



# Climate change predictions in Sub-Saharan Africa: impacts and adaptation

UNFCCC SBSTA 34  
Workshop on research  
Bonn, 2-3 June 2011

## CLIMAFRICA

Climate change predictions  
in Sub-Saharan Africa:  
impacts and  
adaptations

Prof Riccardo Valentini  
CMCC - ITALY



# CLIMAFRICA

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**European Commission – FP7**

**Funding : 3.5 M€**

**Duration : 48 months (1 Oct 2010 – 30 Sep 2014)**

**Partnership: 18 institutions (9 Europe+8 Africa) + FAO**

Ghana	Italy
Togo	Sweden
Sudan	France (2)
Ethiopia	Germany (2)
Congo	Netherlands (2)
Kenya	Spain
Malawi	
South Africa	





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- 2- Assess **climate impacts** in key sectors of SSA livelihood and economy, especially **water resources and agriculture**;
- 3- Evaluate the **vulnerability** of ecosystems and civil population to inter-annual variations and longer trends (10 years) in climate;
- 5- Develop a new concept of **medium term monitoring and forecasting** warning system (for food security, risk management, civil protection)
- 6- Analyse the economic impacts of climate change on agriculture and water resources in SSA and the cost-effectiveness of potential adaptation measures.

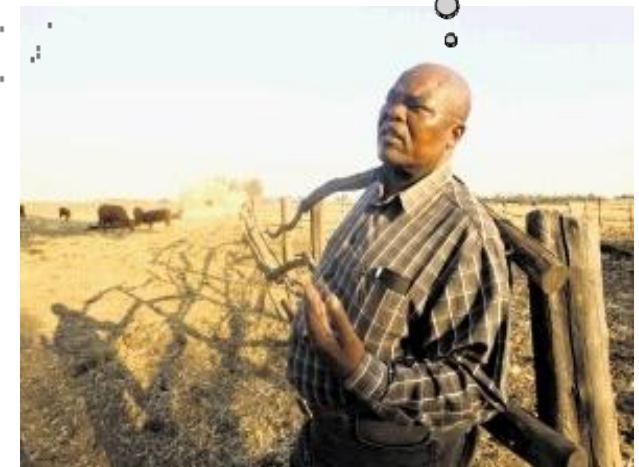
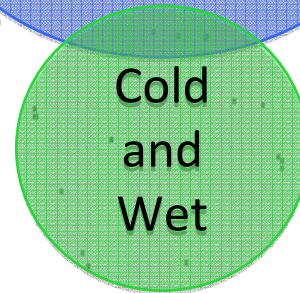
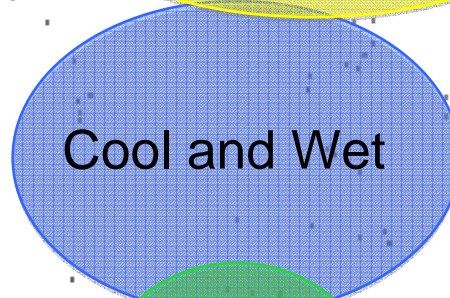
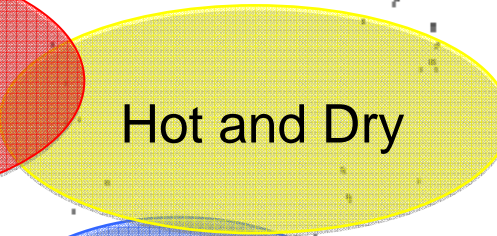
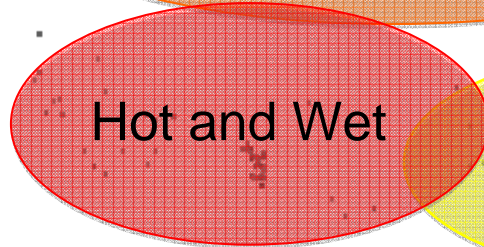
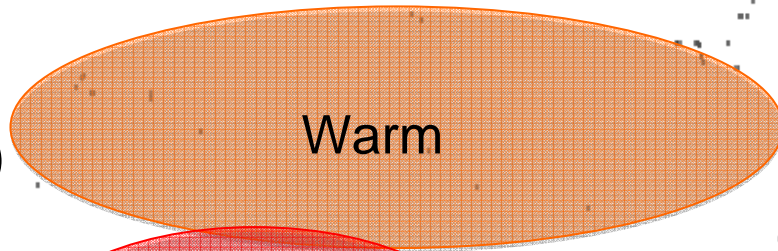
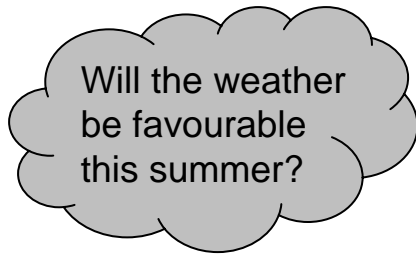




