



# Horn of Africa Partnership for Early Warning and Early Action

Increasing the availability and use of  
disaster risk information for  
decision-making in the IGAD region



Government Offices of Sweden  
Ministry for Foreign Affairs



UNDRR  
UN Office for Disaster Risk Reduction



World Food  
Programme



# Regional Flood Risk Profile and its relevance in early warning and early action in the IGAD region.

Roberto Rudari

Tatiana Ghizzoni

Eva Trasforini

Lorenzo Alfieri

[roberto.rudari@cimafoundation.org](mailto:roberto.rudari@cimafoundation.org)



## GREATER HORN OF AFRICA CLIMATE RISK AND FOOD SECURITY ATLAS



# The Risk Atlas 2018 – our Starting point

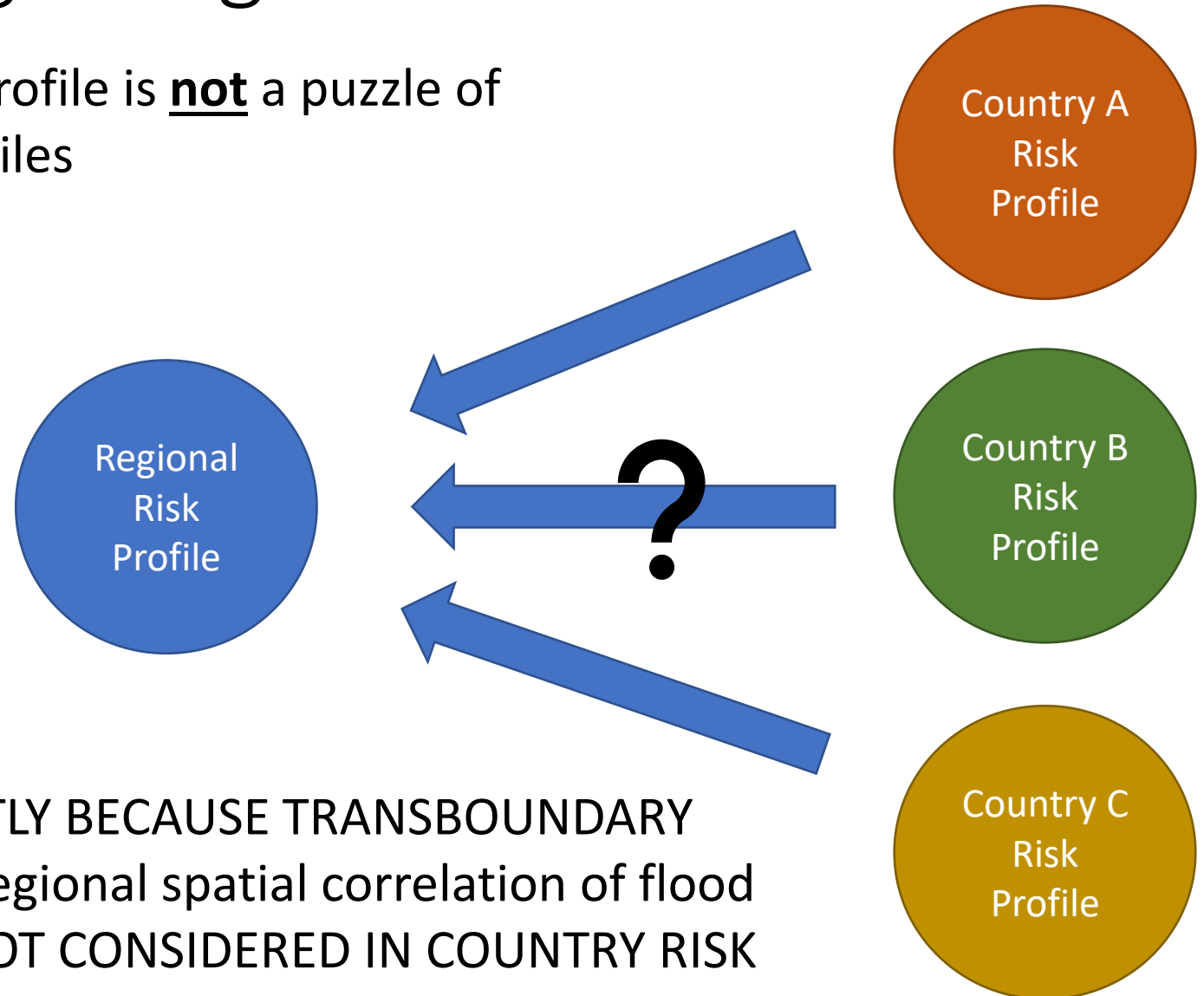
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- An improved methodology including modelling of non observed but possible events
- Inclusion of Climate Change
- Improvement in the Flood assessment
- Connection with EW & EA / FS
- A new methodology Probabilistic Risk Assessment



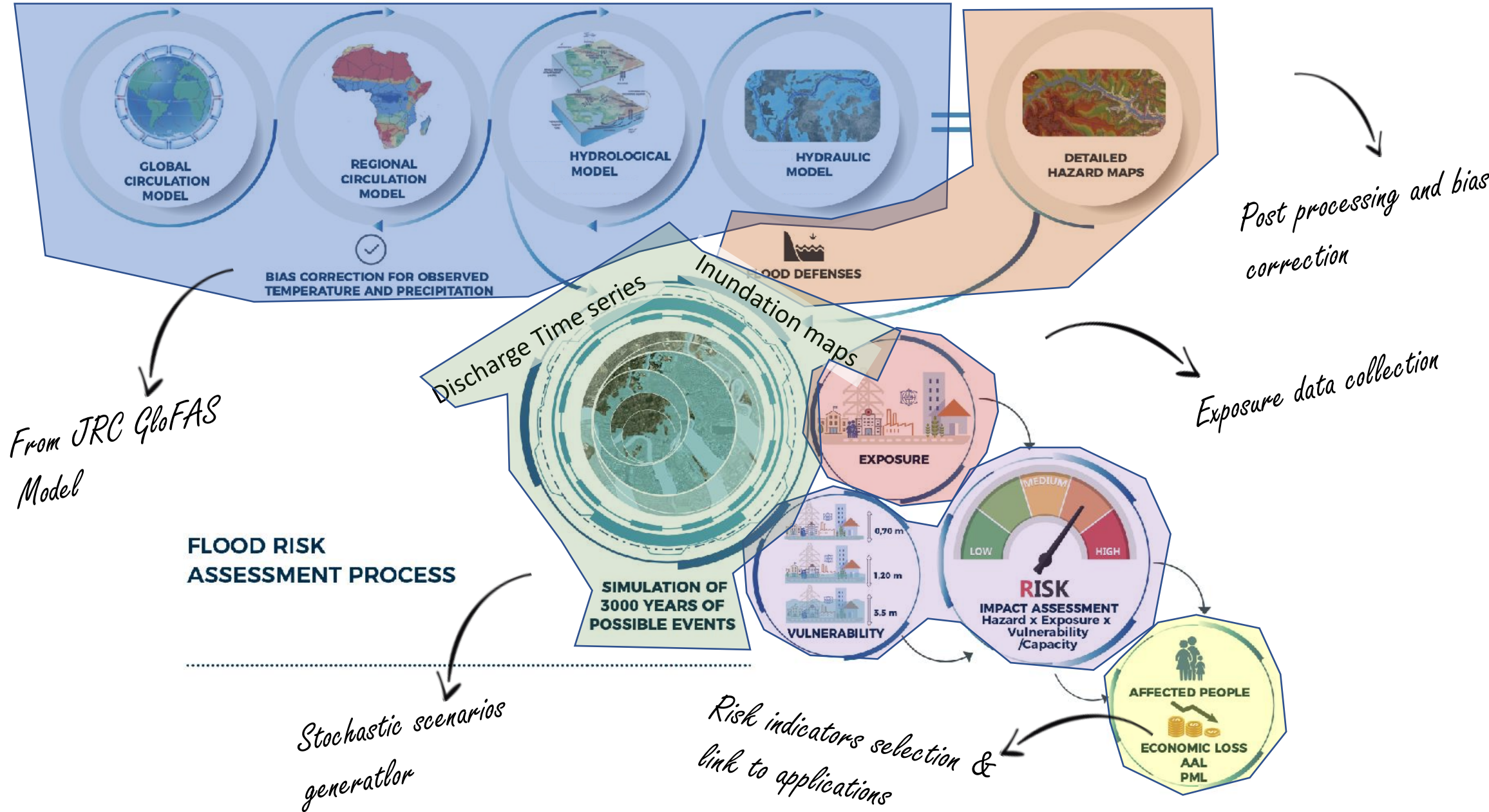
# Flood Risk Modeling – Reg. vs Nat

A Regional Profile is not a puzzle of Country Profiles



NOT DIRECTLY BECAUSE TRANSBOUNDARY EFFECTS (i.e. regional spatial correlation of flood events) ARE NOT CONSIDERED IN COUNTRY RISK PROFILE & DATA HOMOGENEITY ACROSS COUNTRIES IS NOT GUARANTEED

