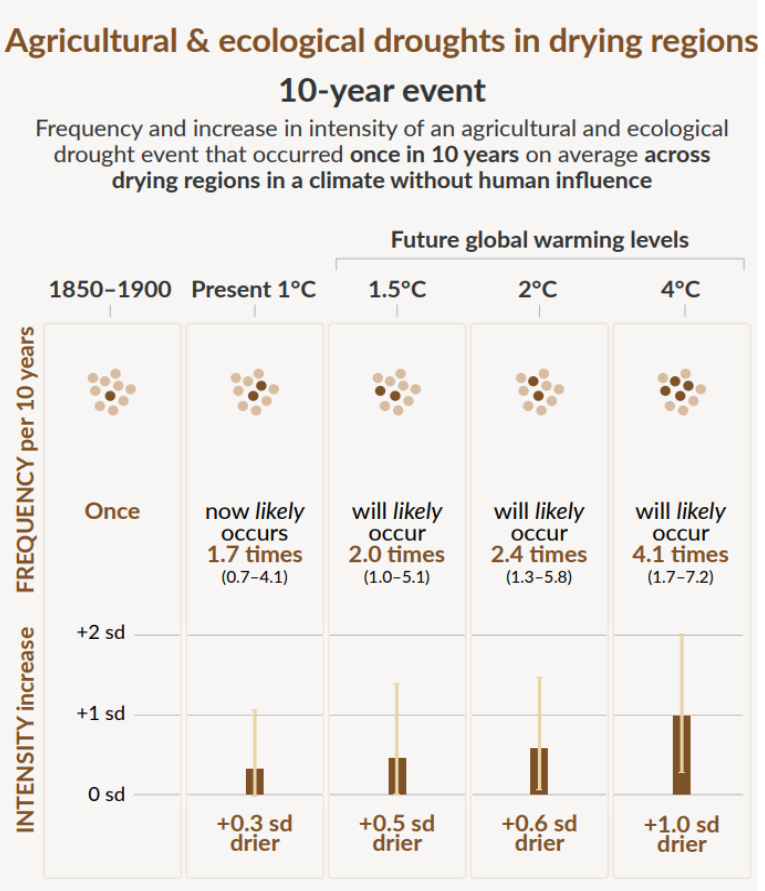
a) Global surface temperature change relative to 1850-1900



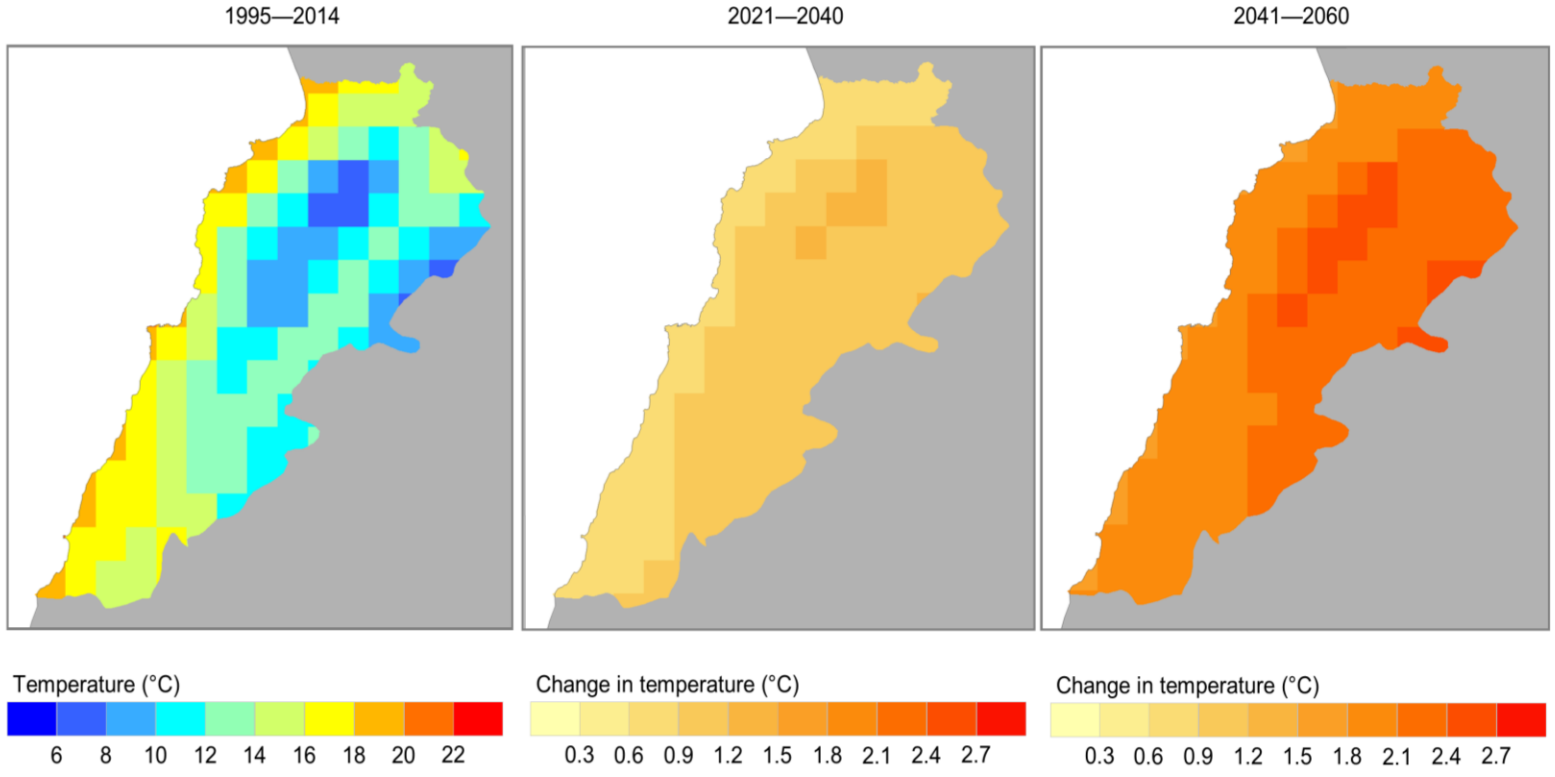
Precipitation and extreme weather events