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## WP2





# Climate change predictions in Sub-Saharan Africa: impacts and adaptation

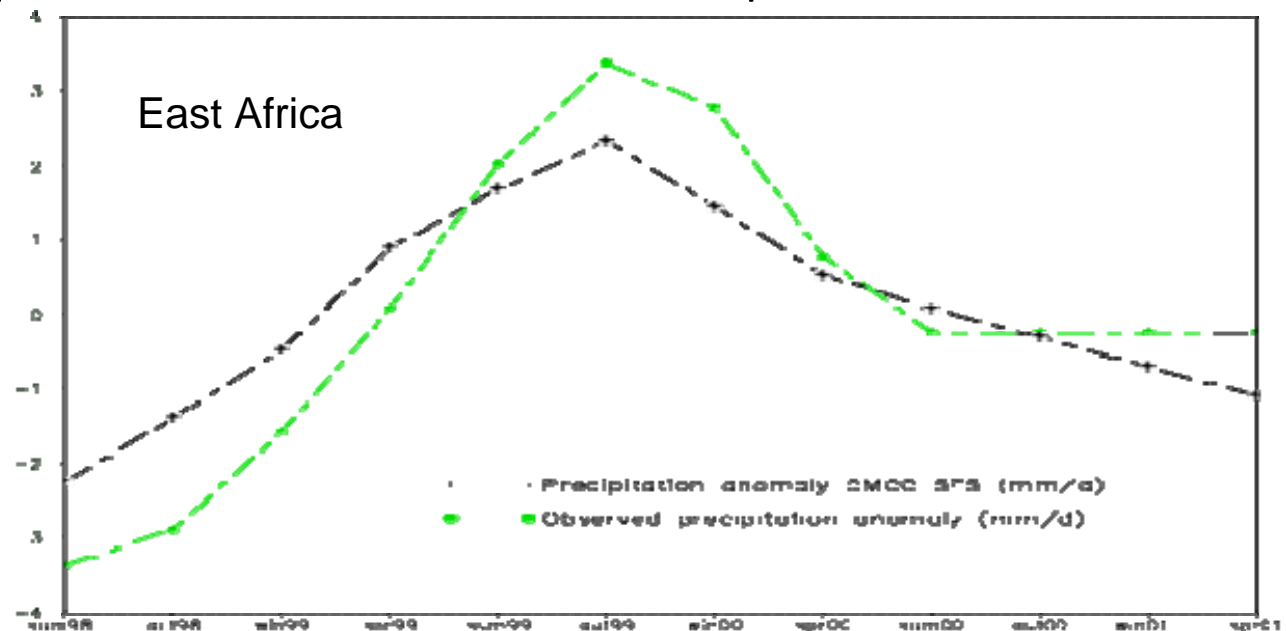
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## WP2 - CMCC improved seasonal forecast and decadal prediction system

- Seasonal retrospective forecast for 22 years (1989-2010). Four six-month-forecasts per year, start dates 1<sup>st</sup> Feb, 1<sup>st</sup> May, 1<sup>st</sup> Aug, 1<sup>st</sup> Nov.
- Decadal predictions. Twenty-year-simulations, start dates 1990-1995-2000-2005-2010, November 1<sup>st</sup>.
- Simulations are performed by means of a global climate model initialized with the best observational products of ocean, land and atmosphere.