# Flood Hazard Methodology Workflow



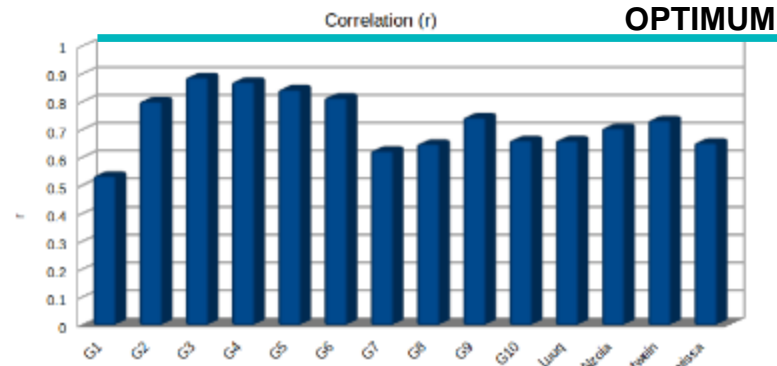


# Flood Hazard Modeling validation

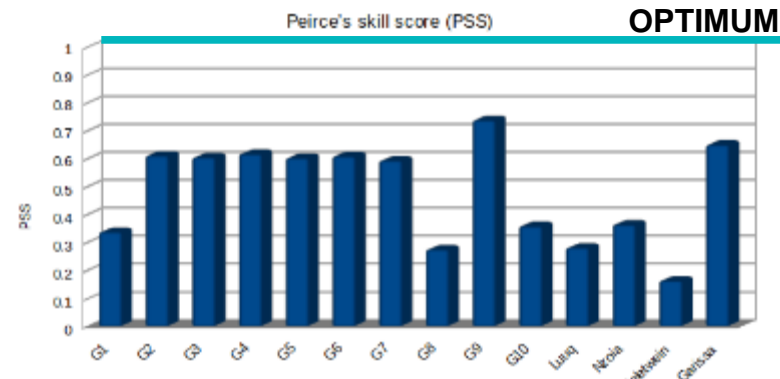
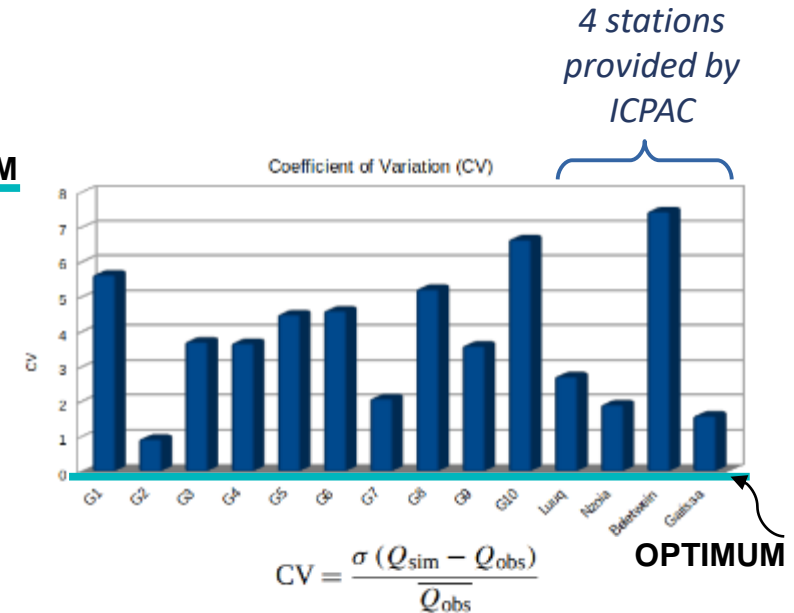
## Evaluation of GloFAS discharge reanalysis



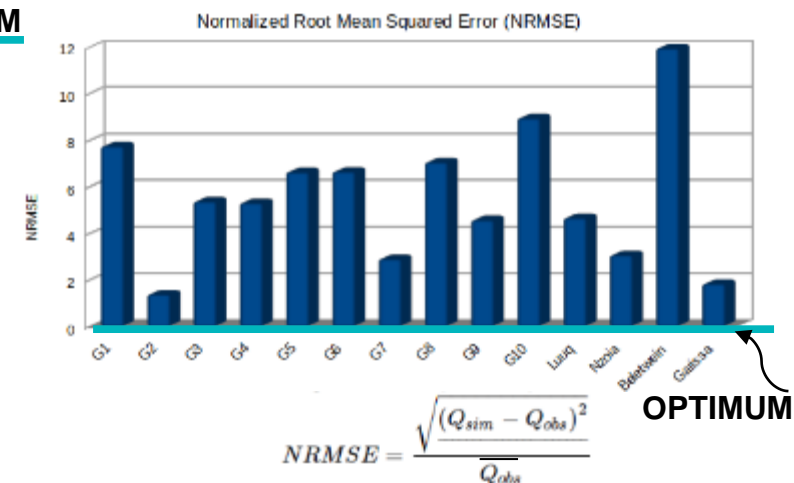
Geographic location of the 14 stations



$$r = \frac{\sum (Q_{obs} - \bar{Q}_{obs})(Q_{sim} - \bar{Q}_{sim})}{\sqrt{\sum (Q_{obs} - \bar{Q}_{obs})^2} \sqrt{\sum (Q_{sim} - \bar{Q}_{sim})^2}}$$



$$PSS = \frac{\text{hits}}{\text{hits} + \text{misses}} - \frac{\text{false alarms}}{\text{false alarms} + \text{correct negatives}}$$

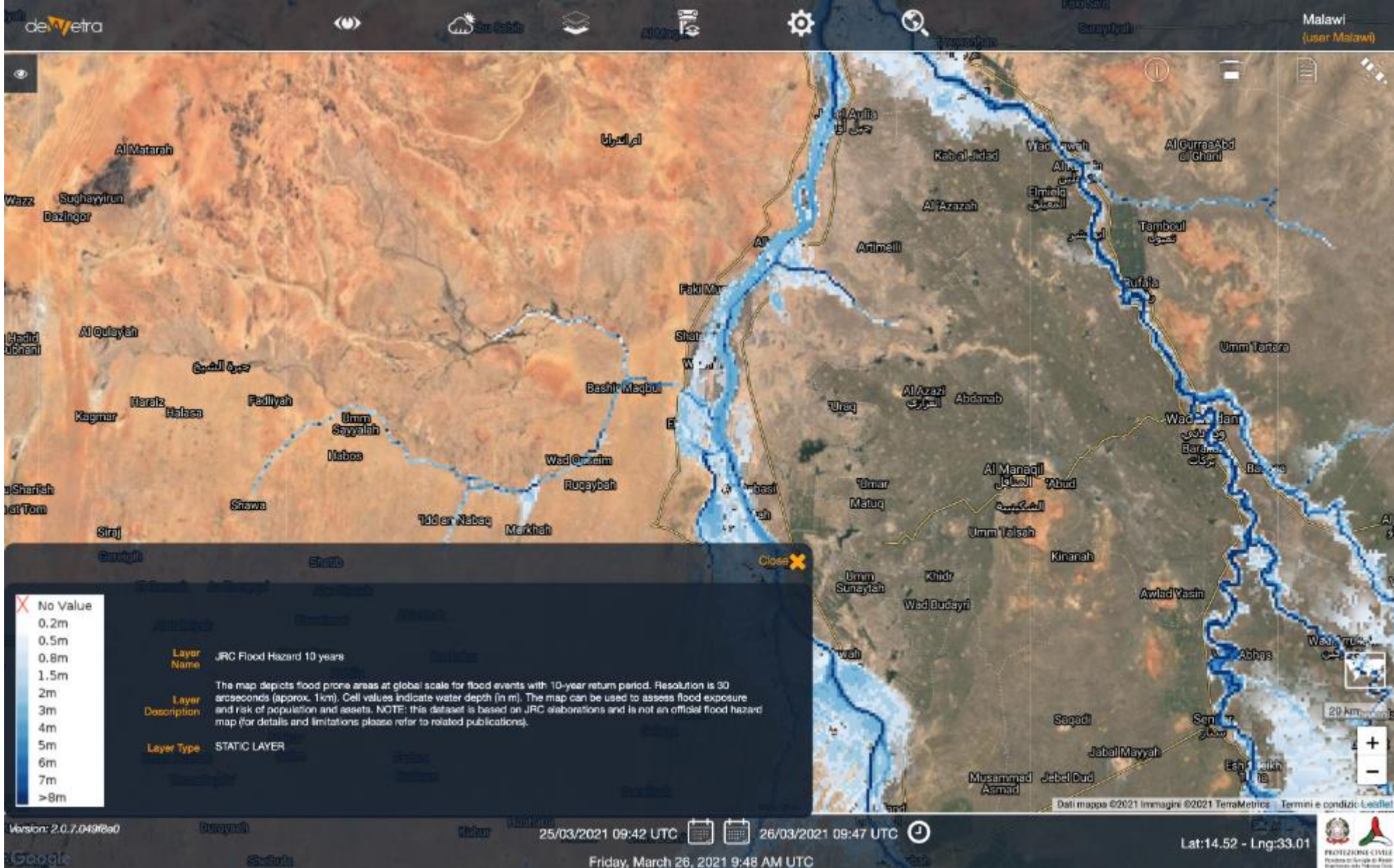


# Flood Hazard Modeling Limitations

While the JRC inundation maps and future hydrological projections are considered as the most suitable available products to use in the context of this project, a number of caveats and limitations of the proposed approach must be clarified:

- The proposed approach focuses on impacts due to **riverine flooding** in river sections with **upstream area larger than 5,000 km<sup>2</sup>**
- Impacts from **flash floods, pluvial floods, coastal floods, and man-made floods** (e.g., dam-breaks) are not considered

# Flood Hazard Modeling outputs



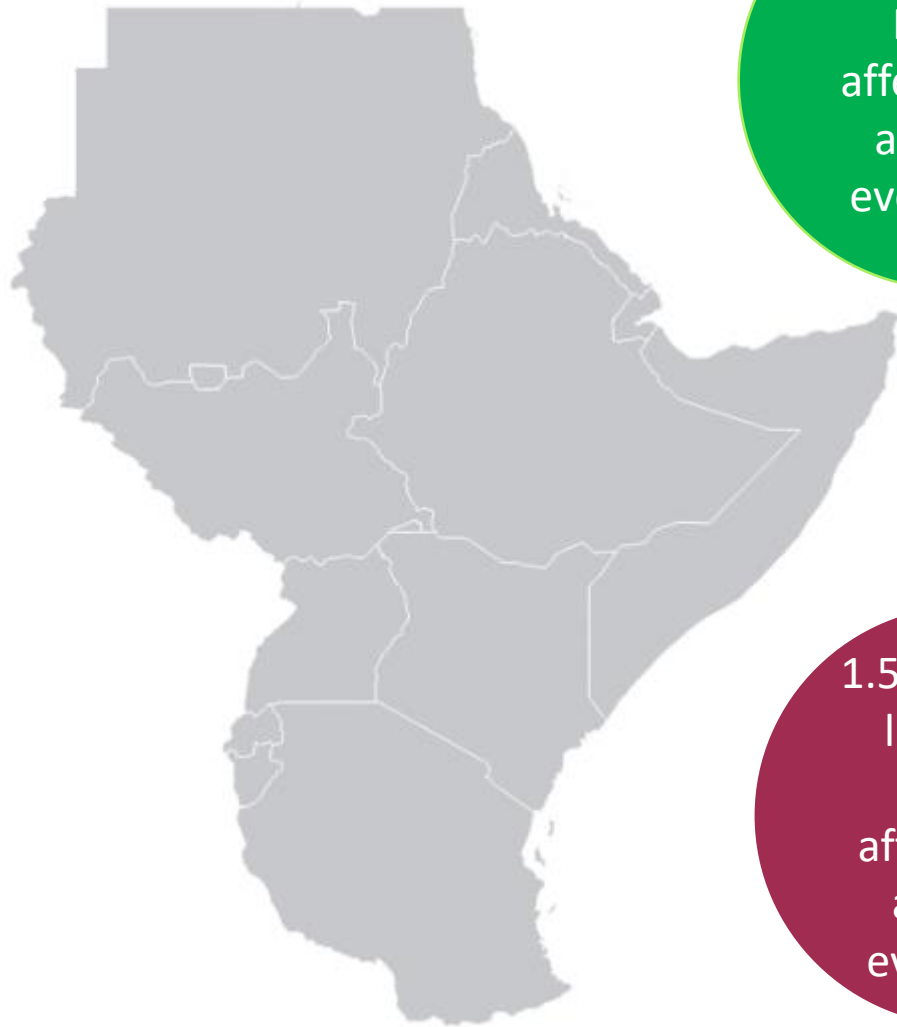


# Flood Risk Modeling - Indicators

HOMOGENEOUS  
INFORMATION ACROSS  
THE GHoA REGION

RISK INDICATORS	INPUT DATA
People Affected	Population Distribution layer
People Displaced	Information of displaced people during past flood events
GDP Affected	GDP Distribution layer
Affected Cropland	Cultivated Areas layer
Affected Livestock	Livestock distribution layer
Affected grazing land	Grazing land layer
Km of roads affected	Roads' network shapefile

# Flood Risk Modeling – what are the results?



1500 Km of  
Roads  
affected on  
average  
every year

1.5 billion \$  
of GDP  
potentially  
affected on  
average  
every year

600000  
hectares of  
crop land  
affected on  
average  
every year

1.3 million  
people  
potentially  
displaced on  
average  
every year

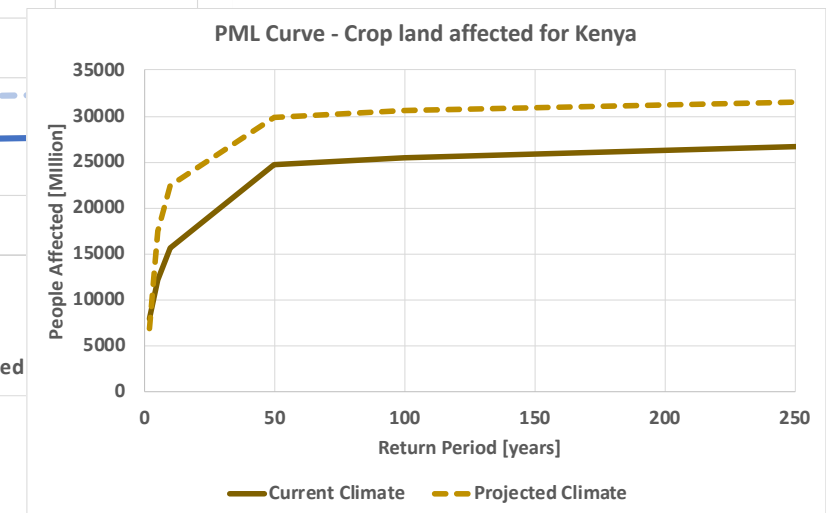
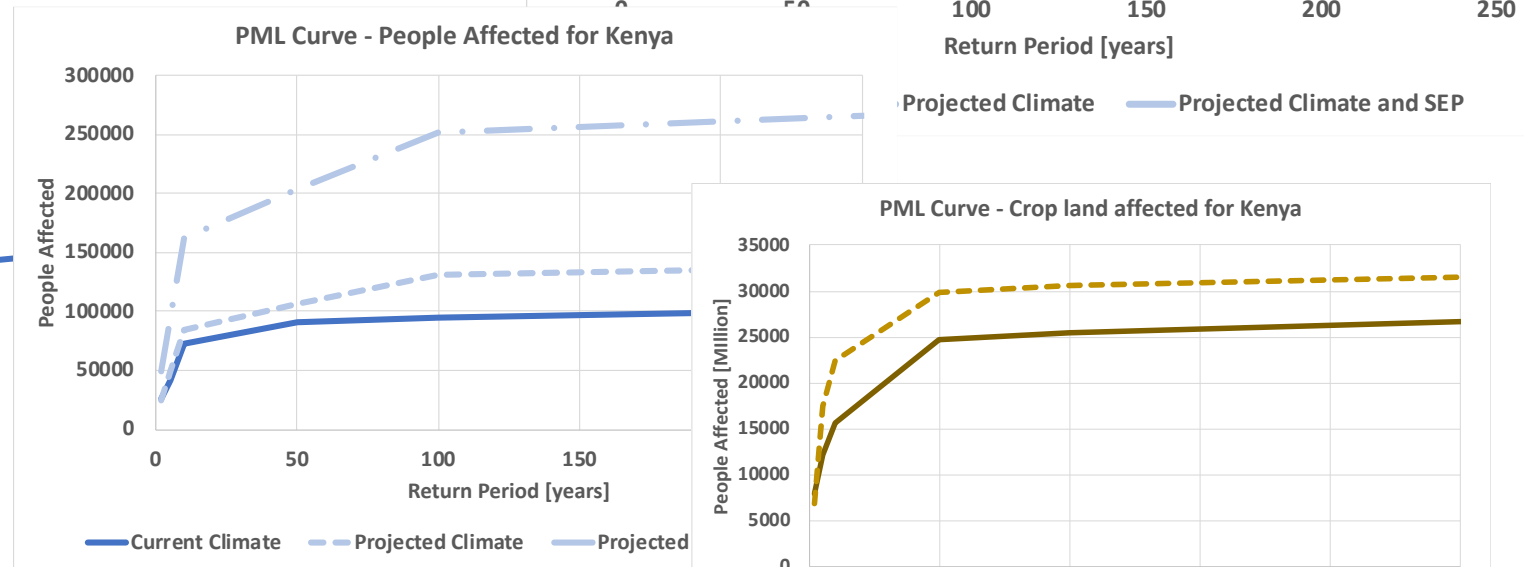
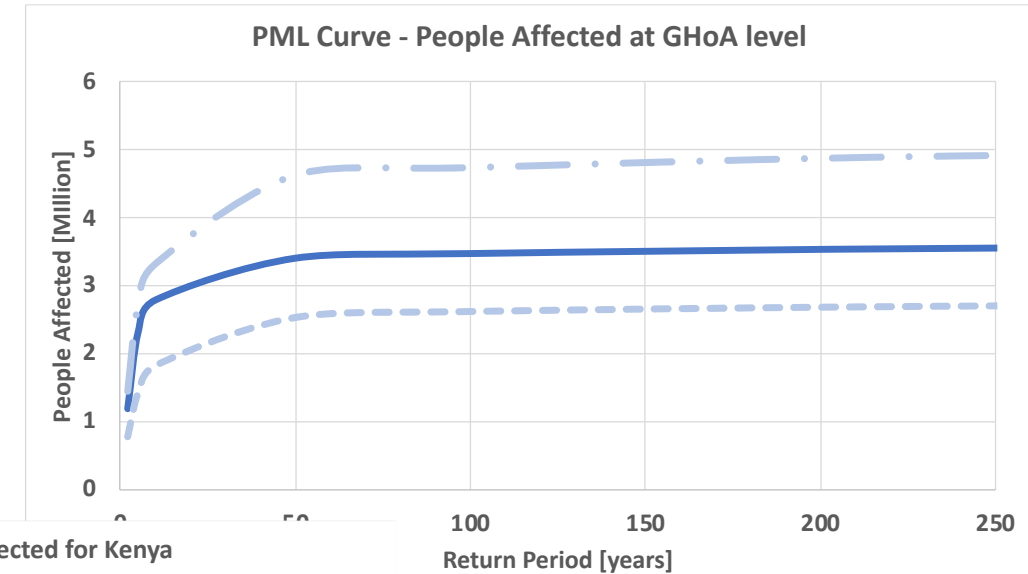
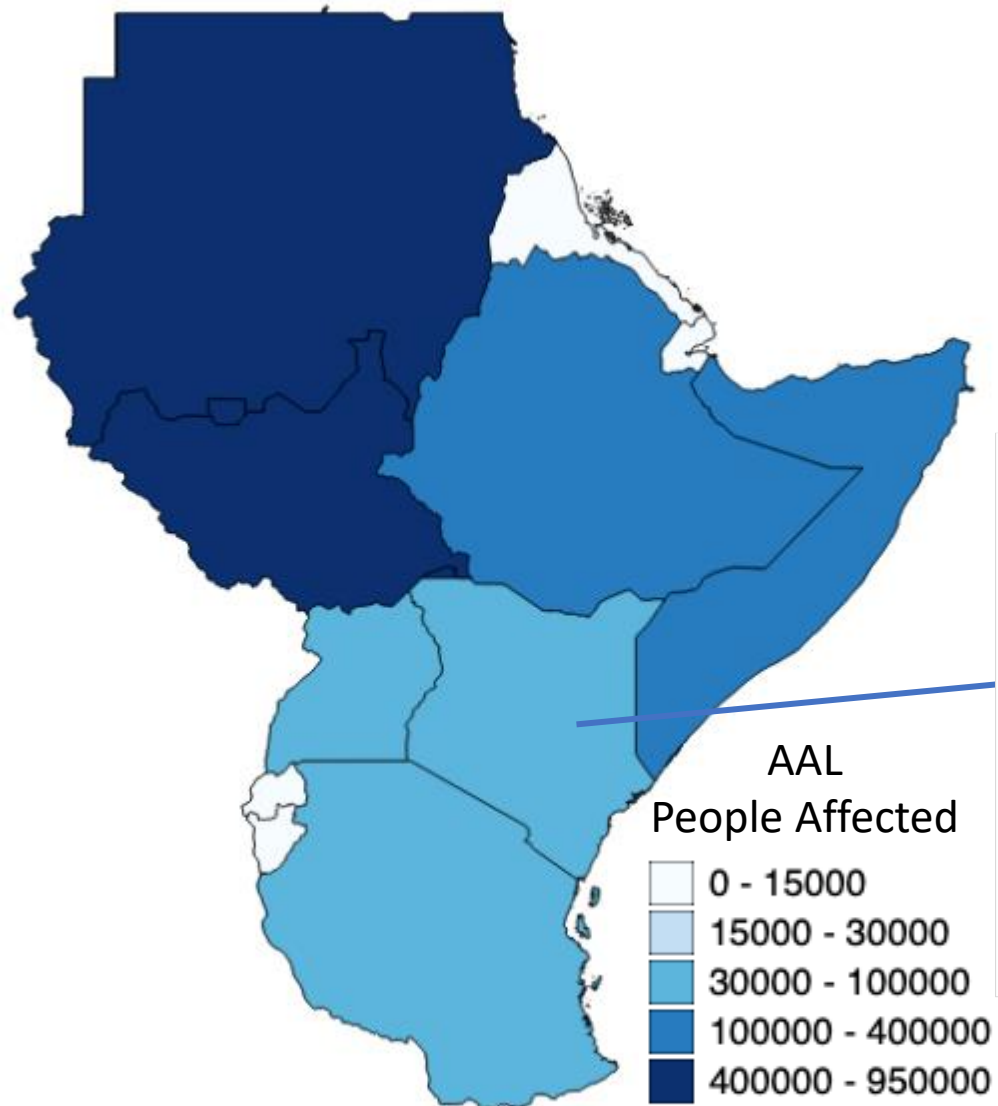
1.5 million of  
livestock  
units  
affected on  
average  
every year

