

CLIMATE-SMART
Agriculture
2015



Global Science Conference

March 16-18, 2015
Le Corum, Montpellier France

Policies and institutions conducive for enhancing the transfer to CSA in Africa

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Montpellier

March 16-18, 2015

☐ Background Information about West Africa(WA)

☐ Enhancing CSA Policy:

- ✓ Science and knowledge generation
- ✓ Education
- ✓ Extension
- ✓ Communication
- ✓ Land use
- ✓ Financial Instruments

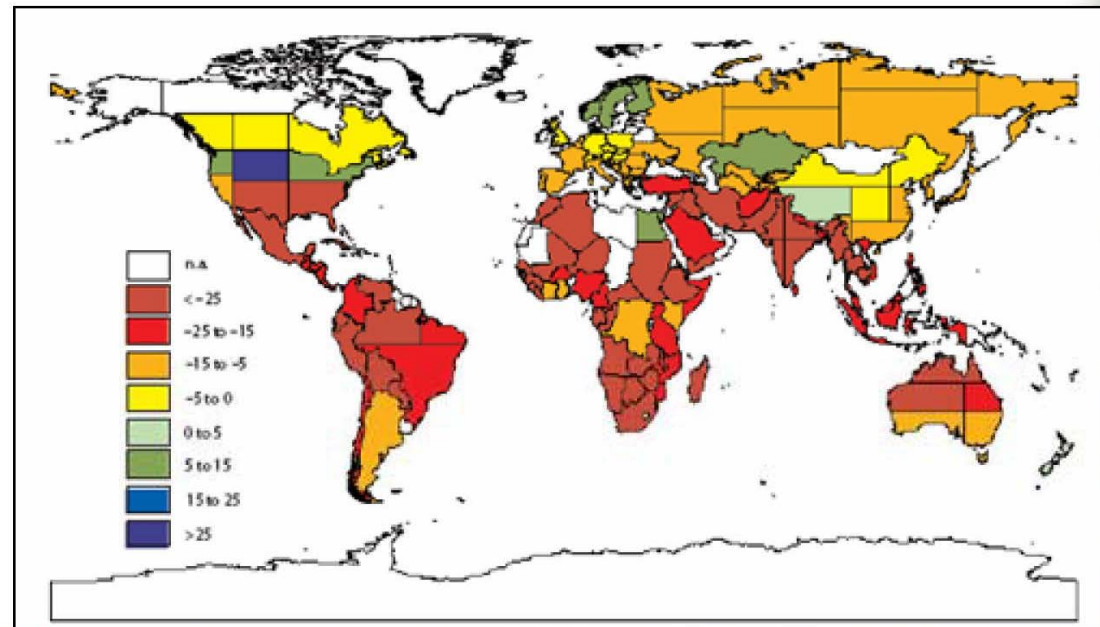
West Africa

- 6 million km² 300 million people (38% of SSA)
- 2/3 of the population depend on rainfed agriculture
- 1/3 of the GDP depends on agriculture

Causes of low cereal productivity:

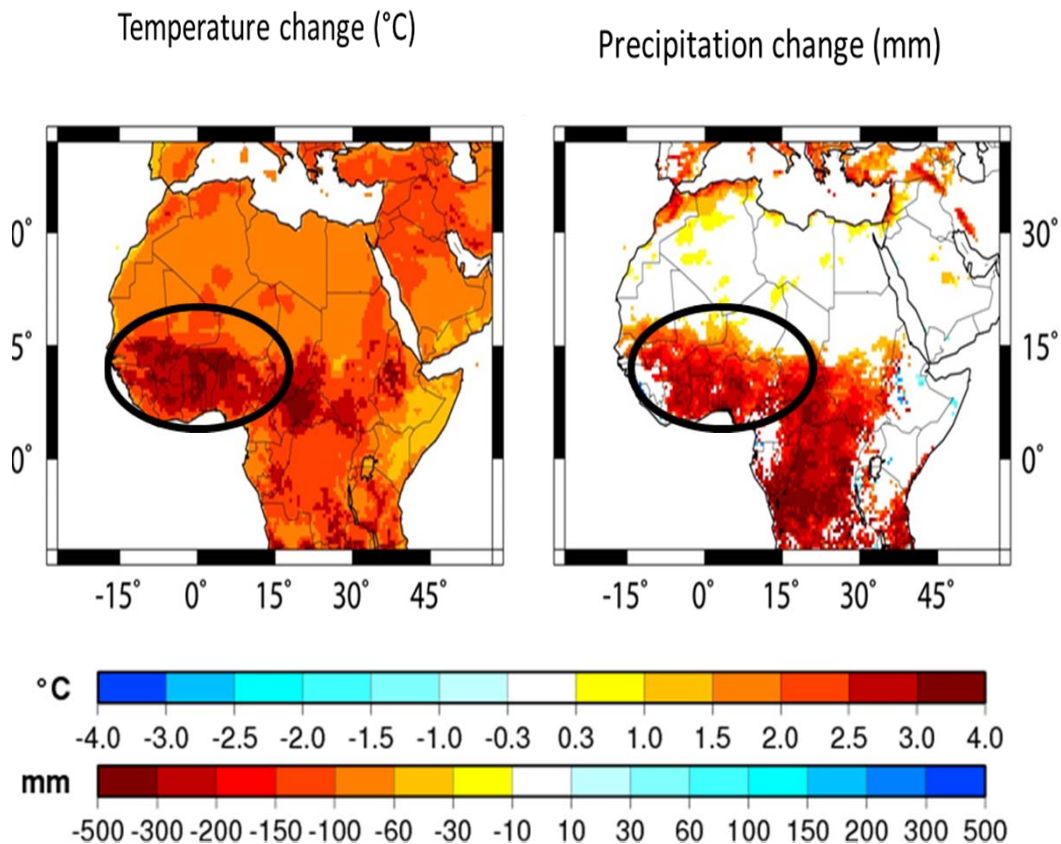
Climate variability

- High population increase
- Highly Vulnerable to climate change & Climate Variability