### *Outputs provided:*

- surface temperature
- Precipitation
- heat fluxes
- winds
- etc.





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## WP2 - Observations and global model skill for Eastern Africa

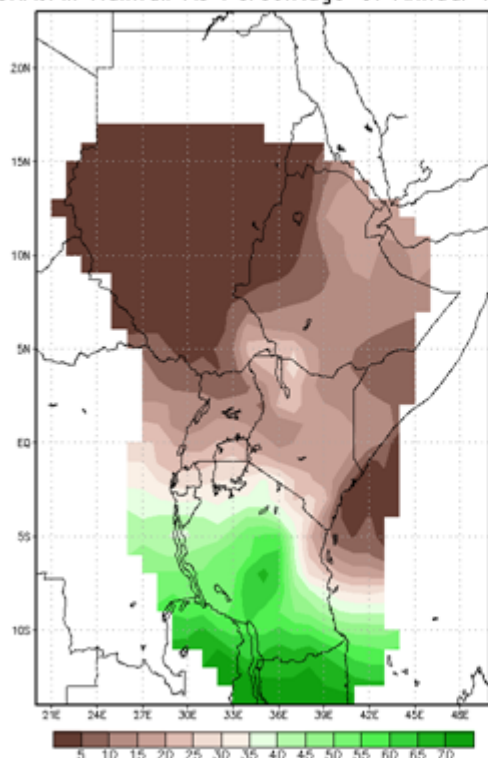
Rainfall is most important climate element to model and prediction in Sub-Saharan Africa (SSA) food security and water resources.

Studies on rainfall patterns are already ongoing in many areas of Africa.

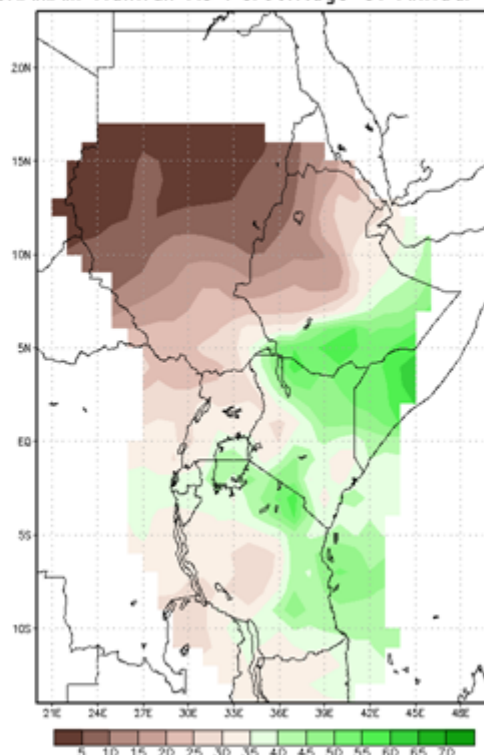


**Seasonal rainfall as percentage of annual total amounts for some seasons within Eastern Africa**  
(from ICPAC, Kenya).

