

African Regional Workshop on Adaptation

Accra, Ghana

21-23 September 2006

# Adaptation to Climate Variability and Change in Agriculture

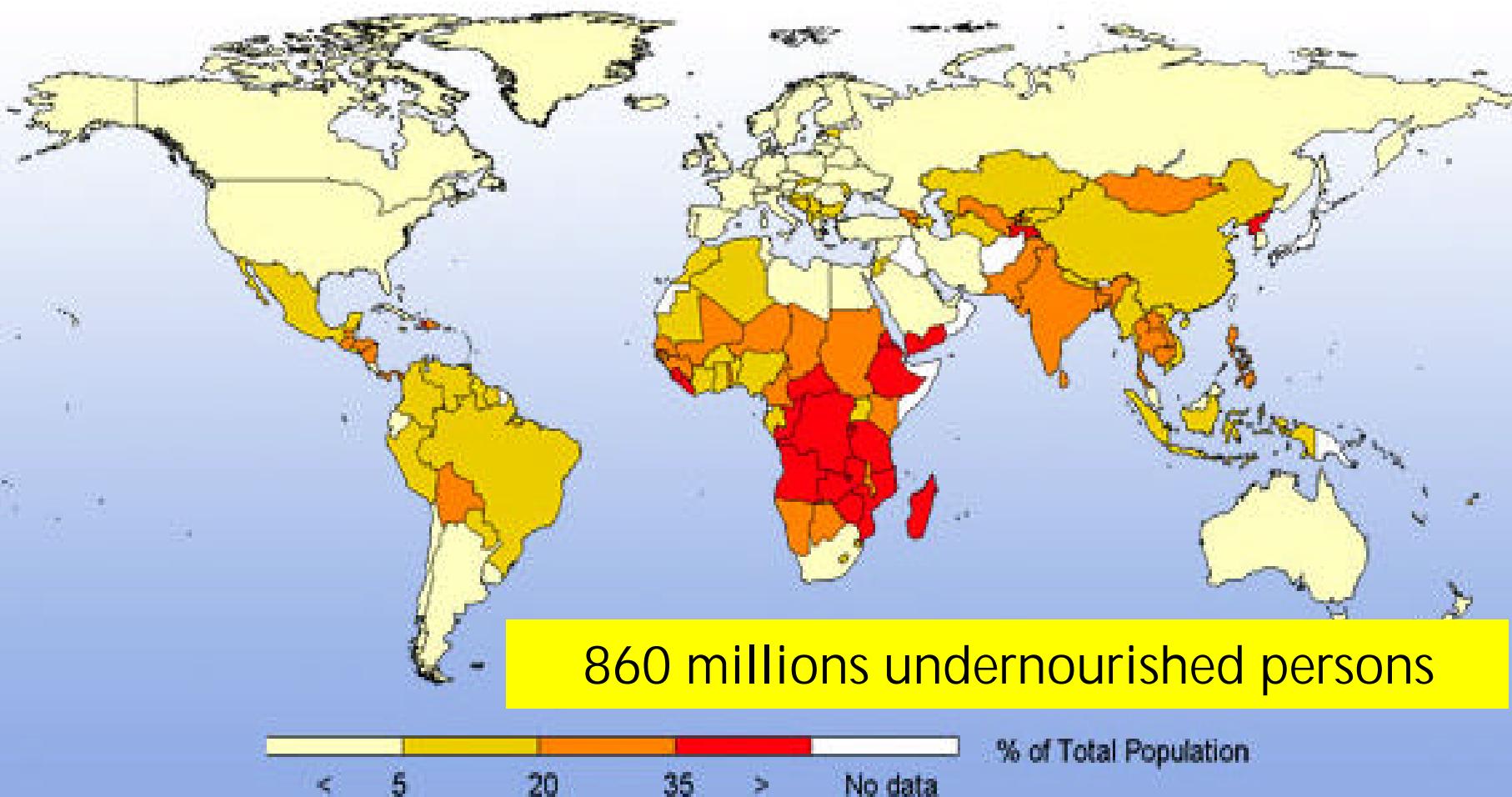
FAO Methods and Tools to Identify  
Options and Develop Responses