Percent change in agricultural production due to climate change

About WA



- Most of West Africa is mostly tropical;
- WMO (2001) classifies 6 agro-climatic zones: humid (mostly along the coast), sub-humid Humid (covering most of Ghana and Cote d'Ivoire), sub-humid (covering Northern Ghana and a chunk of Northern Nigeria), semi-arid, arid and hyper-arid;
- The key climatic element used in explaining climate change are temperature and rainfall.
- The IPCC A1B climate projections were substantially modified:
West Africa exhibits a stronger significant warming and a significant drying trend

Climate change in West Africa

Global Models Predictions:

- Increase in temperature
- Decrease (increase) in rainfall
- Higher variability in rainfall
- Higher frequency of weather extremes (floods, droughts)
- Prolongation of the dry season
- Onset of the rainy season more variable (delayed)
- Dry spells during the rainy season



However:

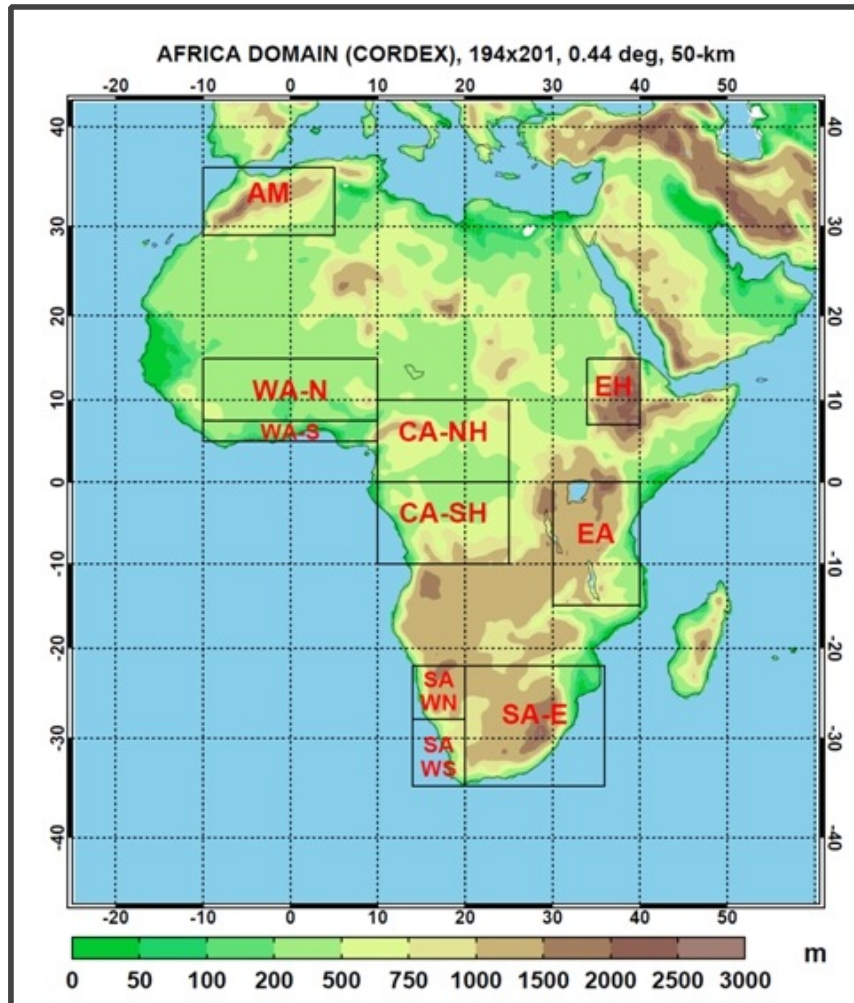
Lots of uncertainties in the predictions