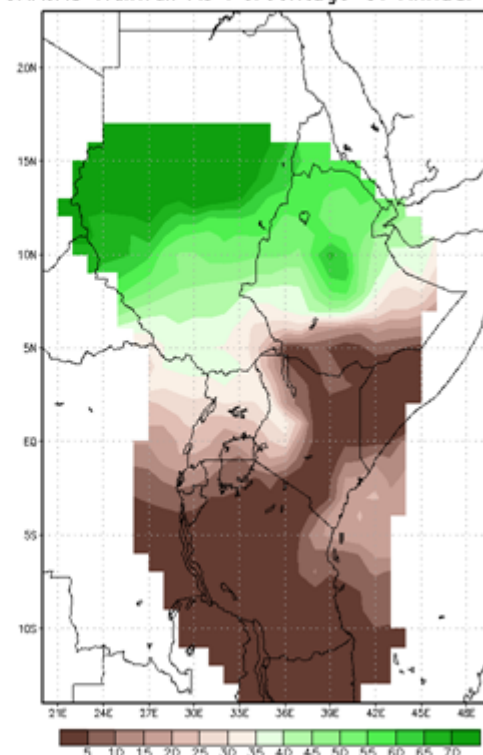
GHAJFM Rainfall As Percentage Of Annual Total



GHAMAM Rainfall As Percentage Of Annual Total



GHAJAS Rainfall As Percentage Of Annual Total





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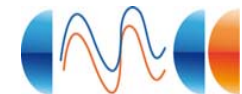
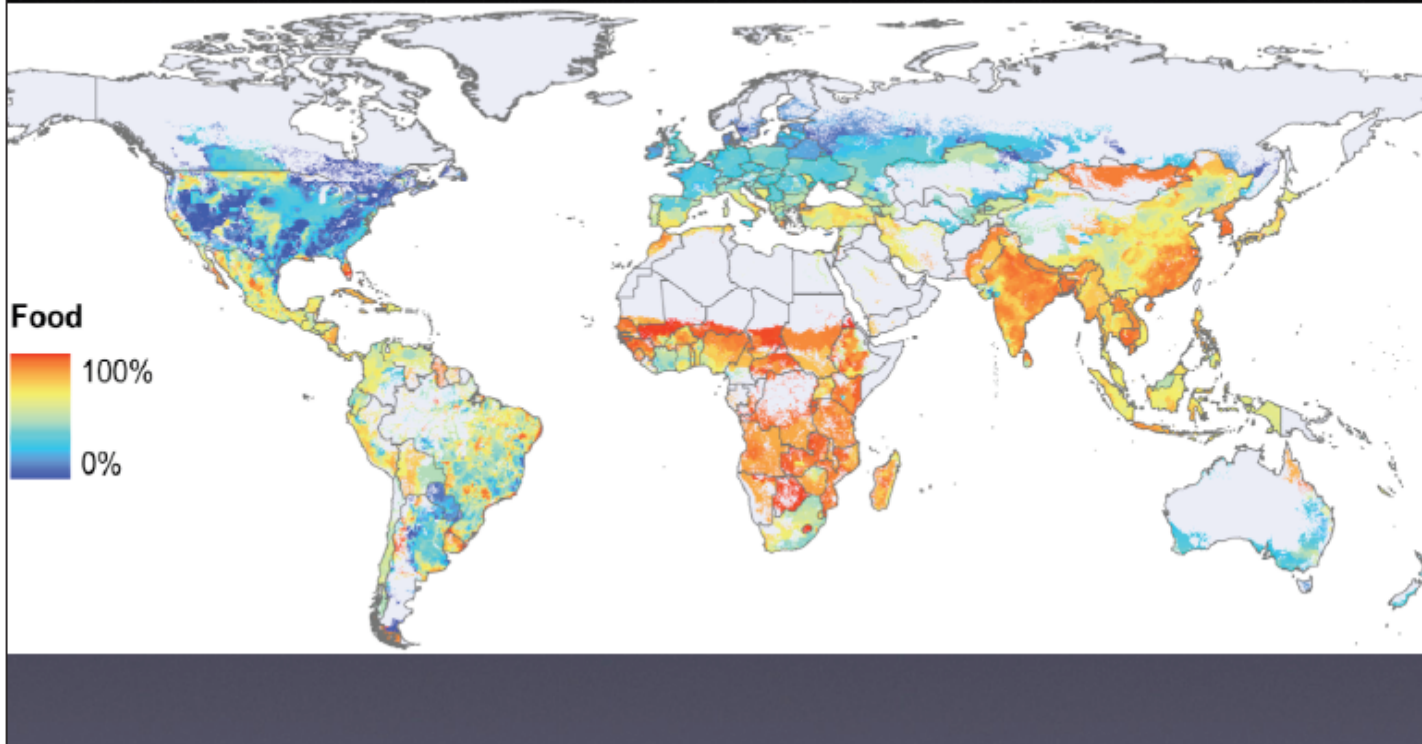
3- Evaluate the **vulnerability** of ecosystems and civil population to inter-annual variations and longer trends (10 years) in climate;

