

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**

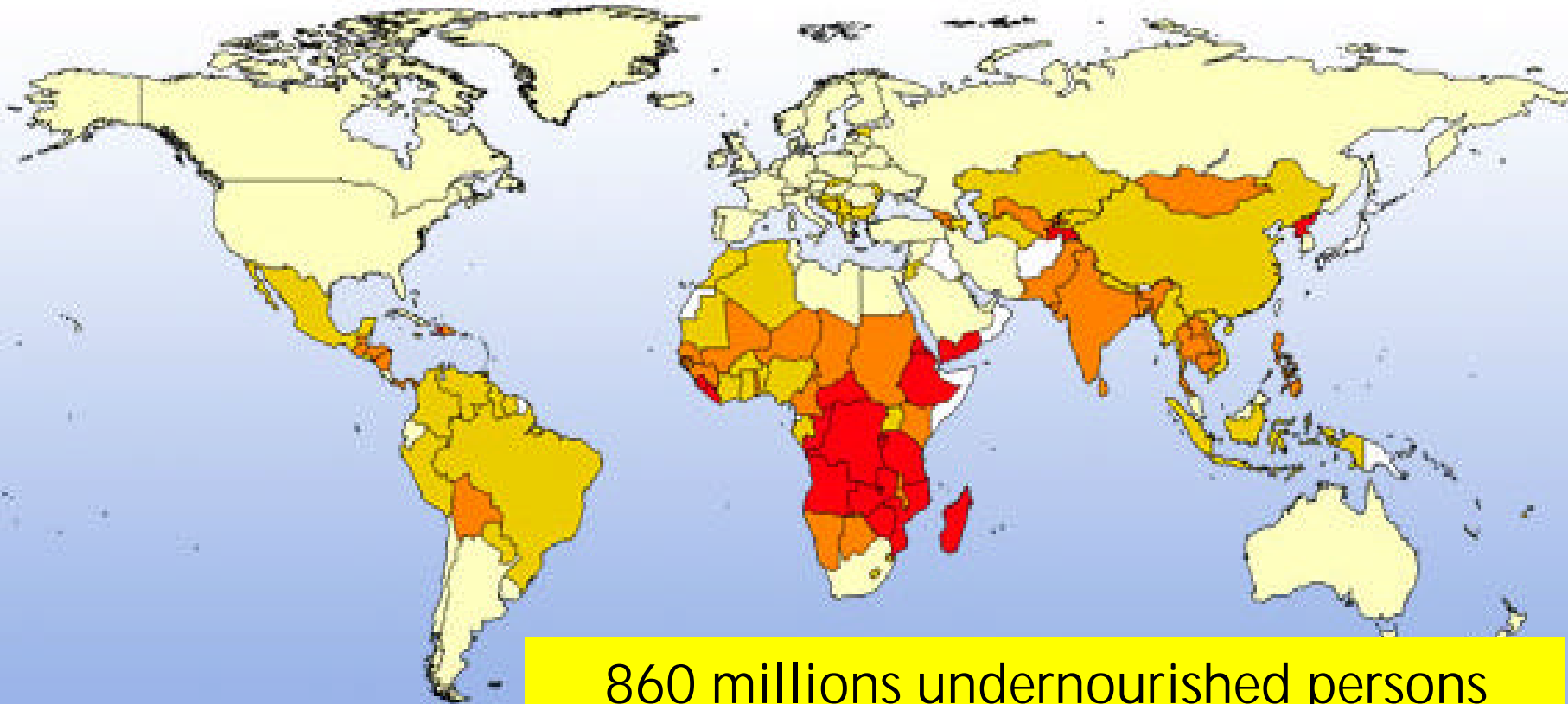


Overview

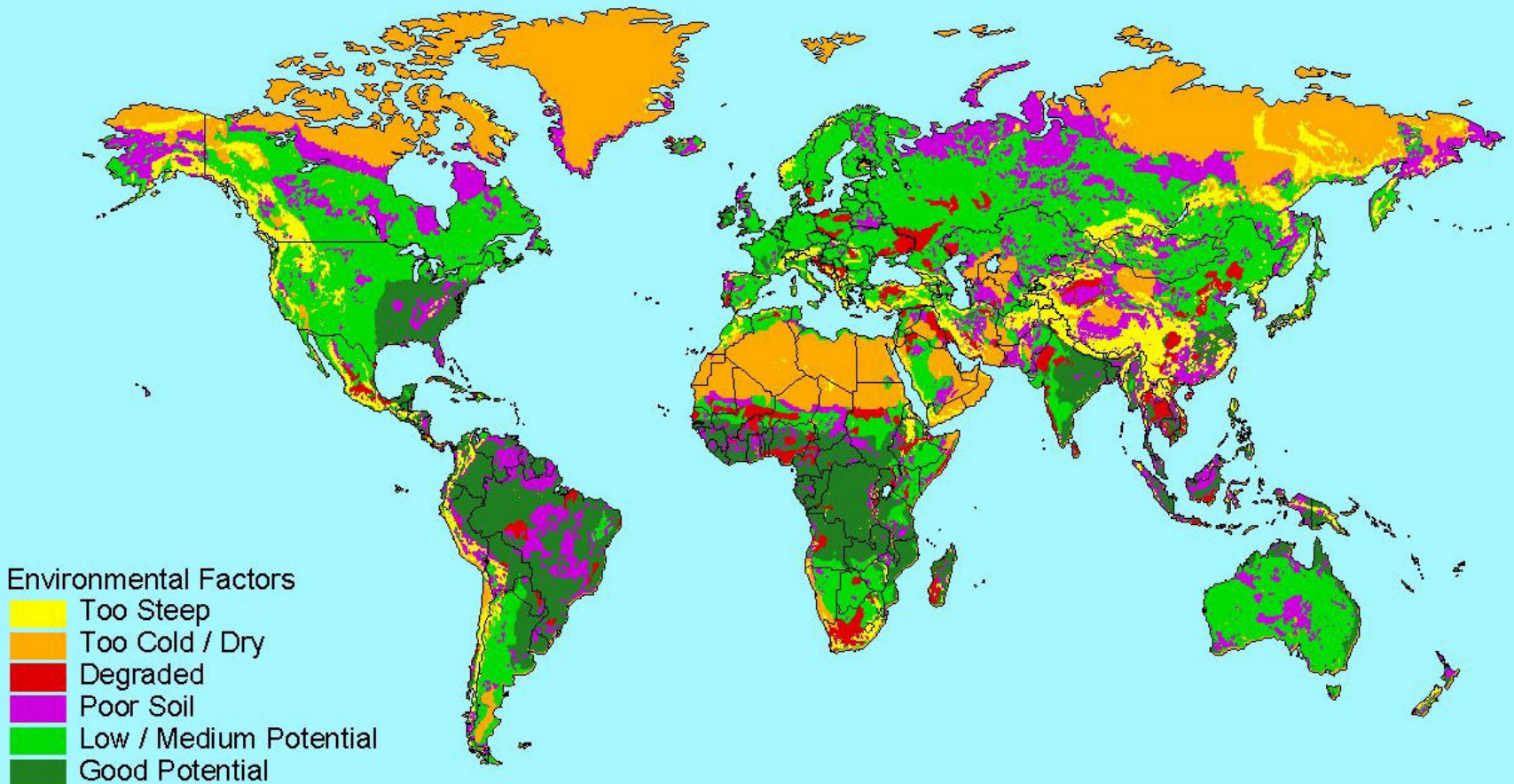
- **World Food Insecurity**
- **Mandate of FAO**
- **Role of FAO**
- **Work of FAO on climate change**
- **Adaptation to climate variability and change**



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**
- 

North Atlantic Oscillation a key factor in international climate vulnerability, with impact on fisheries industries

Egypt/Cairo/The Nile: Coastal areas threatened by sea-level rise; Nile river basin sensitive to climate, with regional implications