Food and Agriculture Organization  
of the United Nations

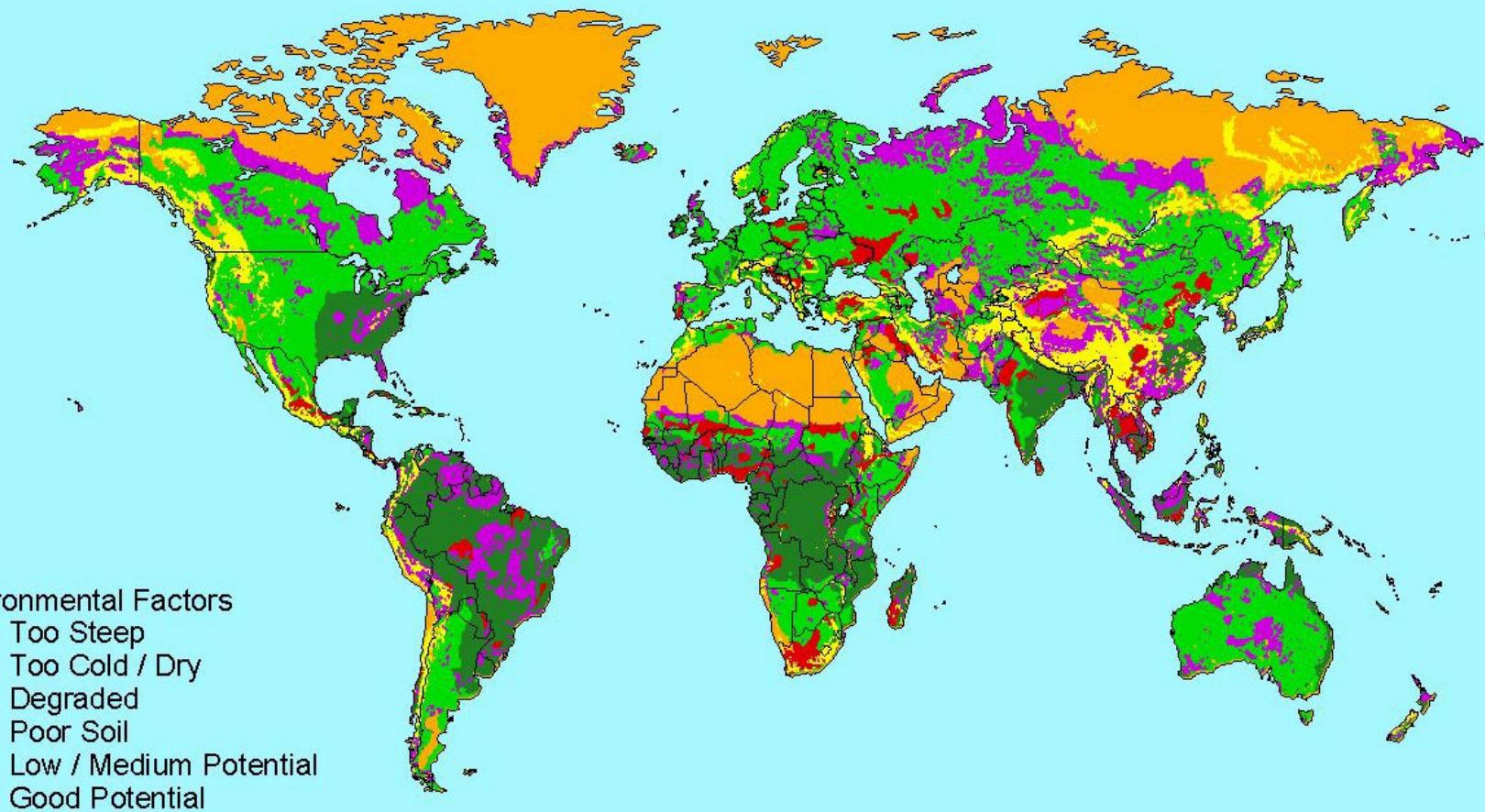
# **Overview**

- World Food Insecurity
- Mandate of FAO
- Role of FAO
- Work of FAO on climate change
- Adaptation to climate variability and change

# Hunger map



# Major Global Environmental Potential and Constraints for Agricultural Production



FAO, 1999. The state of food insecurity in the world.

# **Mandate of FAO**

**Helping to build a food-secure world  
for present and future generations  
over the next 15 years**



# **Role of FAO**

- Neutral forum
- Repository of data and information
- Custodian of methods and models
- Information and advice to Member countries
- Capacity building

# Climate Change Vulnerability in Africa



# Impacts of climate change



# Work of FAO on Climate Change

- Interdepartmental Working Group on Climate Change
- Programme Entity on “Climate Change Adaptation and Mitigation”
- Advice to Member countries
- Technical support to UNFCCC, IPCC



# Interdepartmental Working Group on Climate Change

A screenshot of a web browser window. The address bar shows the URL <http://www.fao.org/climate/>. The page content is the homepage of the FAO Climate Change section.

