

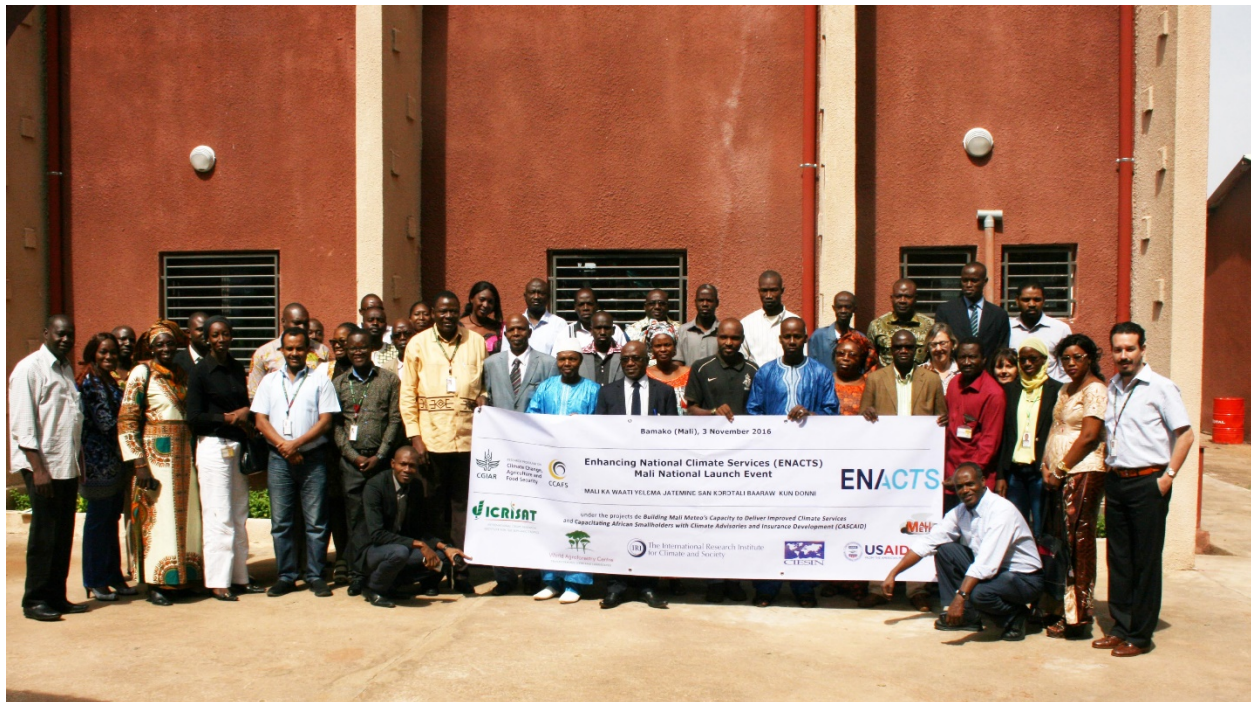


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# Improving Resilience to Climate Impacts in Mali through Improved Availability, Access and Use of Climate Information: Dialogue with Users

Launch of the initiative Enhancing National Climate Services (ENACTS) in Mali  
Bamako, Mali, November 3<sup>rd</sup> 2016.



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## Abstract

The amount and quality of station climate data has been declining all over Africa. Despite a noteworthy legacy in the provision of agro-meteorological extension to farmers (Mason, 2015; Dinku, 2016), the large landlocked country of Mali is no exception: there, a security crisis in the northern half of the country since 2012 has further aggravated the provision of data from an already sparse weather station network. This greatly hinders local decision-making processes that may benefit from the use of climate data, and affects the ability of vulnerable communities to sustain their resilience capacity in a changing environment characterized by population growth, increasing externalization of risk and expected rise in the frequency of extreme events. Restoring the availability and accessibility of quality climate data over space and time is the aim of the ENACTS (Enhancing National Climate Services) initiative, promoted by the International Research Institute for Climate and Society (IRI, at Columbia University). On November 3, 2016, ICRISAT, Mali-Meteo and IRI launched the ENACTS initiative in Mali during a national workshop to i) introduce stakeholders to Mali Meteo's new data and web interface (Mali Meteo Data Library) and; ii) solicit feedbacks and recommendations from the national community of users. This workshop was a result of collaboration between the CCAFS-funded CASCAID project (*Capacitating African Smallholder with Climate Services and Insurance Development*) led by ICRISAT and ICRAF, and the USAID-funded project *Building Mali Meteo's Capacity to Deliver Improved Climate Services*, led by IRI. During the workshop, participants showed high interest in the new tools and requested additional capacitation through a dedicated follow-up event targeting sectorial applications of the data library and maprooms.