Horn of Africa heavily affected by recurrent droughts

Important commercial agriculture adapted to bimodal rainfall; shifts in rainfall patterns would have far-reaching impacts

East African Great Lakes and reservoirs respond to climate variability with pronounced changes in storage

Floods in 1999 severely affected coastal population and infrastructure, with long-lasting economic and development impacts; adaptation and recovery very costly and beyond the means of African countries

Intensity of extreme events increased significantly over South Africa; biome shifts will favor horticulture over plantation forestry; malaria risk areas projected to expand southward



Rainfall variability modulated vegetation dynamics, surface properties in the Sahel; empirical evidence of species changes

High proportion of population concentrated in coastal areas in West African cities such as Lagos and Banjul, thus especially vulnerable to sea-level rise

Regional climate modeling experiments show deforestation in Central Africa will impact climate in distant south (teleconnections)

Coastal marine fishery likely to be negatively affected by changes in Benguelia current

Long-lasting impacts of drought on national economies for SADC region

Complete loss or displacement of Succulent Karoo biome projected under climate change, and many species losses in other biomes

The vulnerabilities

- Desertification
- Sea level rise
- Reduced freshwater availability
- Cyclones
- Coastal erosion
- Deforestation
- Loss of forest quality
- Degradation of woodlands
- Coral bleaching
- Spread of malaria
- Impacts on food security

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



Priority Areas for Inter-disciplinary Action (PAIAs)

Climate Change

Home | Glossary | Contacts

العربية 中文 English Français Español

- The issue
- Science
- FAO's role and view
- Activities
- Sources
- Mitigation
- Adaptation
- Impacts
- Policy
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The Issue

Throughout the 20th 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.

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.

Global warming may thus have profound effects on agriculture¹ 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.

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:

- climate has considerable inertia, and cannot be reversed over a short period of time;
- future scenarios are uncertain and significant