Hence

Difficulties for reliable Policy Making

Example: Regional Climate Simulations

An ensemble of high-resolution regional climate simulations for West Africa



Existing data sets for WA either

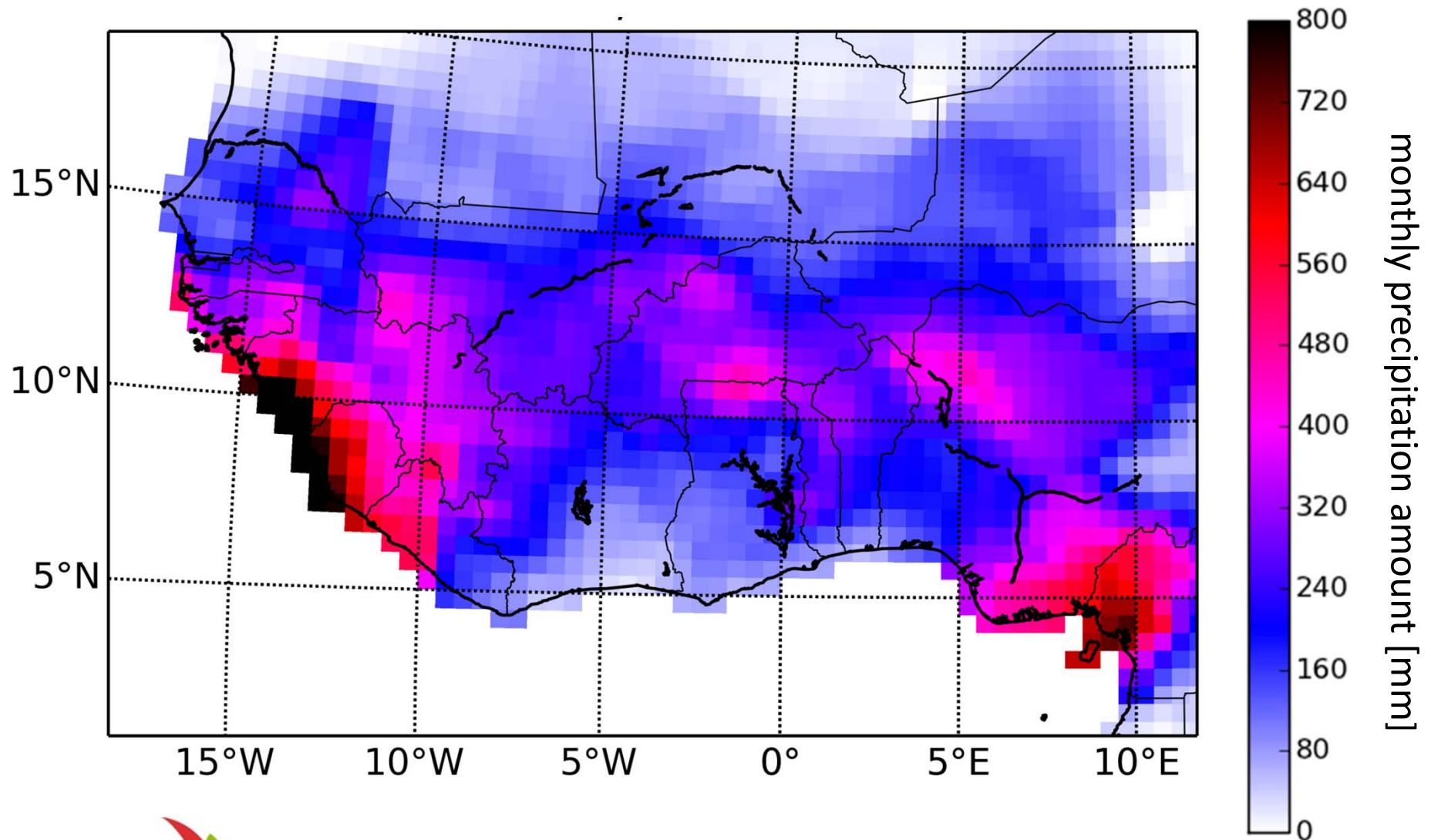
- (a) are of coarse resolution
- (b) extend only over small areas
- (c) cover only short time periods
- (d) provide only few variables or a combination of those aspects.

State of the art: CORDEX-Africa

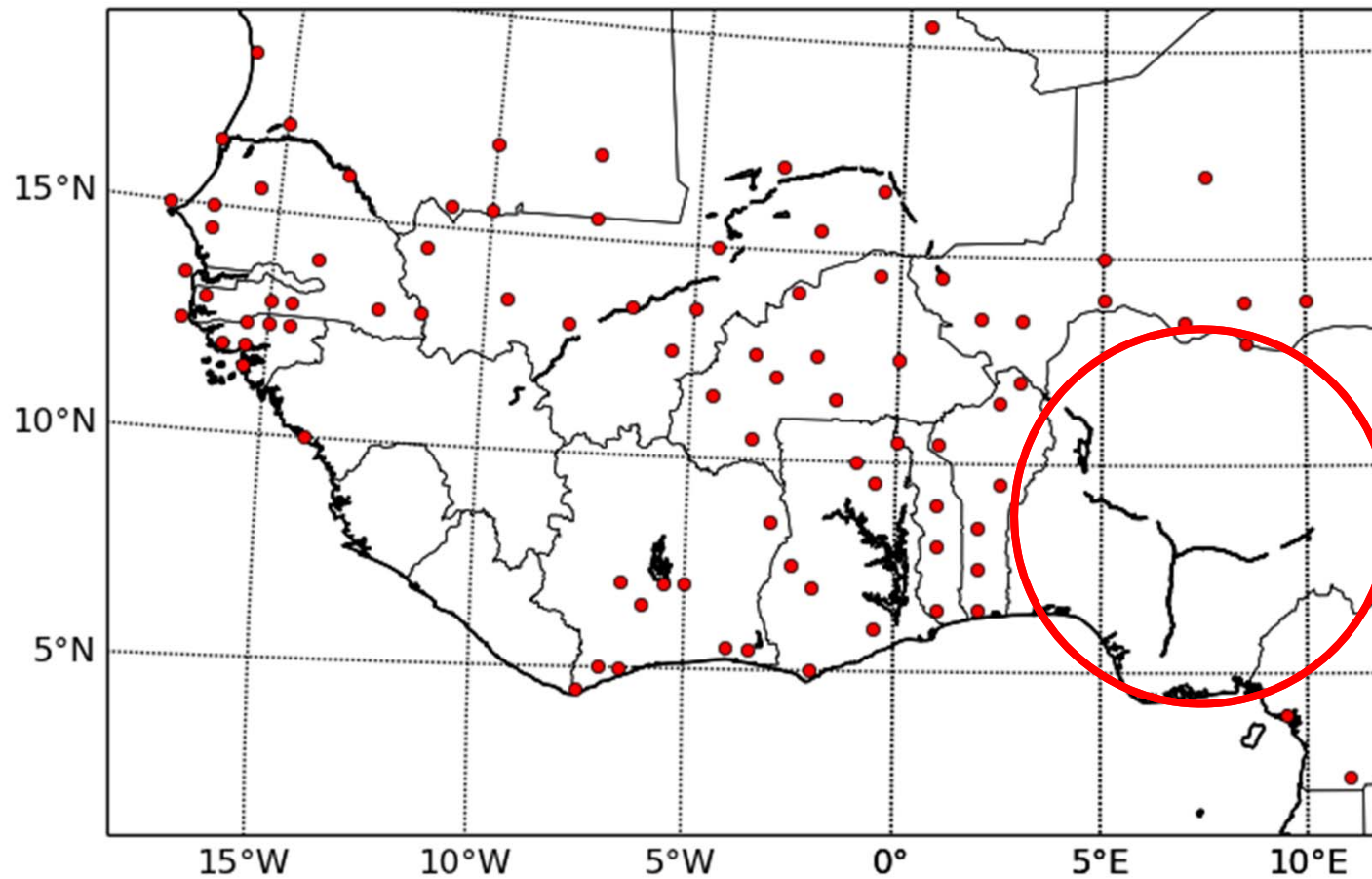
- Full domain at 50km resolution, selected small subdomains at 25km.
- Large ensemble of driving global models and nested regional models
- Large temporal range 1950-2005, 2006-2010 RCP4.5 & RCP8.5 etc.
- Small set of variables, 6-hourly data