For every additional 0.5°C of global warming causes clearly discernible increases in **the intensity and frequency of hot extremes,** including **heatwaves** (very likely), and **heavy precipitation** (high confidence), as well as agricultural and ecological **droughts** in some regions (high confidence).





Future Climate Projections for Lebanon



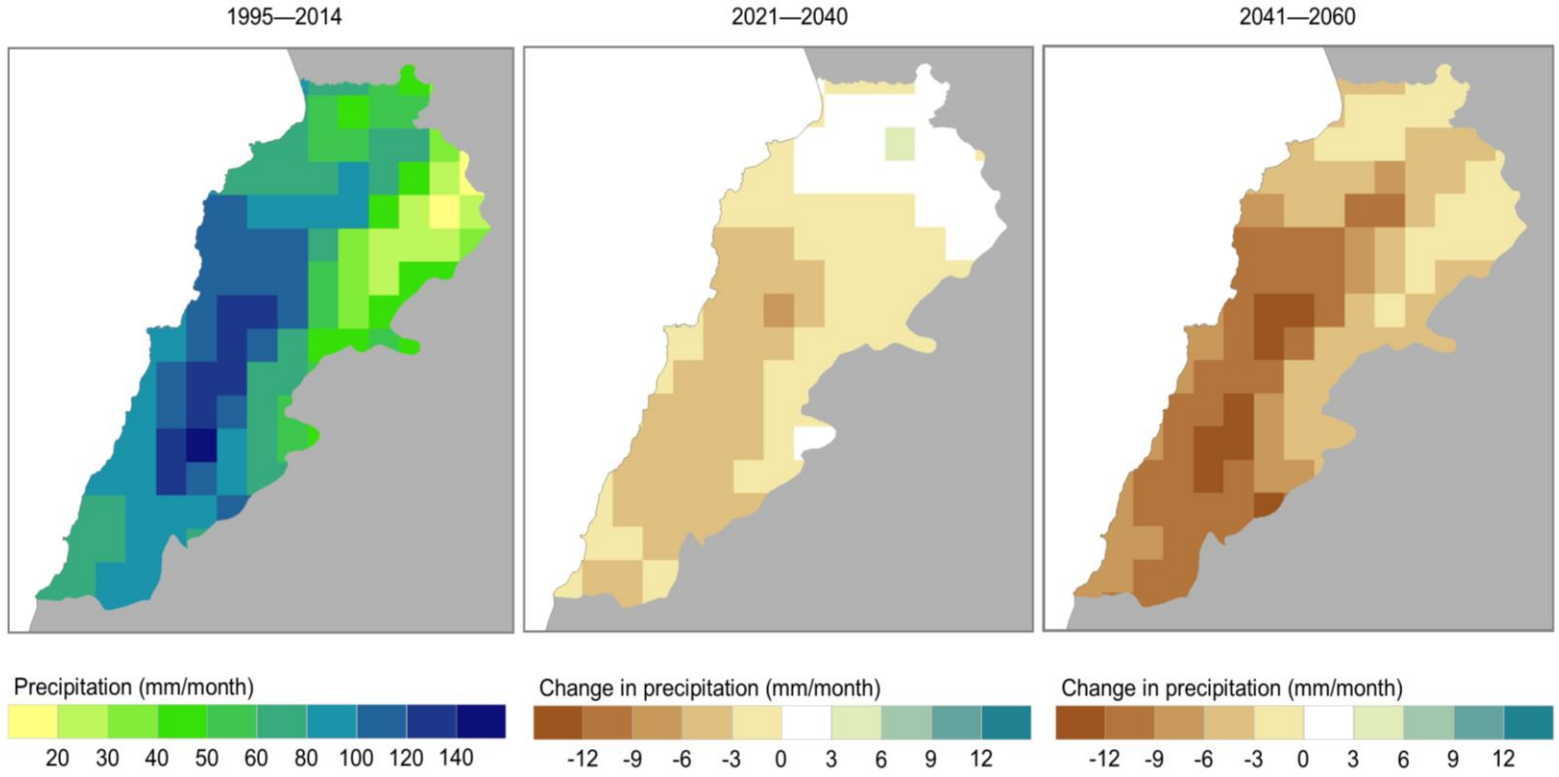
Temperature:

- Recent projections (2022) show an increase in the average temperature of **1.6 ºC to 2.2 ºC** by mid-century compared to a more modest increase of 1.2 ºC to 1.7 ºC previously projected under the IPCC AR5(2014)
- End-century projections previously estimated at 1.5 ºC to 3.2 ºC in the 2014 analysis, have also changed **to 2.2 ºC to 4.9 ºC**

These results show that temperature in Lebanon is projected to **increase intensely over a shorter timeframe**.

The **Bekaa Valley and most coastal areas** across Lebanon will suffer the most from such increases.

Future Climate Projections for Lebanon

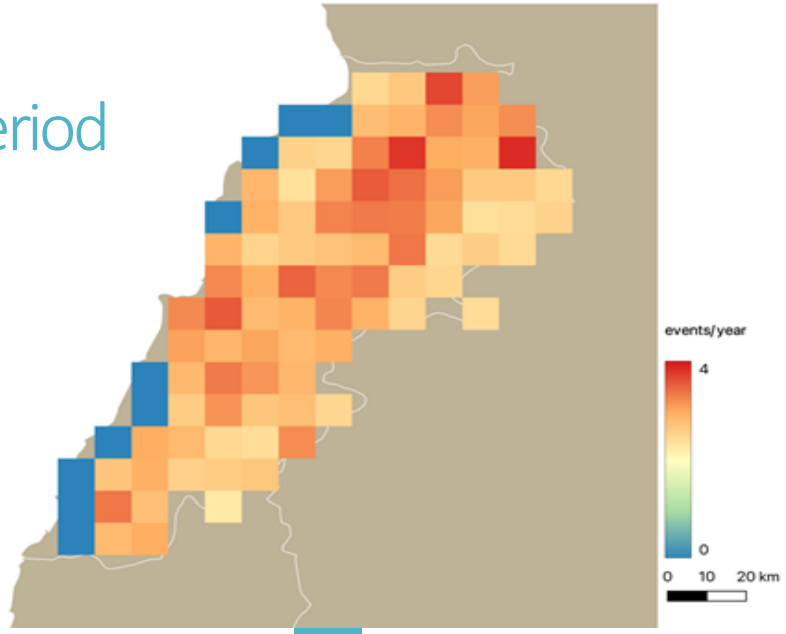


Precipitation:

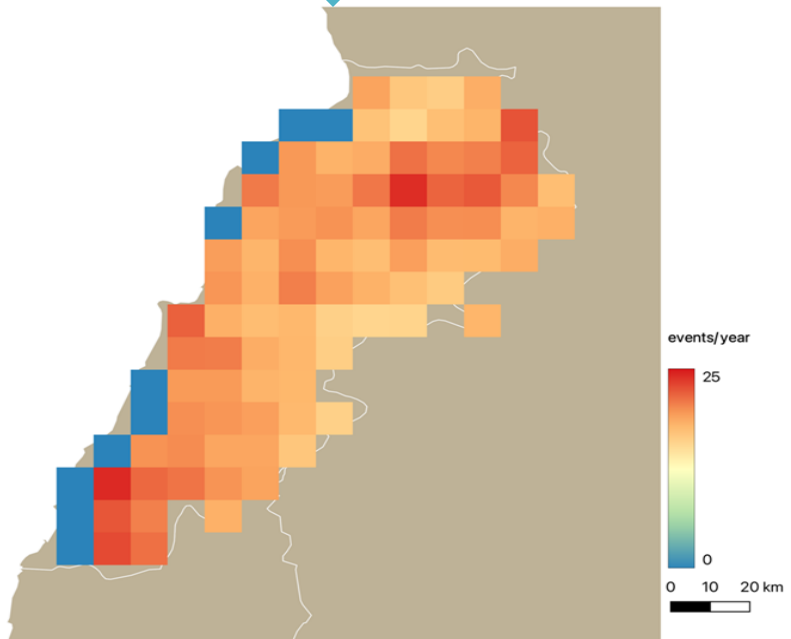
- Precipitation is expected to decrease **by 6.5% to 9%** by mid-century for RCP 4.5 and RCP 8.5 scenarios respectively
- And **by 9% to 22%** by end-century, according to most recent projections.

