



The Niger River needs and actions planed



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Outline

- **Introduction**
- **Hydroclimatic context of the basin**
- **Some needs in the Niger River Basin**
- **Actions planned and project implementation**



The mandate assigned to NBA includes

- to promote cooperation among the member countries
- to insure the integrated development of the basin in all fields notably energy, water resources, agriculture, animal rearing, fish breeding, silviculture, transportation and communications, and industry

Political orientation of NBA

- Summit of Heads of State and Governments
- The Council of Ministers
- Technical Committee of Expert
- NBA Executive Secretariat



The AGRHYMET Regional Centre's mission

13 member countries

- **To collect and process data and disseminate information on:**
 - food security,
 - water resource management
 - desertification control
 - and climate change impacts;
- **To build technical capacities through training and transfer of tools, methods adapted to the Sahelian countries in**
 - climatology,
 - Agrometeorology
 - hydrology
 - information technology
 - crop protection,
 - Geomatics
- **To strengthen interstate co-operation by sharing methodologies and technologies between member states**



Geographical situation



➡ Most of the basin is in the Sahelian region



THE RIVER NIGER: summary

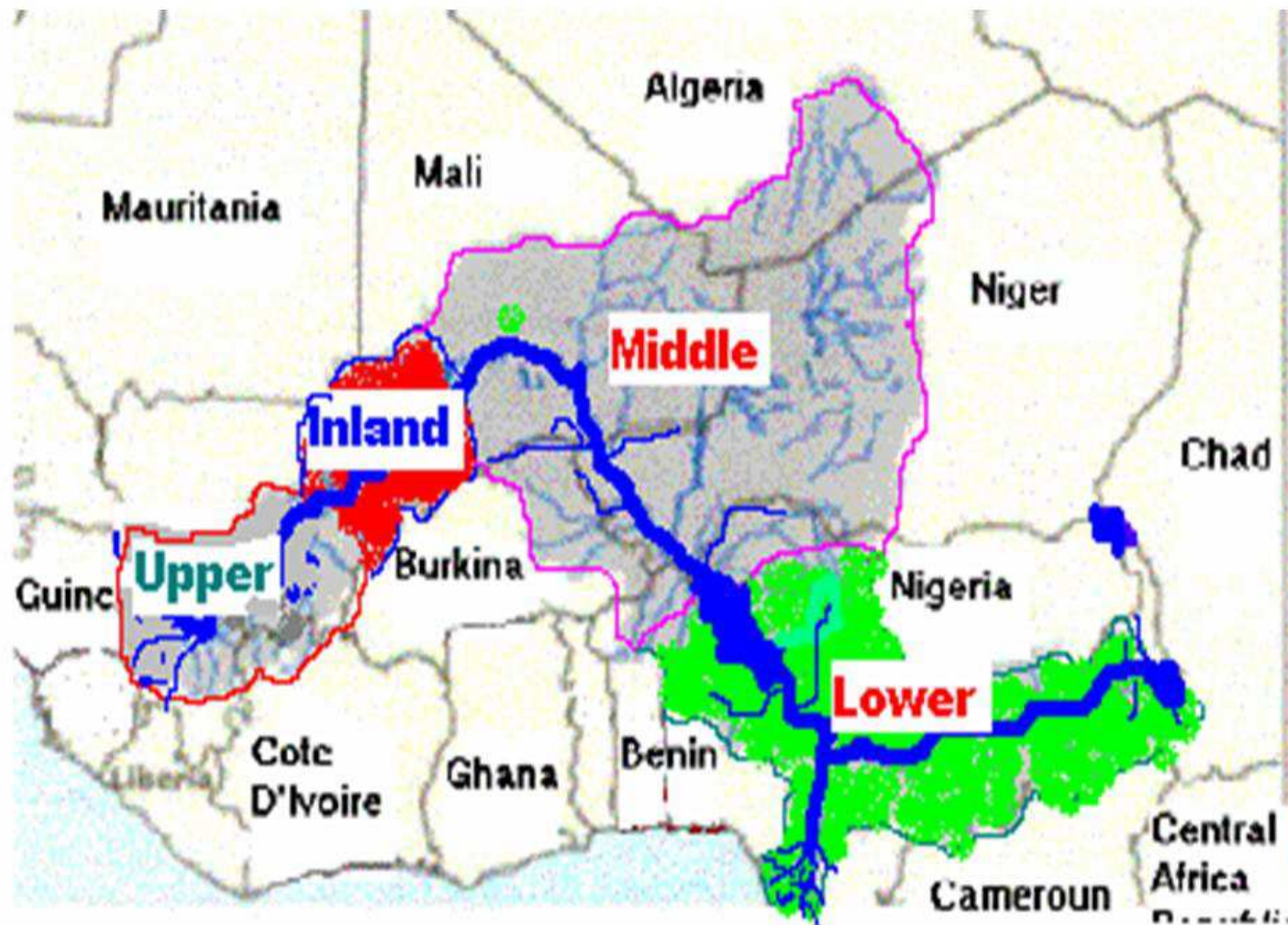
- 9th largest world river
- 3rd largest river in Africa
- Active Basin Area is about 1.5 million km²
- Total length of the river is about 4200 km

- Percentage of Basin in different Countries: Bénin (2 %); Burkina (4 %); Cameroun (4.5%) ; Tchad (0.5 %) ; Cote D'Ivoire (1%); Guinée (6.5 %); Mali (24.5%), Niger (21.5 %); Nigeria (32.5 %);
- the global hydro-agriculture potential in the basin is about to 2.5 millions of ha, but only 20% are currently used
- the hydro-electric potential in the basin is estimated to 30 000 GWH/an. The current production in the basin is about 7000 GWH, representing 30% of the potential producible.



