

CONTRIBUTION TO THE ASSESSMENT OF CLIMATE CHANGE VULNERABILITIES WITHIN THE LIVESTOCK SECTOR IN NORTH AFRICA, THE CASE OF MOROCCO

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AFRICAN YOUTH INITIATIVE ON CLIMATE CHANGE (AYICC)

Contribute to the problem
(Agriculture accounts for 33% of national GHG in Morocco)

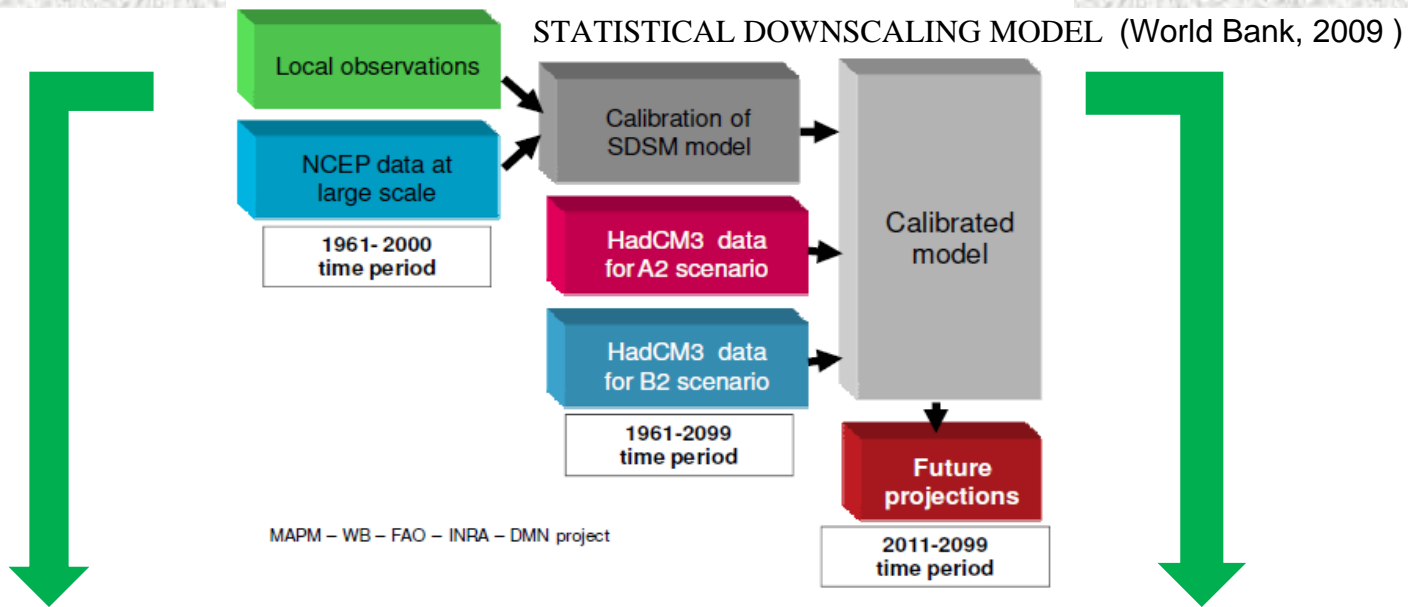
LIVESTOCK

FEEDBACK LOOP

CLIMATE CHANGE

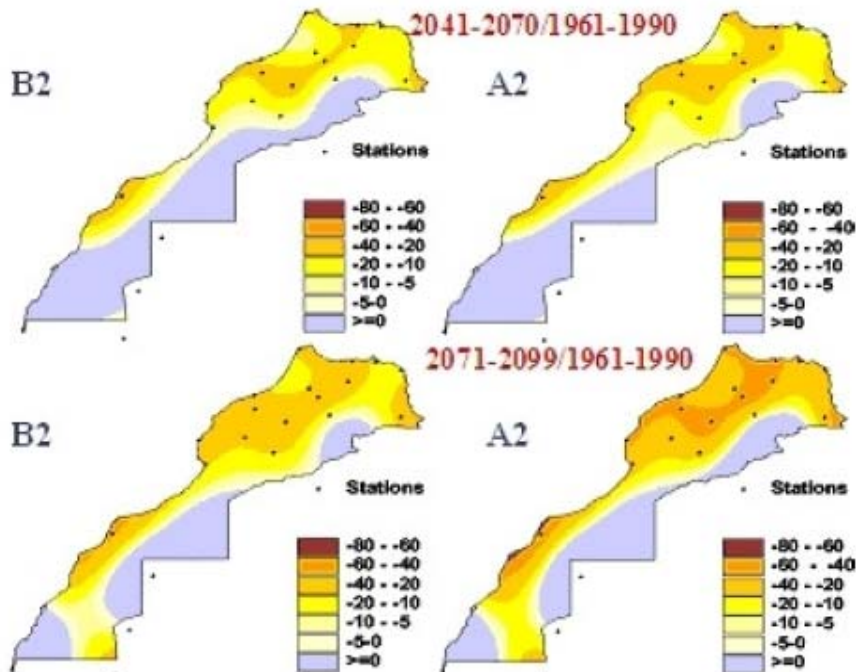
Suffer from its consequences
(decrease in water and feeding resources, heat stress, outbreaks of animal diseases)