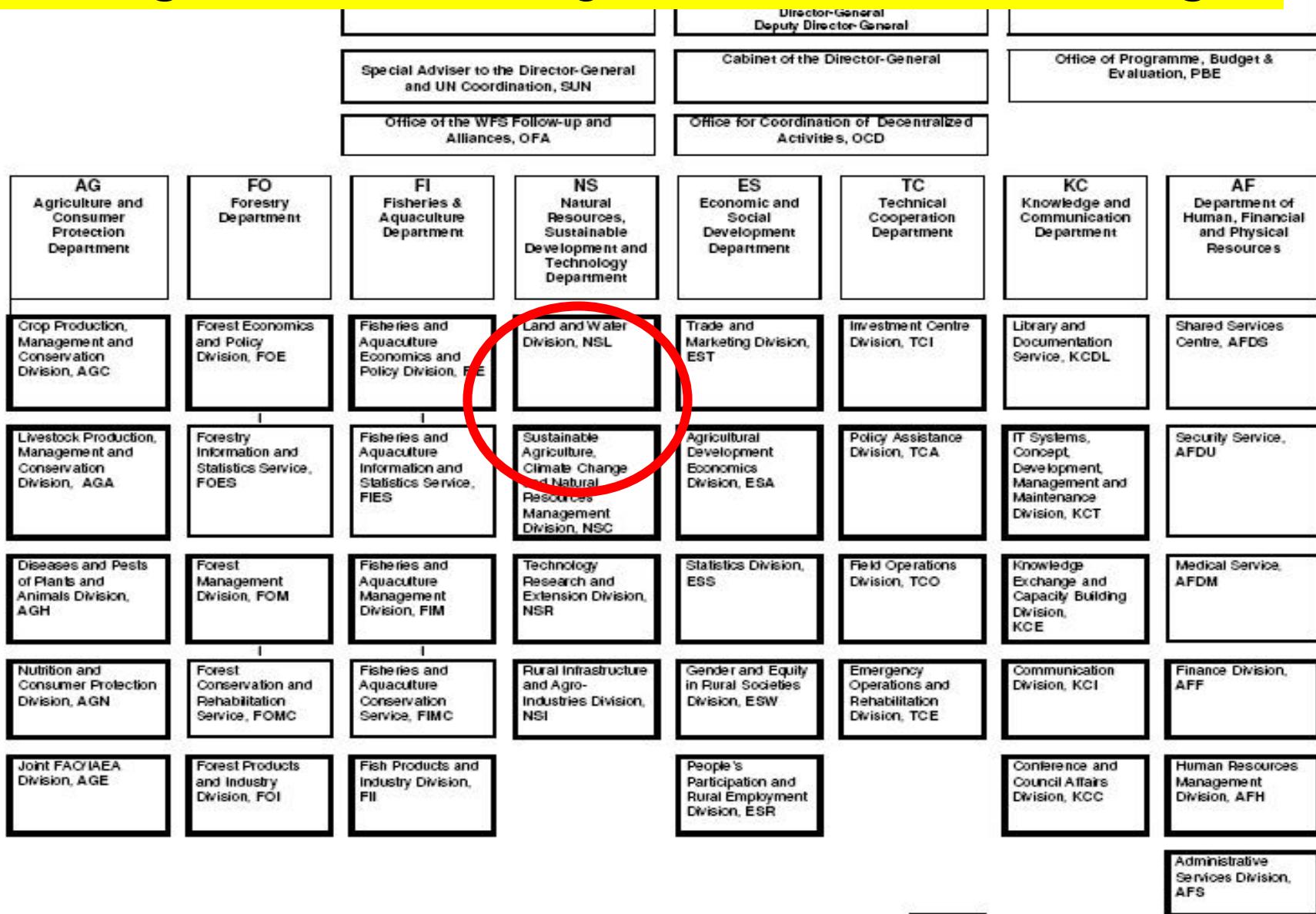
The page features a banner at the top with the text "Priority Areas for Inter-disciplinary Action (PAIAs)" and a background image of a landscape transitioning from green fields to a dry, arid area. The FAO logo is in the top right corner.