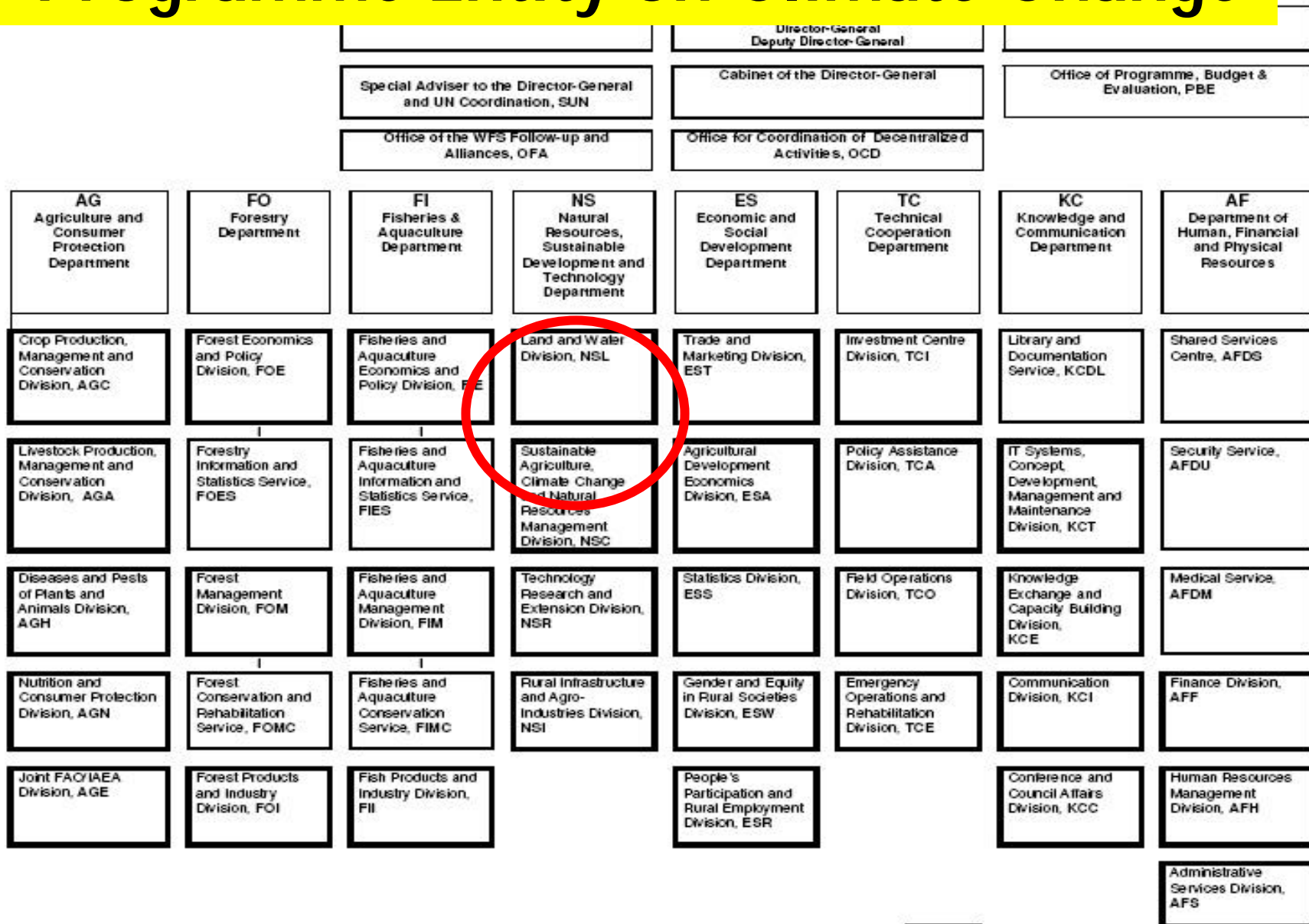
New Publications

-  **World Soil Resources Reports 102**
This publication reflects part of FAO's work on soil carbon sequestration within the framework ...
-  **FAO Forestry Paper 144**
Climate change and the forest sector – Possible national and subnational legislation
-  **Global climate change and agricultural production.**
Direct and indirect effects of changing hydrological, pedagogical and plant physiological processes.

Events

- 31st Session of the Committee on World Food Security 23-26 May 2005**
- Special Event
 - Impact of Climate Change, Pests and Diseases on Food Security and Poverty Reduction *Background Document*
 - PowerPoint presentation *Wulf Killmann*
- Kyoto Protocol entry into force**

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**
- 



Global Information and Early Warning System - on food and agriculture [GIEWS]



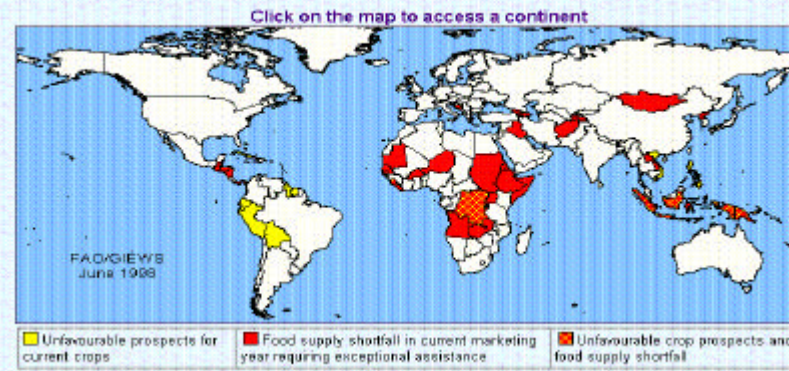
Food and Agriculture Organization of the United Nations