It is important to note that previous scenarios from 2014 stated a 4% decrease in precipitation per each 0.5 degree of global warming, which further highlights the fact that projections are showing almost **1.5 times** the previously projected impacts for both mid- and end-century scenarios since temperatures are increasing more intensely and within a shorter timeframe.

Reference period



End-century



Future Climate Projections for Lebanon

Extreme weather events:

Temperature increases will also impact the number of hot days per year, leading to increased incidents of droughts and heatwaves.

Compound effect of heatwaves and droughts are expected to increase the frequency of extreme weather events/incidents by **fifth fold**, from an approximative **4** incidents to **25** incidents per year, especially at the north part and the coastal region.

FIGURE 21: Vulnerability at mid-century for (a) RCP4.5 and (b) RCP8.5

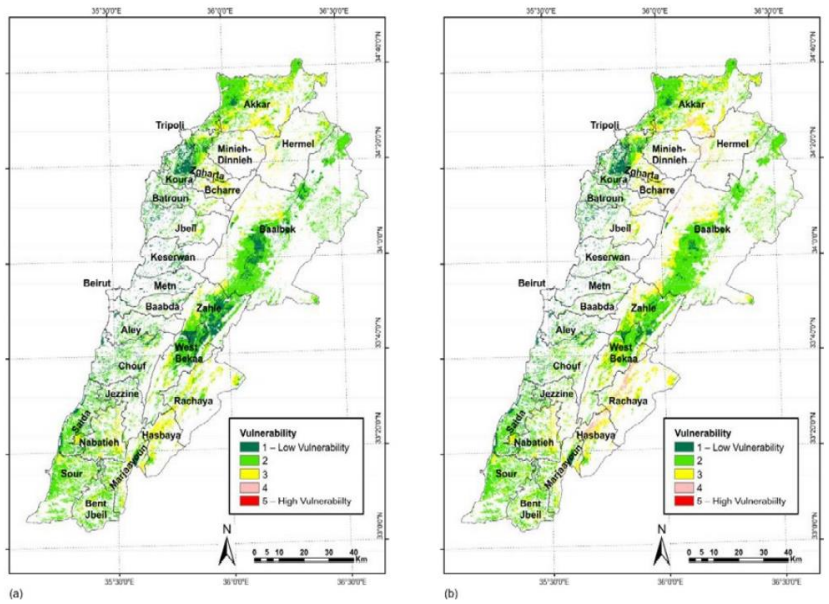
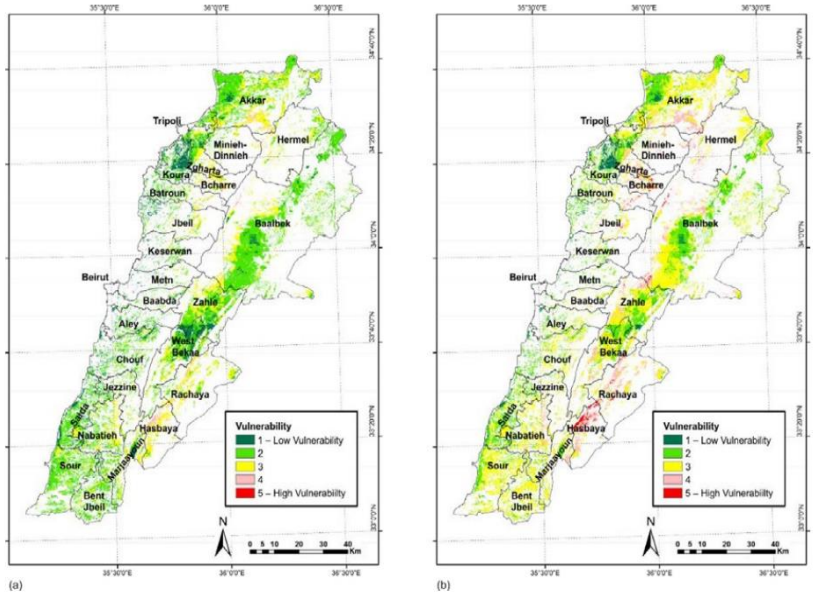
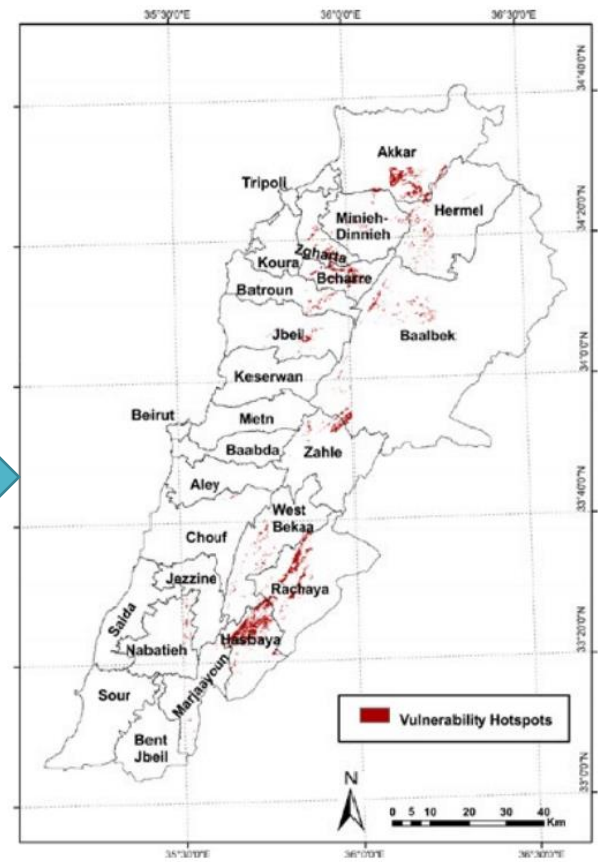