**Climate Change**

**Home | Glossary | Contacts**       **العربية 中文 English Français Español**

<b>The issue</b> <b>Science</b> <b>FAO's role and view</b> <b>Activities</b> <b>Sources</b> <b>Mitigation</b> <b>Adaptation</b> <b>Impacts</b> <b>Policy</b> <b>Projects</b> <b>Links</b> <b>Contacts</b>	<p><b>The Issue</b></p> <p>Throughout the 20<sup>th</sup> century, the global average temperature rose by about 0.5°C, and most of the high temperature records were concentrated in the 1990s. There is strong evidence that human-induced greenhouse gas (GHG) emissions contribute towards this "global warming", which encompasses a change in most climate variables, including their variability patterns.</p> <p>While solar radiation and rainfall are major climatic resources, climate is also the single main factor behind the variability of agricultural production in developing and developed countries alike.</p> <p>Global warming may thus have profound effects on agriculture<sup>1</sup> and food security. Crop agriculture, forestry and livestock are directly involved as sources or sinks of GHG, but they are also among the most vulnerable victims of the foreseen changes.</p> <p>Although there is no consensus on what will happen to agricultural environments and production, and at what pace, the following consequences are generally accepted by the scientific community:</p> <ul style="list-style-type: none"><li>• climate has considerable inertia, and cannot be reversed over a short period of time;</li><li>• future scenarios are uncertain and significant</li></ul>	<p><b>New Publications</b></p> <p><b>World Soil Resources Reports 102</b> This publication reflects part of FAO's work on soil carbon sequestration within the framework ...</p> <p><b>FAO Forestry Paper 144</b> Climate change and the forest sector – Possible national and subnational legislation</p> <p><b>Global climate change and agricultural production.</b> Direct and indirect effects of changing hydrological, pedagogical and plant physiological processes.</p> <p><b>Events</b></p> <p><b>31<sup>st</sup> Session of the Committee on World Food Security</b> 23-26 May 2005</p> <ul style="list-style-type: none"><li>• Special Event <i>Impact of Climate Change, Pests and Diseases on Food Security and Poverty Reduction Background Document</i></li><li>PowerPoint presentation <i>Wulf Killmann</i></li></ul> <p><b>Kyoto Protocol entry into force</b></p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

# Programme Entity on Climate Change



# **Partnerships**

- Other UN bodies
- Bilateral agencies
- Regional Structures
- NGO's
- Universities & Research Centers

# Information systems

- WAICENT
- GIEWS, FIVIMS, EMPRES
- GTOS, GLCN, FIRMS, CarboAfrica, LADA
- ECOPORT, ECOCROP, HORTIVAR
- AEZ, AgroMAPS
- WISDOM, FORIS, FRA, GlobeFISH
- FAOSTAT, FAOCLIM, AGDAT, ECOLEX
- GIS, ARTEMIS, GeoNetwork
- Web sites on CC and CV



Quantification, understanding and prediction of carbon cycle, and other GHG gases, in Sub-Saharan Africa



CarboAfrica

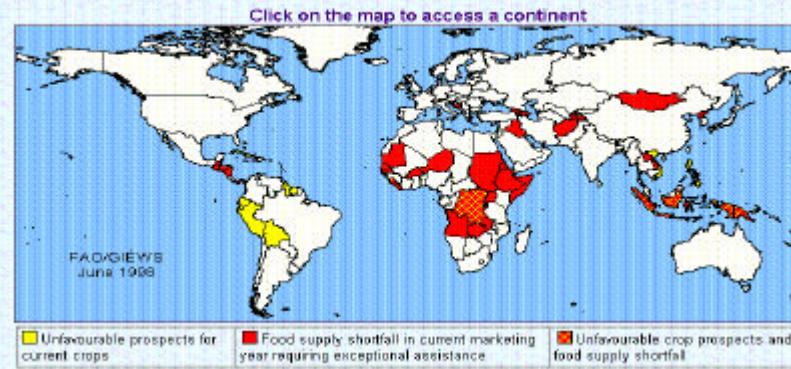
World's largest electronic collection of national laws and regulations on food, agriculture and renewable natural resources