NIGER BASIN HYDROLOGY

The entire Niger basin is usually sub-divided into 4 zones, based on their topographical and hydrological phenomenon as follows: The Upper Niger, The inland Delta, The Middle Niger, The Lower Niger





SOMME MAJOR PROBLEMS FACED IN THE NIGER BASIN

Physical and Environmental problems / Political and Socio-economic Problems

- Physical and Environmental Problem
 - ✓ Flow reduction as a result of the impact of climatic changes and environmental degradation
 - ✓ Silting of the river bed of the water streams
 - ✓ Pollution of various origins (domestic, industrial, craft industry, agricultural, mining)
 - ✓ Floating plants (water lettuce, water hyacinth, etc...)
 - ✓ Water and wind erosion
- Political and Socio-economic Problems
 - ✓ the management of water resources in the basin is made complex because of the insufficiency and the inadequacy of cooperation mechanisms (political and institutional) ;
 - ✓ the reluctance in some cases to put up common interest infrastructure on the national territory of a specific country (issue of national sovereignty) ;
 - ✓ the, sometimes, divergent interests of the countries and the difficulty to reach a basin wide consensus can delay regional integration ;
 - ✓ the difficulty in mobilizing funds for some national projects can be a factor aggravating poverty and the vulnerability of the populations ;
 - ✓ some policies/directives of some development partners do not make it possible to obtain the support necessary for the development of resources in the basin ;
 - ✓ the political instability in the sub-region



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Hydroclimatic variability in the basin



The River Niger Basin faced the most severe drought

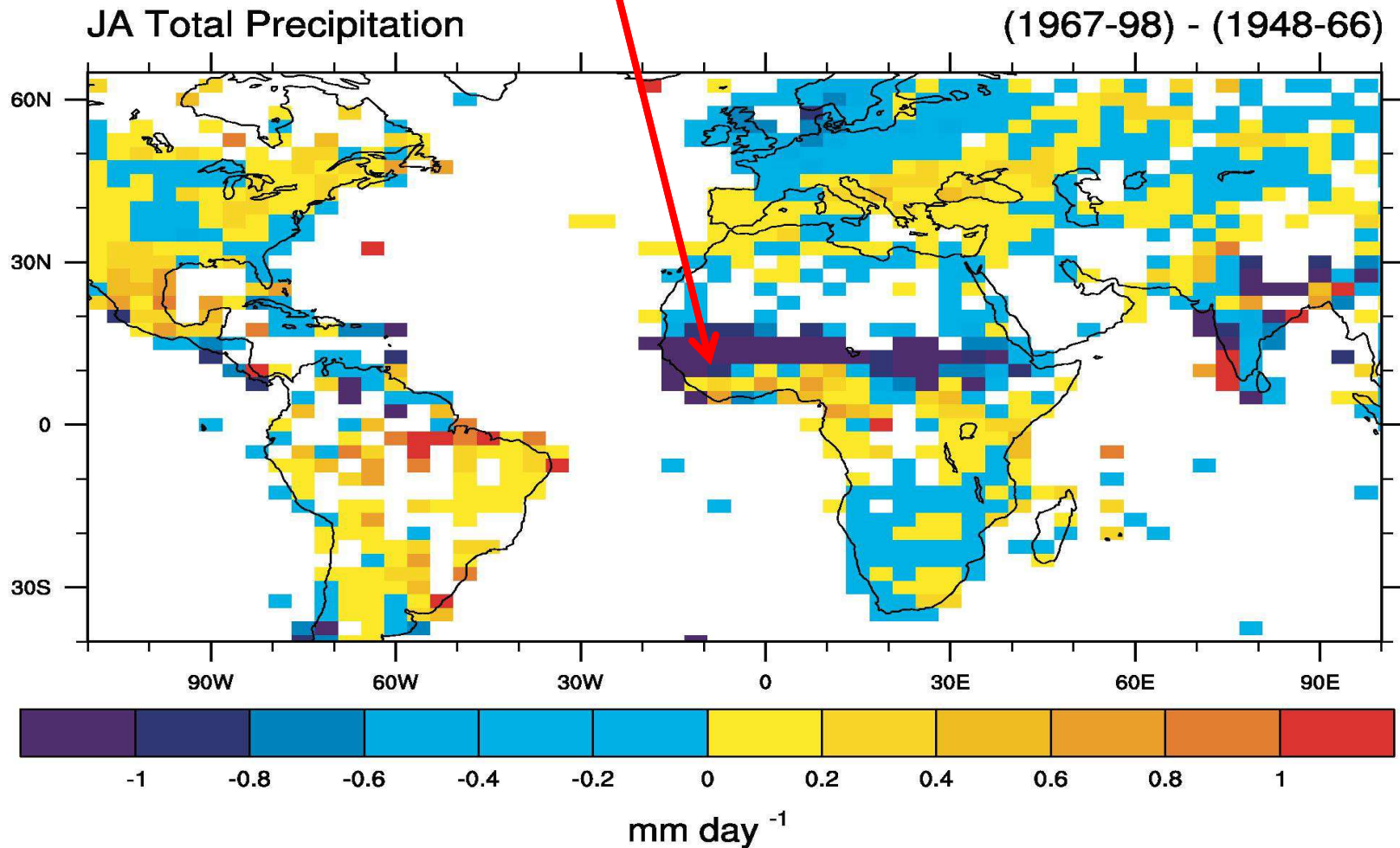
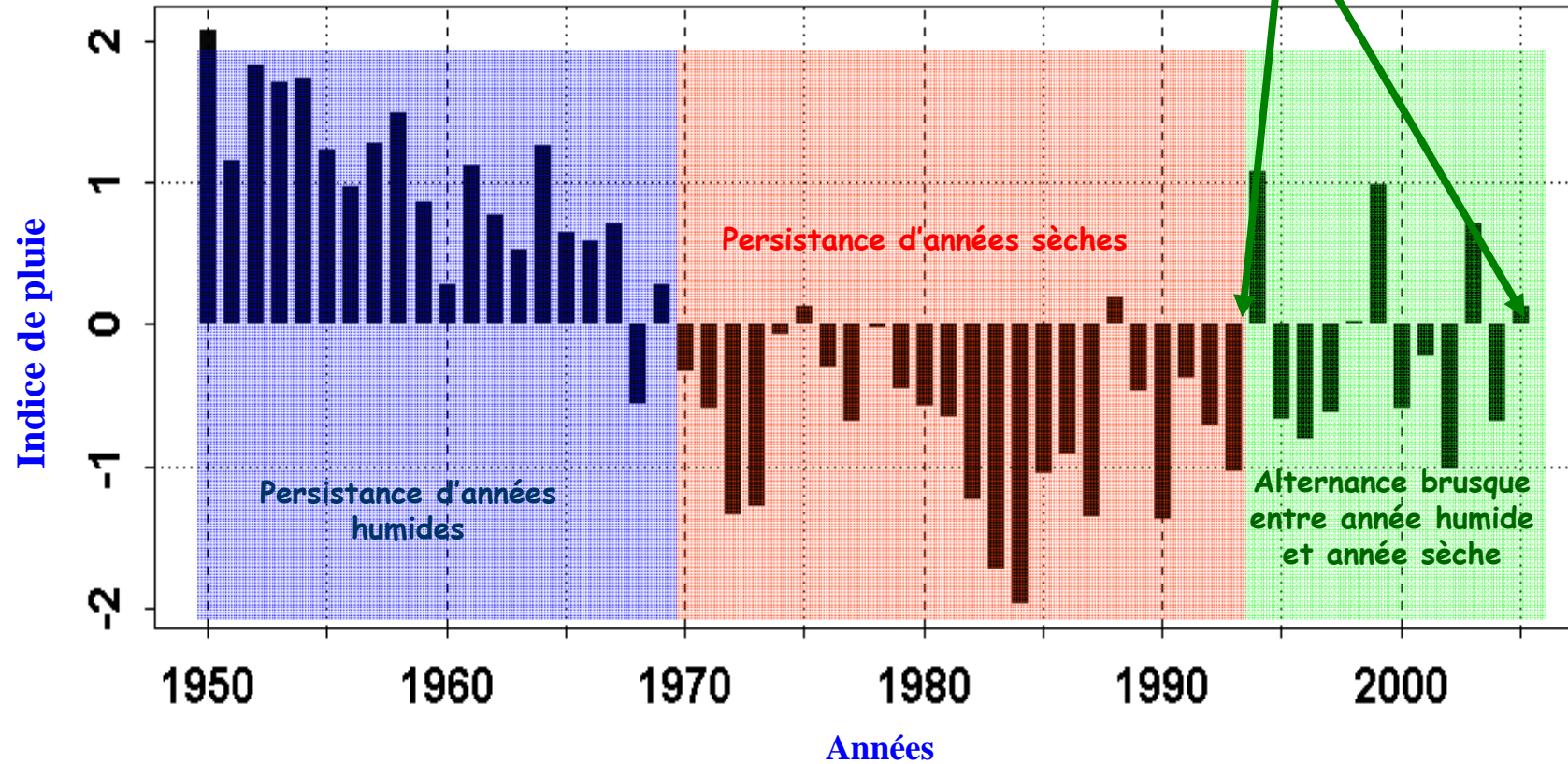