FIGURE 22: Vulnerability at end-century for (a) RCP4.5 and (b) RCP8.5





Impact of Climate Change on agriculture in Lebanon

<u>Vulnerability of the agricultural sector:</u>

The agriculture sector in Lebanon is mostly considered as **moderately vulnerable** (with a maximum of 87% of land areas), **with some small areas with high vulnerability** (up to 14% of land areas).

An analysis conducted by RICCAR shows that the cazas with the largest percentage of croplands (>50%) such as **Hasbaya, Bcharre**, and **Rachaya** are classified as highly vulnerable and the most affected crops include field crops, such as vegetables, olives (particularly in Hasbaya), and deciduous fruit trees.

It is important to note that this assessment was undertaken in early 2019, prior to the economy crisis and Beirut blast.

Specific impacts of climate change to key crops in Lebanon

Wheat	Increases in temperature (a 1°C rise leads to a 13 % loss in wheat yields) and decline in spring rainfall impact wheat yield, especially in the Bekaa valley where reduced spring precipitation is common.
Potato	Potatoes are affected by temperatures extreme (higher winter temperatures) and water unavailability Production is affected when temperatures rise or do not fall in the range of 10–30°C.
Tomato	Tomato is a warm weather crop, with extreme temperatures affecting production.
Apples	Apple blossoms are sensitive to high temperatures (>40°C)
Cherries	Cherries are sensitive to high temperatures (> 21°C).
Grapes	Both temperature and precipitation changes affect grapes production as well as the quality of wine Grape yields and wine quality will be reduced mainly in the Bekaa valley and, to a limited extent, in Akkar.
Citrus	Increased water scarcity will have negative effects on citrus production.
Almonds	Almond cultivation is at risk from spring frosts.
Apricots	Increased temperatures will have negative effects on the fruit.
Peaches	Increased temperatures during flowering reduce peach flower size and germination.
Plums	Heat can damage plums. Plum trees have a shorter lifespan and lower production with a 1°C rise in average air temperature between February and April leading to early blossoming.
Pears	Pears are sensitive to rainfall and temperature extremes; yield and fruit quality (poor colour) is due to drought stress, reduced chilling hours, disrupted reproductive processes, and increased incidence of sunburn from rising temperatures.
Banana	Banana production is reduced due to availability water for irrigation, especially on the coastal plains and during the arid season.
Olive trees	Although the olive tree can withstand long droughts and temperatures above 40°C. Spring frosts and warm winters can adversely impact production as well as the quality of olive oil. Decreased rainfall can also lead to slight yield reductions especially when combined with reduced chilling.

Economic costs of climate change induced disasters in Lebanon

Hazard					Total economic cost (USD million)
	Agriculture	Animal	Fishery	Forestry	
Heavy wind	89%	1%	5%	5%	93
Cold wave	84%	11%	1%	0%	241
Flood	83%	9%	5%	0%	330
Landslide	82%	0%	1%	9%	74
Storm	81%	8%	9%	5%	212
Heavy rain	79%	8%	2%	5%	177
Heat wave	71%	6%	0%	0%	149
Wildfire	56%	0%	0%	44%	125

	Hazard	Cost per year (USD)
Temporary crops Cereals (wheat and barley), field crops (potato, tomato, cucumber) and leaf vegetables	Winter related hazards such as Frost and cold	415 million
	Wildfires and heat waves	55 million
Fruit trees Pome fruits (apple and pear), stone fruits (cherry, plum, peach, etc.)	Heatwaves	70 million
	Cold waves	30 million
	Wildfires	45 million
	Heavy rainfall	8 million
Other Permanent crops (citrus, orchards)	Heat waves	35 million
	Winter and autumn hazards	37 million
Greenhouses	Winter heavy wind	25 million
	Cold waves	12 million
	Flood	10 million
Animal sector (cows, sheep, goats, and poultry)	Cold waves	11 million

Source: El Abdallah et al., 2018.