Example: Precipitation Quantification

Illustration of the Problem: GPCC Precipitation August 2007



GPCC estimates e.g. for *Nigeria*?
There is not a single gauge behind the
gridded product!



Key concept for **C**limate **S**mart **A**griculture (**CSA**)

- **Agriculture contributes to Climate Change but concurrently is also part of the solutions**
- **CSA addresses three objectives:**
 - **Sustainably increasing production, providing for social inclusiveness and reducing poverty;**
 - **Increase resilience to risks through adaptation to CC&CV;**
 - **Contribute to mitigation of CC in reducing GHG emissions and fixing CO₂**

What is sorely missing ???

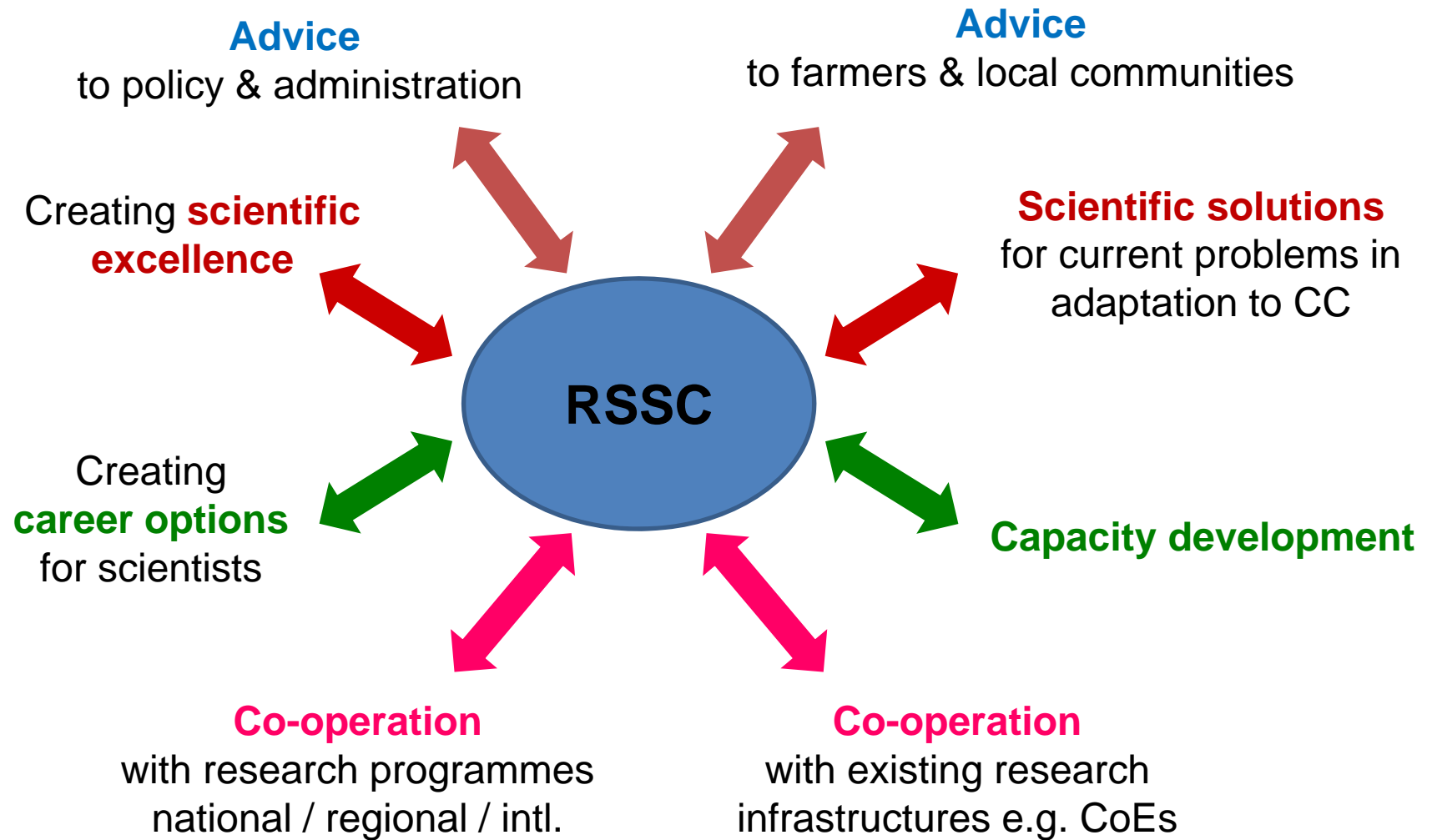
- *Scientific Evidence and Knowledge*
- *Good and Continuous Quality Data*
- *analysis, synthesis and policy recommendations*
- *novel and viable solutions*
- *experts*



