The session 3330b « Facing climate change in Sub-Saharan Africa » has taken place at UNESCO Headquarters. Five (5) oral scientific presentations have been shared with participants estimated around one hundred (~100) coming various African, European and American institutions. This session was focused on climate change impact and adaptation.

1. What are the session key findings? What are the new Lesson(s) learned / Scientific progress (since AR5 release, if relevant)?

   a) Robust projections of negative impacts are predicted, particularly in West Sahel.
   b) Most proposed “adaptations” are not more beneficial in the future than in the current climate -> not really reducing climate change impacts.
   c) Increased temperature resilience during grain formation period is the main adaptation that emerges. Also, changing from the traditional to modern cultivar and later sowing in West Sahel appear to be robust adaptation strategies. Water harvesting had fewer benefits than expected.
   d) Improve understanding of climatological and hydrological systems - and ability to predict future water availability. Predicted impact of Climate Change on water limited yield is concerning but small compared to room for improvement of actual yields.
   e) Farmer’s yields may strongly increase even under Climate Change constraints.
   f) Global re-greening over the Sahelian bands over the last 30 years, explained by precipitation recovery. Satellite archive provides indexes that are well related to vegetation production (herbaceous) and is reliable concerning temporal trends. Not uniform behaviour should be highlighted (in some areas vegetation degradation (Fakara, observed by both satellite and in-situ; possible fallow degradation)). Even in re-greening areas, degradation can occur at a finer spatial scale, observed for some shallow soils in the Gourma with important consequences on the hydrological system.
   g) Simulations of Rift Valley Fever and ability to develop for other vector borne disease:

   - For Malaria simulations:
- Length of the malaria transmission season and prevalence increases over the highlands of Ethiopia, Rwanda, Burundi, south-western Uganda; decrease over the eastern coasts of Kenya and Uganda.
- Southward shift of the malaria epidemic belt (changes in seasonal length low prevalence values in the north of the region.
- Similar patterns across all climate multi model ensembles.

For Rift Valley Fever simulations:
- Established a dynamic model with two vectors and stratified host population.
- As far as is possible responds as expected to current climate drivers.
- Shows future changes with altitude due to warming and rainfall pattern changes, especially in highlands in Kenya.

2. What are the major knowledge Gaps and Research Needs identified in the session?
   a) Generate evidence to inform management and policy decisions.
   b) Mediate between competing demands to achieve equitable and sustainable water use for all.
   c) Enable adaptation to reduce vulnerability to future change.
   d) Contribute to economic development and poverty alleviation.
   e) Impact of Climate Change on the risk associated with crop intensification.
      a) It might be wise to intensify crops, but:
         - Global Food security 2050: no credible scenario without closing yield gaps as part of the solution.
         - Highest yield gaps are in Sub-Saharan Africa (local food security + poverty).
            - agricultural area per capita often close to or below threshold under which food security is not ensured at household level with current yields.
            - Income per capita very often below poverty threshold in SSWA.
            - Migration from rural areas has become the sole adjustment variable for many families, despite the lack of job opportunities in urban areas.
      f) Regarding, desertification versus re-greening debate, there are valuable needs on reliable data, including in-situ long term observations that is fundamental.
      g) Verification of current climate malaria and Rift Valley Fever simulations.
      h) Improvement in rainfall simulations from climate models at daily levels.
      i) On-going bias correction of temperature and precipitation fields from GCMs.
      j) Use of ESMs for vector habitat climates.

3. Did the session discuss/identify promising approaches in the fields of Adaptation and Mitigation, or both?
   Co-development of empirical data for parameter settings and model verification.

   Interdisciplinary observatories are able to monitor climate-environment-society changes, then providing opportunities to set-up reliable adaptation solutions.
Yield intensification is necessary/fruitful in sub-Saharan Africa and the related climate change impact risks must be evaluated. Implement policies must be incentive to yield intensification.

4. Are there take-home messages from the session?
   a) Strong need in maintaining observatories for in situ measurements and data collection.
   b) Strong need to reduce uncertainties regarding science based products.
   c) It is urgent to determine and implement policies incentive to agricultural intensification (= yield + income jointly increasing), as it might be easier under present climate than in the future.
   d) Sentinel sites (if not already established) for monitoring changes in altitudinal and latitudinal changes in malaria and Rift Valley Fever distributions.
   e) Non-climatic factors need to be linked within an integrated analysis.
   f) Communication outcomes relevant government and development programmes.

5. Are there Important Quotes from the session?

6. Please include any other remark that you might have.

Some actions can be taken now in one hand, and in the other hand on-going initiatives are expected to bring new findings during the next years, in a short-term perspective. In some cases, seasonal forecast products can help among adaptative strategies.

Regarding coming initiatives, we can mention:

   a) Future Climate For Africa (FCFA), supported by DFID & NERC.
   b) HyCRISTAL (Integrating Hydro-Climate Science into Policy Decisions for Climate Resilient Infrastructure & Livelihoods in East Africa).
   c) Weather & Climate Information Services (WISER) supported by DFI.
   d) LVB-HyNEWS (Lake Victoria Basin - HydroClimate to Nowcasting for Early Warning Systems).
   e) Date Rescue (DARE) supported by WMO.