2 million  
people  
affected on  
average  
every year

1 million of  
hectares of  
grazing land  
affected on  
average  
every year

# Flood Risk Modeling – what are the results?

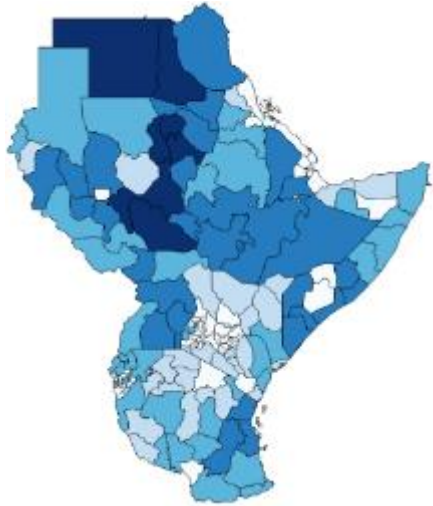
Current Climate Conditions



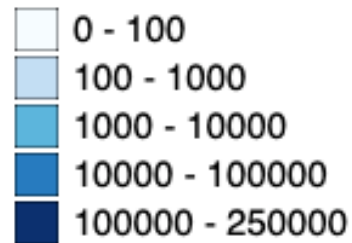


# Flood Risk Modeling – what are the results?

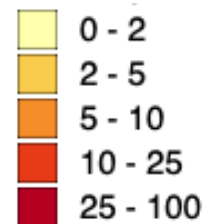
Current Climate Conditions



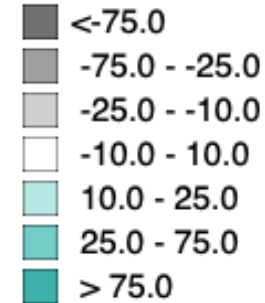
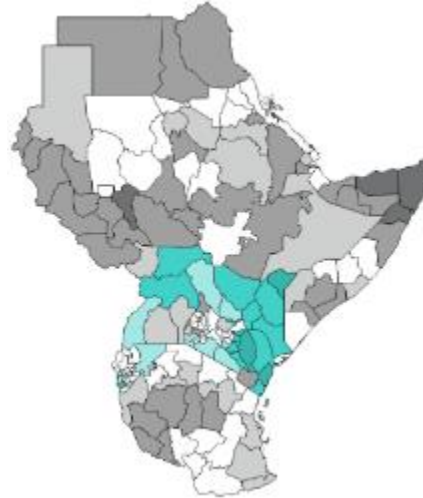
Population Affected



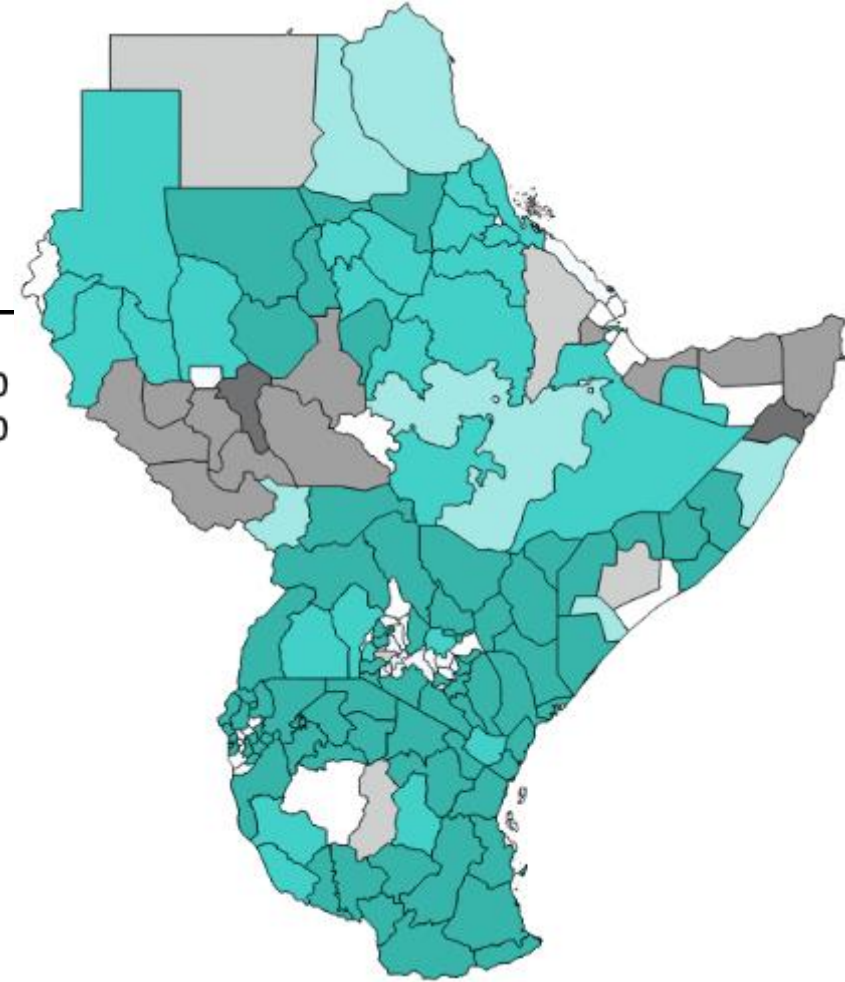
Population Affected/Total Population at Admin1 level [%]



