

# EXECUTIVE SUMMARY

## CLIMATE RISK ASSESSMENT



**Private Sector Promotion of the Agriculture Sector in Upper Egypt**



# ACKNOWLEDGEMENT STATEMENT

This publication is part of the "Private Sector Promotion for the Agriculture Sector in Upper Egypt" project. The project is implemented by Enroot Development in collaboration with the universities of Aswan, Assiut, South Valley, Luxor, and Sohag, with funding from the Embassy of the Netherlands in Egypt.

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## ABOUT ENROOT:

Enroot is a social business set up to develop disruptive models that empower communities with untapped potential, particularly youth and women, across the MENA region and Africa. It was established in 2018 with a mission to address the root causes of development challenges and to capitalize on youth innovation. We design and execute socio-economic development projects as well as conduct research aimed at promoting inclusive, participatory, and sustainable economic development.

## ABOUT CLIME UP!

The Private Sector Promotion for the Agriculture Sector in Upper Egypt, implemented by Enroot and funded by the Embassy of the Netherlands, aims to enhance climate resilience and water smart agriculture in Upper Egypt. The project follows a private sector promotion approach in upscaling the quality of agricultural products and enhancing accessibility to international markets. Through the promotion of the private sector and the integration of civil society organizations (CSOs), the project's theory of change envisions the enhancement of the technical skills and market accessibility of both the businesses and the farmers. The adoption of climate-smart practices by farmers, sustained by the CSOs and incentivized by their integration of the private sector companies enhances the sector's resilience and adaptability to climate hazards and risks. As such the Clime Up! project objectives are articulated as follows:

- Enhancing market access and financial resources for agribusiness enterprises.
- Improving the socioeconomic living standards of smallholder farmers in Upper Egypt.
  - Strengthening market Linkages and accessibility to the international markets, with a special emphasis on the European Union.
  - Fostering climate resilience of the agriculture sector in Upper Egypt. The project focus areas are as follows: Locations Assiut Sohag Qena Luxor Aswan Crops Onions Pomegranates Hibiscus Fennel Henna Pumpkin Loofah.



# Executive Summary

This Climate Risk Assessment Report provides an overview of the key climate-related challenges and risks, and adaptation strategies for agricultural value chains in Upper Egypt. The assessment focuses on key crops, including pomegranate, hibiscus, onion, henna, squash, fennel, and Loofah, assessing their vulnerabilities and potential resilience strategies in Upper Egypt governorates (Assiut, Sohag, Qena, Luxor, and Aswan).

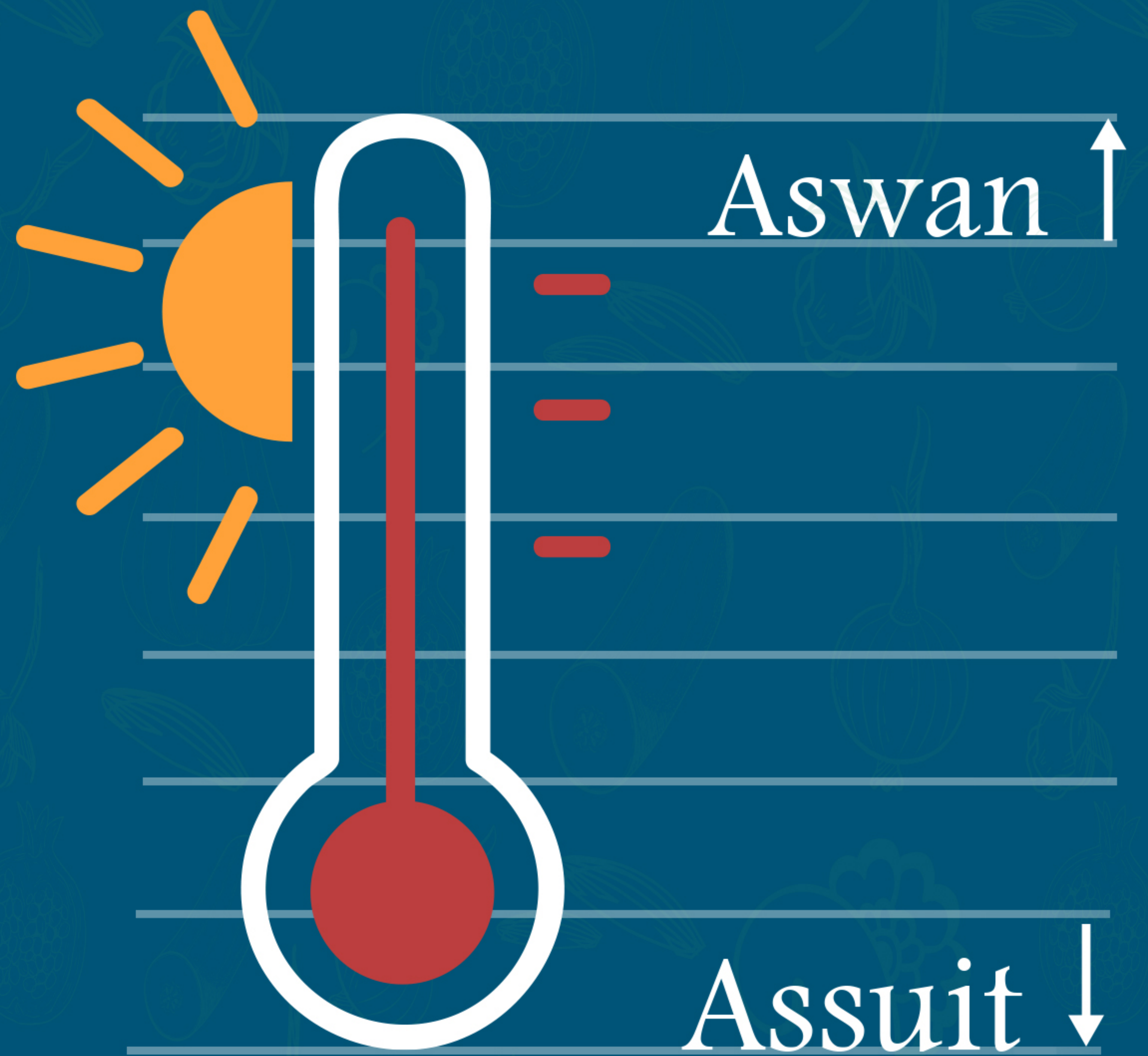
Climate change increases the magnitude, frequency, duration, and severity of climate-related hazards. It has become a major driver of disaster losses and development achievement setbacks. Climate and disaster risks arise due to compounding and cascading hazards and impacts, leading to complex and interconnected adverse consequences for various ecological and human systems.