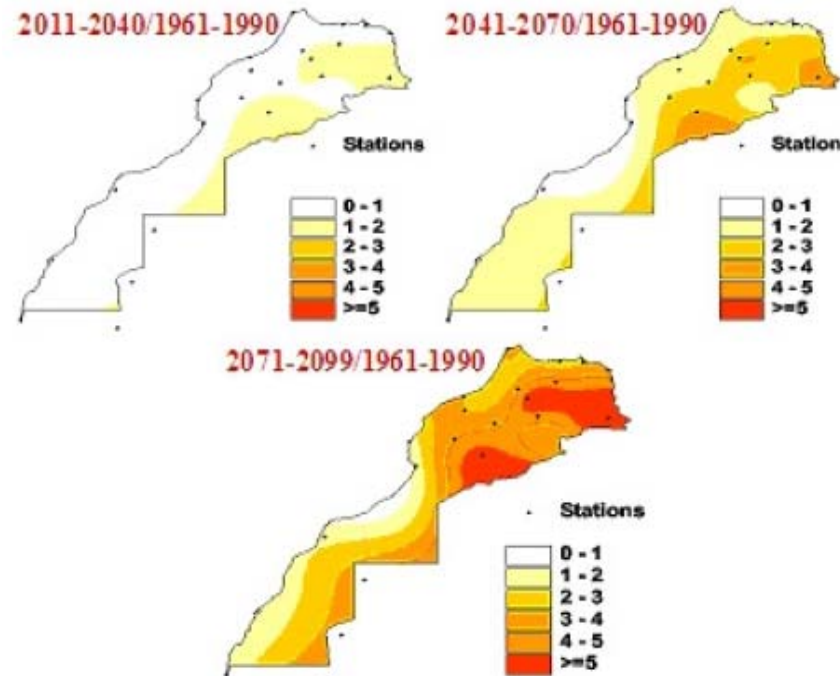


MAIN CLIMATE PROJECTIONS FOR MOROCCO (World Bank, 2009)