Information systems



Map of unfavourable crop prospects and food supply shortfalls



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

# Information systems

## FAOCLIM 2

World-wide agroclimatic database

AGDAT AFRICA 1.1

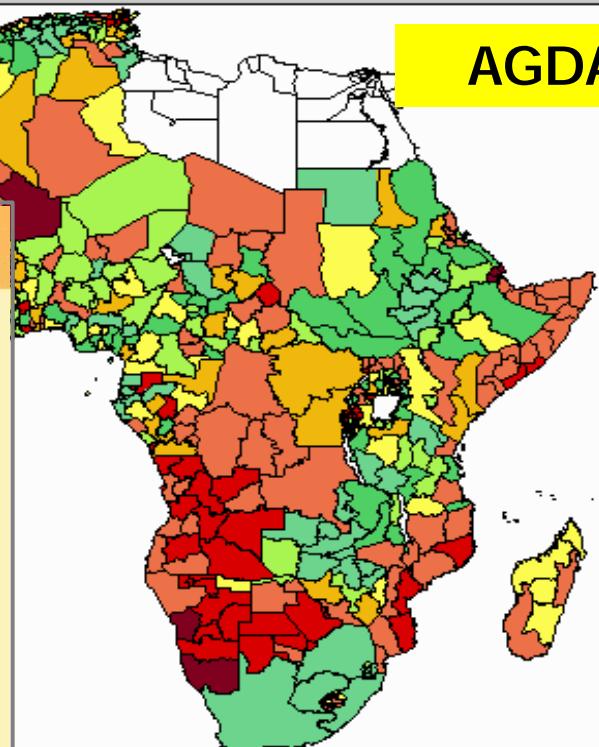
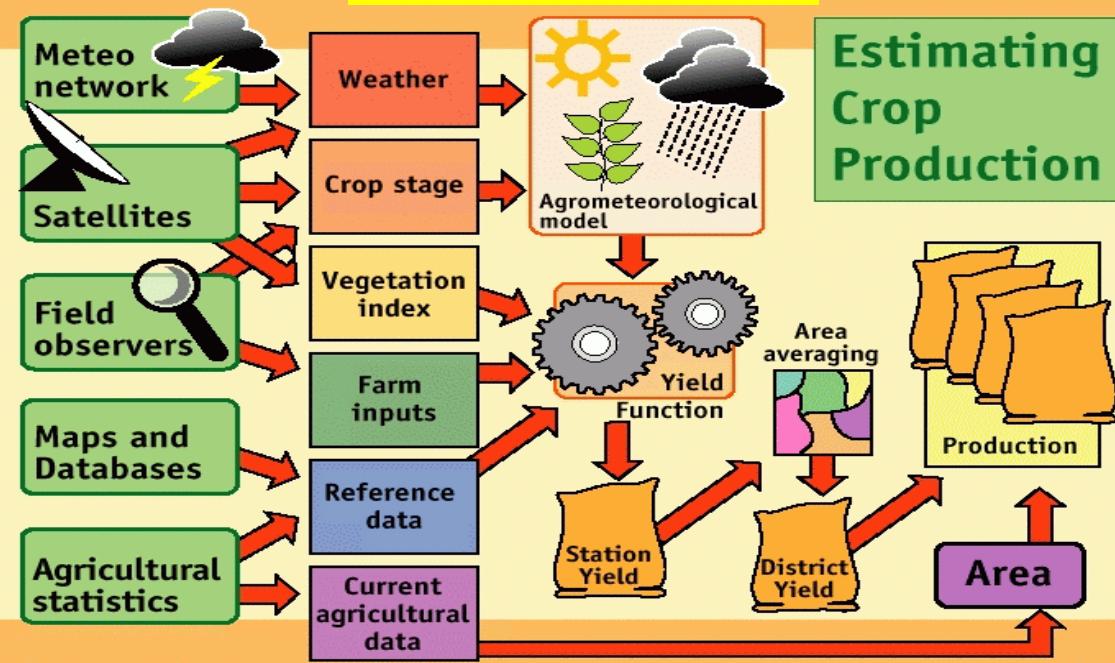
FAOCLIM



Food and Agriculture

AGDAT

AgroMetShell



Lon: Lat:

# Information systems

CLIMPAG - The FAO web site on agrometeorology - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Bookmarks 9 blocked Check AutoLink AutoFill Send to Settings Links

Address http://www-data.fao.org/sd/climpag/ Go

Google G

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS helping to build a world without hunger

ENVIRONMENT AND NATURAL RESOURCES [ SDRN ]

What's new in SDRN About SDRN SDRN home

FAO home SD-Dimensions home Assessment & Monitoring Environmental Management Geo-Spatial Data & Info Global Environmental Change