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# Where the food production matters

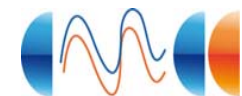
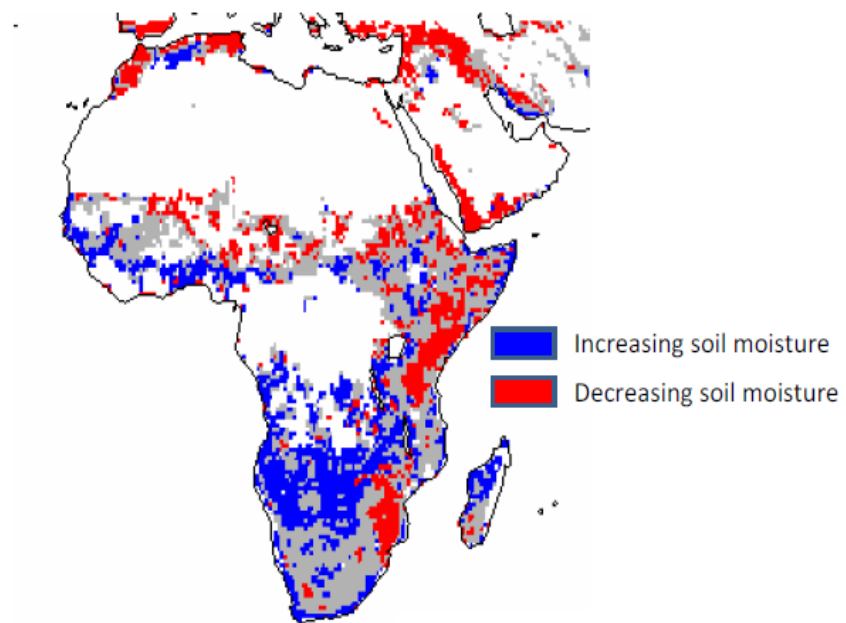
## Food (Direct) from Crops