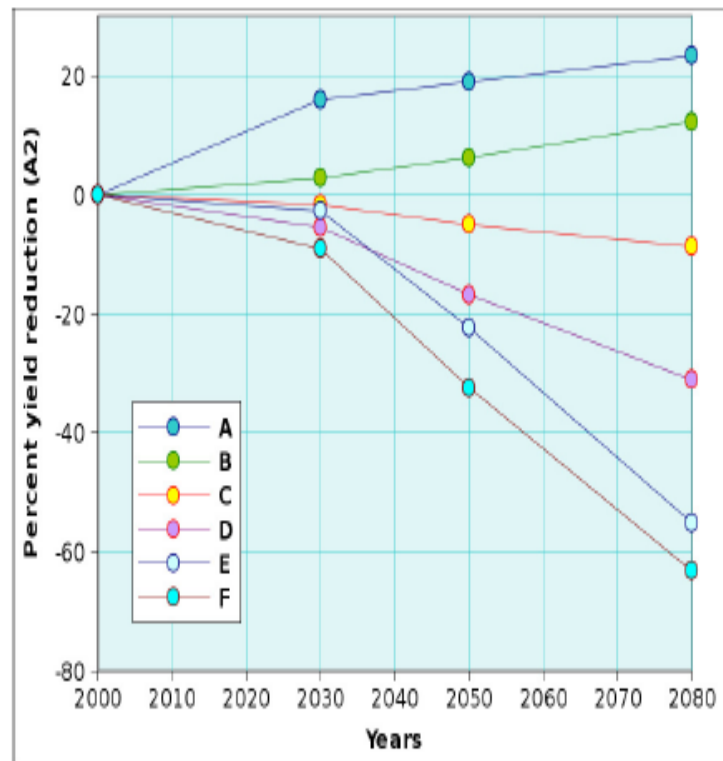
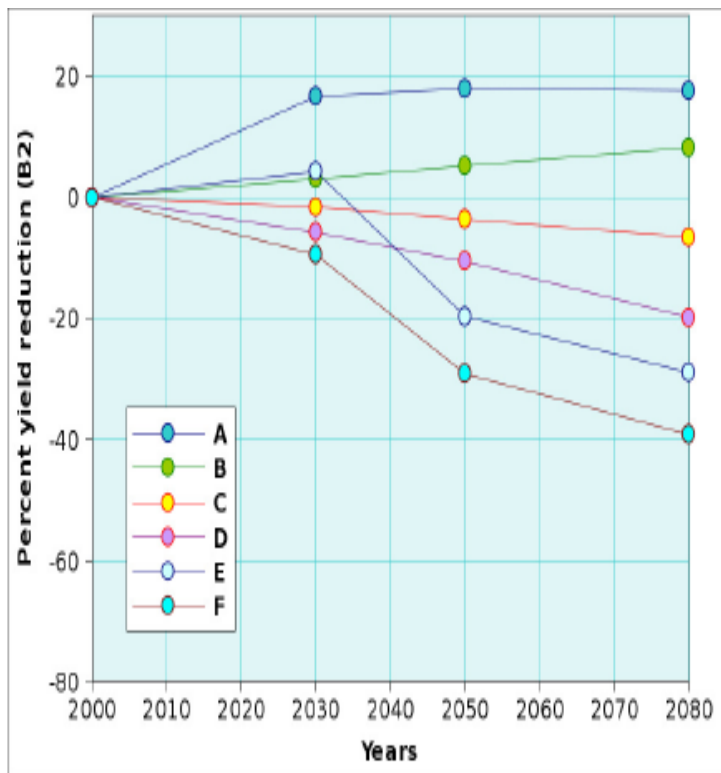
Precipitations



Temperatures



PERCENTAGES OF YIELD REDUCTIONS AT DIFFERENT TIME HORIZONS FOR 6 CROP-GROUPS IN MOROCCO (World Bank, 2009)



- A: Unrelated irrigated crops projected to significantly benefit from climate change
- B: irrigated fruits and vegetables that will benefit from climate change;
- C: fodder crops and vegetables that will suffer from climate change very moderately starting in the 2030s;
- D: rainfed cereals and legumes undergoing a drop of yields of about 5% in 2050
- E: wheat and barley (both rainfed) whose yield drops will exceed 20% from 2050
- F: rainfed winter crops that will undergo yield losses in excess of 30% by 2050



WEAKNESSES OF THE RUMINANT SECTOR AND ITS PROBABLE VULNERABILITIES IN A CLIMATE CHANGE SITUATION

		Intensive	Mixed/Agro-pastoral	Extensive/Pastoral	Oasis
WEAKNESSES IN CASE OF CLIMATE CHANGE	Feeding	- Slight decrease in irrigated fodder crops productivity and high water pricing for irrigation -> feeding shortage	- Decrease of rangeland grazing potential, low yields of fodder crops and adjusted pricing for irrigation water -> feeding shortage and competition over resources	- Lack in water/ pasture resources associated to unaffordable feed prices will lead to overgrazing and nomadic stockbreeding - Competition over pasture lands and water resources -> resources-use conflicts and social instability	- Humans/animals competition over grains and water resources
	Heat stress	- Imported breeds highly vulnerable to heat stress - Decrease in feed intake -> significant drop on growth, reproduction aptitudes and productivity performances (particularly in dairy cattle)	- Crossbreeds vulnerable to heat stress - Decrease in growth, production and reproduction outputs	- Local breeds relatively adapted to heat stress - Significant growth and productivity losses	- Local breeds relatively adapted to heat stress - Significant growth and productivity losses
	Health	- Selected breeds are highly sensitive to diseases -> high risk in case of outbreaks of (re)emergent diseases	- Crossbreeds significantly sensitive to animal diseases -> threat in case of outbreaks of (re)emergent diseases	- Local breeds significantly resistant to animal diseases	- Local breeds significantly resistant to animal diseases
	Socio-Economic effects	- Additional costs for methane and manure management, feeding shortage and emergent disease control -> Less profitability - Decrease in production -> Food security risks	- Environmental and animal health costs - Competition over resources -> conflicts - Relatively expensive prices of industrial feed -> limited benefice margin	- Low productivity associated to animal losses due to high vulnerability to climate hazards such as floods -> economic losses - Hunger and poverty leading to rural exodus - Accelerated deforestation and desertification	- Social conflicts over the use of water resources - Hunger and poverty leading to rural exodus - Accelerated deforestation and desertification
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FEEDING RESOURCES

- ✓ Significant competition over pasture resources might occur within systems relying mainly on grazing
- ✓ In the oasis system, feeding resources may be highly to severely vulnerable to climate change;
- ✓ Irrigated fodder crops could be slightly or moderately affected as fodder production may decrease starting from 2030.

