School of Earth and Environment

INSTITUTE FOR CLIMATE AND ATMOSPHERIC SCIENCE

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A Change in the Weather? - Contributions to innovation in weather services for developing countries (African Perspective)

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GCRF African SWIFT

National Centre for Atmospheric Science

NATURAL ENVIRONMENT RESEARCH COUNCIL

GRATITUDE

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Objective at National level

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To save lives, protect property and enhance the national economy (through delivery of the most accurate, most timely, and most relevant weather information)

Functional Entities:

Research <-> Operations <-> Applications

Weather Enterprise:

Academia <-> Public <-> Private

Public Sector

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The role of the public sector arguably have been:

- Data collection
- Model development
- Research
- Warnings
- Alerts

(Potential) Role of Private Sector

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1. Raise and deploy private (venture) capital, especially for high-tech developments in measurements and computing/data technology
   - ❖ Can fund specific research
2. Provide data service
3. Enable a transfer of risk (e.g. those associated with building, launching and operating satellites from the public sector)
4. Use its resources to assist in technology transfer to developing countries
5. Operationalize innovation that has arisen from public sector investment in research and development (private sector is recognized as capable and efficient in this)
   - ❖ Many companies already add value to public NWP data and disseminate weather forecasts

Current Situation in Africa (1)

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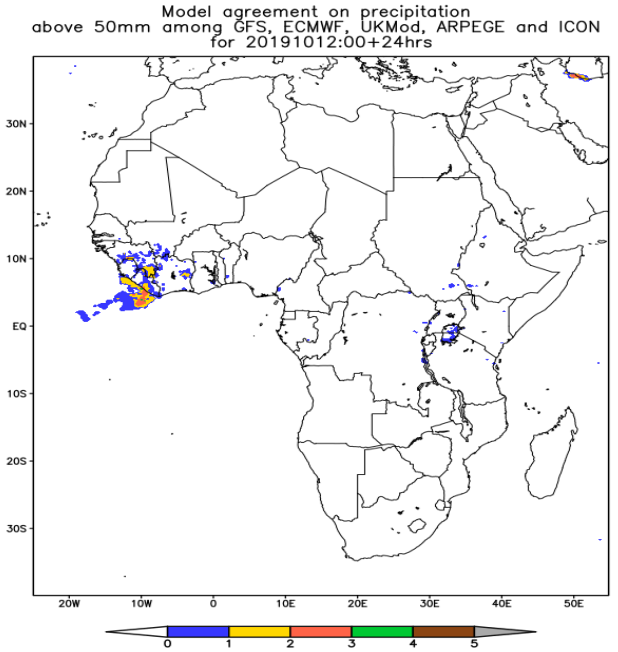
- Continental
  - ACMAD provides forecast guidance
- Regional
  - West Africa – AGRHYMET
  - East Africa – ICPAC
  - Central Africa – ECCAS
  - Southern Africa – SADC-CSC
  - North Africa – Network of Regional Climate Centres
- National
  - NMHSs and ASECNA (member countries)
    - ASECNA is L'Agence pour la securite de la navigation aerienne en Afrique et a Madagascar (Agency for the safety of Air Navigation in Africa and Madagascar)
    - ASECNA has Headquarters in Senegal with country offices in ASECNA member countries



Current Situation (2) - ASECNA

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- ASECNA provides weather services to Civil Aviation in its member countries, by channeling funding from aviation into meteorological services.
- It shares data generated and provides some financial support to the NMHSs
- However, it does not have a remit for other meteorological services (agriculture, fisheries. etc.)
- These services remain with the NMHSs in ASECNA member countries, who therefore may not receive the support from aviation

Current Situation (3) – ASECNA continued

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Member countries

North Africa (1)	Mauritania
Central Africa (5)	Cameroon, Central African Republic, Chad, Congo, Gabon
West Africa (8)	Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal, Togo
East and Southern Africa (2)	Madagascar, Comoros

Current Situation (4) – Some Private Companies

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- Accuweather (www.accuweather.com) – provides weather forecast for almost the whole of Africa
- IGNITIA (www.ignatia.se) – provides weather forecast to farmers in Nigeria, Ghana, Cote d'Ivoire, Senegal, Mali
- KUKUA (www.kukua.cc) - provides weather data and forecast to farmers in Nigeria, Ghana, Cote d'Ivoire, Senegal, Mali
- TAHMO (www.tahmo.org) – installed stations in Ghana, Nigeria, Tanzania, Rwanda, etc
  - Most of their stations are installed in schools (www.school2school.net)

Justification for Private Sector Intervention

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- Most sectors of production (especially agriculture) in Africa are dependent on weather and climate resources
- Most sectors are highly vulnerable to weather and climate extremes
- Inadequate services at decision making scales
- Operational Public Sector less capable of offering modern user-focused services relative to the developed countries
- Offers potential to increase production and enhance climate risk management
- Offers potential business opportunities