FAO // Climpag Climate Impact on Agriculture

Contact References Search in FAO Français Español About Climpag Related links

ABOUT CLIMPAG

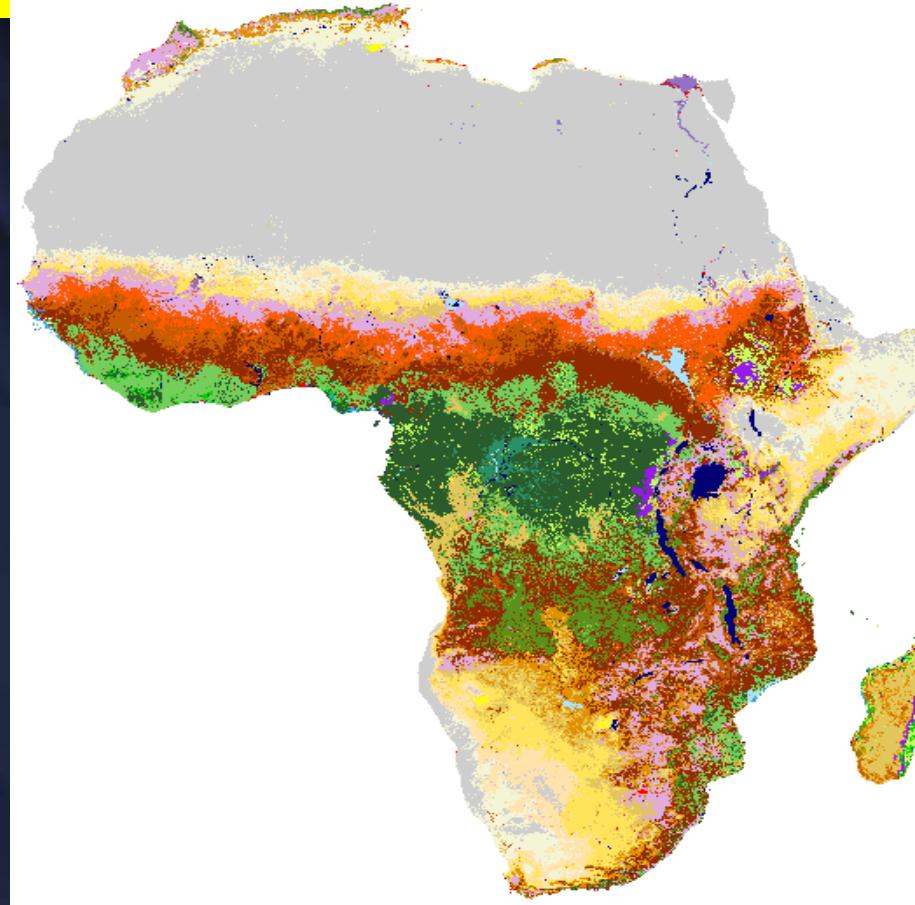
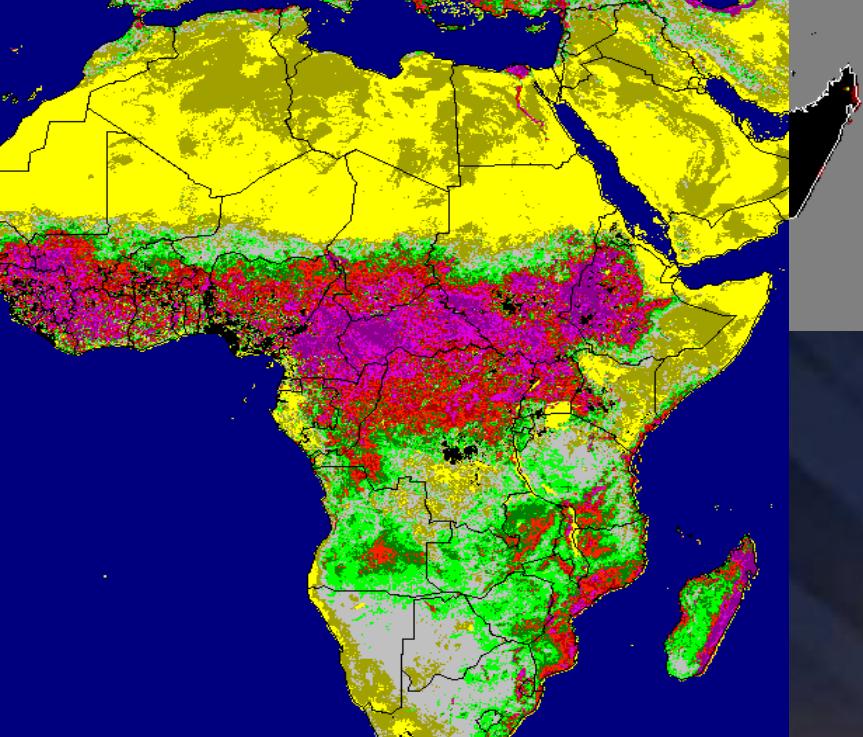
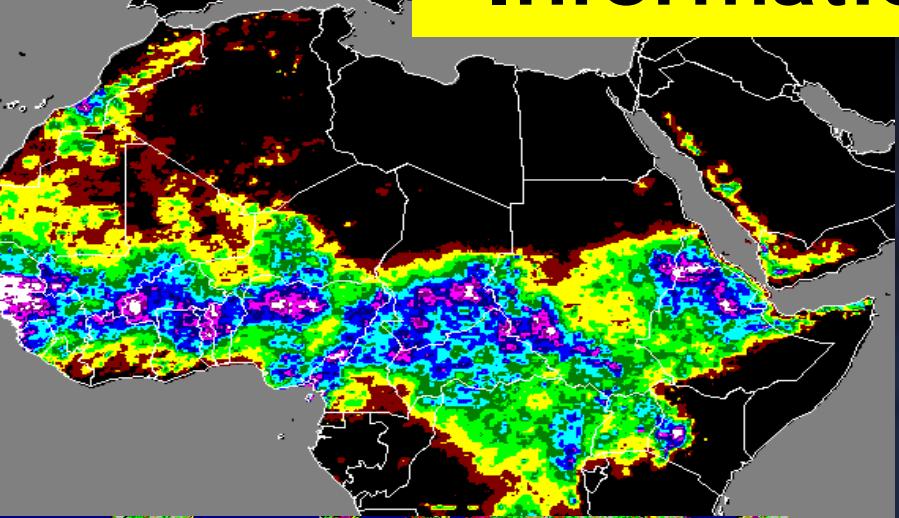
ADVICE and WARNINGS CLIMATE CHANGE CLIMATE INDICATORS DATA and MAPS HOTSPOTS NATURAL DISASTERS