**Key Words: climate Data, ENACTS, Data Library, CASCAID, Mali**





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## Acronyms

<b>CASCAID</b>	<b>Capacitating African Smallholders with Climate Advisories and Insurance Development</b>
<b>CCAFS</b>	<b>CGIAR Research Program on Climate Change, Agriculture and Food Security</b>
<b>CGIAR</b>	<b>Consortium of International Agricultural Centers</b>
<b>CIESIN</b>	<b>Center for International Earth Science Information Network</b>
<b>ENACTS</b>	<b>Enhancing National Climate Services</b>
<b>GLAM</b>	<b>Groupe Locaux Agro-météorologiques</b>
<b>GTPA</b>	<b>Groupe de Travail Pluridisciplinaire</b>
<b>ICRISAT</b>	<b>International Crop Research Institute for The Semi-Arid Tropics</b>
<b>IRI</b>	<b>International Research Institute for Climate and Society</b>
<b>MM</b>	<b>Mali Météo</b>
<b>PICSA</b>	<b>Participatory Integrated Climate Services for Agriculture</b>
<b>USAID</b>	<b>United State Agency for International Development</b>





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## I. Introduction

This report delineates the one day workshop on the official launch of the initiative “Enhancing National Climate Services (ENACTS)” in Mali. ENACTS is lead by the International Research Institute for Climate and Society (IRI, at Columbia University) and its objective is to create reliable climate information to improve decision making at national level. This workshop stems from a collaboration between the International Research Institute for Climate and Society (IRI) under the USAID project “*Building Mali Meteo’s Capacity to Deliver Improved Climate Services*”, the National Meteorological Agency of Mali (Mali Meteo) and the International Crop Research Institute for Semi-Arid tropics (ICRISAT) under the CCAFS project “*Capacitating African Smallholder with Climate Services and Insurance Development (CASCAID)*”. The collaboration lead to the generation of over 30 years of rainfall and 50 years of temperature time series at every 4km across Mali, and the creation of an online tool accessible through Mali Meteo’s web page to provide timely, accurate and high resolution climate information products tailored to agricultural needs and health.

The workshop was organized on November 3, 2016 by Mali Météo, in collaboration USAID, IRI and ICRISAT to raise awareness of the existence of this state of the art tool, and support improved resilience to climate impacts, across sectors in Mali. The two main objectives of the workshops were:

- (i) Introduce Mali Météo’s latest data and web interface to stakeholders.
- (ii) Soliciting feedback and needs from participants. This will enable Mali Météo to assess the value of the available tools and products to users and improve/add what is most relevant to stakeholders.

The implementation of the ENACTS initiative in Mali will contribute to the achievement of some key objectives of the project CASCAID, particularly: i) building the capacity of the NMHS to provide timely and reliable climate information; ii) easing the implementation of the Participatory Integrated Climate Services for Agriculture (PICSA) approach in Mali; and iii) generating merged data which may be used for improved food security sub-national outlooks – a novel utilization the CASCAID project will test by calibrating the CCAFS Regional Agricultural Forecasting Tool (CRAFT) for a 100,000 km<sup>2</sup> area covered by the Malian Textile Development Company (CMDT) cotton parastatal in southern Mali.

The launch event brought together 59 participants, including 13 women, from National institutions, Mali Meteo, USAID, IRI, ICRAF, and ICRISAT. It started with welcoming addresses and opening speeches, went through various presentations introducing the new tool developed by Mali Meteo and how it can be useful in agriculture, and ended with recommendations and closing remarks (Appendix 1).







## II. Meeting Overview

### 1. Opening Session

The launch event started with speeches from the different officials present who all welcomed participants with interesting messages.

Dr. Ramadjita Tabo (ICRISAT's Regional Director for the West and Central Africa region): for him subsistence agriculture, among national agriculture and other economics sectors, remains the most vulnerable from the ongoing unpredictable and variable climate, and valorizing climate information remains a shared responsibility between many actors, be it public or private sectors, for which we should be armed. He happily welcomed the initiative ENACTS and mentioned that ICRISAT is proud and honored to be involved in its implementation in Mali, after having recently launched the Joint Agrometeorological Services incubator agreement with Mali Meteo last June.

Dr. Robert Zougmore (CCAFS Regional Program Leader for the Africa region): ENACTS is seen by CCAFS as an important tool that will contribute to build effectively the capacity of national met agencies towards developing high quality data bases needed to generate downscaled and tailored climate information services. Actually since 2011, CCAFS has been supporting AGHYMET and national met agencies to clean their historical climate data, so ENACTS comes as a mean to complement such work on the development and improvement of reliable climate databases. This is implemented via one of the CCAFS's stellar projects, CASCAID (Capacitating African Smallholders with Climate Services and Insurance Development) whose one of the main objective is to strengthen the capacity of national and regional providers of and communications mechanism of climate information. CCAFS-WA is glad that ENACTS is truly effective in Mali, and urges Mali Meteo to see it as a capacity building instrument that could help Mali Meteo to generate CIS products with added values, avoiding the routine production of weather bulletins that are not tailored to the needs of beneficiaries. Therefore Mali Meteo needs to explore ways and develop investment strategies that could sustain such vision of new CIS products development, including the development of win-win PPP (Private-Public Partnerships).

Dr. Alessandra Giannini (IRI representative): thanked the financial support of USAID for the success of the project "*Building Mali Meteo's Capacity to Deliver Improved Climate Services*". Expressed her happiness in the engagement progress of MM, particularly of young staff, in this project.

Dr. David Yangen (coordinator of AEG): thanked IRI for their efforts in providing climate services to improve the resilience of farmers against climate related risks, Mali Meteo



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for the interesting collaboration, and ICRISAT for providing their support for the success of this project.

Mr. Djibrilla A. Maiga (General Director of Mali Meteo): Thanked USAID, IRI and ICRISAT for the consistent support in building the capacity of Mali Meteo. For him ENACTS helps resolve the major problems faced by MM in their data base. And he Hope that these new products of Mali Meteo will add more value to the services it already provides to satisfy user's demands and will significantly help actors in their decision making. All sectors vulnerable to climate would surely benefits from these new products.

There were 10 presentations during that one day workshop, two discussion sessions at the middle and end of the day. Questions about the various presentations where asked during the discussion slots.