Fig. 3: The change in high summer (July-August) total precipitation (mm day^{-1}), 1967-1998 minus 1948-1966, estimated from land surface records ('g55wld0098.dat' constructed and supplied by Dr. Mike Hulme at the Climatic Research Unit, Univ. of East Anglia, Norwich, UK).



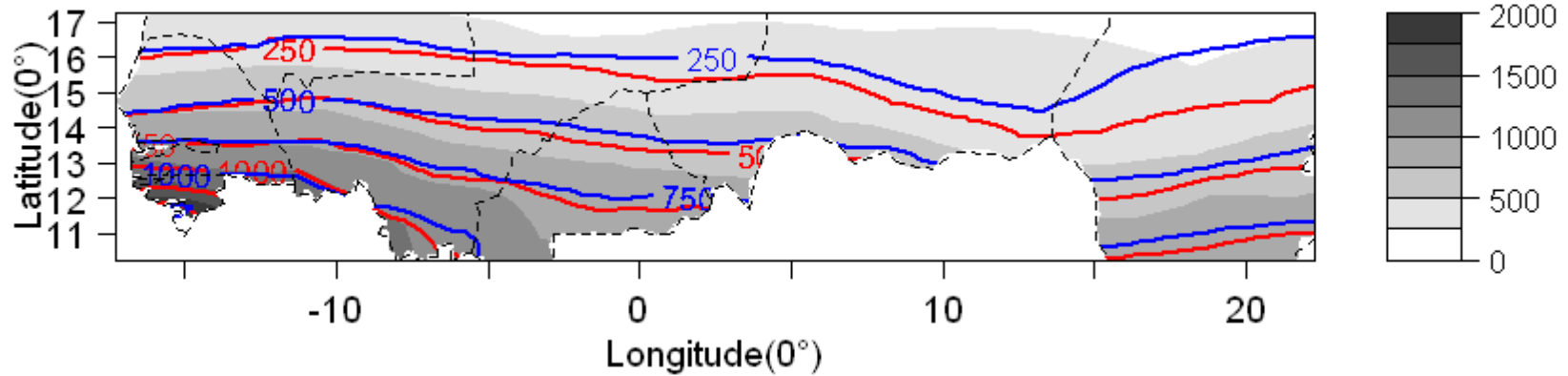
Current trend



A new mode in the rainfall variability seems to be installed in the region



The Upper Niger Still faces to the persistent drought

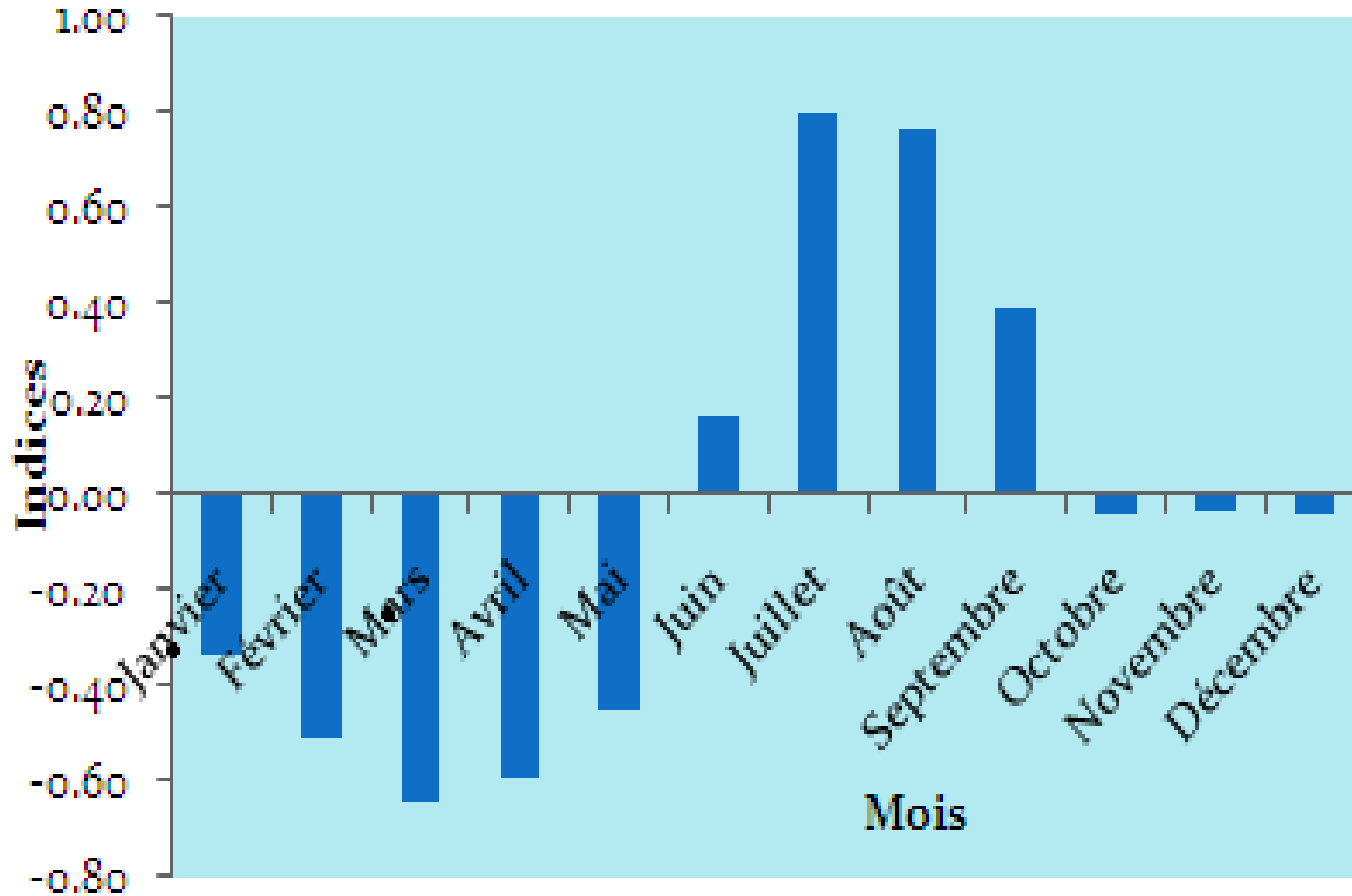


1950 – 1969 : wet period
1970 – 1989: dry period
1990 – 2009: current period



More river flow during the rainy season, severe low flow in the dry season

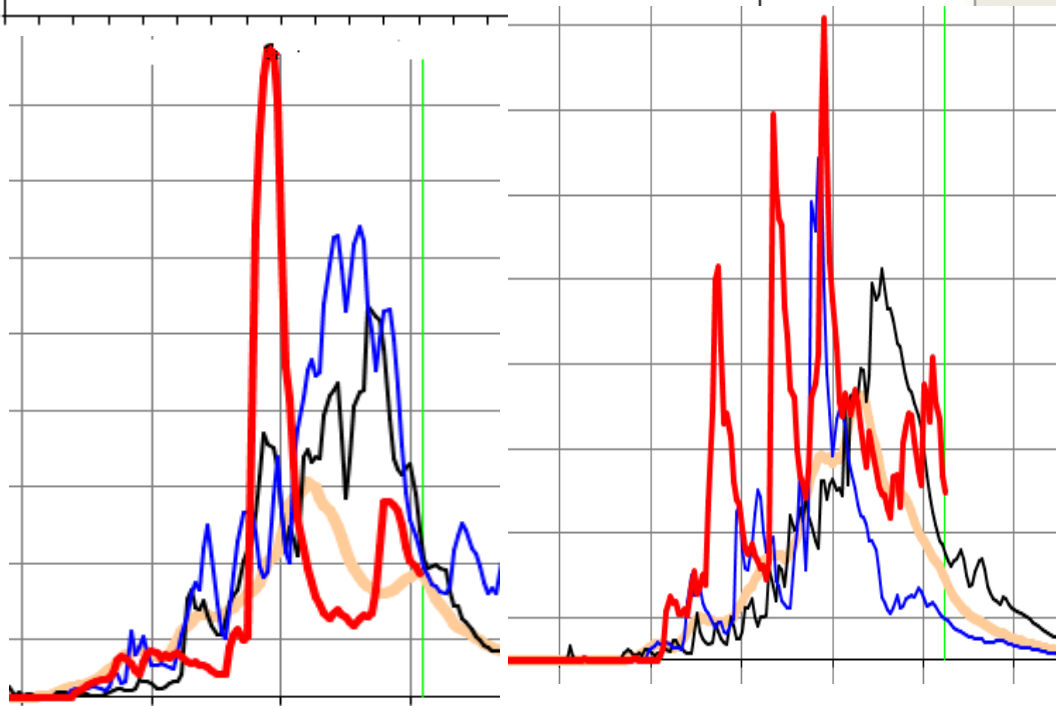
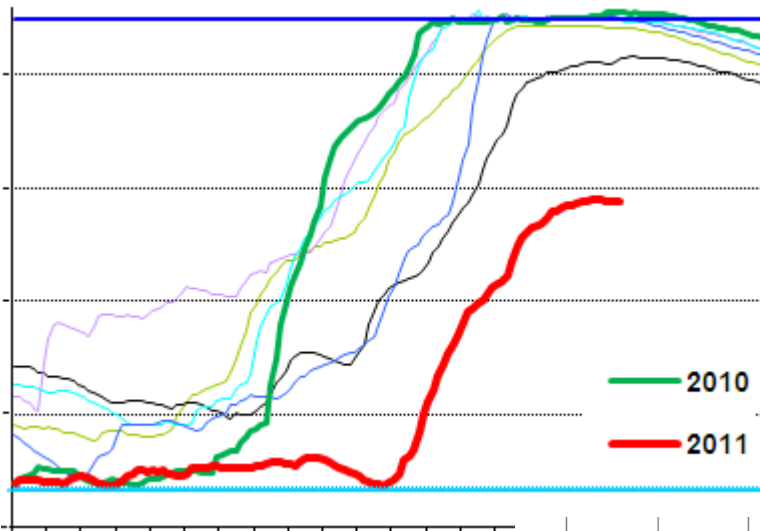
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Some hydrographs for west-Africa River for 2011 and 2012

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Some urgent needs in the Niger River basin

- Operational and relevant hydrological and meteorological data collection network in the basin;
- Relevant forecasts at all different time-lead: seasonal, intra-seasonal and near real time forecast on meteorological and hydrological conditions are one the need N°1, regularly expressed by stakeholders during several meetings;
 - ✓ What is the coming rainy going to be? More rainfall and river flow or less. What will be the repartition? The probability of extremes (heavy rainfall and very long dry spells)? When will dams start receiving inflow? Early or late onset, the length of the rainy season?
 - ✓ What actions? the choice of crop varieties. Do people promote the use of plateau area for agricultural activities instead of shallow area? Is it recommended to use fertilizers? Etc...