Farmers

Food for thought (1)

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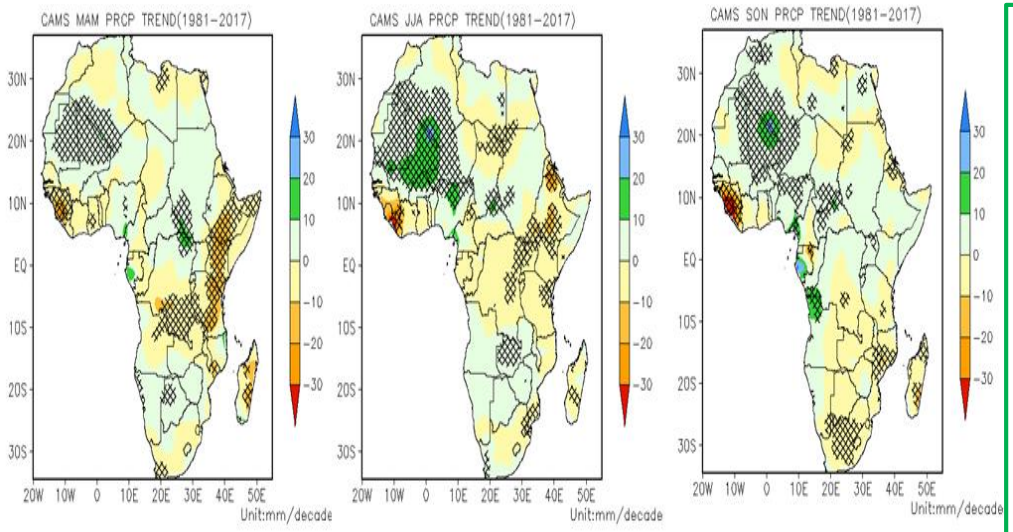
- Technical know-how and capability – vis-à-vis vulnerability to private companies from the North
  - Changing with time – Need to encourage young ones to choose career paths in NMHSs as well as Universities
  - Short-term – NMHSs need conscious effort to develop capacity in specific areas. For example, computational skills



- AMAD currently coordinates most of the RCOFs over the African continent.
- Seasonal rainfall varies greatly in time and space across the African continent. SWIFT program will help increase the understanding and eventually improve the prediction of African rainfall at different timescales.
- Briefs for policy and decision makers across a range of sectors will be improved.
- The legacy of SWIFT project will be maintained across the continent by ACMAD

Food for thought (2)

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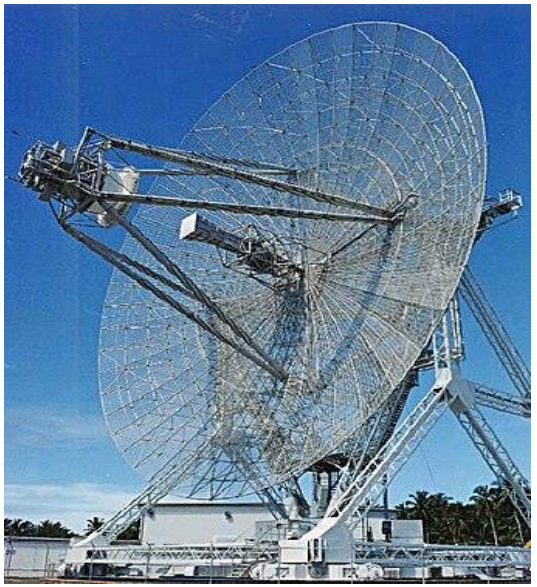
- Radar
  - Regular maintenance cost be should included in weather radar investment
  - The right people should be trained on the operation and maintenance of the radars (Engineers, Data Analysts, Data Managers, Coordinators)
  - Critical Mass of people should be trained. Probably across related institutions including Universities.
  - The right environment should be provided for the radar (UPS for power outages, grounding for lightning, appropriate means of communication between radar and NMHS)
  - Sign Appropriate agreements with radar suppliers



Food for thought (3)

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PPP – Agree on a business model

- Private
  - Provide infrastructure for resources that cannot be provided by NMHS (mostly IT). For example HPC
  - Jointly manage observational network with NMHSs
  - Get involved in communicating of forecasts (including feedback)

- Public
  - Generate the forecasts including tailor made ones
  - Conduct for forecast verification
  - Ensure instruments used conform to WMO standards
  - Manage observational data – including data from private company networks

Food for thought (4)