## **2. Introduction and success stories of ENACTS (by Tufa Dinku – IRI)**

In his presentation, Tufa, the mastermind of the ENACTS initiative, emphasized that climate data is the foundation of climate services. He added that the focus should not be on climate service information, but rather on climate data because it is the core foundation for delivery of good climate services. He said *“without a strong foundation a house cannot be stable; likewise without strong, efficient and quality climate data provision, information from climate services will not be reliable”*. The aim of ENACTS is therefore to simultaneously improve the availability, access and use of climate information and its cornerstone lies in collaborative work with the NMHS to quality control all available station data and combine them with satellite data and other proxies. The three pillars of ENACTS are:

- (i) Improve Availability of climate information by –building the capacity of national meteorological data, quality control station data, combining data with proxies, improving seasonal forecast
- (ii) Enhance access by – installing the IRI data library, developing the online tools for data analysis and visualization, and creating mechanism for data sharing
- (iii) Promote use by engaging potential users i.e raise awareness, build capacity of users, understand and use climate information, involve users in products development.

This innovative initiative is now implemented in East and West Africa regions, as well as in Madagascar. Some projects use ENACTS data and products to provide climate information to smallholder farmers, such is the projects *Climate Services for Agriculture: Empowering Farmers to Manage Risks and Adapt to a Changing Climate* in Rwanda funded by USAID, others to assess the impact of climate in malaria control interventions, that is the aim of the project “Impact Evaluation for Malaria







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Interventions” funded by President’s Malaria Interventions (PMI) and USAID. Individuals also make use of ENACTS data, that is the case of Ethiopian students who are making interesting research across the country.

### **3. Introduction to the project “Building Mali Meteo’s capacity to Deliver Improved Climate Services” (Daouda Zan Diarra – MM)**

The project “Building Mali Meteo’s capacity to Deliver Improved Climate Services” is funded by USAID and led by IRI & CIESIN, with main partner being MM supported by ICRISAT. The projects’ objectives are (i) Improve the data base of Mali Meteo; (ii) Improve the seasonal forecast and the physical understanding of the observed trends in rainfall seasonal and sub-seasonal distribution variables; and (iii) build Mali Meteo Capacity to deliver high quality climate services. Daouda mentioned that these objectives were achieved through a series of trainings (six) with technical support from IRI and ICRISAT which has improved the capacity of MM’s staff and these latter are now able to do quality control of data and combine satellite data with station observed data using the software Climate Data Tool (CDT) developed by IRI. He pointed that to build the whole system of climate information delivery there is need to (i) generate high quality information; (ii) have a good communication mechanism and (iii) integrate climate information in decision making. He uttered an interesting Malian proverb to illustrate that “Climate services is like the three stones of the cook in a family (i) first provisioning of goods, then (ii) the fire enlighten with pot on the fire, and finally (iii) the cook put the needful grain in the pot, this to reinforce family unity”

### **4. Climate Services provided by Mali Meteo (Modibo Kone – MM)**

Mali Meteo provides a range of services to the public for instance: climate analysis products (dates of the start and end of the rains, dry spell, climate year-book), agrometeorological products (sowing dates calendar, decadal and monthly agro-hydro-meteorological bulletins, early warnings bulletin on the progress of the rainy season, weekly oral communication to the government) and meteorological (daily, weekly and decadal) and climate (monthly and seasonal) forecast. The presenter stated that the data collected by Mali Meteo are normally for selling, except for students who request it for research purposes.

### **5. Introduction to the new web-based climate information products of Mali Meteo (Diabaté Fatoumata SANGHO – MM)**

The new web-based climate information products of Mali Meteo is called the Meteo-Mali Data Library. It is a state of the art tool which provides unique climate information





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on rainfall and temperature called maprooms and are in twofold: the climate maproom and the historical malaria analysis maproom. The climate maproom offers a wide range of information products on the historical, current and future climate conditions and consists of three components: (i) the historical climate analysis; (ii) the climate monitoring and (iii) the climate forecast. The presenter stressed that the climate forecast here are just information that are used by MM to improve and refine their climate forecast. This innovative tool can freely be accessible via Mali Meteo's "DATATHÈQUE" (French for Data Library) menu available at [www.malimeteo.net](http://www.malimeteo.net).

#### **6. Nouvelle base de données combinées de Mali Météo (Modibo Kone – MM)**

Climate information services is very important to improve resilience against this variable and unpredictable climate. But various challenges are met on the availability and accessibility of climate data with an increasing climate information demand by the population. The presenter said that the meteorological agency is sometimes unable to satisfy clients' request because of: the sparsity of the meteorological station observation network, the presence of missing data in the data base for some areas, the doubtful quality of the data manually recorded on station and the difficult access to available data from remote stations. But he continued saying that with the initiative ENACTS, these problems will be solved. With ENACTS climate (rainfall and temperature) data are now available at every 4.2 km on the Malian territory which stems from blending station data with satellites data and other proxies. The presenter mentioned that there are three steps to implement ENACTS in a country, in other words to have such a web data base and a freely accessible tool, three activities should be done: (i) Assessment of the availability of the meteorological and climatological station data; (ii) quality control of these data; and (iii) and merging of the quality controlled data with satellites data (rainfall) and reanalysis products (temperature) (see appendix 2-Figure 1). This work has revealed that the number climatic & meteorological station managed by the meteorological agency has reduced 160 (since 1980) to about 40 (in 2015) (see appendix 2-Figure 2).