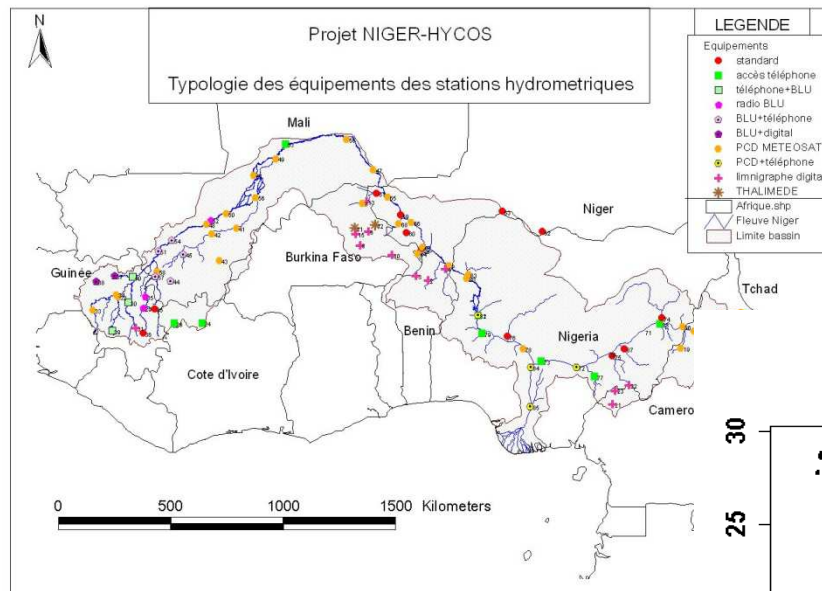
Some urgent needs in the Niger River basin

- **Concern about the future: what is the future going to be in terms of hydrological and climatologic conditions in the basin in order to support and better plan the long term development programs;**
- **Water resource information to promote the development of local scale irrigation: this consist of assessing and monitoring the water resource in small basin to support agriculture development, in particular for small unguaged basins**
- **Needs of information to support the operationalization the Shared Vision and Sustainable Development Action Plan adopted countries.**
- **Improve the communication of these information to end-users**
- **Promoting and finalizing the Signature of a data charter in the region**



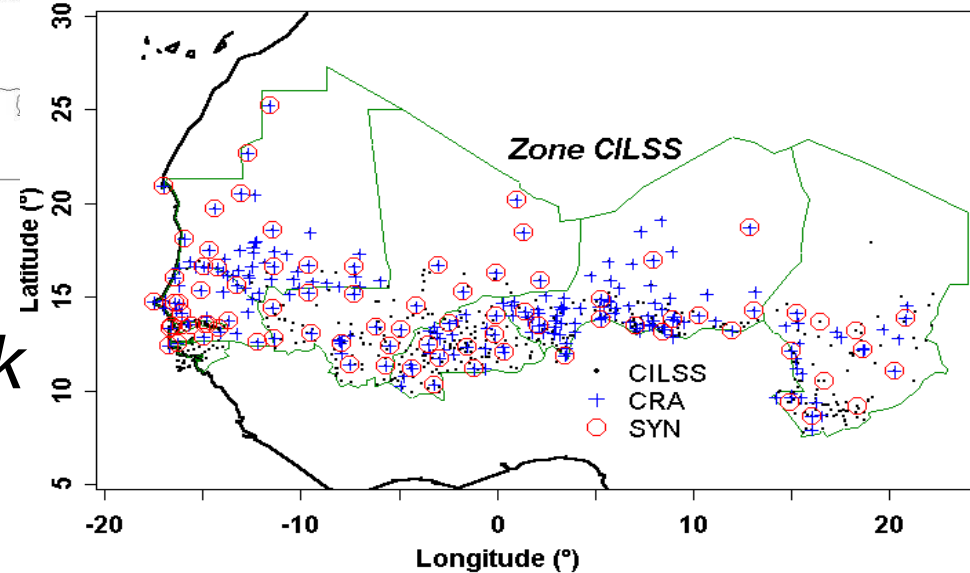
The current situation: Hydrological and meteorological data

- Hydrometric data exist, mostly in the framework of Niger-HYCOS and their accessibility is not so crucial
- Meteorological network exist, not fully operational, but the issue concerns the accessibility;



hydrometric stations

Raingauge network





the Hydrological Network Stations)

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hydrometric stations

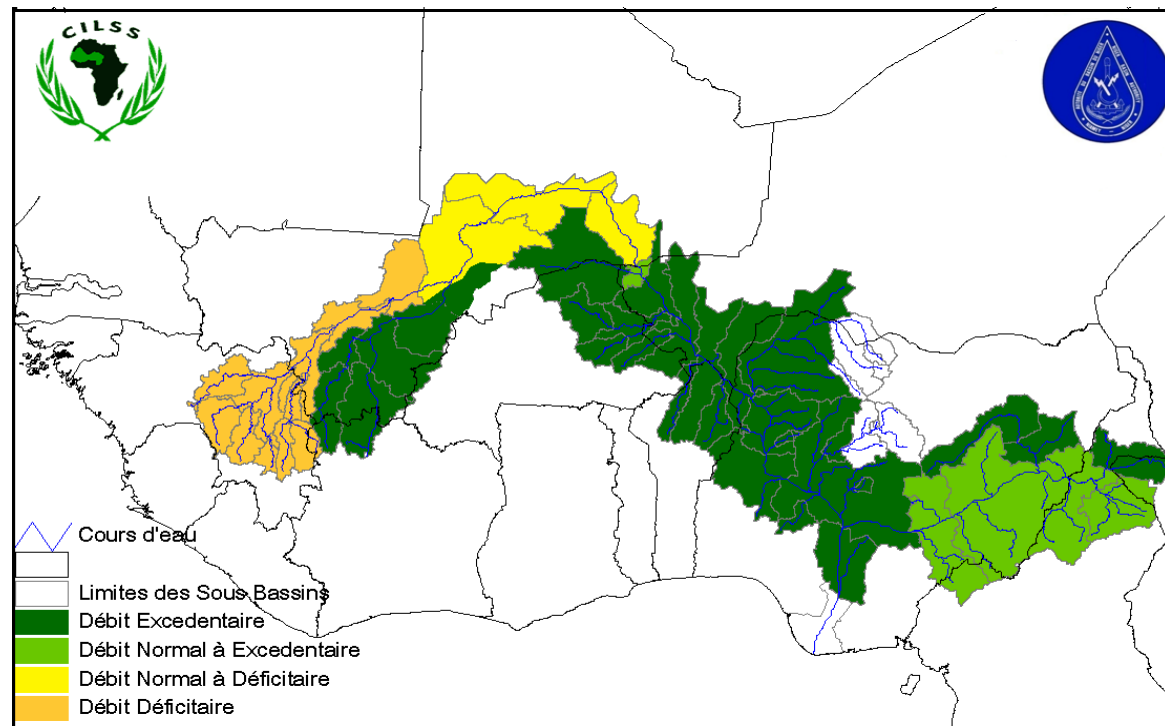
DCP





The current situation: Existing forecast products:

Qualitative seasonal forecast already operational;
Discharge/Discharge system of flow forecasting exists at NBA, but it is not relevant during the rainy season, and doesn't work for small tributaries.