- ✓ Increasing competition with the bio-fuel sector such as maize used as feedstock for ethanol production, associated to high prices of fossil fuels (pollution taxation) could lead to economically unaffordable industrial feed prices for stockbreeders.

Several appropriate adaptation measures to be mentioned here are planned within the PMV such as water saving practices including drop irrigation, recasting fodder crop's agricultural calendar, use of complementary irrigation and climate adapted fodder crops varieties. Nevertheless, accurate actions are needed in terms of better grazing management practices and protection of dry pasture lands, as well as long-term research-action strategies

HEAT STRESS

- ✓ Projected losses in production and reproduction performances could unbalance the economic effectiveness of formal market oriented stockbreeding units, and affect national food security
- ✓ Small stockbreeders may see their small benefice margin disappear impacting therefore on their livelihoods and survival.

Necessary adaptation actions start by introducing some ration adjustments and providing enough quantities of fresh water, as well as improving feeding management practices by distributing fresh, palatable and high quality feed during cooler times in the day; as for animal housing some adjustments could be done such as minimizing overcrowding, making shade available for animals and increasing the air flow through good ventilation

ANIMAL HEALTH

- ✓ Worldwide outbreaks of emergent and re-emergent animal diseases have been closely monitored due to their socio-economic costs and their consequences on international trade.
- ✓ There is a growing fear about the role that may play climate and environmental changes in multiplying and spreading these diseases beyond their current distribution areas.
- ✓ The recent outbreak of west Nile fever indicates that Morocco is not an exception.

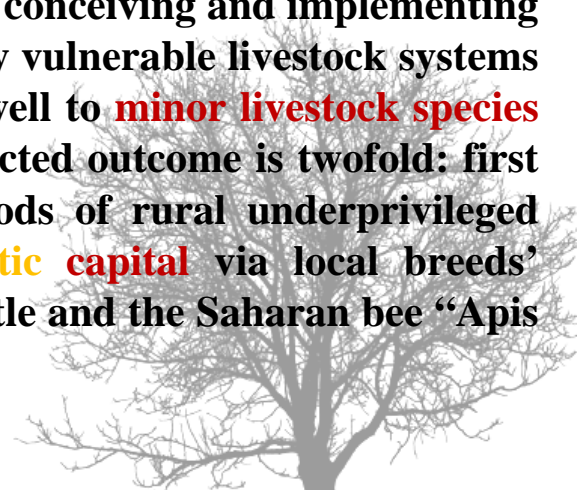
The first step towards adaptation is by understanding how climate change could affect livestock diseases within the Moroccan context through oriented research programs that will enable developing a risk based framework to screen for organisms that could have high likelihood to emerge as a consequence of climate change and to identify any endemic pathogens or vectors that might be affected if the climate changes



RECOMMENDATIONS & POLICY IMPLICATIONS

Climate change vulnerabilities within the livestock sector are **warning signals** to **food security** and **livelihoods** of the wide community of Moroccan stockbreeders and other stakeholders within the livestock-agricultural cluster. These signals should be interpreted in due time to come up with an **integrated livestock preventive adaptation response** starting by **reducing its water footprint** while increasing its productivity. However, prior to any adaptation strategy, **methodological tools and models** needs to be developed and adapted through a **multidisciplinary research approach** in order to conduct **detailed vulnerability assessments** through a cascade of interlinked livestock related sectors including **climate, hydrology, agriculture and animal health**

This analysis could serve as a **substantial asset to build on positive synergies** and partnerships with national/international institutions and development agencies towards conceiving and implementing **small scale pilot adaptation projects**. The main focus will be on highly vulnerable livestock systems i.e. **extensive and oasis systems**; a special attention will be given as well to **minor livestock species such as honey bees**. In addition to climate change resilience the expected outcome is twofold: first such projects are **entry point to end poverty** and sustain livelihoods of rural underprivileged populations; second, it's a valuable option to **preserve the genetic capital** via local breeds' valorization including the Draa goat, D'man sheep, Atlas/Oulmes cattle and the Saharan bee "Apis Mellifera Sahariensis"





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THANK YOU

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