#### **7. Demonstration of Mali Meteo's online climate information products (Ishmahila Koumaré – MM)**

This was a life demonstration on how to navigate in the Meteo Mali Data Library. The presenter showed to participants how to access the online tool, how to specify the administrative boundaries and download the maproom products, the types of historical climate analysis which can be done directly online (seasonal and yearly climatology, dry spell, number of rainy days and more). These analysis can be done on daily, decadal and monthly rainfall data, and on decadal and monthly temperature data. The presenter progressed by showing how one can monitor the current climate every ten days or





month. Using a rainfall anomaly graph, he concluded that rainfall amount had been decreasing compared to the mean rainfall amount of the past 30 years in Mali.

## 8. Discussion

This was an open session for questions, comments and contributions. During the presentations participants had a lot of burning questions

- **Q:** What is the use of anomalies? **R:** Anomalies are used to see if climate variables such as rainfall and temperature increase/decrease with time compared to their normal value. It is used to assess the variability of a variable in this case a climate variable. The respondent added that it is based on this type of information that decision making on socio-economic activities is made.
- **Q:** in the MCCA project, MM has given traditional rain gauges to farmers, does the rainfall amount collected by these farmers feed into MM's Data base, for this will improve data availability with time? **R:** not yet, but it is planned as this will also improve the merged data.
- **Q:** Is it possible, from the online tool, to download raw data for personal analysis? **R:** no, it is not possible this is only accessible by Mali Meteo staff.
- **Q:** Is it possible to integrate my geographical coordinates and select a district? Does the information on the maproom only concerns that district? **R:** Yes.
- **Q:** Is information on livestock also available in the maproom as only agrometeorological information has been mentioned so far? Note that livestock is also negatively affected by climate. **R:** this sector is already integrated in agrometeorological information.
- **Q:** Is it possible to organize a workshop training for members of the GTPA to understand how to use this new tool? **R:** yes it is possible, such a training would be for 2 to 3 days, and this workshop aims at raising awareness.
- **Q:** Is there other climate variables aside rainfall and temperature, such as humidity, wind, radiation...? **R:** not yet available.
- **Q:** How are satellites data estimated? **R:** the estimates are done based on the height of the clouds with S3 summit; it is assumed that the more it is clouded, the more the clouds contain water. However there is a bias; high intensity rainfall values are sur-estimated, while low-intensity rainfall values are under-estimated.
- **Q:** What is the years' range of the merged data? **R:** rainfall satellite estimates are only available from 1983, so is the merged rainfall data. However with reanalysis products, temperature estimates can go be hincasted up to 1960.
- **Q:** Is there a possibility to put the names of the locality on the maproom before downloading it to avoid additional work and improve visualisation? **R:** On a maproom, if you choose a location, if it is a point it gives you its latitude and



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- longitude, if it is a district, it gives you its name. The respondent added that one can do a lot with the Data Library. The actual maprooms represent only 10% of what the Data Library is actually capable of.
- **Q:** Since the actual climate forecast maproom is used by MM to refine their forecast, when will we have a tool that give us information on the real climate forecast? **R:** Surely MM will work on such tool, but for the meantime forecast is provided everyday on MM website.
  - **Q:** what types of satellites are used to get these satellites data? **R:** Meteo Sat are the satellites being used. Satellites estimations (4.2km), taken every 15 minutes by geostationary satellites and which covers all Africa, produced by the TAMSAT team of the University of Reading are the ones used for the rainfall merging.
  - **Q:** it has been said the satellites data are reliable at a resolution of 4.2km, while there are now sattelites data at a higher resolution of 1 km, why are these not used? **R:** the resolution is based on what the data will be used for. As far as climate data are concerned, 5km resolution is enough to have reliable information on a specific area.
  - **Q:** How will smallholders concretely benefit from these tools at the local level, and what are the mechanisms Mali-Meteo intends to rely on to disseminate information into the last mile?
  - **Q:** Is the project on *“Building Mali Meteo’s capacity to Deliver Improved Climate Services”* going to continue? **R:** Aminata Diarra (USAID) said she is not sure, because the continuation of the project depends on the various aspects that still need improvement and of course on funds. However she expressed the happiness of USAID in seeing the results from the project she said “USAID is happy of the achieved results, and glad that Mali Meteo is now able to update the ‘Meteo Mali Data Library’”. Now the program MCCA/USAID has done a market analysis and is planning to develop a business plan for climate services provision.
  - **Q:** How can this new tool be interfaced with sms, rurals radios, audio communications in local languages?

During the discussion Moussa Touré (MM) stressed that ENACTS is an interface to do data analysis online, it does not show all the capabilities of MM. There are webpages on MM’s website which allows users to have forecast information. He informed that that MM does downscaled forecast in Mopti, Diema and Kolokani under the framework of a project. “The Meteo Mali Data Library is surely a very interesting and innovative tool, but it is there to complement what MM already does, not to substitute it” he said. Sibiry shared the same view with Moussa and said “ENACTS is an initiative whose objective is to bring data closer to the user, it is not there to replace the already existing mechanism to access data”.



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For Tufa Dinku, the merged data is a new format, and a mechanism on how to give its access to outsiders should internally be defined by MM. He added that as far as seasonal forecast is concerned, the inclusion of the seasonal forecast in this initiative aimed at improving the forecast being done, however an additional forecast maproom, called the IRI flexible forecast maproom, would be added.

For Djibrilla A. Maiga (DG of MM), the aim of the workshop is also to increase collaboration between potential stakeholders and the meteorological agency to work together and produce user's specific, efficient, reliable and usable products.