Hence for introducing CSA solid information is needed but presently missing such as:

- Science and knowledge generation
- Education
- Extension
- Communication
- Land use
- Financial Instruments

Regional Climate Service Centres to support Policy Making CSA & Adaptation to Climate Change



Climate Service Center

- Provides information and sound, evidence-based advice to the public and private sectors
- Translates feedback from stakeholders to research questions

- An interface between climate-researchers and climate-counselors
- Analyses available and newly generated research data on the climate-socio-ecological systems,
- Prepare these for stakeholders according to their needs
- Concurrently translating feedback from stakeholders to research questions

2 Climate Service Centers in Africa with the contribution of Germany



WASCAL in West Africa and,

SASSCAL in South Africa

WASCAL: Bridging Research and Policy Making

- Top level research on CC and LU is a major challenge for WA which requires joint efforts of the regional and international scientific communities.
- To achieve that, adequate infrastructure and research conditions have to be provided.
- The "West African Science Service Center on Climate Change and Adapted Land Use (WASCAL)" was established to respond to these issues
- With a Sister Institution in Southern Africa

Building Capacity and Expertise to face CSA and Adaptation Challenges

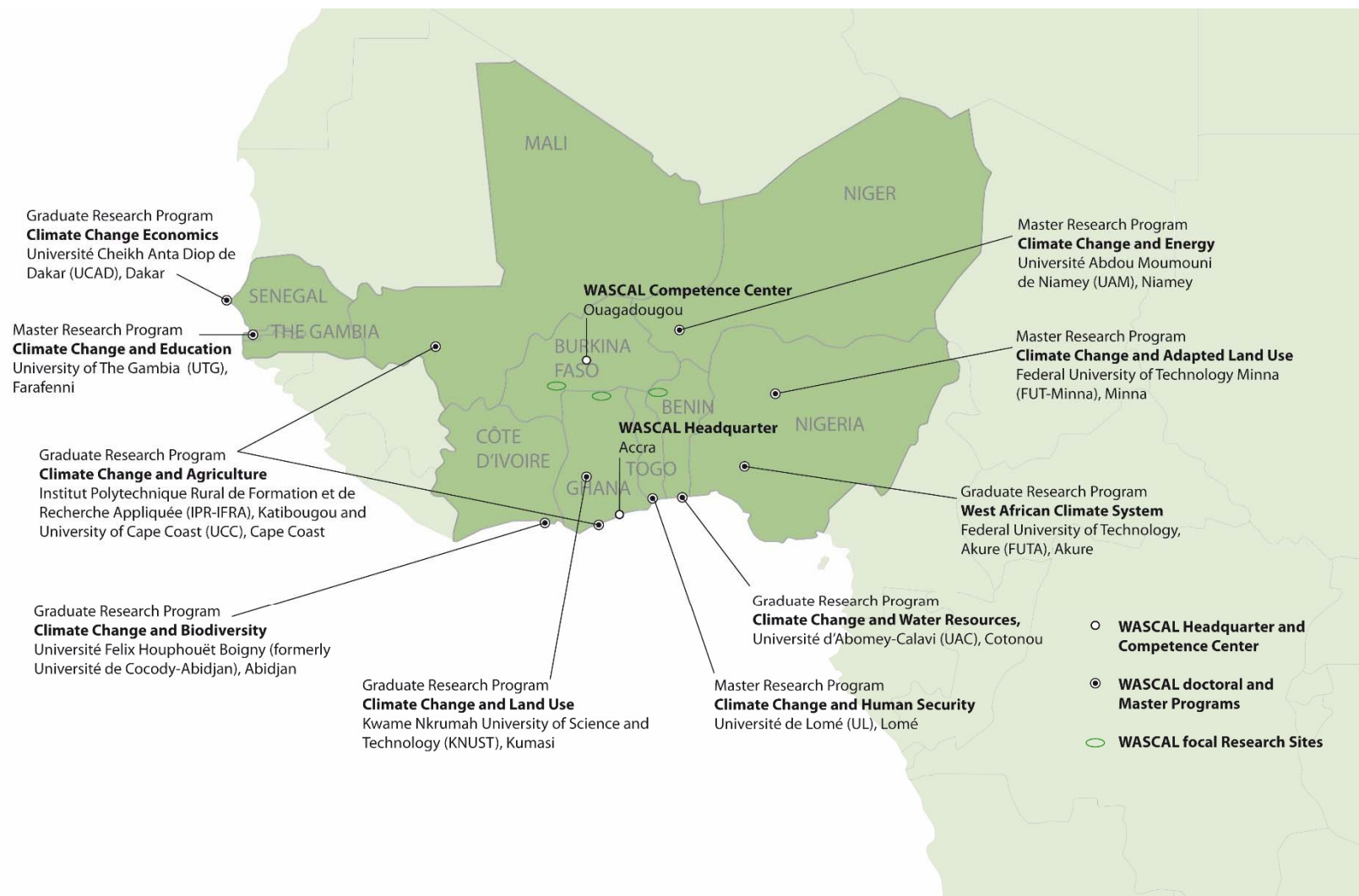
5th IPCC report:

831 invited authors – 66 were African scientists (8%)

- publications on climate and related issues:
2.4% from African scientist (1981-2009)
- academic staff / students ratio at universities:
Africa 1:25 – 1:30
Latin America 1:12 – 1:15
Asia (1:8) – 1:20

Hence, enhancing human and institutional capacities and the frameworks for building those capacities, such as WASCAL promotes, necessarily includes establishing appropriate infrastructure to enable and support technical training and advanced education in natural and social sciences. WASCAL is thus committed to focusing not only on outputs (information and policy advice), but also on the inputs that help to obtain these outputs.