Anomaly in Projected Climate Conditions

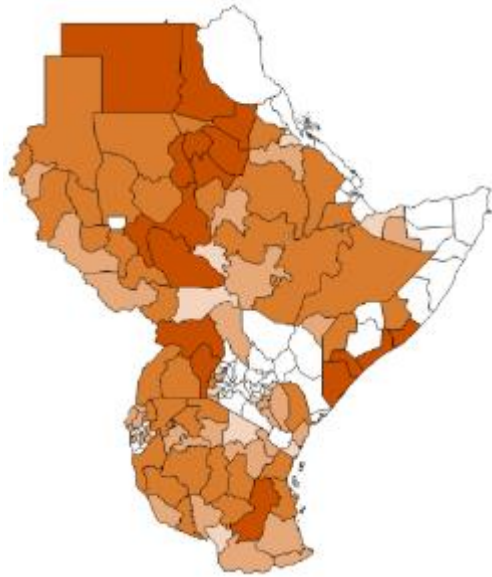


Anomaly in Projected Climate Conditions & SEP

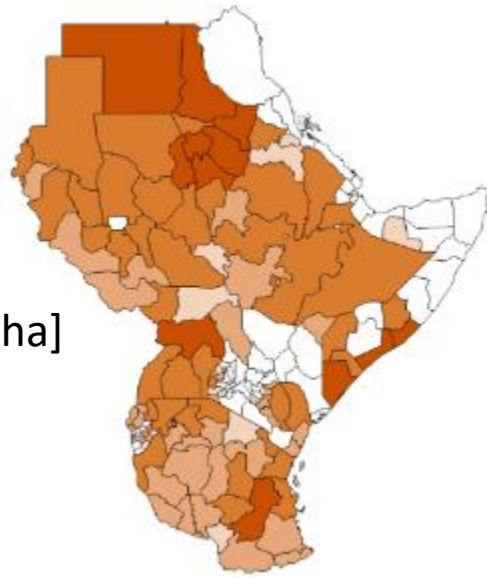


# Flood Risk Modeling – what are the results?

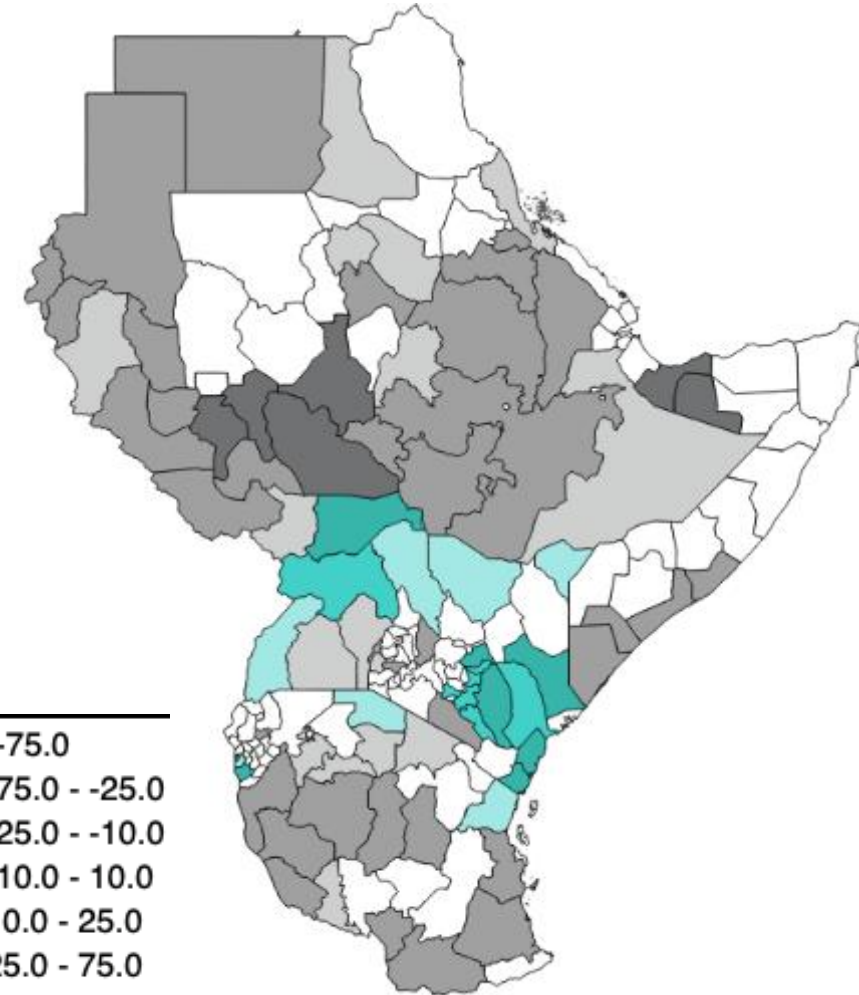
Current Climate Conditions



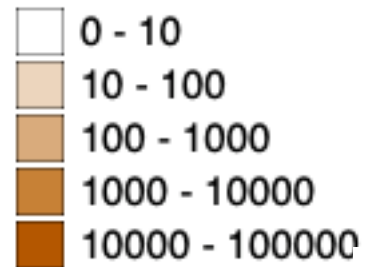
Projected Climate Conditions



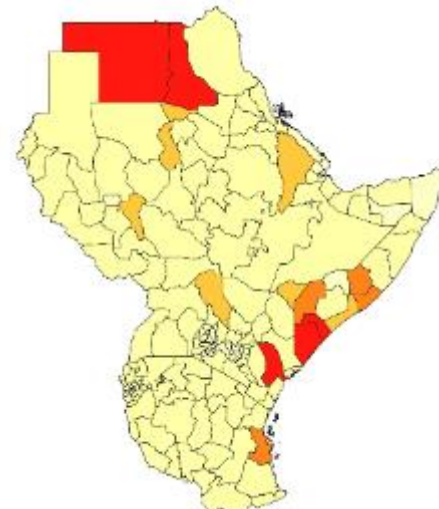
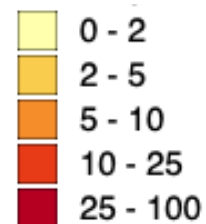
Anomaly in Projected Climate Conditions



Crop land Affected [ha]



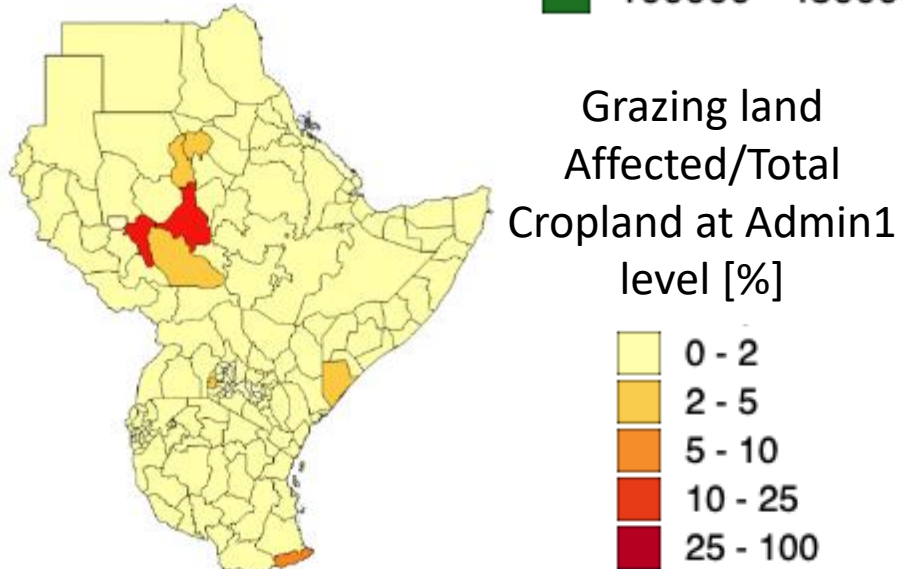
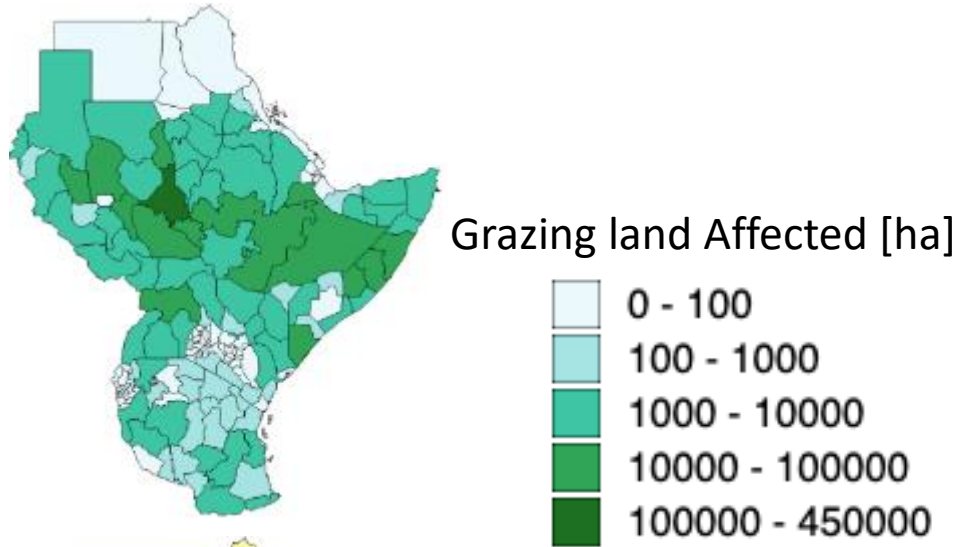
Cropland Affected/Total Cropland at Admin1 level [%]