This workshop aims to raise awareness and obtain feedback from stakeholders on the additional information services that can be developed and added in the Data Library and the format they should follow. There is therefore a need to collaboratively work with MM and end users to produce specific services that best fit their needs.

“The objective is to develop a community of practice who will transform these new data into information products to improve decision making. Therefore from all the presentations done since the beginning of the workshop, do you have any ideas on immediate applications from using this tool?” That was the question asked to participants as a food for thoughts before going for lunch by Sibiry Traoré.

#### **9. Use of the merged data for climate monitoring (Issa Traoré - MM)**

Climate Monitoring can be done every 10 days because the online data base is updated at that time scale. The presenter stressed that this particular product contributes to the generation of the decadal agro-meteorological bulletin received by partners, but however he would be glad to be able to do climate monitoring weekly as well, for oral communication to the government. See Appendix 2-figure 3 for an example of climate monitoring product.

#### **10. Use of the merged data for climate forecast (Moussa Touré – MM)**

The Data Library is very important for the forecast team at MM, it helps them to have crucial data for a better forecast. The presenter revealed that about 50% of the process used to elaborate the forecast is accounted by the Data Library. “With the Data Library, we are now able to have downscaled forecast and also forecast the climate of the Northern region of Mali which had not been reporting observed data for the past five years” he said.

#### **11. A long term perspective on climate change in the Sahel (Alessandra Giannini – IRI)**

Sea surface temperature are used to forecast the rainfall season in the Sahel, because they were sufficient enough to explain the evolution of climate in the 20<sup>th</sup> century (see addendix 2-figure 4). Using the Meteo Mali Data Library to analyze the correlation



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between seasonal rainfall amount and number of rainy days, the presenter concluded that the number of rainy days explains the seasonal rainfall amount as their correlation is about 0.9 while the correlation between seasonal rainy days and daily rainfall intensity is closed to 0.6. However daily rainfall intensity is increasing with time. For the presenter the rainfall occurrence and intensity is linked to sea surface temperature; “sea surface temperature of tropical oceans determine the convection threshold while sea surface temperature of the Northern Atlantique oceans influence the supply of humidity during the rainy season ” she said, hopefully we will get to know what actually influences the rainy season in Mali.

## **12. The value of Mali Meteo’s new data for climate services to the agricultural sector (Pierre Sibiry Traoré – ICRISAT)**

The presenter started by uttering that climate is not the only factor of agriculture productivity, availability and accessibility of nutrients also need to be met to boost agricultural productivity sustainably. He said *“Until such conditions are met, smallholders fully realizing the value of quality climate information will remain a challenge. This should stress the importance of mainstreaming the use of climate information, such as that provided by ENACTS, inside a larger ecosystem of farm services – rather than focusing on ‘climate services’ as a standalone goal”*. He progressed saying that the new database developed by Mali Meteo will help achieve key objectives of the CCAFS funded project CASCAID. In addition to capacity building of NMHS to provide timely and reliable climate information, the presenter mostly stressed on the implementation of the Participatory Integrated Climate Services for Agriculture (PICSA) approach in Mali - a sustainable approach, which provides smallholder famers with climatic information they don’t have access to, to manage climate related risks and improve their resilience. Is PICSA not an approach that would lead to the emergence of the ENACTS products and help Mali Meteo staff to improve the work they already carry with GLAM? He asked. For him there is need to go deeper into agronomic aspects and livelihoods activities choices to determine on what production aspects should we base our assessment of climate impact? He continued by explaining how aflatoxin emergence is related to climate. He said that, if MM is able to reliably forecast the risks of dry spell occurrence during the month of august and the risks of late rains occurrence after peanut harvest, then they would possess a good tool to provide agro-meteo advisories to farmers on how to avoid aflatoxin contamination as this also affects our health not only through the grain we consume, but also through the cattle milk we drink as these latter are fed with peanut Stover. He finished his presentation by saying that climate information can be provided to farmers using a farmers’ observer network just like what is being done in the MCCA project. In the CASCAID project, more precisely in Senegal, a farmers’ observer’s network has been created in which farmers collect rainfall information via an application (jotbi) developed by the private company MANOBI, and in return receive advisory services such as optimal



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sowing dates or on other management application that would boost farmer's production.

### 13. Discussion & recommendations

**Q:** as the merged data have been used for the seasonal forecast this year, has this latter improved compared to the seasonal forecast last year? **R:** yes, it has improved. Last year's seasonal forecast ignored some local elements which were taken into consideration this year and therefore improve local decision making. 2015 seasonal forecast was based on a basic system's analysis of other elements.

**Q:** is there a possibility to create farmers' observers network in Mali using the application jotbi?

**Q:** Does Aflatoxin, present in peanut Stover, also affects meat as it affect milk?

Participants were later gathered into three groups (GTPA, MM, and research) to think about two main recommendations about these ENACTS products. Below are their recommendations.

#### (1) GTPA

- Training of GTPA members, other national institutions and end users (both regional and local) on the use of the Meteo Mali Data Library;
- Integrate more interdisciplinary maprooms on water resource management, livestock, zoonosis etc.

#### (2) MM

- Need of two server for the maintenance of the Meteo Mali Data Library
- Capacity building of Meteo Mali to better master the tool and integration of this tool in GFCS in Mali.

