RICCAR
Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region

Green Sector Case Studies:
Examining Agricultural Production in a Climate Change Context

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High Level Conference on Climate Change Assessment and Adaptation in the Arab Region – Beirut, Lebanon – 26-28 September 2017

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Background

FAO's Regional **Water Scarcity Initiative** (WSI) with the support of GIZ, and in collaboration with ACSAD and ESCWA, developed and implemented the project on "*Climate Change and Adaptation Solutions for the Green Sectors of Selected Zone in the NENA Region*"

Through RICCAR **climate projections**, **vulnerability** assessment and **hotspots** identification, we gave a close observation to the impact of climate change on major green sectors in the Region, specifically, **crop systems**, **livestock**, **fishery and aquaculture**, and **forestry**

The Representative Concentration Pathways (RCP) are **RCP 4.5** (moderate-case scenario) and **RCP 8.5** (worst-case scenario). The projected climatic and hydrological variable are for the **mid-century** (2046-2065) and **end-century** (2081-2100) with reference to the baseline period of 1986-2005

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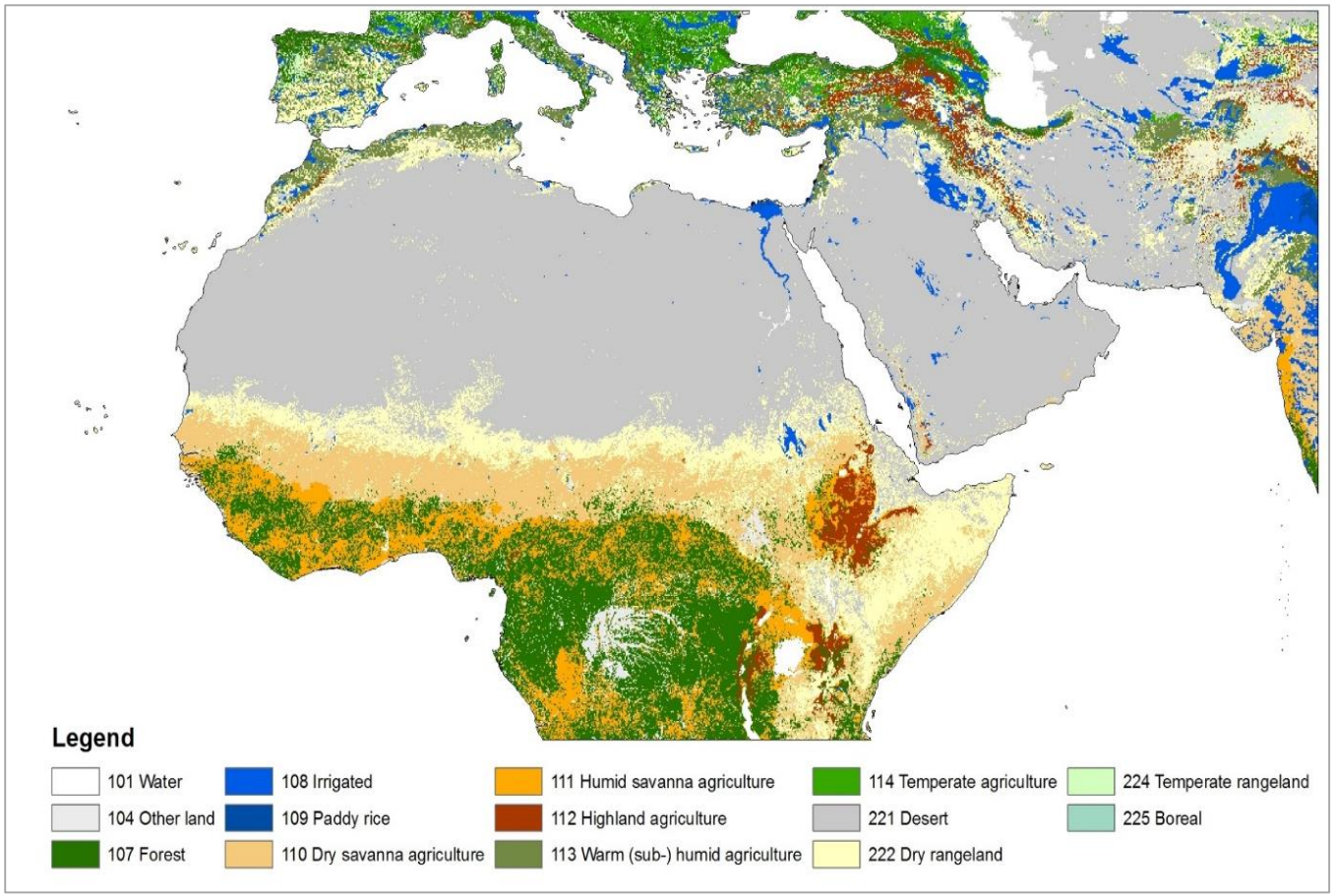
Impact on Cropping Systems

