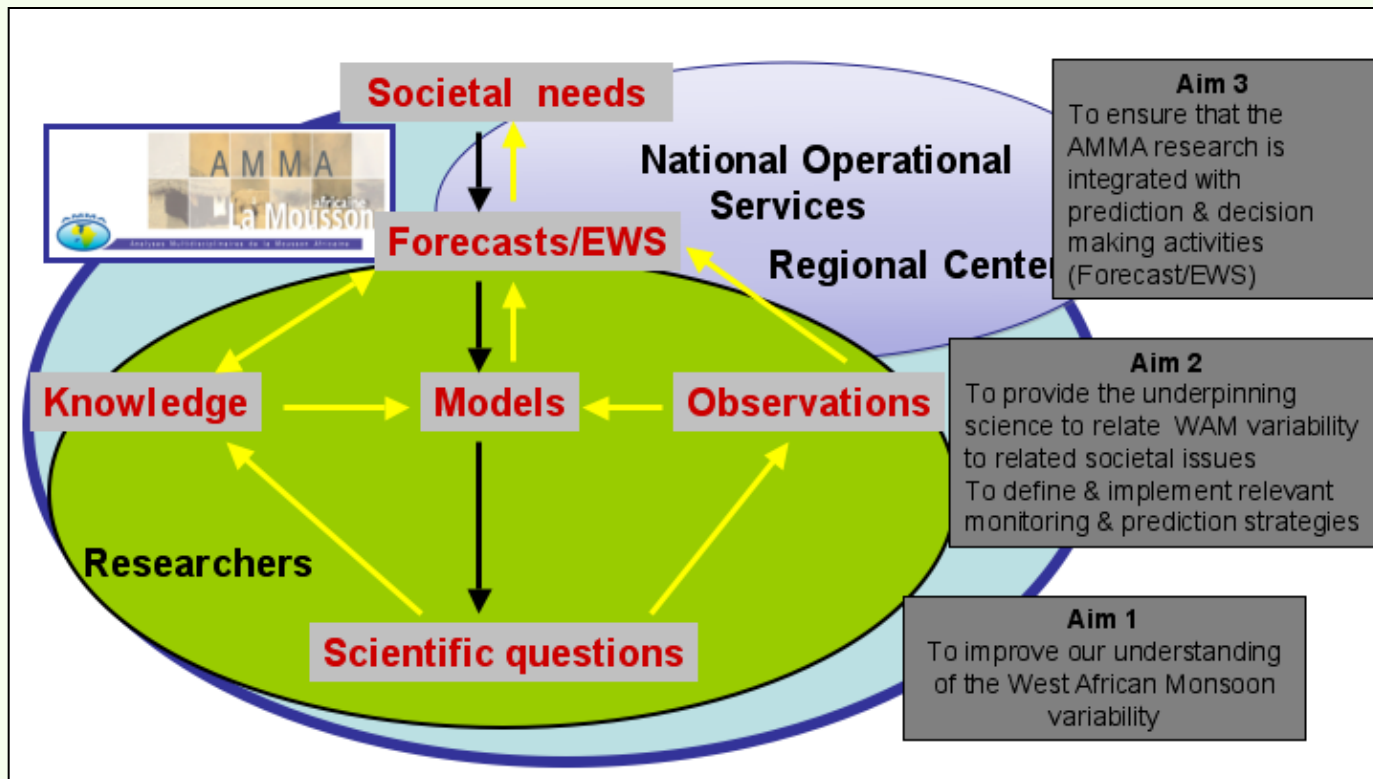




# African Monsoon Multidisciplinary Analyses

<http://www.amma-international.org>

AMMA is an international programme to improve our knowledge and understanding of the West African monsoon (WAM) and its variability and has emphasis on daily-to-decadal timescales including climate change. AMMA is motivated by an interest in fundamental scientific issues and societal needs for improved prediction of the WAM and its impacts on West African nations.





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## 1. Key advances in understanding/success of the programme

- (a) The first international experiment in Africa at regional scale & long term observational network. AMMA's implementation and coordination of observing systems in the West African region including the long observation period since 2001 as well as the more extensive research field campaigns between 2005 and 2007. Societal data have also been collected at the place of the high resolution geophysical observatories, enabling some estimate of the anthropogenic impact (land use).*
- (b) Improved understanding of the West African Monsoon and its influence on the physical, chemical and biological environment regionally and globally, from weather to climate scales (> 700 peer review papers, 10 special issues).*
- (c) The underpinning science that relates variability of the West African Monsoon to issues of health, water resources and food security for West African nations has been established.*
- (d) A unique data set documenting the sea-air-continent system over full seasonal cycles and over an eco-climatic transect. Two twin databases in France and at AGRHYMET. Has been used for models evaluation and improvement.*
- (e) AMMA has achieved the establishment of a large and active African community working on AMMA science - the AMMA-Africa network "AMMANET".*
- (f) Enhanced capacity building and training among West Africa scientists (PhDs, summer schools,...).*



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## 2. Remaining gaps/continuing limitations to achieve greater progress

(a) *Climate global and regional models have still failures preventing to use them with confidence (warm bias in the Guinean gulf, rainfall intermittency not well simulated,...). There is also a lack of knowledge on the uncertainty propagation from large scale models to impact local models (crop & hydro models).*

(b) *The observation network is presently not as dense as it was in 2000-2009, and it is very difficult to get funds available on the long term to support such networks.*

(c) *The multidisciplinary research carried out in AMMA has not been effectively integrated with prediction and decision making activities in order to deliver products from science relevant to societal needs. A closer collaboration with operational meteorological and hydrological centers is now needed and has started recently.*

(d) *AMMA has begun to consider a more integrated approach of climate-environment-society interactions: assessment of systems vulnerability, evaluation of adaptation strategies, from knowledge to actions. This has to be enhanced and needs better communication and exchanges between end users, decision makers and AMMA scientists.*

(e) *AMMA has to maintain a strong coordination in front of numerous isolated projects sharing AMMA aims and benefiting from AMMA (community, knowledge, database,...).*

(f) *The AMMA-Africa community is not known enough to decision makers.*



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## 3. Recommendations for strategies for making progress

- (a) Only 10-20 % of the potential of climate information is used in low and middle income countries (Hallegate, World Bank 2012). Improving the quality of hydro-meteorological services and of Early Warning Systems can really make a difference.*
- (b) The climate is changing ! Statistics of extremes distribution too ! Increase and sustain observing systems to support monitoring and prediction of climate, and high impact weather analysis and prediction.*
- (c) Climate models must be improved to remove robust biases and better simulate small scale variability and extremes. Quantification of uncertainties and their propagation. It is still very difficult to fund such type of research.*
- (d) Examine how the society, environment and climate interact to improve on Early Warning Systems. Part of natural and anthropogenic forcings. Also address detection/attribution issues.*
- (e) Capacity building and training efforts in West Africa need to be continued and pursued. The AMMA-Africa community must be supported and promoted to decision makers.*
- (f) Examine how the West African Monsoon interacts with other regions of Africa and especially East and Central Africa. An opportunity to strengthen linkages with African scientists in these regions.*
- (g) Transfer of methodology and tools developed in AMMA to other working groups in Africa.*