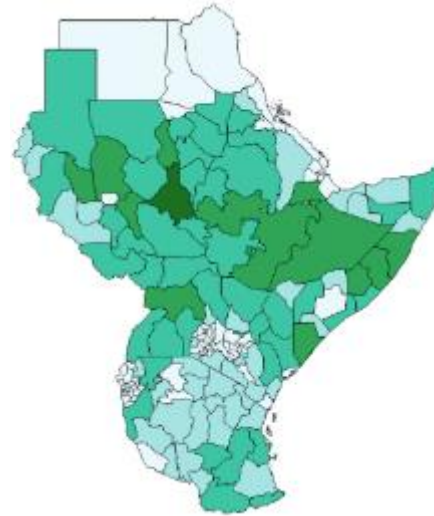


# Flood Risk Modeling – what are the results?

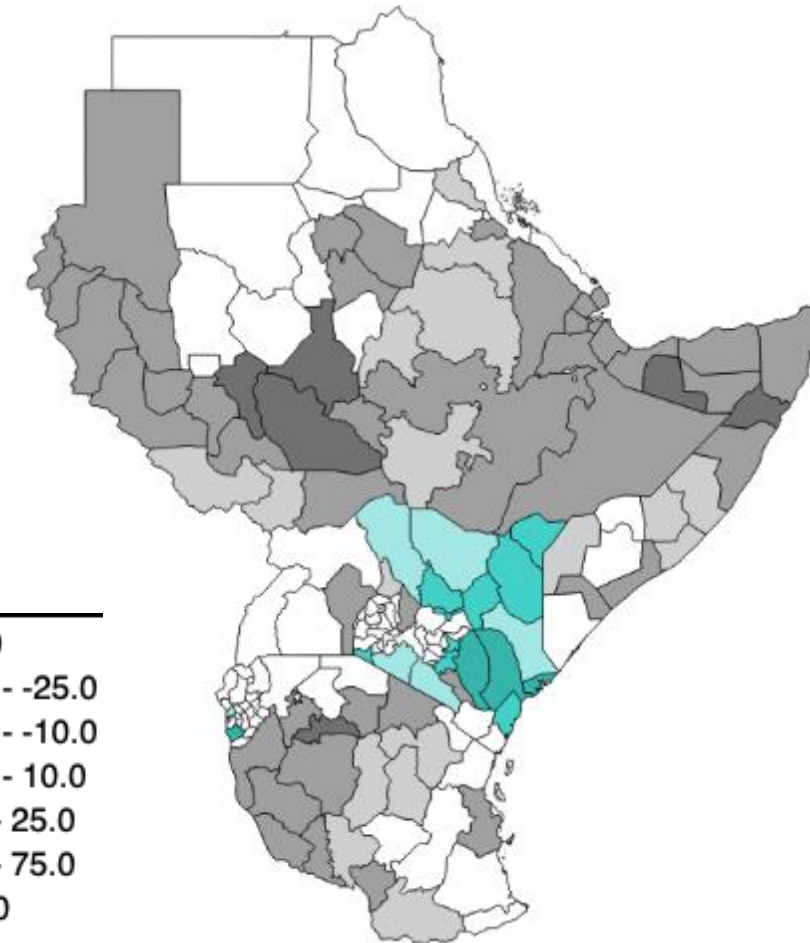
Current Climate Conditions



Projected Climate Conditions



Anomaly in Projected Climate Conditions





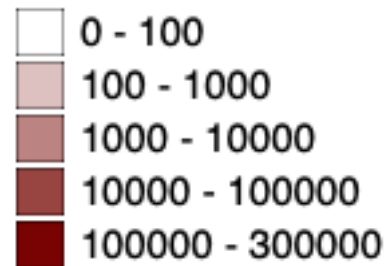
# Flood Risk Modeling – what are the results?

Current Climate Conditions

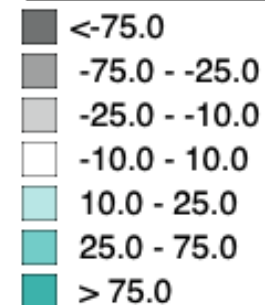
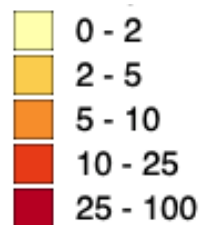
Projected Climate Conditions

Anomaly in Projected Climate  
Conditions

Livestock Affected

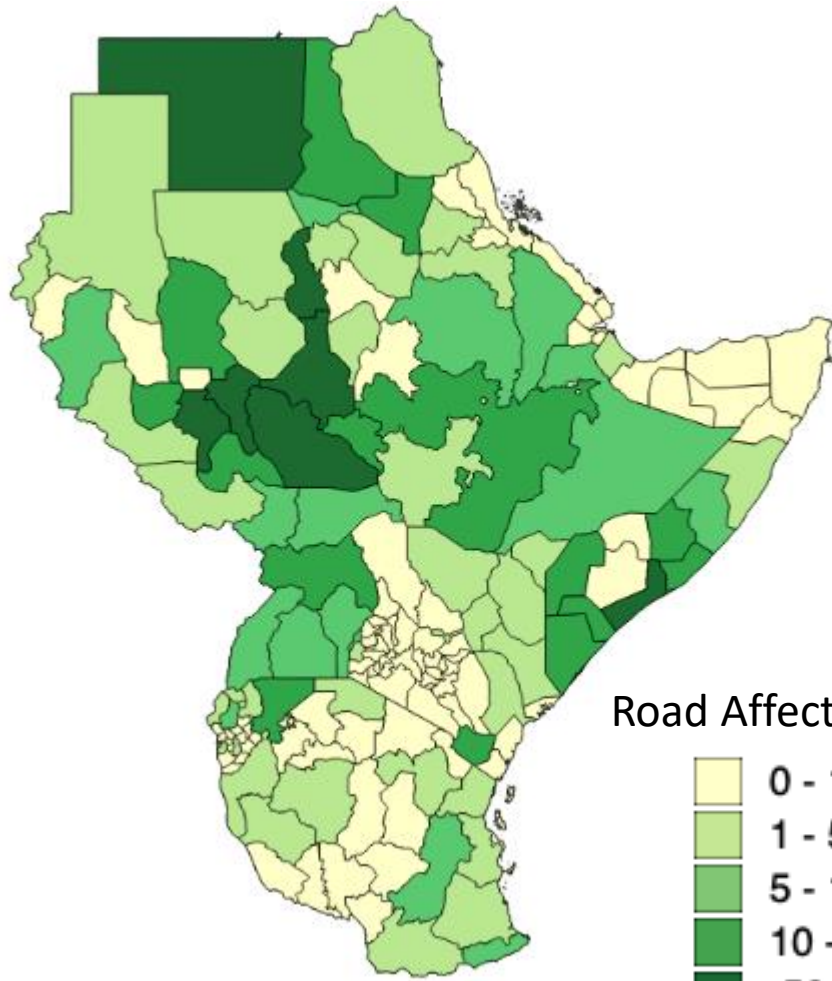


Livestock  
Affected/Total  
livestock at  
Admin1 level  
[%]