Foodcrops and shortages

Global Information and Early Warning System on food and agriculture

Map of unfavourable crop prospects and food supply shortfalls



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



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS



Information systems

Information systems



FAOCLIM 2

World-wide agroclimatic database

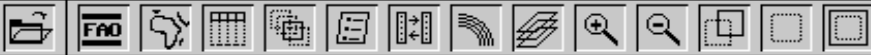
FAOCLIM



Food and Agriculture

AGDAT AFRICA 1.1

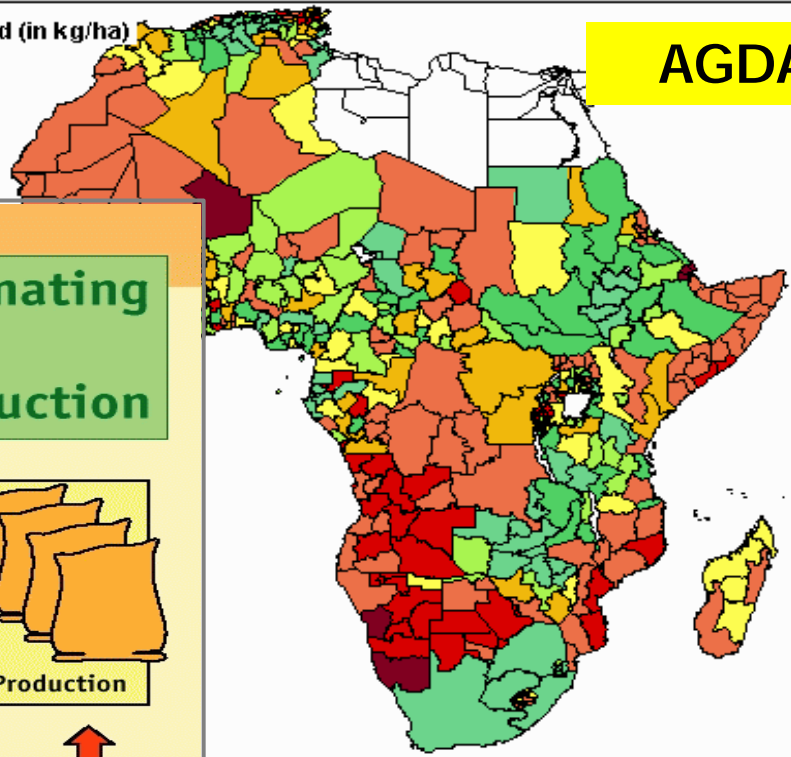
File Edit Data Overlay View Help



Layers

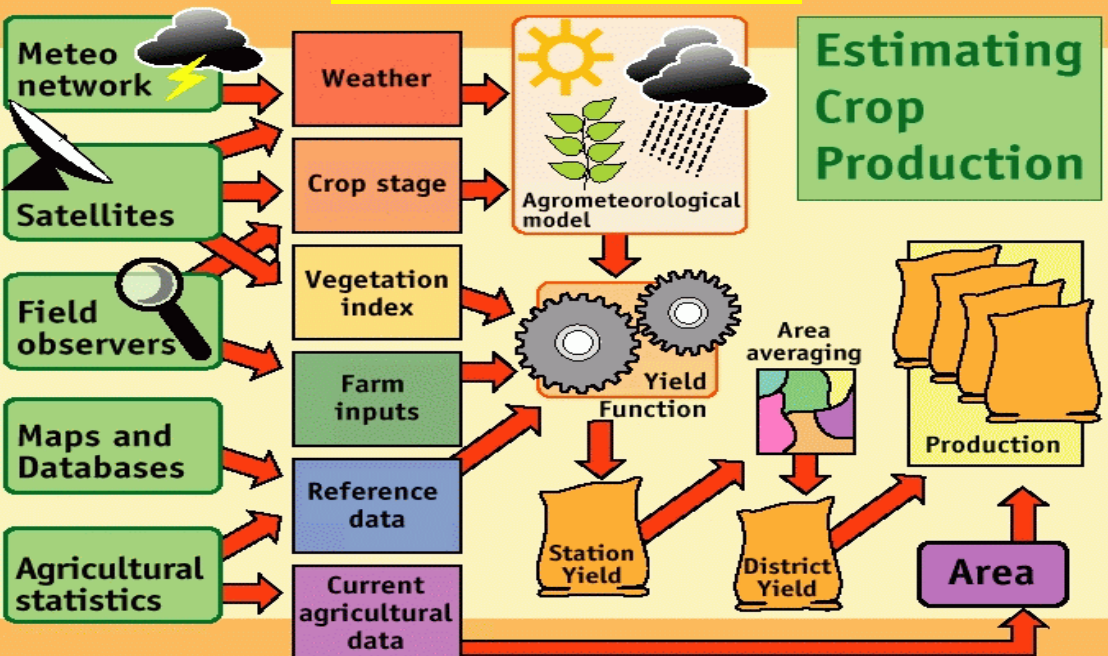
- Data carrier

Maize: yield (in kg/ha)



AGDAT

AgroMetShell



Lon: Lat:

Information systems

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

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

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

Google G Go Bookmarks 9 blocked Check AutoLink AutoFill Send to Settings Links

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

ENVIRONMENT AND NATURAL RESOURCES [SDRN]

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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 **RELATED LINKS**