Seasonal river flow forecast made in May for the Niger River Basin



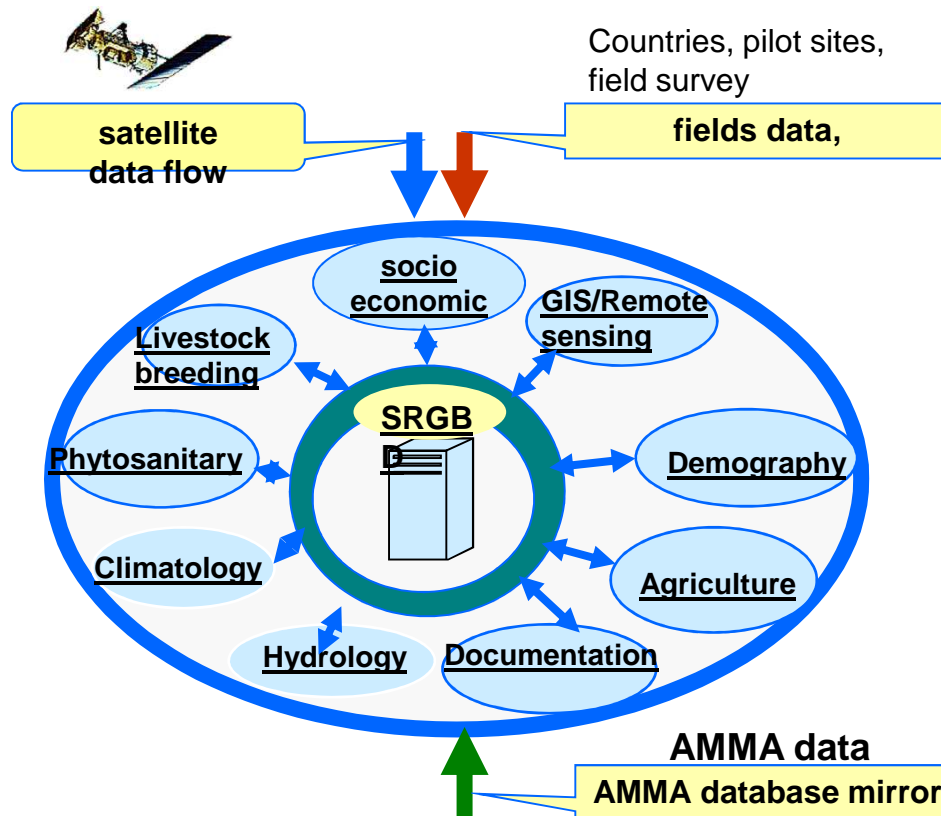
Niger project implementation and action plan for 2013 - 2014

- **Improve data collection and management (2013 – 2014)**
- **Develop and operationalize an integrated forecasting system (2013 – 2014), supported by University of Tokyo.**



Improve data collection and management

- Define optimal hydrometric and meteorological network (2013 – 2014) to support monitoring and forecasting activities in the basin
- Finalize by 2014 the data charter with the NMHS
- Operationalize an integrated regional data system accessible online by 2014