#### (3) Research

- Make ENACTS more accessible to farmers and all sectors influence by climate
- Reinforce the collaboration between research institutes, Mali Meteo and all private and public sectors

## III. Conclusion

The workshop ended with some closing remarks by Mali Meteo's DG and CASCAID's project leader who kindly expressed their thanks to all participants for having made the day interactive and productive. They mentioned that a training on the use of Mali Meteo's new tool will be organised by end of December.

## IV. Appendices

### 1. Appendix 1 – Program

Time	Activity	Responsible
08:30-09:00	Registration	Fatoumata Tangara (ICRISAT)
09:00-09:10	Opening ceremony: key note address & speeches	Ramadjita Tabo (ICRISAT)
09:10-09:20		Djibrilla Maiga (Mali Météo)
09:20-09:30		Robert Zougmore (CCAFS)
09:30-09:40		Alessandra Giannini (IRI)
09:40-10:00	Introduction and success stories of ENACTS	Tufa Dinku (IRI)
10:00-10:10	Introduction to the project : “Building Mali Météo’s Capacity to Deliver Improved Climate Services”	Daouda Zan Diarra (Mali Meteo)
10:10-10:20	Climate and weather services provided by Mali Meto	Modibo Koné (Mali Météo)
10:20-10:30	Mali Météo’s new merged climate time series	Diabaté Fatoumata Sangho (Mali Météo)
<b>10:30-11:00</b>	<b><i>Coffee break/ group picture/ media</i></b>	
11:00-11:20	Introduction to Mali Météo ‘s online climate information products	Modibo Koné (Mali Météo)
11:40-12:40	Demonstration of Mali Météo’s online climate information products	Ismahila Koumaré (Mali Météo)
12:40-13:30	Questions and discussion	Tous



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<b>13:30-14:30</b>		
<b>Lunch/ coffee break</b>		
14:30-14:50	Analysis of Mali's Climate Using the new data	Issa Traoré (Mali Météo)
14:50-15:10	Use of the new gridded data for Seasonal forecast	Moussa Touré (Mali Météo)
15 :10 -15 :25	A long term perspective on climate change in the Sahel	Alessandra Giannini (IRI)
15:25-15:45	The value of Mali Météo's new climate data and information products for climate services to the agriculture sector	Pierre C. Sibiry Traoré (ICRISAT)
15:45-16:30	Questions and discussion	Tous
16:30-16:45	Way forward and closing remarks	ICRISAT, IRI & Mali Météo



## 2. Appendix 2 – Graphics

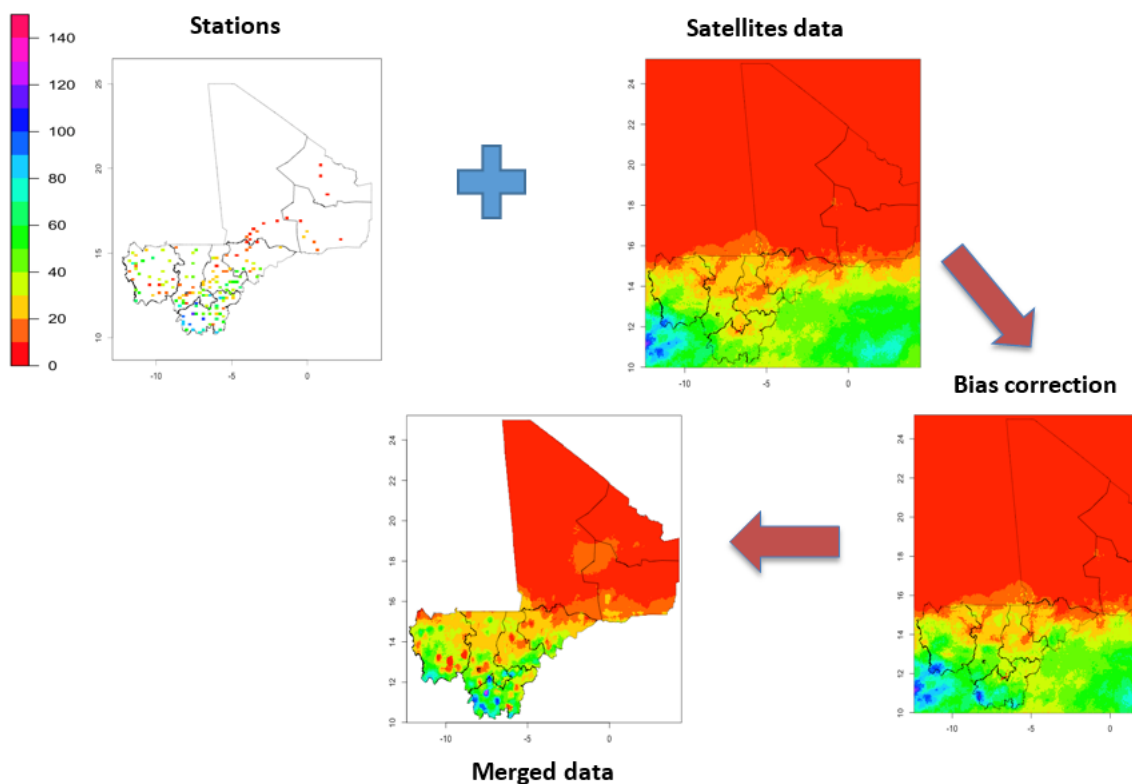


Figure 1: Merging process: from quality controlled station, to bias correction of satellites estimates, to actual merging.