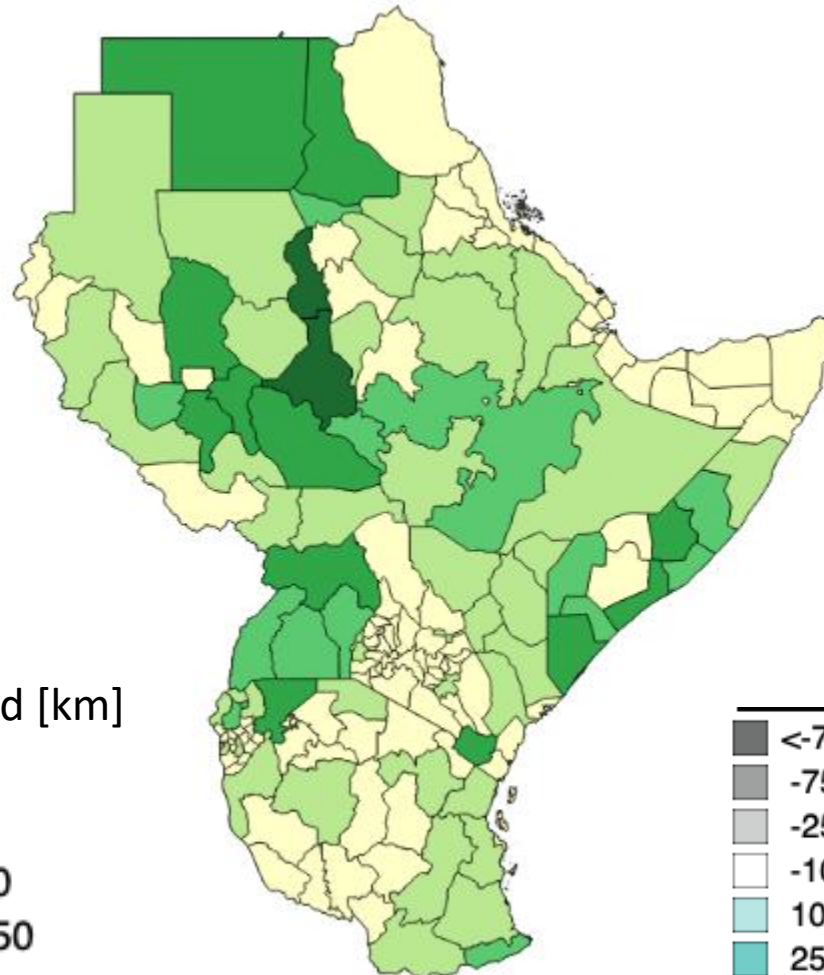


# Flood Risk Modeling – what are the results?

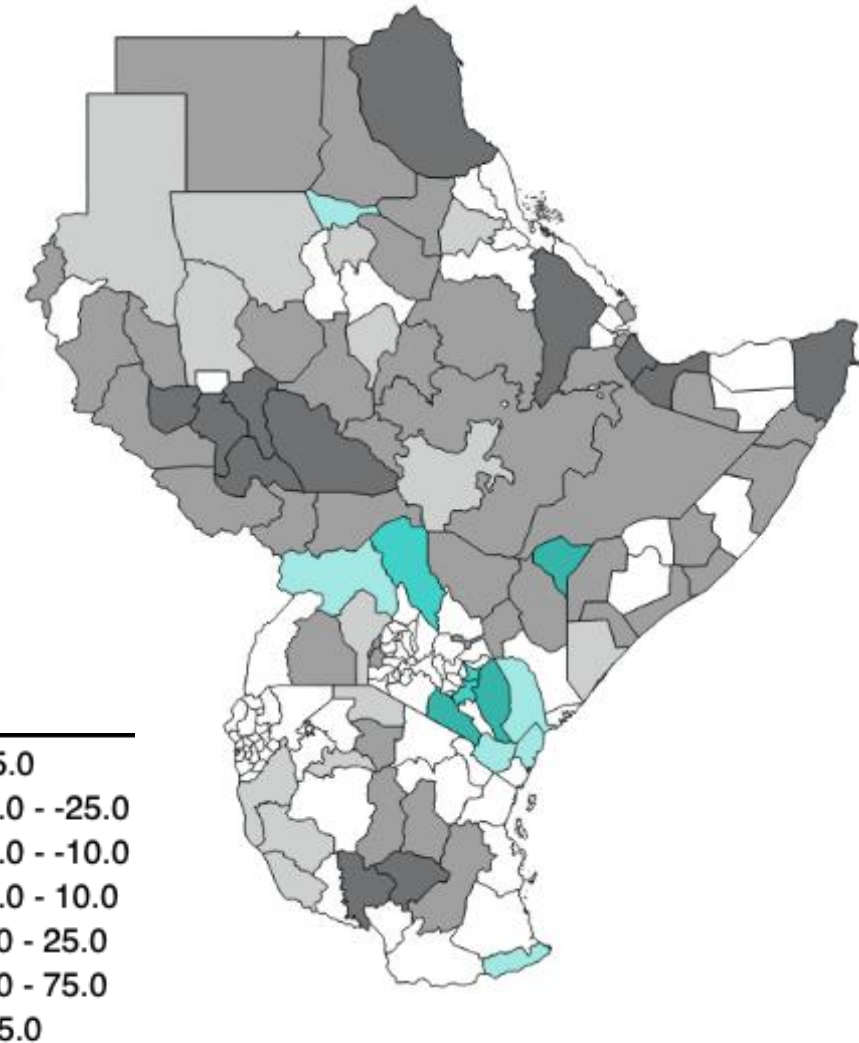
Current Climate Conditions



Projected Climate Conditions



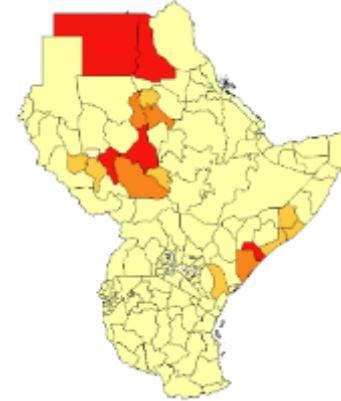
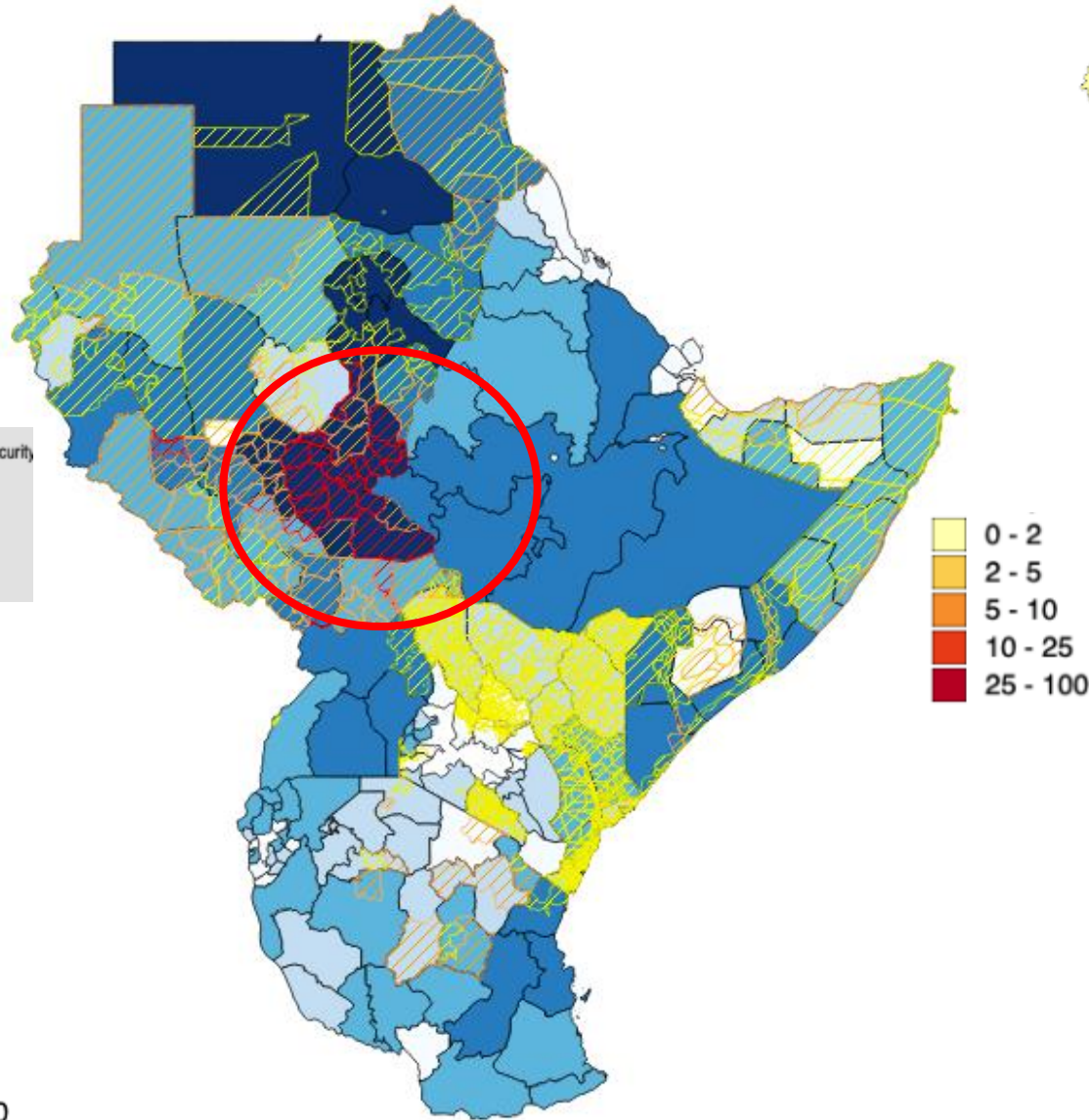
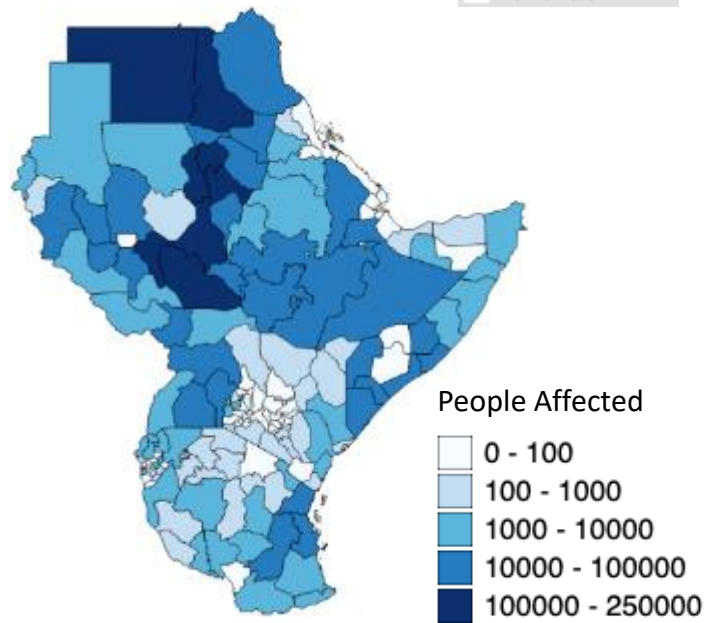
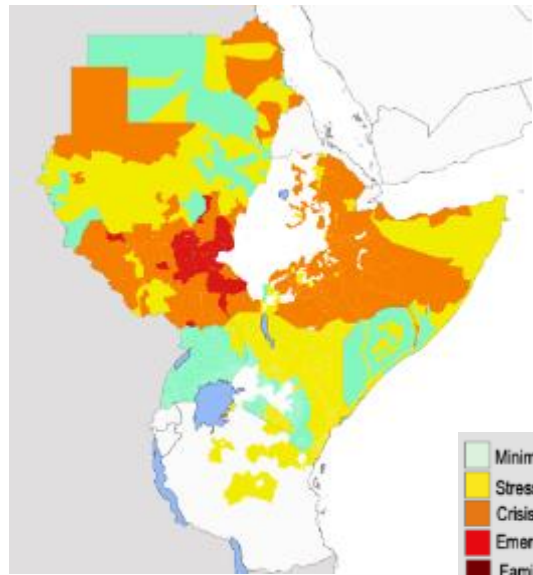
Anomaly in Projected Climate Conditions