**Regional
integrated data
base system (at
AGRHYMET)**

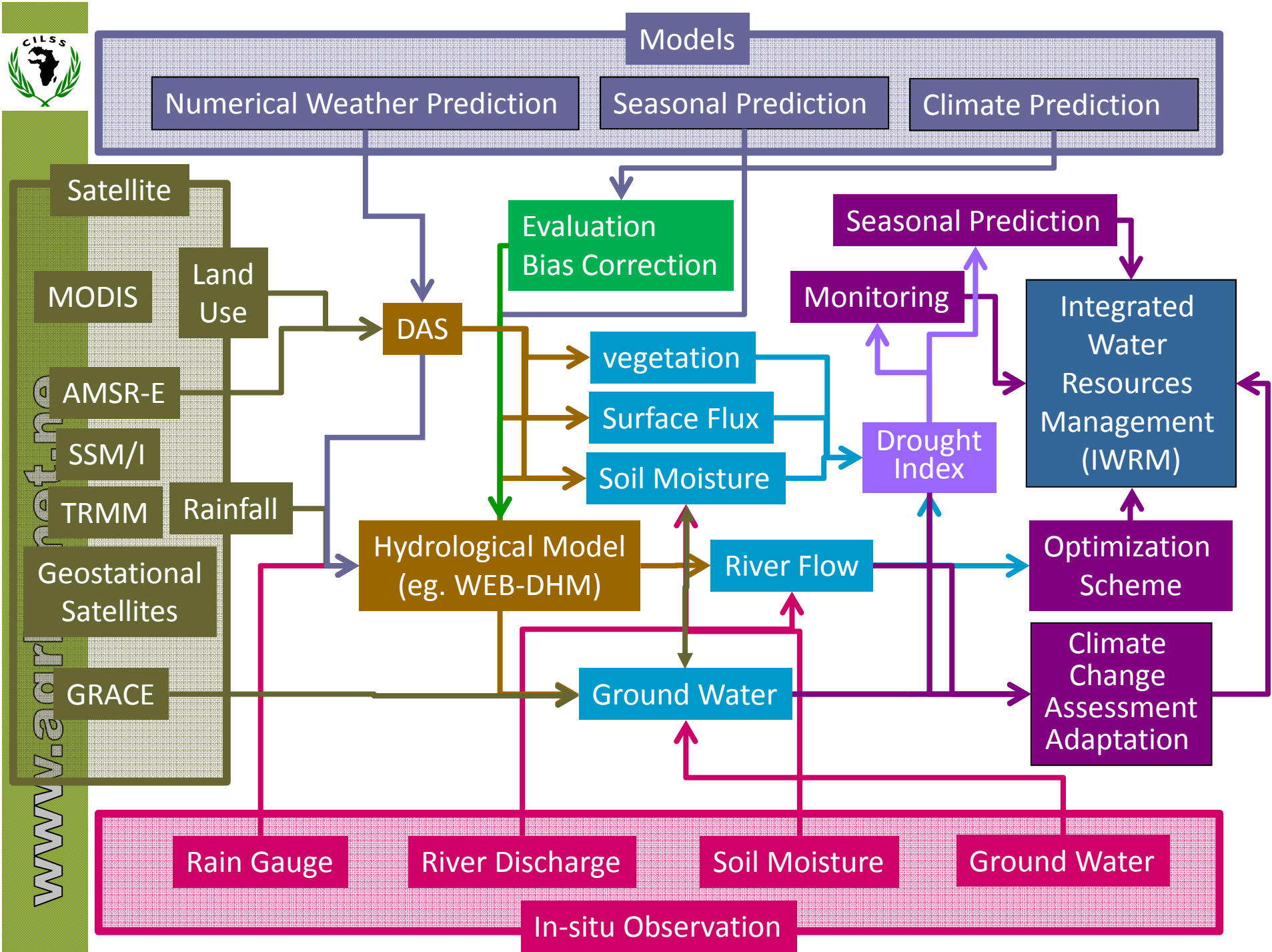


Integrated forecasting system supported by University of Tokyo

- **The Upper Niger which is the most strategic part of the basin is considered for the application of the system**
 - **Faces to high climate variability**
 - **Environmental changes and degradation**
 - **Because of the growing needs of populations, many dams are planned to be built in the Upper-Niger**
 - **Mine exploitation and source of pollution**



- **ACTIONS**
- **Developing Integrated Monitoring Systems**
- **Developing near-real time observing systems that can maximize the benefits of coupled satellite and in-situ measurements**
- **Linking meteorological, hydrological and agricultural observations obtained from different sources in an interoperable system**
- **Developing a long-term, comprehensive climate observation data base for the basin.**
- **Developing Integrated Early Warning Systems**
- **Weather and seasonal predictions should provide inputs to hydrological and agricultural prediction systems.**
- **Optimized prediction systems need to be developed for reducing disaster risks and increasing societal benefits**
- **Assessing Climate Change Impacts for Adaptation**
- **Recent climate model applications should be facilitated by multi-model analyses, bias correction and downscaling.**
- **An assessment of the importance and characteristics of the climate-water-food-energy nexus should be carried out for the basin**
- **Data and Information Integration and Sharing System of Systems should be developed and implemented**
- **Capacity Building Programs should be tailored to the needs of the region and should be provided on a routine basis.**
-
- **SCHEDULE**
- **2 year: conduct an integrated research- oriented feasibility study**
- **3 year: implement an operational program that will strive to be self-sustaining at the end of three years (five from the start of the project)**