# Observed changes in soil moisture

Soil moisture trends derived from radar remote sensing  
(TRMM), 1998-2009

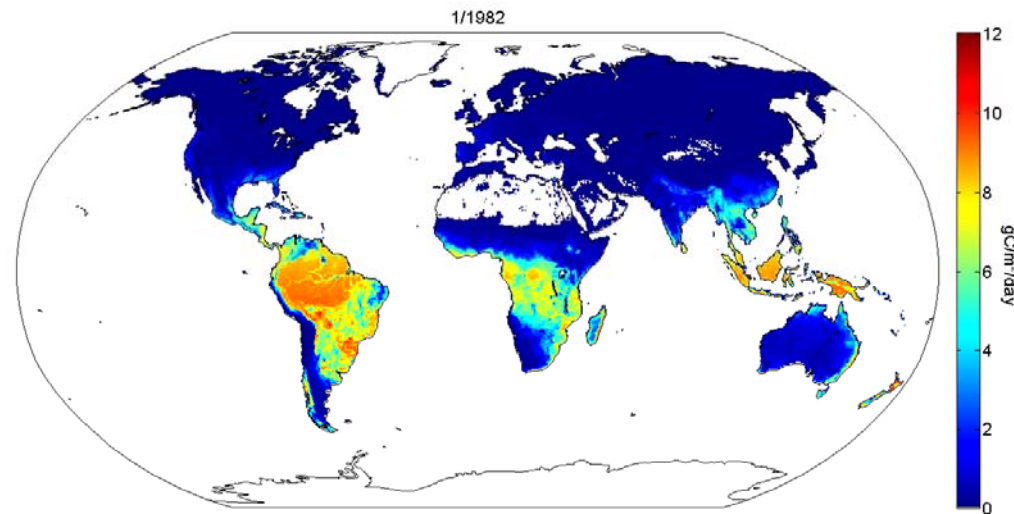




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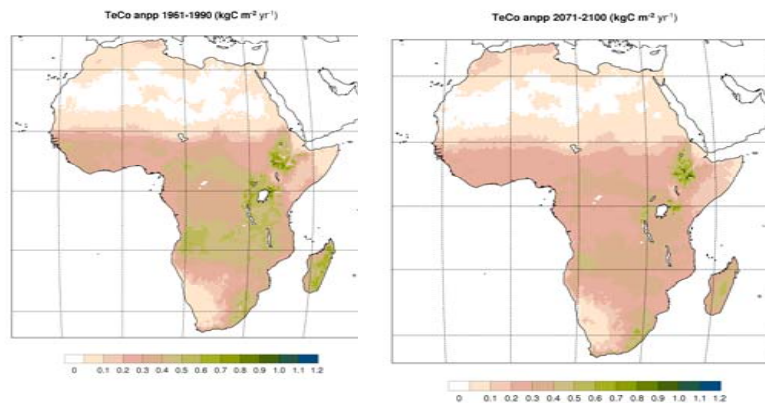