WASCALs Graduate Research Program: 6 PhD, 4 MSc Schools in 10 W.A. Universities



2.6 billion people or
40 percent of the
world's population
are small-scale

farmers



**Africa is producer
but is suffering of
hunger while 35
billions of food
import**



Farming Practices /Extension

**African farmers have
developed several
adaptation options to
cope with current
climate variability, but
such adaptations may
not be sufficient for
future changes of
climate**



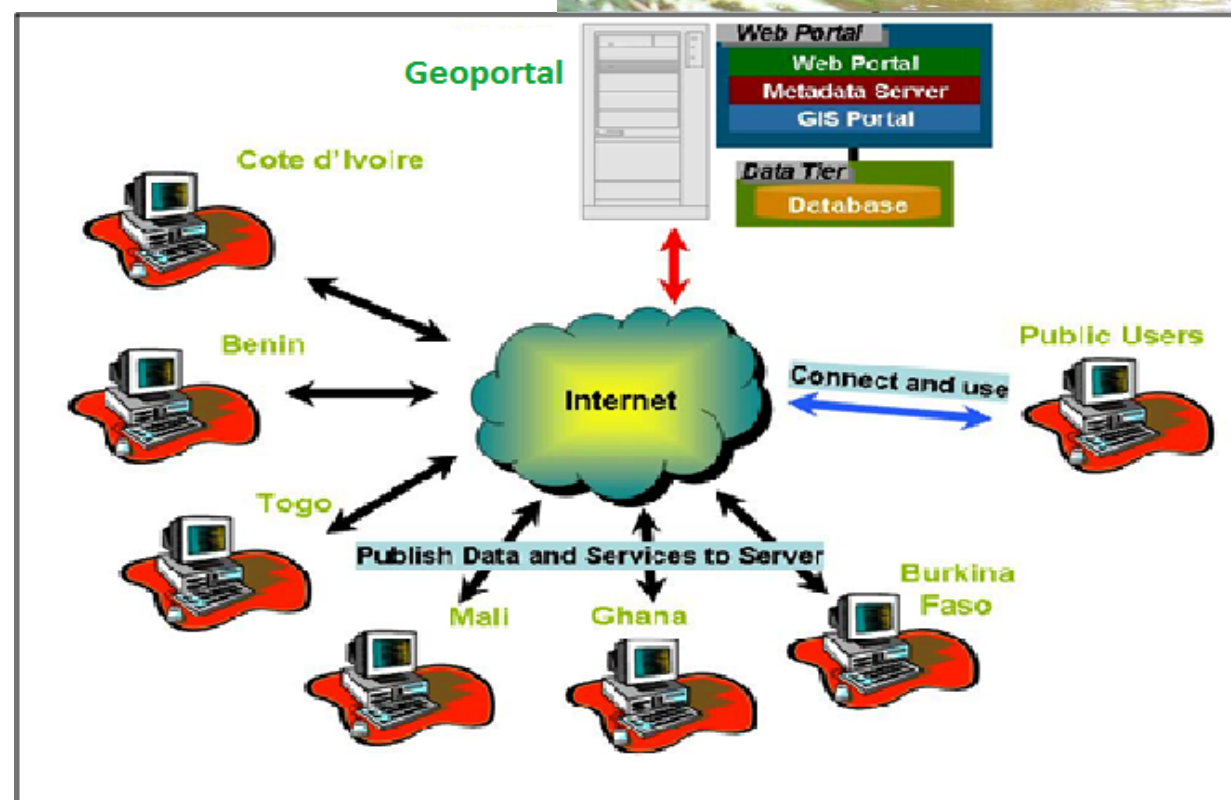
Spreading Existing technologies that demonstrated efficiency in climate change adaptation but not yet spread

Maintaining healthy soil to improve soil-related ecosystem services and crop nutrition => **Zai system**;

- Cultivating a wider range of species and varieties in associations, rotations and sequences => **cereal-legume intercropping and residues incorporation**;
- Developing strategies for buffering against temperature increases, => **massive tree plantations**;
- Using quality seeds and planting materials of well adapted, drought-prone and high-yielding varieties;
- Adopting the integrated management of pests, diseases and weeds;



Providing Climate Services: Reliable Information to Support Sound Policy Making



Information & Communication

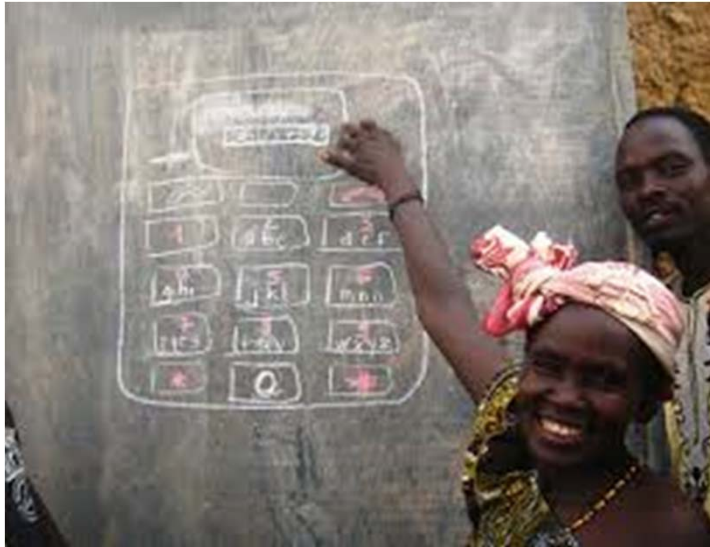


- Information and communication technologies (ICT) use in agriculture and rural development is a powerful instrument for improving agricultural and rural development.
- Access to information (markets, prices....) can considerably lower transaction costs
- Mobile penetration has exploded across Africa but:
- Only 30% of rural Africans are phone users