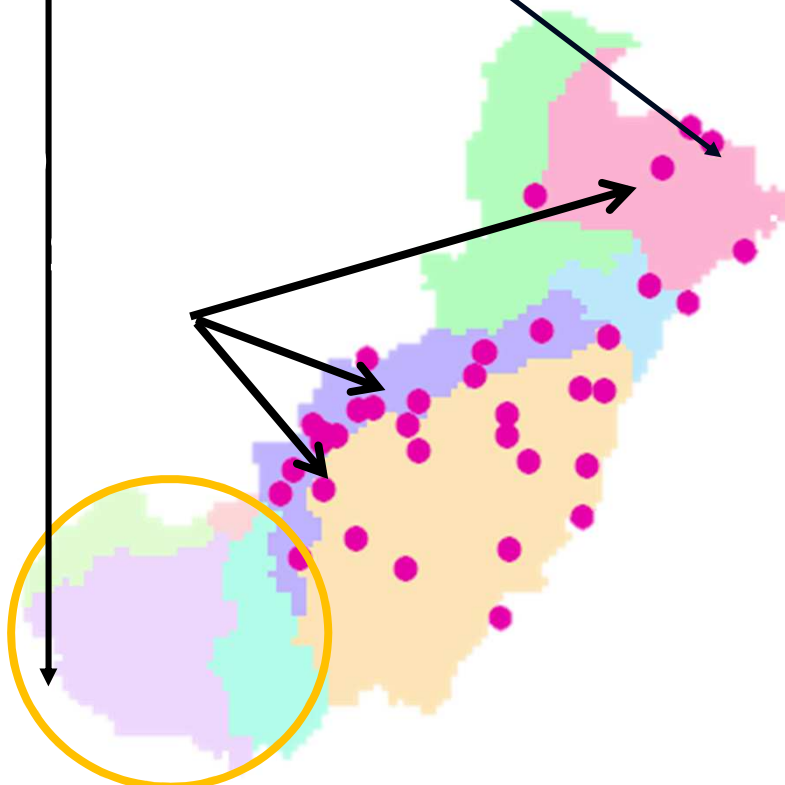


Problems in the Upper Niger



no-gauges are presently available for the project

Alternative solution is needed



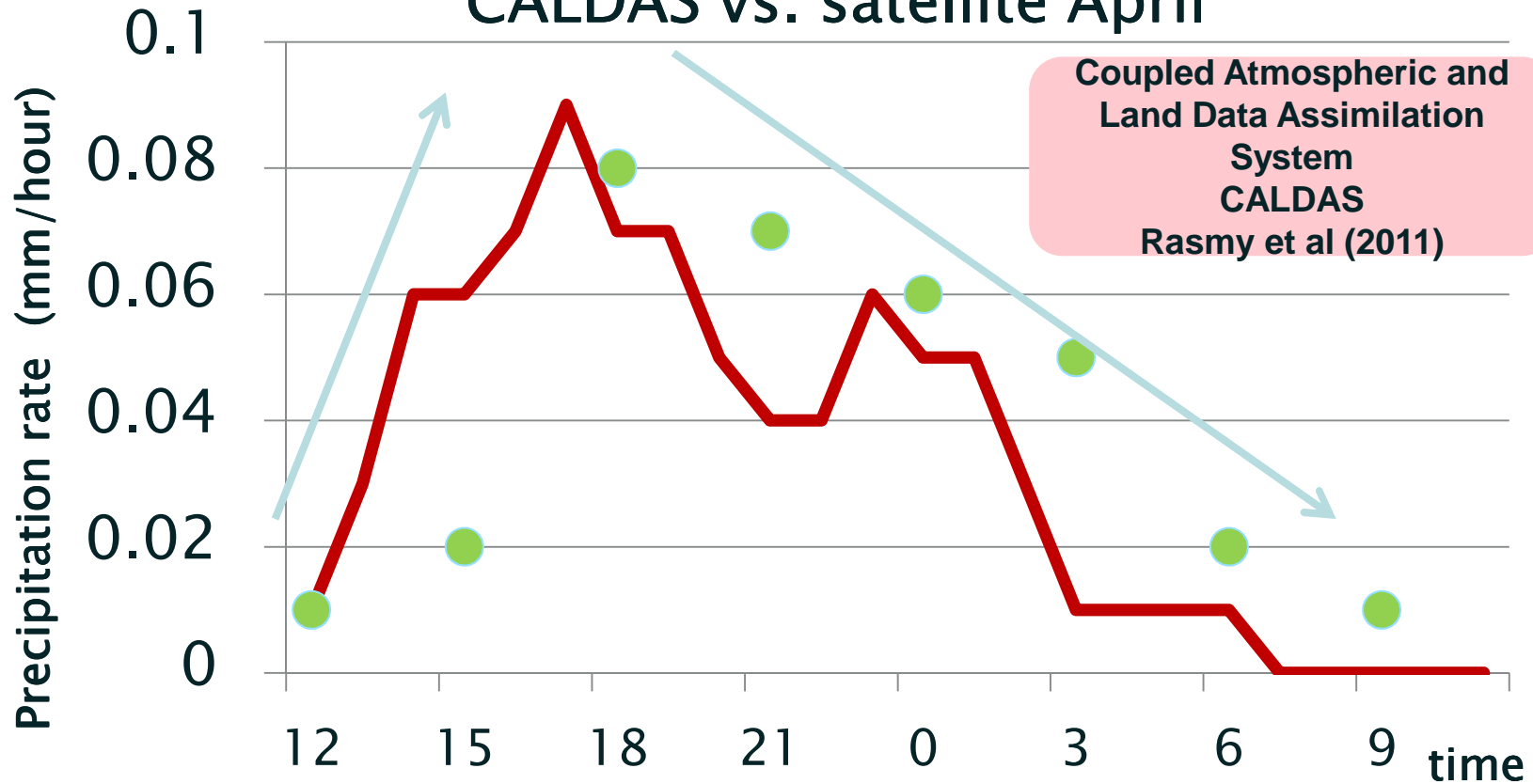
model simulation



Estimation of precip. rate ~Apr~

Precipitation rate

CALDAS vs. satellite April



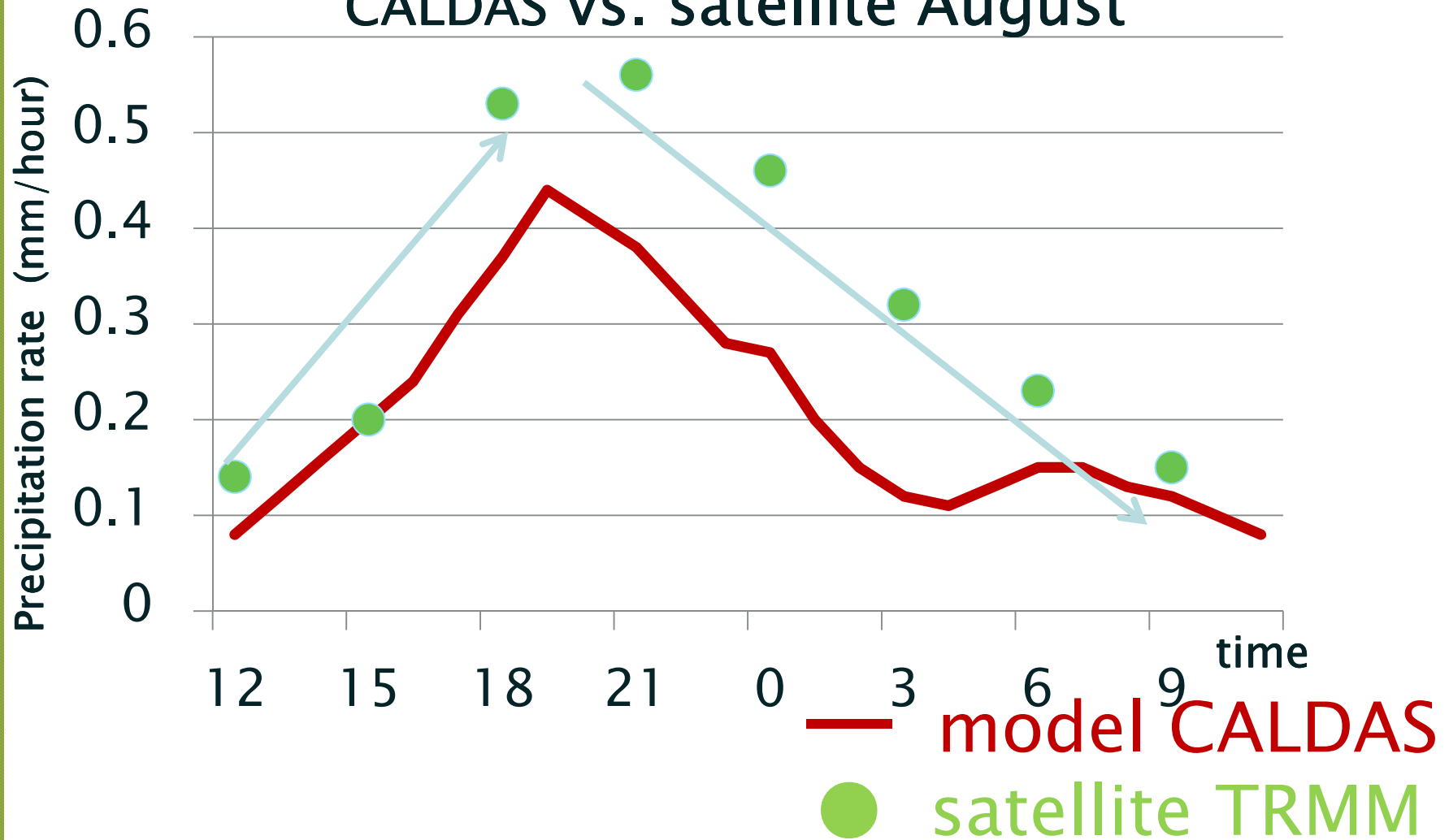
— model CALDAS
● satellite TRMM



Estimation of precip. rate ~Aug~

Precipitation rate

CALDAS vs. satellite August





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Thank you for your attention