Impact of Climate Change on water in Lebanon

Vulnerability of the water sector:

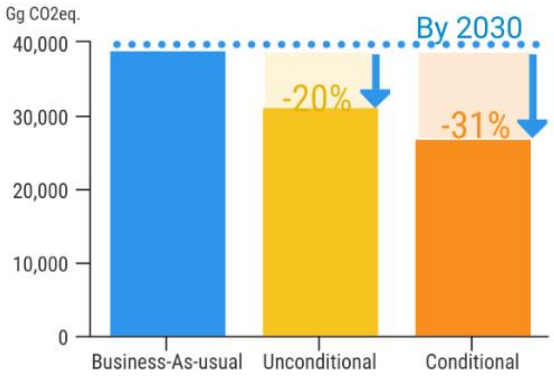
Increases in temperature and decrease in precipitation will impact different aspects of the water sector:

- Projected changes in temperature and precipitation will **exacerbate the conditions of coastal aquifers t**hat are already strained through high water demands in densely populated coastal regions, **over-extraction of groundwater**, and increased **aquifer salinity**
- River basins will suffer from **continuous deficits in water availability** falling heavily behind projected demands, in both BAU (RCP4.5) and worst-case event (SSP5-8.5).
- Studies have shown that in Lebanon there is a **downward trend on snow amounts** from 2012 to 2018, a shift un the date of snowmelt and an interannual decreased in snow cover (70% difference between 2013 and 2018). The **percentage occupation of snowfields is 10 times smaller in 2018 than in 2017**, 12 to 50 times smaller for snow in March and April in Akfka and Mzar areas.

Lebanon's Nationally Determined Contribution – update 2021

Mitigation targets

Lebanon's priority for the next decade is to spur sustainable economic growth through the creation of decent jobs and improve the well-being of its population through welfare programmes and protection of natural resources



In the 2020 update, Lebanon commits to **increase its unconditional target** from 15% to 20%.

The unconditional mitigation scenario includes actions which Lebanon can nationally implement, and through international support in the form of loans or other repayable instruments.

The conditional mitigation scenario includes further mitigation actions which can be implemented upon the provision of additional international support in the form of grants.

UNCONDITIONAL

- 18% of the **power** demand generated by **renewable energy** sources by 2030
- 11% of the **heat** demand (in the building sector) generated by **renewable energy** sources by 2030
- -3% reduction in **power demand** through **energy efficiency** by 2030

CONDITIONAL

- 30% of the **power** demand generated by **renewable energy** sources by 2030
- 16.5% of the **heat** demand (in the building sector) generated by **renewable energy** sources by 2030
- -10% reduction in **power demand** through **energy efficiency** by 2030

Adaptation priorities

Preserve and restore the natural capital and enhance and protect the built capital, as well as livelihoods, to ensure sustainable growth and resilience to climate change

Adaptation Priorities

- Strengthen the agricultural sector's resilience to enhance Lebanon's agricultural output in a climate-smart manner
- Promote the sustainable use of natural resources, restore degraded landscapes, and increase Lebanon's forest cover
- Structure and develop sustainable water services, including irrigation, in order to improve people's living conditions
- Value and sustainably manage terrestrial and marine biodiversity for the preservation and conservation of its ecosystems and habitats and the species
- Reduce the vulnerability of climate change impacts on coastal zones, especially in cities
- Ensure overall public health and safety through climate-resilient health systems
- Reduce disaster risk and minimize damages by mitigating and adapting to climate related natural hazards and extreme weather