- Access problems:
- High prices of phone for rural households,
- Charging issue Rural Africa is the most expensive place to charge a phone
 - ==> electricity issue : only about 14 percent have access to electricity.



Communication-Opportunities



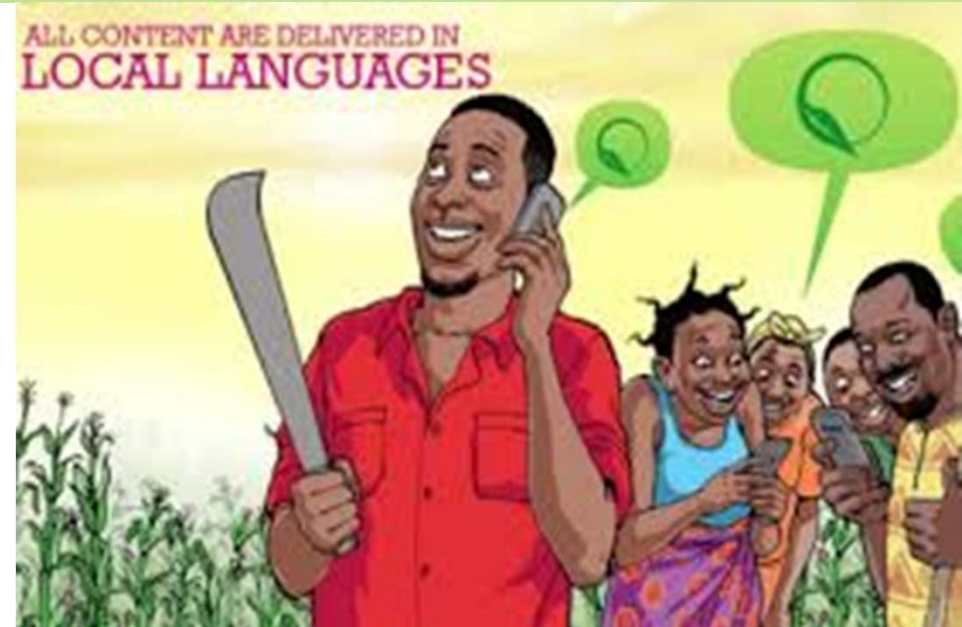
➤ For instance enable access to mobile phone

==> Enable access to energy for charging mobile phone (Renewable energy: Solar, biofuel, etc....)

==> Delivery in local languages

==> Learning process! Taking account local languages is a priority.

➤ To increase farmers' access to weather forecasting and risk management tools, such as insurance.



Promoting SLM: Example of Fertilizer Micro-Dosing

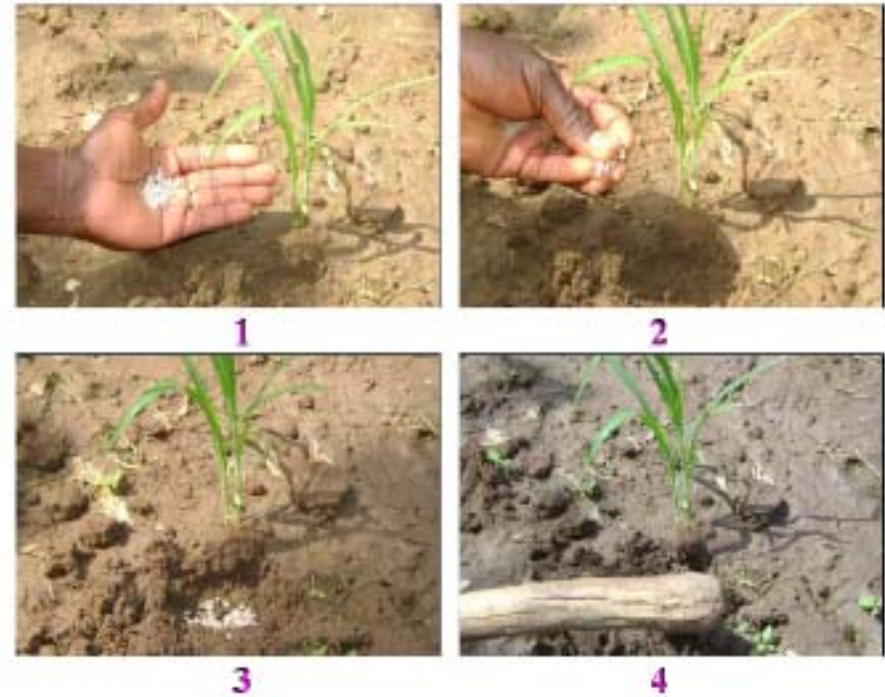
- Small doses of NPK fertilizer
- Localized application at sowing or after emergence

Ca. 4 kgs of P per ha
In Europe and North America farmers usually apply 3-6 times that amount