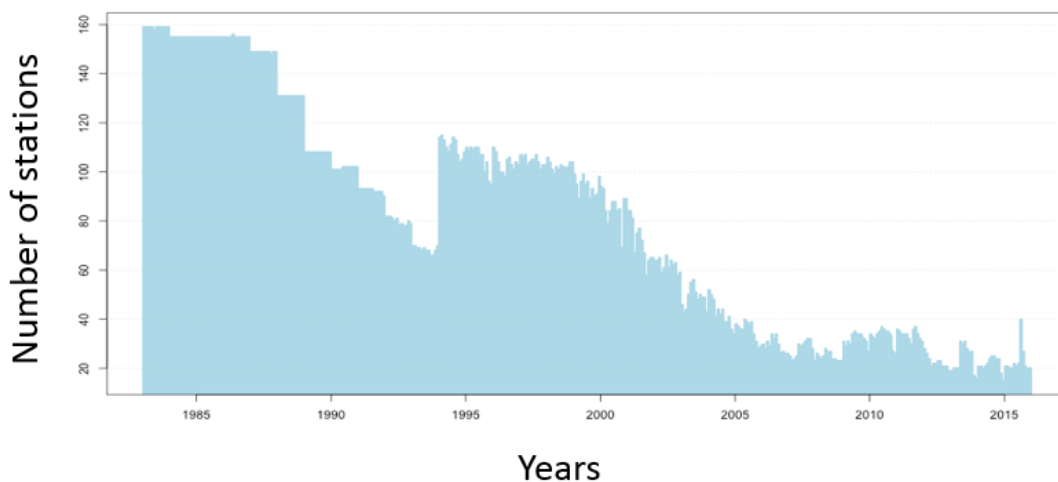
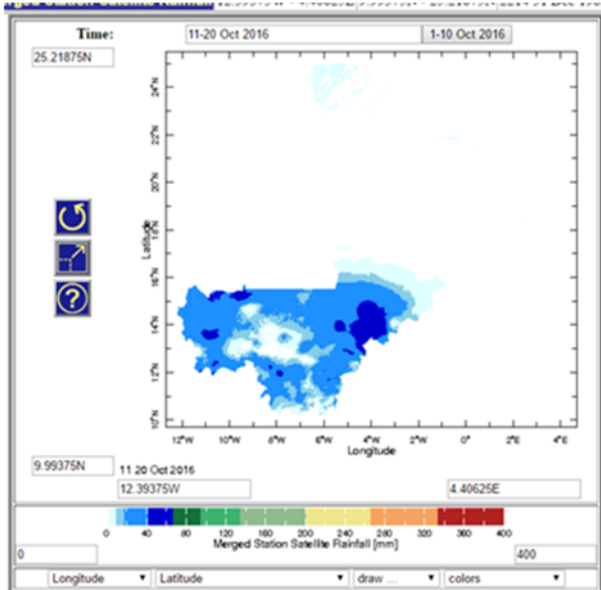


Figure 2: Number of stations recording observed rainfall data in Mali

**Decadal Rainfall**  
Decade from 11 to 20 October 2016



**Climatology – 1983-2012**  
Decade from 11 to 20 October 2016

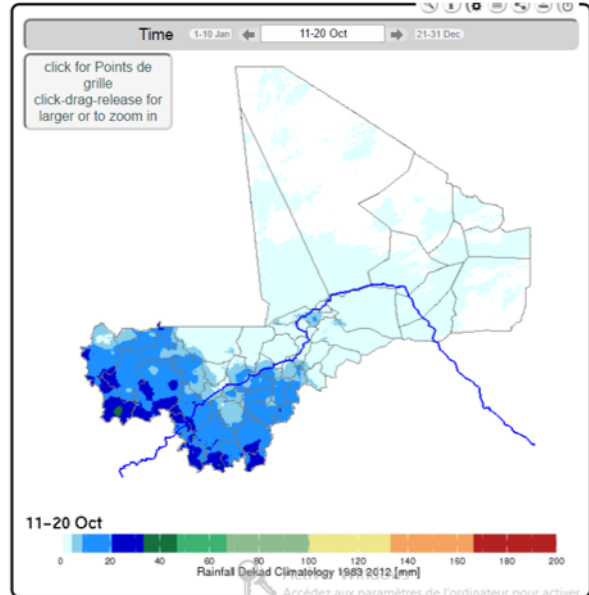


Figure 3: Climate monitoring: comparison of the decade 11-20 October 2016 to the climatology (mean value) of the same decade from 1983 to 2012.