 **ADVICE and WARNINGS**

 **CLIMATE CHANGE**

 **CLIMATE INDICATORS**

 **DATA and MAPS**

 **HOTSPOTS**

 **NATURAL DISASTERS**

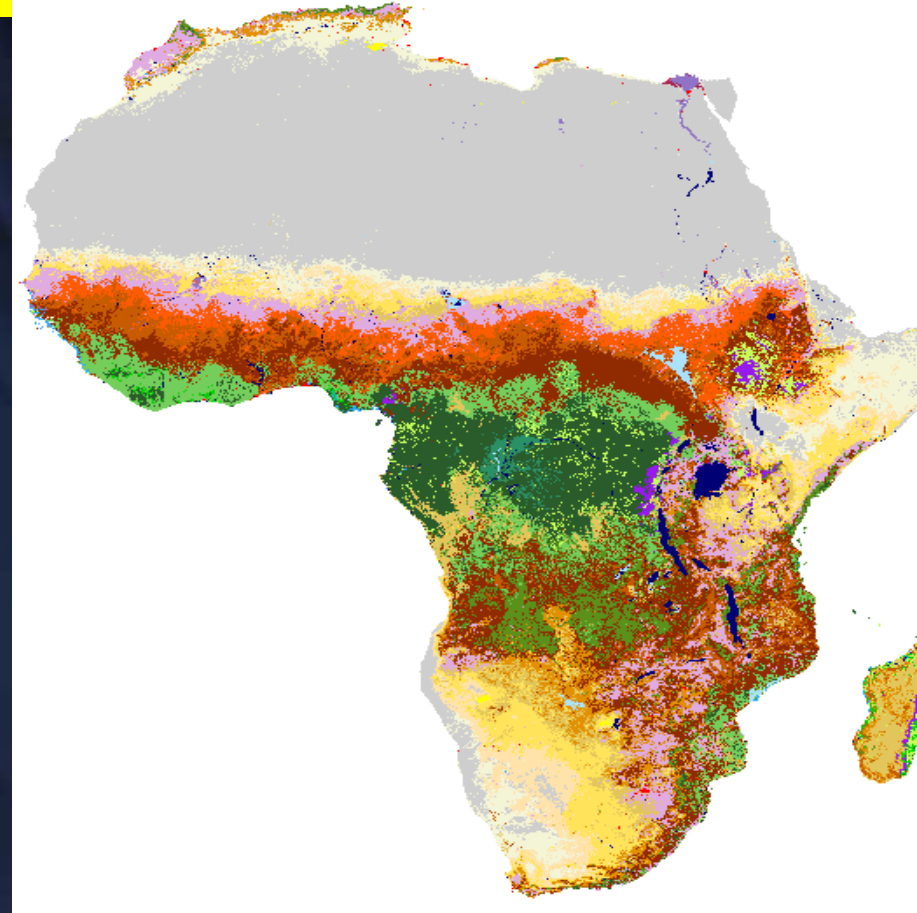
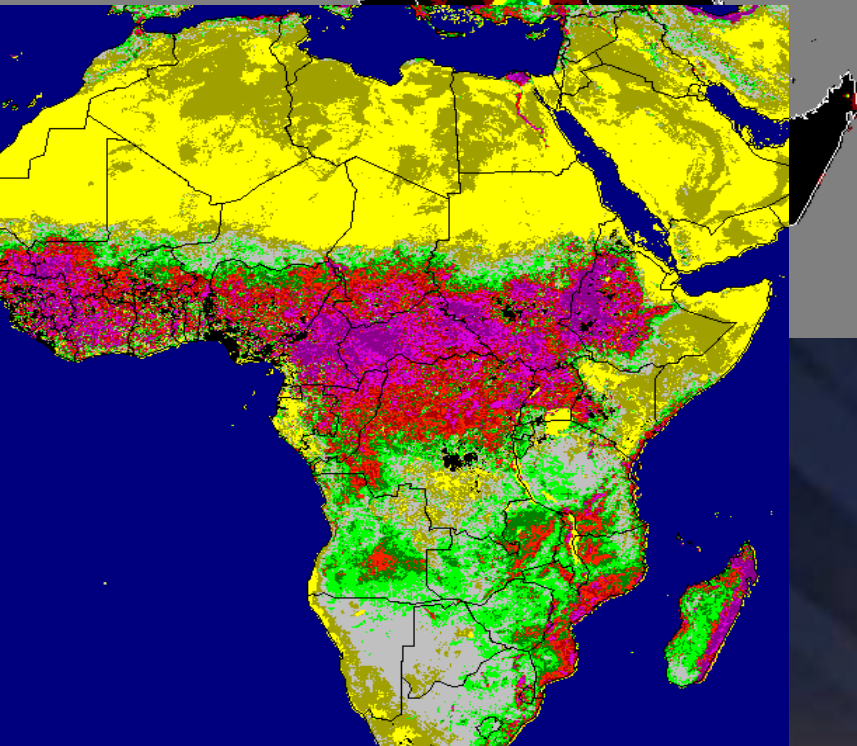