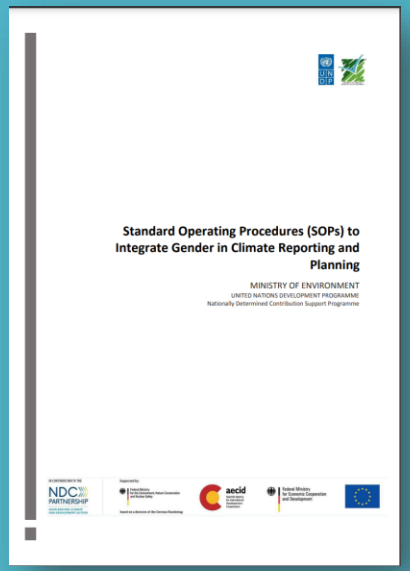
Guiding Principles

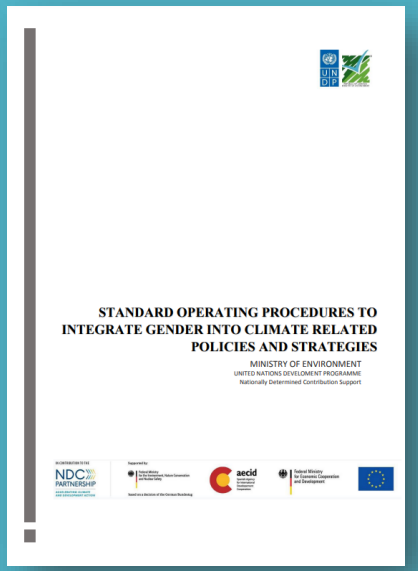
1. Achieve **food security** through the sustainable management of resources
2. Enhance the resilience of the **infrastructure,** urban and rural areas to subsist climate-related disasters
3. Ensure and protect **public health**, well-being and safety of all communities through climate-resilient systems
4. Incorporate **Nature-Based Solutions (NBS)** as a first line of defense from adverse impacts of climate change
5. Combat desertification and land degradation by achieving L**and Degradation Neutrality (LDN)**
6. Substantially reduce the risk of climate and non-**climate related disasters** to protect lives, the economy and physical/natural assets

Gender and climate change

Main Challenges Identified in Analysis

- **Cultural barriers** to gender equality and women's participation in decision-making;
- **Misunderstanding of the concept of gender** which hinders its effective consideration and prioritization in policies;
- Difficulties in understanding **the linkages** between gender and climate change;
- Lack of **capacity-building on climate change** in institutions, which renders capacity-building on gender increasingly challenging;
- **No systematic mainstreaming** of gender into climate change policies and planning, integration is irregular and varies across sectors;
- **No dedicated budget** for gender-related activities;
- **Lack of adequate data** to perform informed policy-making on gender integration;
- **Lack of coordination** for data collection between the relevant ministries, public institutions and academic institutions.