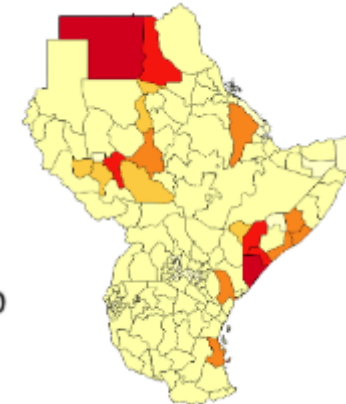


# Use of Risk Information for Food Security

IPC Phases APRIL 2020



Population Affected/Total  
Population at Admin1  
level [%]



Cropland Affected/Total  
Cropland at Admin1 level  
[%]



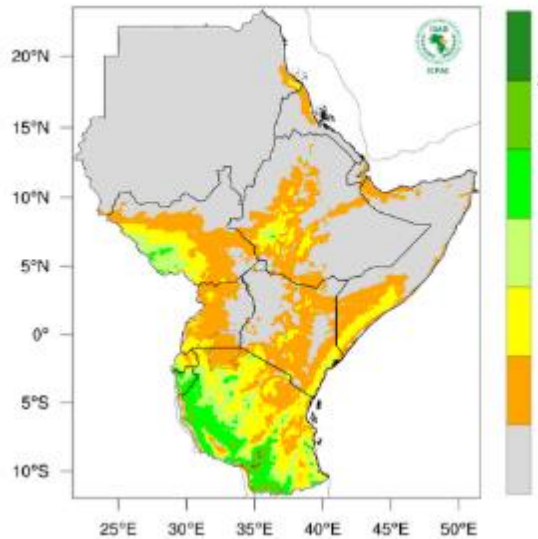
Livestock Affected/Total  
livestock at Admin1  
level [%]



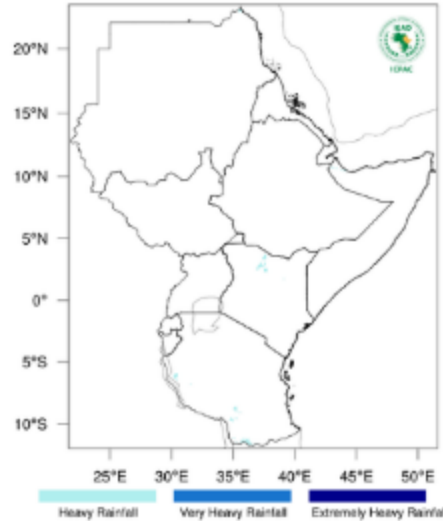
# Use of Risk Information for Early Warning and Early Action

## Hazard section

Total Rainfall (mm) for 09 - 16 Mar 2021



Exceptional Rainfall for 09 - 16 Mar 2021



## Hazard section

- Rainfall forecast
- Temperature forecast
- Streamflow Forecast

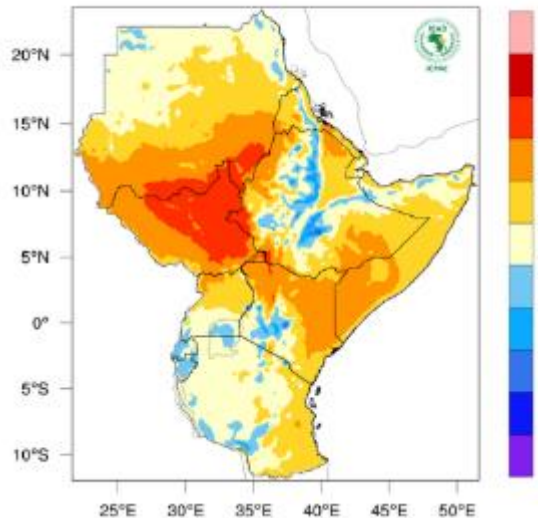
(Figures & Text)

## Impact/Risk section

- Potential people affected
- Potential GDP affected
- ...

(Figures & Text)

Mean Temperature (C) for 09 - 16 Mar 2021



## Flood related Food Security Section

- FS Index
- FS sub Indexes
- ...

( Figure (admin1 index representation) & Text)

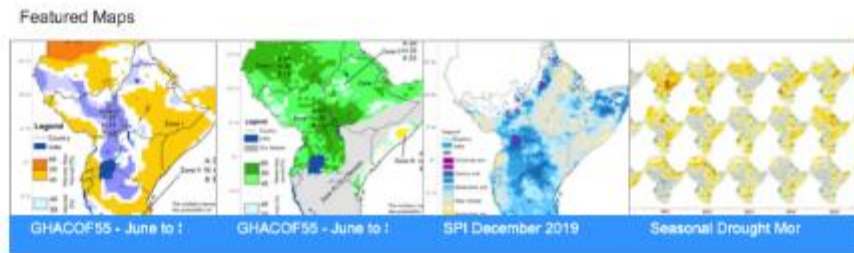
## Mitigation Actions

- Suggestions
- Report of actions put in place...

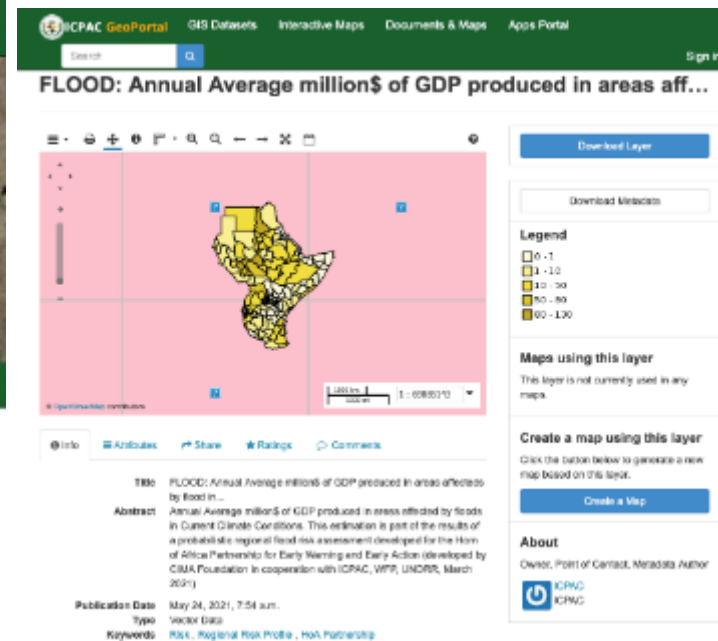
( Figure (Summarizing activities in the field) & Text)

# Where to get input data and results?

<http://geoportal.icpac.net>



## RISK METRICS



## EXPOSURE INFORMATION



## HAZARD INFORMATION



**Explore Data**

Click to search for geospatial data from our



**Explore Maps**

Data is available for browsing, aggregating and



**Upload Data**

GeoNode allows registered users to easily



## Horn of Africa Partnership for Early Warning and Early Action

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availability and use  
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THANK YOU!