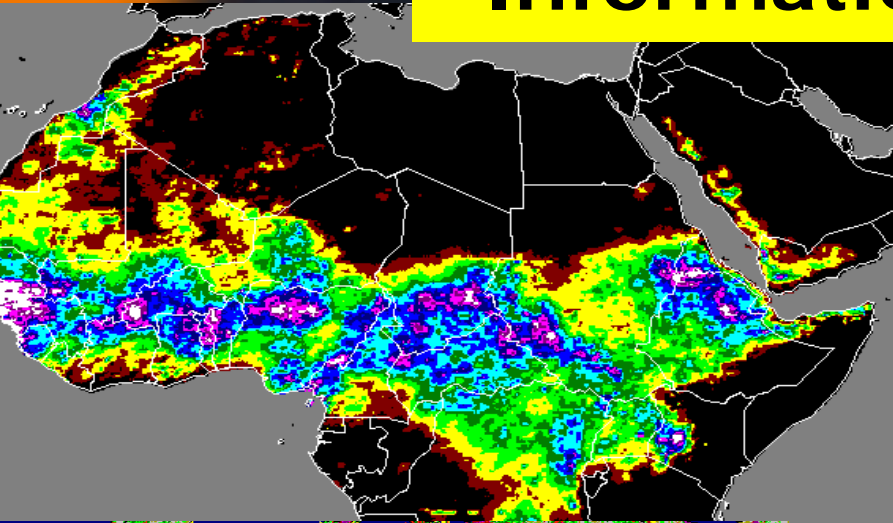
Agri-environmental hotspots

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

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)