RELATED LINKS

Agri-environmental hotspots  
Global water stress maps  
Methods and tools

*Climpag*, the portal of integrated information, data, methodologies and tools for a better understanding and analysis of the effect of the variability of weather and climate on agriculture. [ more.. ]

# Information systems



ARTEMIS

# Climate change risks and adaptation priorities

Arid and Semi-arid	Humid	Coastal and Islands
<b>Problems</b>		
<ul style="list-style-type: none"><li>• Water scarcity</li><li>• Faster desertification</li><li>• Lower productivity of natural resources</li><li>• Food security</li><li>• Rural livelihoods and pastoral economies</li><li>• Health</li></ul>	<ul style="list-style-type: none"><li>• Storm damage and flash flooding risks to settlements, public and productive infrastructure and human life</li><li>• Agricultural productivity</li><li>• Hydroelectric capacity</li><li>• Health</li></ul>	<ul style="list-style-type: none"><li>• Flood and storm risks to coastal settlements, public infrastructure and human life</li><li>• Loss of agricultural land</li><li>• Salt water intrusion in aquifers and rivers</li><li>• Water scarcity</li><li>• Food security</li><li>• Damage to fisheries and marine resources</li></ul>
<b>Priorities</b>		
<ul style="list-style-type: none"><li>• Improved crop, grassland and livestock management</li><li>• Research and dissemination of improved crop varieties and breeds</li><li>• Community grain storage for food distribution</li><li>• Weather-related insurance</li></ul>	<ul style="list-style-type: none"><li>• Change to dam and infrastructure specifications</li><li>• Storm and flood resilient building codes</li><li>• River defences</li><li>• Watershed management</li><li>• Restricting development in high risk (flood, mudslides) zones</li></ul>	<ul style="list-style-type: none"><li>• Coastal defences: hard defences – groynes, revetments, embankments; soft defences – mangroves, coral reefs, wetland conservation</li><li>• Relocation of settlements, roads and other infrastructure</li><li>• Integrated coastal zone management</li><li>• Desalination plants</li></ul>

# Methods and Tools to Adapt to Climate Variability and Change

The knowledge and technology required for adaptation includes understanding the patterns of variability of current and projected climate, seasonal forecasts, hazard impact mitigation methods, land use planning, risk management, and resource management.