A point of departure for analyzing the impact of climate change on crop systems was the intersection between the Farming System map and the Vulnerability Assessment maps



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The areas with highest vulnerability are the Nile Valley, the Euphrates-Tigris basin, the south-west of the Arab Peninsula, and the western parts of North Africa on the Atlas Mountains.

Analysis project increased intensity of water scarcity (higher evapotranspiration; & runoffs decline)

Over 50% of the surface area of the Arab region's major cropland systems (including wheat, maize, sorghum, potatoes, vegetables and olive) are exposed to the highest two classes of vulnerability

As expected, the vulnerability increases from the moderate-case to the worse-case scenario and from mid-century to end-century

C3 crops, like wheat and cotton, under irrigation (non-limited water conditions) appear to benefit from elevated atmospheric CO_2 concentration

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Impact on Livestock System

The impact of climate change on livestock is related to declining of water and feed resource base due to recurrent droughts, degradation of rangelands and desertification

Most vulnerable areas are located along the Nile Valley, the Horn of Africa, and south-west of Arabian Peninsula, followed by areas of Fertile Crescent and North Africa.

Excluding camels, which have the lowest density, cattle is the most affected by climate change, followed by goats and sheep

Livestock raised under grassland production systems will be more prone to climate vulnerability than those raised under mixed systems

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Impact on Fishery & Aquaculture

Drought, floods and high temperatures are the major factor of climate change impact on the fishery and aquaculture sector

However, it must be noticed that the fishing pressure exerted on the bio-diversity by fishing activities has greater impact on stocks and ecosystem than the climate change

Because many fishery resources are heavily overexploited, a change in climate is very likely to cause the final collapse of some stocks if the fishery management does not secure a reduction of the exploitation accordingly.

Impact on Forestry

Morocco: The impact of climate change on the Maâmora forest will result in an absence of regeneration and an overall ageing of the Aleppo pine populations, in defoliation due to water stress and pest attacks

Algeria: The vulnerability to climate change of the Senalba forest for mid-century and end-century (and for both cases scenarios) is mostly influenced by water stress, amplified by overgrazing

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Tunisia: The vulnerability to climate change of the Siliana forest is mostly influenced by water deficit and droughts, impeding Aleppo pine regeneration and amplified pest attacks

Lebanon: In the Jabal Moussa Biosphere Reserve, major tree species like *Quercus cerris* or *Juniperus drupacea* are declining principally because of extreme dry and hot years affecting reproduction and shifts in species composition

Overall: A major climate change impact on the forests of the Region is expected from water stress (dry and hot years), inducing defoliation, accelerated aging, reduction in regeneration capacity, increased sensitivity to pest attacks and possible shifts in species composition

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Concluding Remarks

The project findings highlight clearly how the resulting increase in **water scarcity is one of the major impact of climate change** on all green sector of the Arab region

This is **particularly the case for crops and forests**. If water would not be limiting, some crops would even benefit from the elevated CO2 concentration. Even the impact on livestock is mostly through the grassland production system to feed the animals. Temperature increase, instead, assumes much more relevance for fishery and aquaculture

The **extreme events** such as drought and floods, as further impact of climate change, **can have devastating impact on all sectors**

All adaptation measures that improve **water conservation** and **water storage/harvesting** should be promoted on short term

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Thank you

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