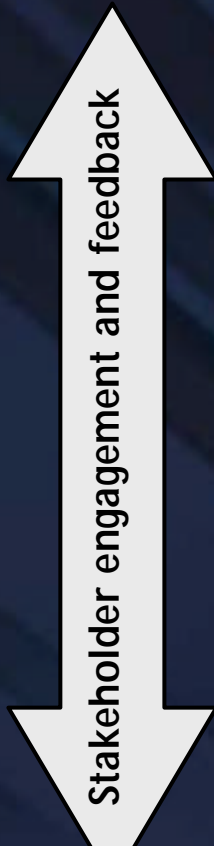
Weather-based Yield
Index for Crop Insurance

Length of Growing Season
(Actual, Future projection)



Livelihood Adaptation Options to Climate Variability and Change

Developing an operationalization strategy



Testing adaptation options

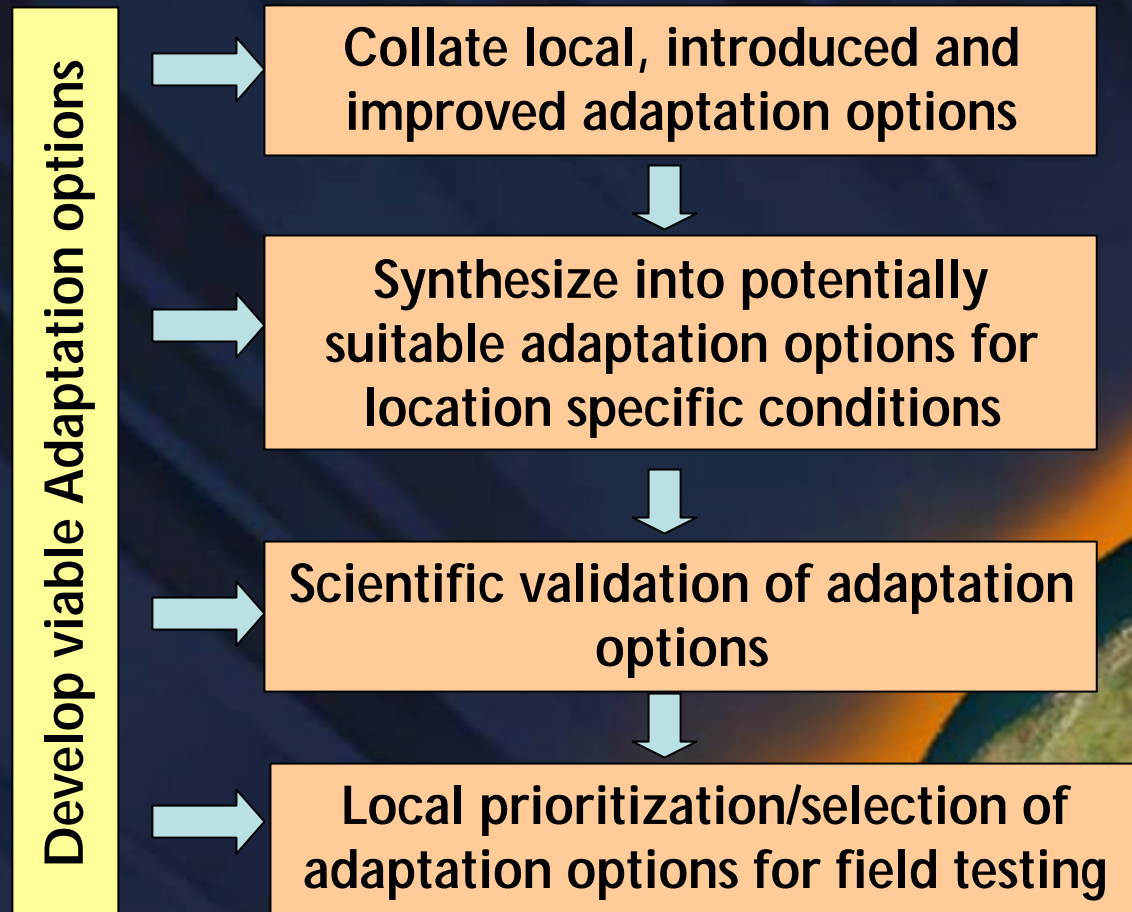
Designing adaptation strategy

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>