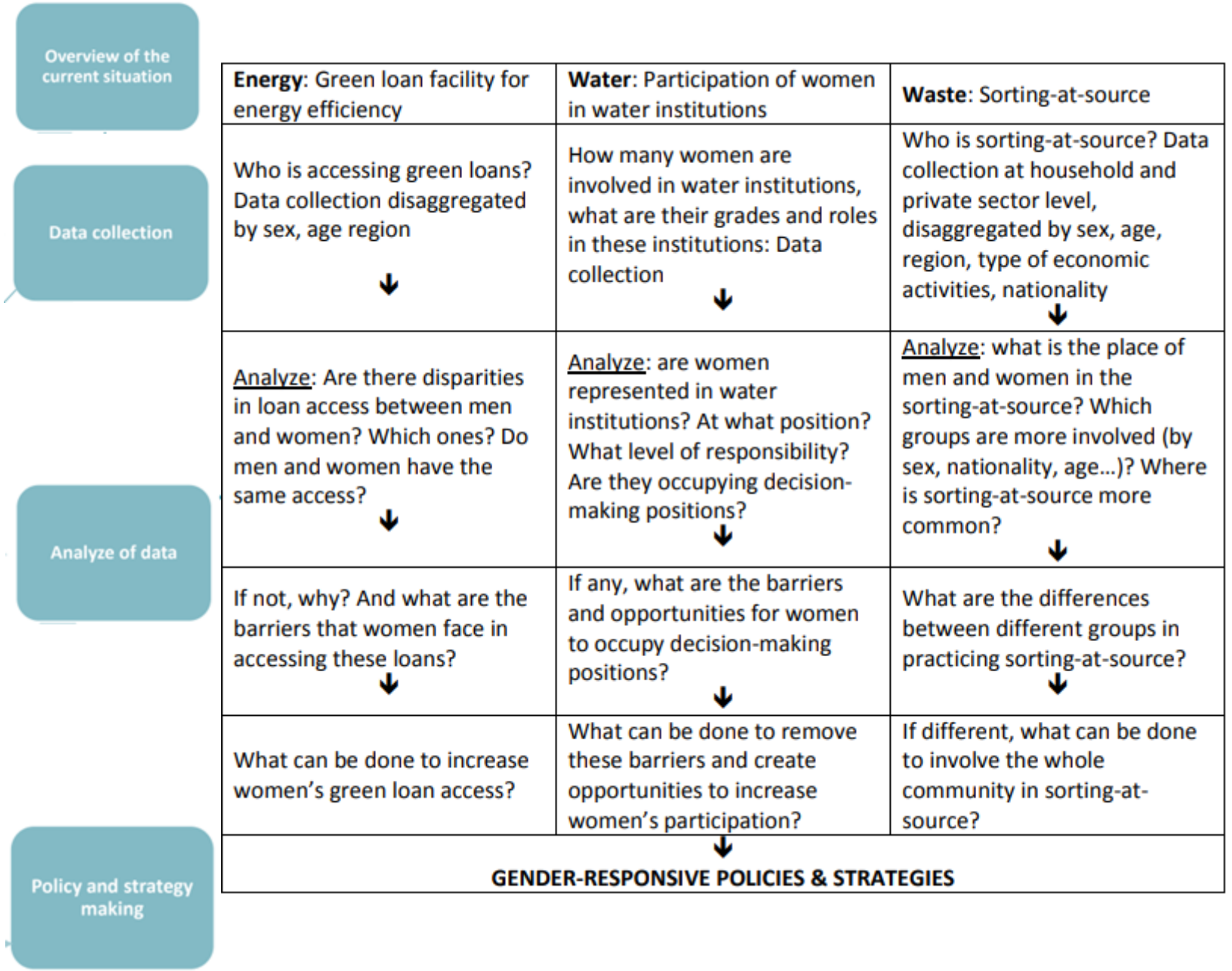




A prioritization exercise identified which sectors needed further capacity-building in order to focus efforts

Sector	Impact	Status	Opportunity	HUMAN RESOURCES	Sub-Total	External Financial support	Total
Agriculture	HIGH	MEDIUM	HIGH	HIGH	11	YES	8
Biodiversity	LOW	LOW	UNKNOWN	LOW	3	NO	6
Disaster Risk Reduction	HIGH	MEDIUM	HIGH	HIGH	11	YES	8
Energy	HIGH	LOW	HIGH	LOW	8	NO	11
Land degradation neutrality	LOW	UNKNOWN	LOW	LOW	3	YES	0
Land change, Land-use change, forestry	LOW	HIGH	LOW	HIGH	8	YES	5
Public Health	MEDIUM	UNKNOWN	LOW	UNKNOWN	3	NO	6
Transport	HIGH	LOW	LOW	LOW	6	NO	9
Tourism	HIGH	LOW	LOW	LOW	6	NO	9
Waste	HIGH	LOW	MEDIUM	LOW	7	NO	10
Water	HIGH	LOW	HIGH	LOW	8	NO	11

Impact: importance that gender relations play in the related sector and level of impact that the integration of gender can have on gender relations;
Status: current status of the sector regarding gender inclusion;
Opportunity: Current opportunity to integrate gender including updating of strategies, policies or new institutional mechanisms;
HR: existing human resources with capacity to integrate gender in policies;
External support: existing financial support already provided to include gender


Overview of the current situation
Data collection
Analyze of data
Policy and strategy making
Energy: Green loan facility for energy efficiency
Water: Participation of women in water institutions
Waste: Sorting-at-source
Who is accessing green loans? Data collection disaggregated by sex, age region
How many women are involved in water institutions, what are their grades and roles in these institutions: Data collection
Who is sorting-at-source? Data collection at household and private sector level, disaggregated by sex, age, region, type of economic activities, nationality
Analyze: Are there disparities in loan access between men and women? Which ones? Do men and women have the same access?
Analyze: are women represented in water institutions? At what position? What level of responsibility? Are they occupying decision-making positions?
Analyze: what is the place of men and women in the sorting-at-source? Which groups are more involved (by sex, nationality, age…)? Where is sorting-at-source more common?
If not, why? And what are the barriers that women face in accessing these loans?
If any, what are the barriers and opportunities for women to occupy decision-making positions?
What are the differences between different groups in practicing sorting-at-source?
What can be done to increase women's green loan access?
What can be done to remove these barriers and create opportunities to increase women's participation?
If different, what can be done to involve the whole community in sorting-at-source?
GENDER-RESPONSIVE POLICIES & STRATEGIES

Other relevant initiatives

- Update and submission of Lebanon's **4th National Communication**

- Report on "Vulnerability assessment of **health care facilities** in Lebanon: lessons learned from COVID-19 crisis"

- Establish institutional arrangements and donor coordination mechanism to track CC related activities and funding (**CBIT project**)

- Mainstreaming of **climate proofing methodology** in future development and reform plans

- Designing the **Lebanon Green Investment Facility** to mobilize private sector and donor funding into climate change projects

- Develop a **National Adaptation Strategy and Roadmap** for Lebanon + vulnerability assessment of pilot areas (GCF readiness)

For more info:

https://climatechange.moe.gov.lb/home

climatechange@moe.gov.lb

Lea.kai@undp.org