**Sahel precipitation - July-September 1930-2000**

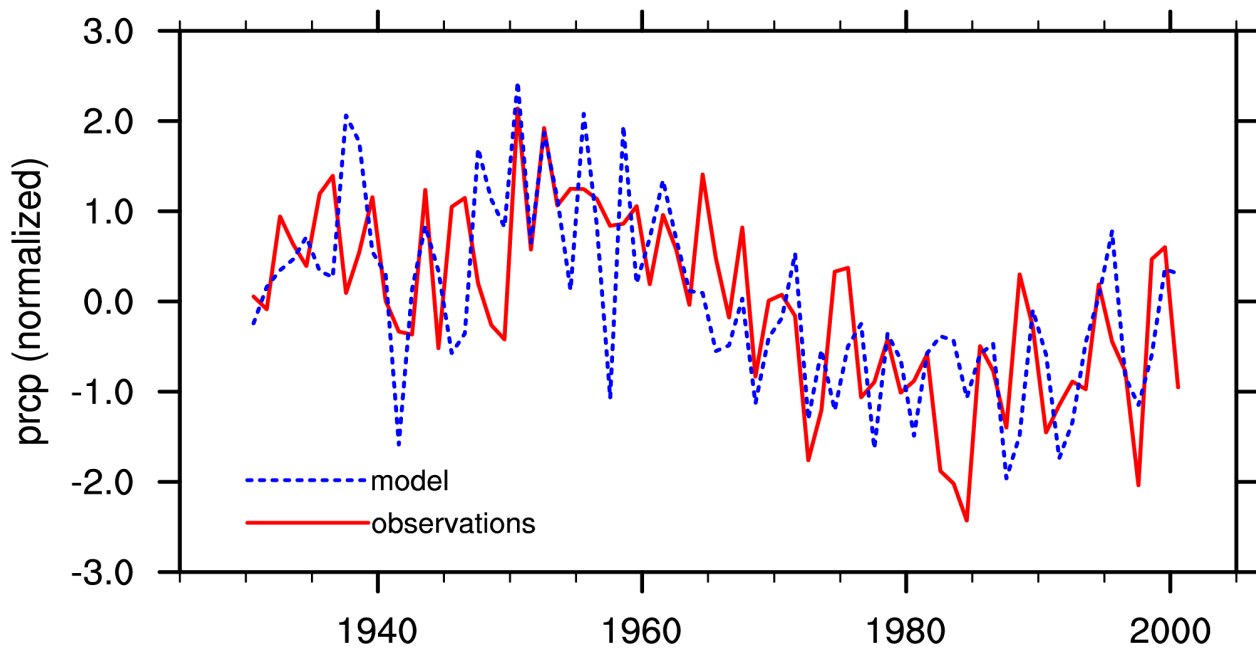


Figure 4: Giannini et al. 2003, in Science

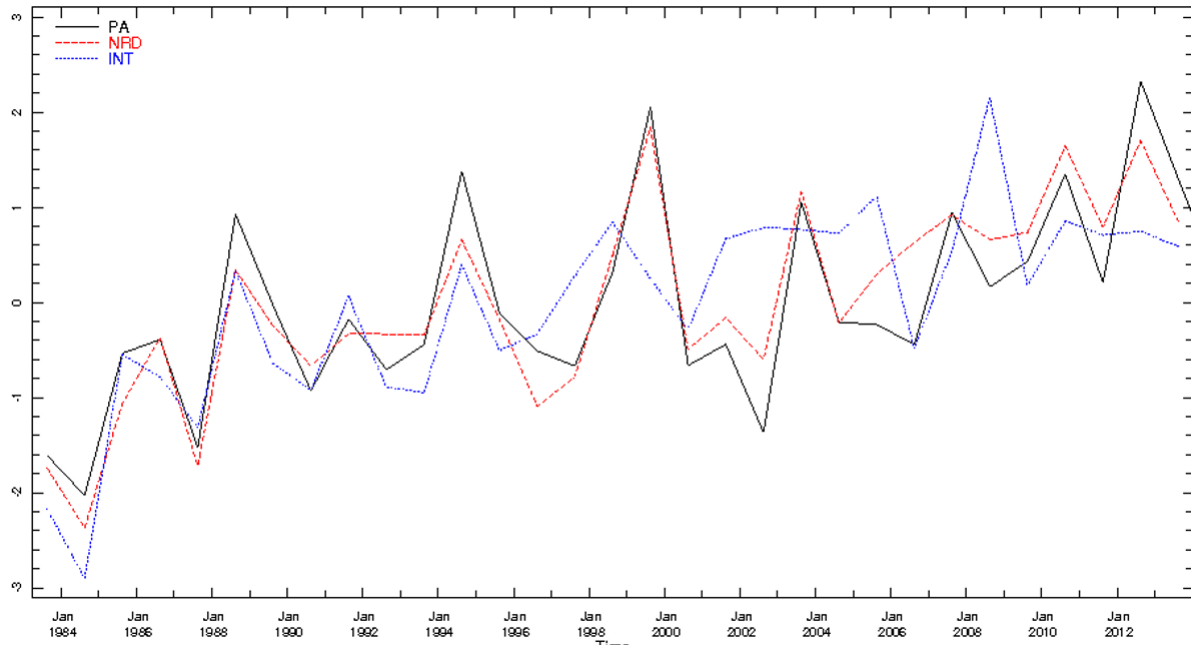


Figure 5: Correlation between seasonal rainfall totals from July to September (black line), number of rainy days (red line) and mean daily rainfall intensity (blue line).



### 3. Appendix 3 – Participants list

No.	Full Name	Institutions
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11	Birhanu Zemadim	ICRISAT
12	Catherine Dembele	ICRAF
13	Charles Davis	Mali Meteo/IRI Alternate Activity Manager
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25	Isac DIARRA	MALI-METEO
26	Isai Somboro	MALI-METEO
27	Ismahila Koumare	MALI-METEO
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29	Issa Traore	MALI-METEO
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51	Sayon KAMISSOKO	IER
52	Siaka Baya	ASECNA
53	Sibiry Traoré	ICRISAT
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58	Yéhia ABOU	DNPD
59	Zeinabou Maiga	DNEF



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## References:

Mason S., Kruczkiewicz A., Ceccato P., Crawford A. (2015): Accessing And Using Climate Data And Information In Fragile, Data-Poor States.

Dinku T., Cousin R., del Corral J., Ceccato P., Thomson M., Faniriantsoa R., Khomyakov I., Vadillo A. (2016): The Enacts Approach -Transforming climate services in Africa one country at a time, World Policy Paper.