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## WP1 - Africa is a hotspot of interannual variability of the global land carbon cycle



*Jung et al.  
In press*

maize





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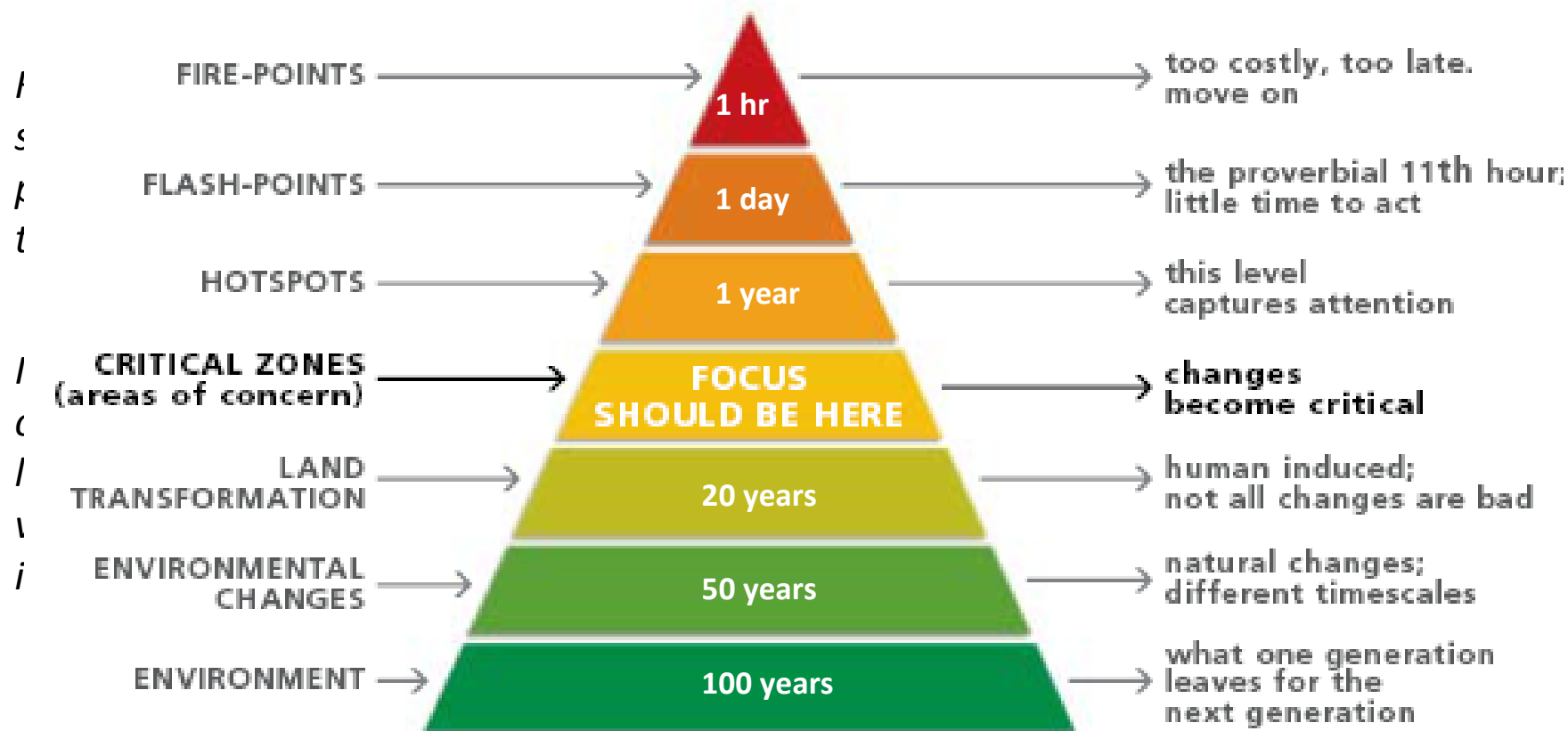