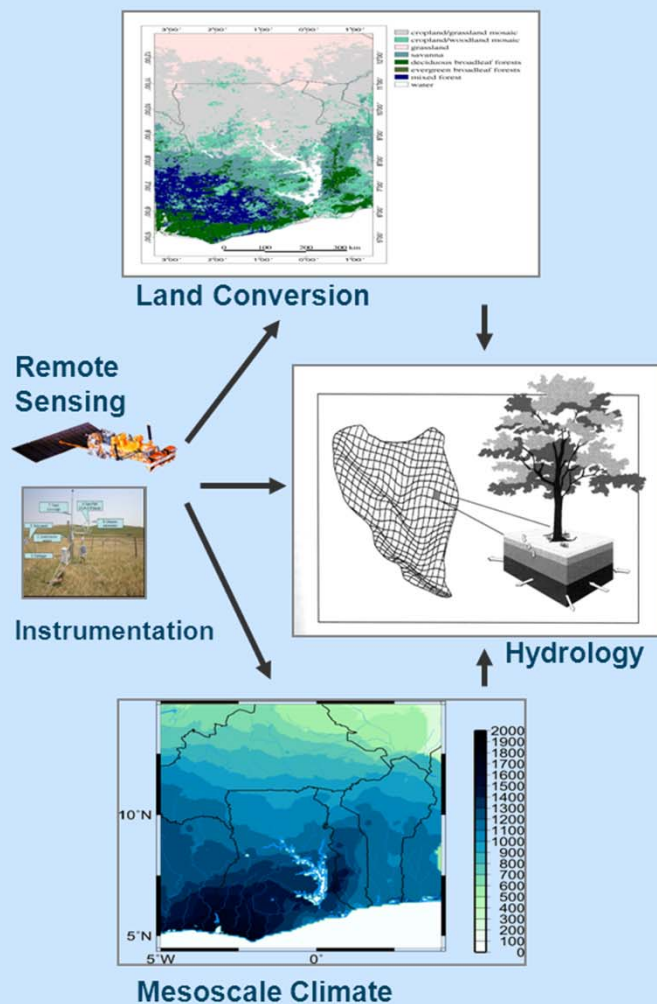
At seed sowing



After seed germination



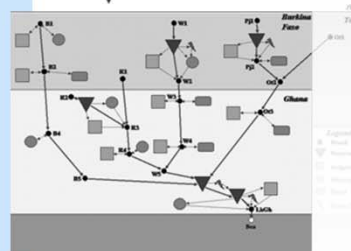
Climate, Land Use, Hydrology



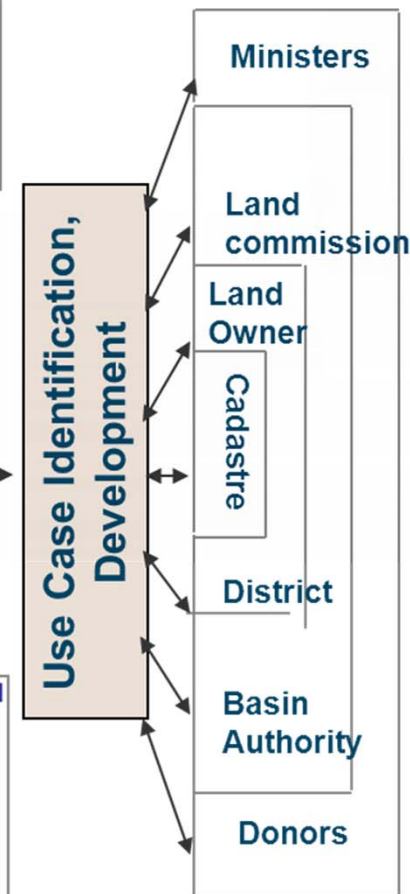
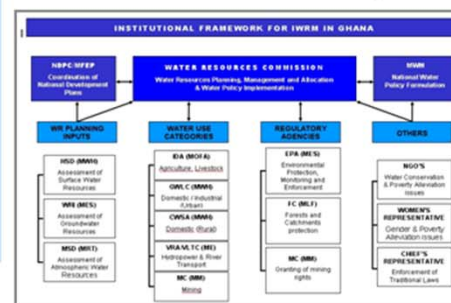
Economics, Institutions, Stakeholders



Field Investigations



Integrated Basin Model



Financial Instruments

- Important barriers to the adoption of CSA: Lack of investment and credits
- Climate finance :Mitigation finance is (or seems) easier to access
- For Africa, adaptation and climate resilience is a priority with mitigation as a co-benefit ==> **Urgent needs of funds for infrastructure (irrigation and whatever, equipment, roads...)**
- Climate finance policy context:
 - Global ==>(UNFCCC), Kyoto Protocol, Cancun Agreements, Durban Platform
 - Regional (Africa) ==>AUC-NEPAD , (CAADP)
 - National ==>National development, food security and climate plans

Important Role of Private Sector

- Private sector funds flowing into the African continent already exceeds current bilateral aid by seven times,
- National governments are urged to elaborate legislation supporting investments by private smallholders and private enterprises.
- Means must also be found to increase the contribution of the farmers, who are the largest private sector in Africa.

Conclusion

- Under a business-as-usual scenario, Africa will be hit much harder than any other continent by the impact of global warming and consequent CC & CV.
- To mobilize the sleeping giant Africa, the significant achievements of the past need to be complemented and continued with innovative actions. Together with an increase in agricultural productivity, living conditions in rural areas must be made more attractive to youth, whilst women need much better access to education.
- Enabling policies and instruments must enhance knowledge generation, improve education and communication, acquire financing and promote investment.
- The Climate Service Centers WASCAL and SASSCAL will contribute significantly to the research and education that inform these crucial policies and instruments

Thank you for your attention