According to climate data collected during the years 1994 – 2023 in the governorates of Upper Egypt (annual averages), it could be observed that the highest maximum temperatures during the study period was witnessed in Aswan Governorate in 2010. The lowest average temperature recorded during this period was in Assiut Governorate in 2011.



You may also notice that in 2010, the largest number of governorates recorded the highest maximum temperatures during the study period 1994 - 2023. The data also showed that 2011 was the year in which the lowest average temperatures were recorded at the level of many of the study governorates during the period 1994 - 2023.



Considering the impact of climate change on temperature rise under different scenarios, we find that there will be an increase in temperatures (average - maximum - minimum) for the year 2050 compared to the average temperature data during the study period. On the other hand, we find that temperatures for the RCP 8.5 scenario are higher compared to the RCP 4.5 scenario. Regarding the evaluation of temperatures under different scenarios in the governorates, we find that Aswan Governorate will continue to rise under current and future conditions compared to the rest of the governorates.








The risk assessment shows that Aswan is the most affected governorate by heat waves, high temperature, temperature variability, and drought, as all those hazards fall in the very high to high-risk zone. Biological Hazards are very high-risk in both governorates Assiut and Sohag and high in both Qena and Luxor while have medium-risk in Aswan.



The risk assessment shows that Luffa is the least affected crop as all hazards fall in the medium-risk zone except Flash Floods that fall in the high-risk zone. Flash Floods, Temperature variability, High Temperature, and Heat Waves are the most affecting risks as they fall in the high to very high-risk zone. Onion is the most affected and sensitive crop to climate hazards as all hazards range from high to very high-risk zones except Drought that falls in the medium-risk zone and Soil Salinity which falls in the low-risk zone. Soil Salinity is the least affecting risk as it falls in the low-risk zone for most crops.

# WHAT CLIMATE HAZARD AFFECT THESE CROPS?



	Crops						
Hazard							
Heat Waves	●	●	●	●	●	●	●
High Temperature	●	●	●	●	●	●	●
Temperature variability	●	●	●	●	●	●	●
Storms (including sand and dust storms)	●	●	●	●	●	●	●
Flash Floods	●	●	●	●	●	●	●
Heavy Precipitation	●	●	●	●	●	●	●
Drought	●	●	●	●	●	●	●
Cold Wave Frost	●	●	●	●	●	●	●
Soil Salinity	●	●	●	●	●	●	●





# Recommendations

Through the results of the report and the various surveys conducted by the project team, climate adaptation strategies along the value chain can be summarized as follows:



## Climate-Resilient Seeds & Varieties

Introduce drought- and heat-tolerant cultivars – Use local landraces adapted to Upper Egypt's climate.



## Efficient Water Management

Expand drip irrigation and subsurface irrigation – Promote rainwater harvesting and soil moisture conservation – Use drought-resistant rootstocks for fruit trees like pomegranate



## Soil Health Improvement

Apply organic compost and biochar to retain moisture – Reduce chemical fertilizers to prevent soil degradation – Practice crop rotation (e.g., onion with hibiscus) to maintain fertility



## Improved Storage & Processing

Solar drying units for hibiscus, fennel, and henna to reduce losses – Climate-controlled storage for onions and pomegranates – Cold storage solutions powered by renewable energy





## **Value Addition for Climate Resilience**

Develop processed pomegranate products – Introduce pumpkin-based food products to extend shelf life – Promote luffa-based eco-products (sponges, biodegradable materials).



## **Diversified Markets & Digital Agriculture**

Establish direct-to-consumer platforms for Upper Egypt farmers – Use mobile-based price tracking to reduce dependency on middlemen – Expand organic certification programs for export opportunities



## **Farmer Cooperatives & Contract Farming**

Organize cooperatives for group marketing and shared resources – Strengthen farm-to-market logistics to prevent post-harvest losses



## **Early Weather Warning Systems**

Establish SMS-based early warning alerts for farmers to prepare for extreme weather events – Deploy smartphone applications for real-time weather updates and pest outbreak alerts – Train local farmer cooperatives on how to interpret and act on weather forecasts – Integrate community radio broadcasts to reach farmers without internet access.





## **Government & Institutional Support**

Support research on climate-resilient crop varieties



## **Climate Insurance & Financial Access**

Introduce weather-indexed insurance for climate risks - Offer microfinance for climate-smart investments in processing and storage

The assessment underscores the urgent need for targeted adaptation measures to safeguard agricultural productivity and economic stability in Upper Egypt. By integrating climate-smart practices with various adaptation options, stakeholders can build a more resilient and sustainable agri-food system, ensuring long-term food security and rural livelihoods in the face of climate change.









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