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## WP4 - Medium-term of Forecasting food and water vulnerabilities and adaptation measures

Establish a monitoring and forecasting warning system (based on ClimAfrica data) that produces prospective analyses about food insecurity and water crisis for at least the next 10 years.







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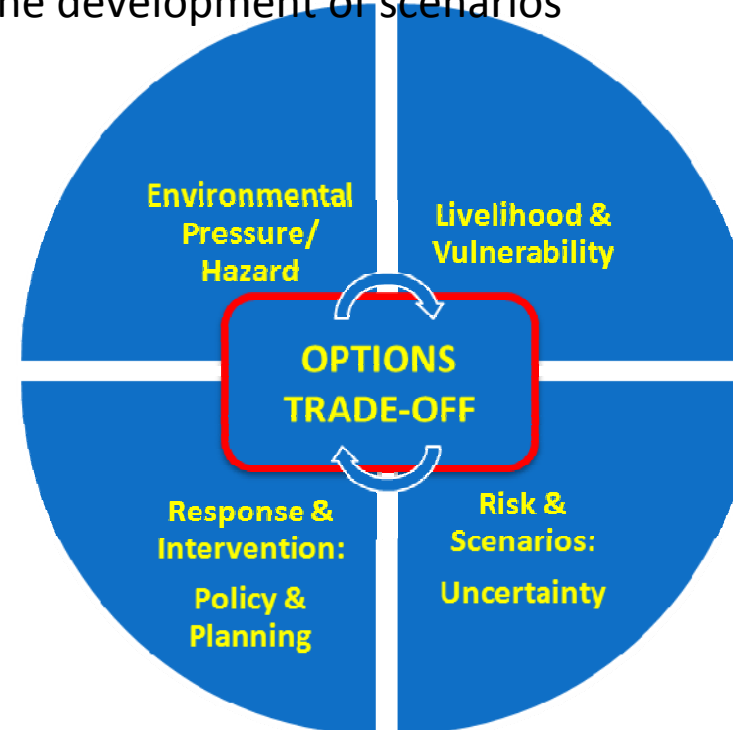
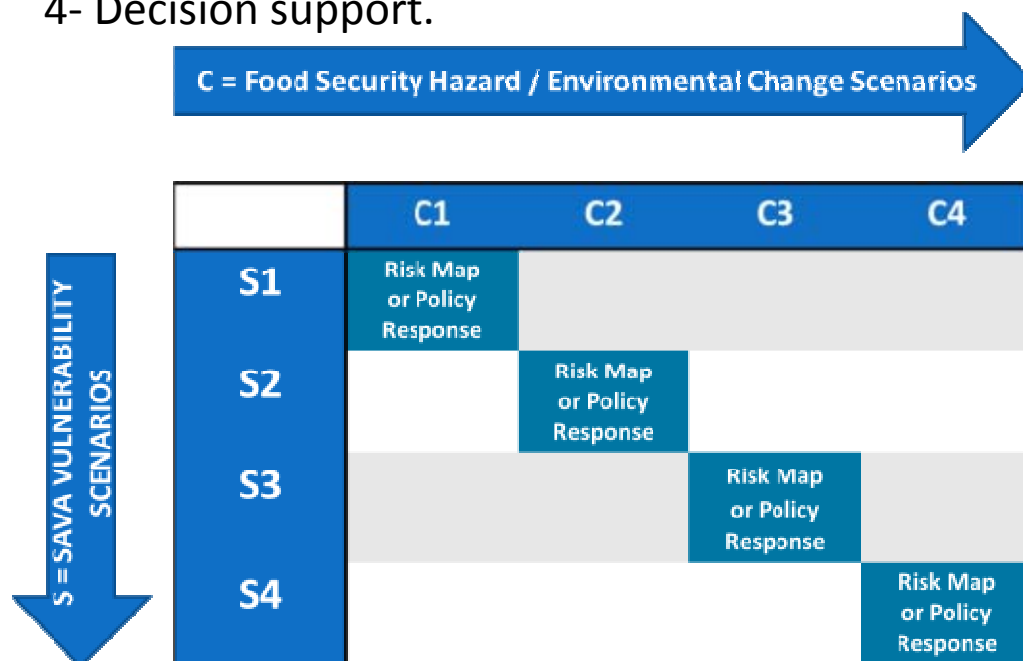
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## WP4 - Natural Resources and Food Security – Systems at Risk (NaF-SAR)

Integrate and harmonize ClimAfrica data with existing data and information to be used as inputs to develop improved vulnerability assessment and optimal adaptation options. A Risk framework is being used to provide a strategic context for the data and tools generated. The framework consists of 4 key stages:

- 1- Physiographic data related to hazard or environmental pressure;
- 2- Socio-economic data (people)
- 3- Risk assessment hot spotting based on (1) & (2) and the development of scenarios
- 4- Decision support.





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## Case Studies

The countries identified by a data sets, as it economic con

- Global Ecolo
- Major farmir
- GLC-2000 Ba
- cover
- Prevalence c
- malnutrition,
- Total renewa
- scarcity

The analysis h

- 1) Burkina Fa
- 7) Tanzania, 8



- Burkina Faso
- Ghana
- Burkina Faso
- Ghana
- Togo
- Congo
- Sudan
- Ethiopia
- Kenya
- Tanzania
- Malawi
- Congo
- South Africa



# CLIMAFRICA WEB

Provisional:

[http://dwms.fao.org/climafrika/index\\_en.asp](http://dwms.fao.org/climafrika/index_en.asp)

Final :

[www.climafrika.net](http://www.climafrika.net)

A photograph of a lioness standing in a savanna landscape. The lioness is positioned on the right side of the frame, looking towards the left. The background consists of dense green trees and bushes. The foreground is filled with tall, dry grass. A speech bubble with a black border and a white background is overlaid on the left side of the image, containing the text "Thanks !!!".

**Thanks !!!**