# Methods and Tools to Adapt to Climate Variability and Change

## Agrometeorological Applications

Agriculture Areas under Water Stress  
(Past, Present, Future projection)

Crop Yield Forecast

Crop Suitability  
(Actual, Future projection)

Extreme Events  
Risk Analysis

Date of Planting  
(Actual, Future projection)

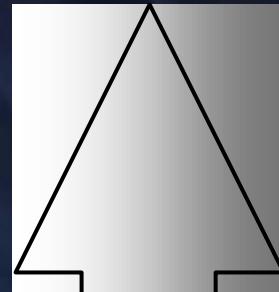
Weather-based Yield  
Index for Crop Insurance

Length of Growing Season  
(Actual, Future projection)



# Livelihood Adaptation Options to Climate Variability and Change

Developing an operationalization strategy

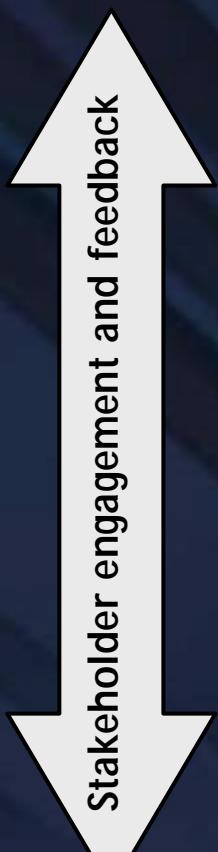


Testing adaptation options

Designing adaptation strategy

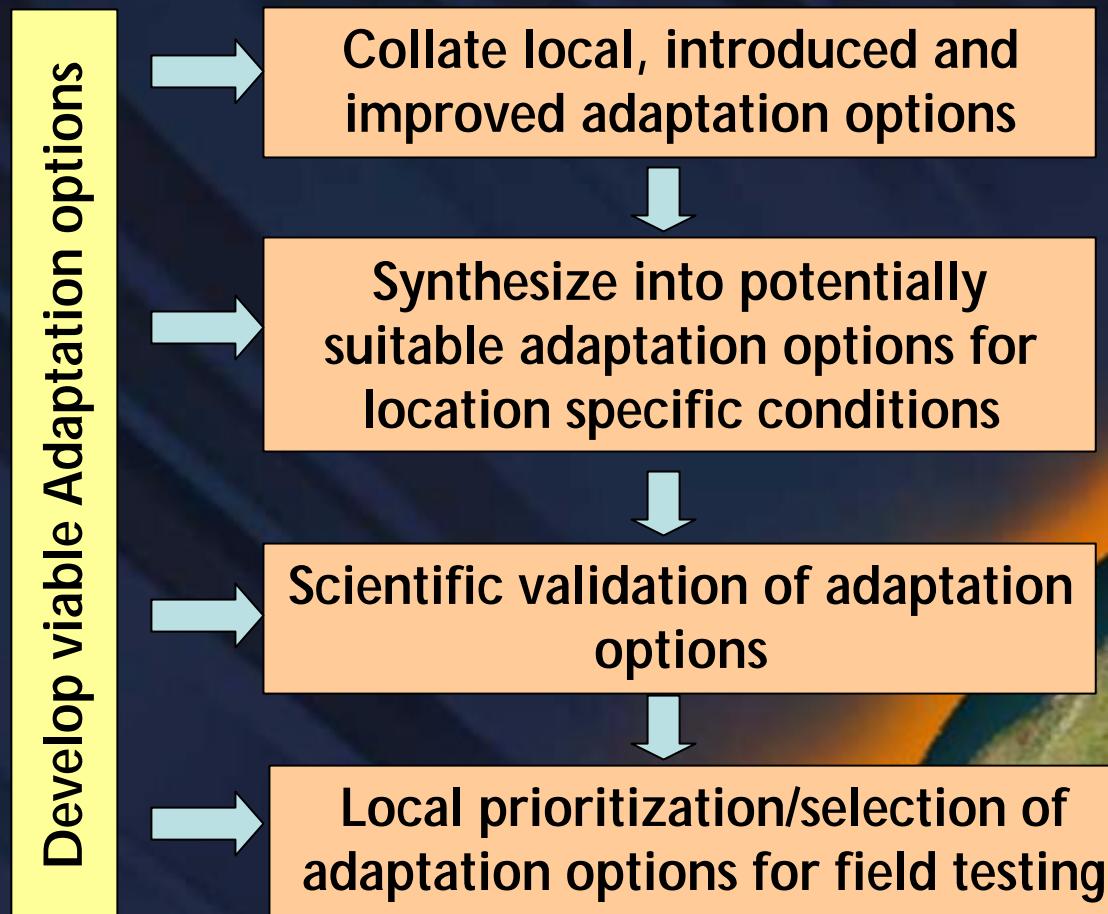
Assessing future climate risks

Assessing current vulnerability



# Livelihood Adaptation Options to Climate Variability and Change

## Designing adaptation options



# Adaptation practices in agriculture

- **Agronomic management**
- **Water harvesting and exploitation**
- **Water Use efficiency**
- **Crop intensification**
- **Alternate enterprises**
- **Post harvest practices**



# Thank you

<http://www.fao.org>