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- Development of NMHSs – “Global North” vs “Global South”
  - African NMHSs should develop appropriately picking good lessons from the Global North
  - African NMHSs should develop in a manner that will ensure they are context- relevant
- Is it better for them to direct resources to things that must be done in country? (e.g. maintaining basic observational equipment?)
  - They must go the whole value chain to get information to the ultimate user but adopt the appropriate approach and infrastructure
  - Can even work out appropriate partnerships to help achieve goals

A hemispherical cup anemometer

Food for thought (5)

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- NMHSs need to connect with decision makers to raise their stature
  - That has been recognized AMCOMET is working in that direction
  - Regional Climate Centres are also working in that direction
  - For example, ACMAD organized a workshop for Legislators in December 2016; SADC-CSC had done something earlier (2014 or 2015
  - NMHSs must have an infrastructure for engaging decision makers
- Should the basic forecast be “white labeled” from a third party (e.g. ECMWF or a private company)
  - No the NMHS should build capacity to provide the basic forecast.
  - NMHSs have plans to provide forecast at sub-national level (Kenya has started; Ghana is working on that)
  - Need to have the vision and work towards the vision with appropriate partnerships, etc

Food for thought (5)

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- Should the NMHS staff only focus on evaluation/feedback to supplier and adjustments to forecasts?
  - No NMHSs should provide the forecast but make evaluation/feedback an integral part of their work
- Need to recognize the current path is not working
  - NMHS need to have a change of mindset;
  - NMHS need to take advantage of initiatives (e.g. GFCS) and projects (SWIFT Project) to improve efficiency and effectiveness
  - SWIFT Project has User engagement and evaluation Work Packages and NMHSs have personnel in these WPs. They should plan on mainstreaming these activities

Project Aims

GCRF African SWIFT

I. **Significant improvements in weather forecasts in Africa, and the tropics, from hourly to seasonal timescales.**

II. **Build capability among UK and African partners to improve, maintain and evaluate operational tropical forecasts in future.**

III. **Develop African capacity for sustained training of forecasters.**

Food for thought (6)

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- Observations in the “South

NMHSs need to form appropriate partnerships to harness or benefit from available opportunities such as

- ➢ Use of smartphones
- ➢ Download data from Cell Phone Towers (to infer precipitation)
- ➢ Increased resolution of satellite data

- ❖ Hourly (nowcasting) to seasonal forecast timescales
- ❖ £7.8 million of funding over 4 years 2017-2021
- ❖ Focus countries: Senegal, Ghana, Nigeria, Kenya
- ❖ 10 African and 6 UK partners
- ❖ WMO, ACMAD and ICPAC as international partners
- ❖ Website: https://africanswift.org

GCRF African SWIFT

Link with adaptive capacity of a nation or continent (similar challenges for Weather Enterprise)

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Factors that determine adaptive capacity include;

- Technology
- Education
- Information
- Skills
- Infrastructure
- Access to resources – including data
- Various Psychological factors
- Management capabilities

Africa's status in most of the above is relatively low, although it is currently improving very fast.

Challenges for Weather Enterprise - Response

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The following agenda of a workshop reflects what needs to be done

- the improvement of technical and organizational infrastructure
- the implementation and optimization of procedures and methods, capacity building for technical and general management
- the improvement of education and training, the strengthening of service mindedness
- the facilitation and fostering of international collaboration, and
- the coordination of donors and funding opportunities in development cooperation

Priority Needs of NMHSs

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- Data Rescue and Digitization
- Data Base Management System (DBMS) – to manage data from observational network (AWS, Conventional)
- Skills to add value to data
  - Climate monitoring, State of the Climate
- Some critical things that fall outside the influence of the Enterprise (but affect productivity).
  - Right Leadership of the NMHSs
  - Political will in the country
  - Mindset of the people
  - Ingenuity within the NMHSs

Global Targets and implementation in Africa

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1) UN Agenda 2030 – Sustainable Development Goals (SDGs)
2) 2015 Paris Climate Agreement
3) Sendai framework for Disaster Risk Reduction 2015-2030
4) Global Framework for Climate Services (GFCS) – For example National, EU funded Intra- ACP
5) AU Agenda 2063 https://au.int/en/agenda2063
6) African Ministerial Conference of Ministers on Meteorology (AMCOMET) Integrated African Strategy on Meteorology (Weather and Climate Services)(Investing in Weather and Climate Services for Development)(**IASM**) https://www.wmo.int/amcomet/sites/default/files/field/doc/pages/amcomet-integrated-african-strategy-meteorology-13677_en.pdf
7) African Space Policy (meteorological input)
8) Climate Research for Development in Africa (CR4D-Africa)
9) Africa Hydromet Programme

AU 2063 – implementation will involve high level sector documents on other sectors such as Agriculture (e.g. Malabo Declaration, CADAP), DRR, etc.

IASM – STRATEGIC PILLARS

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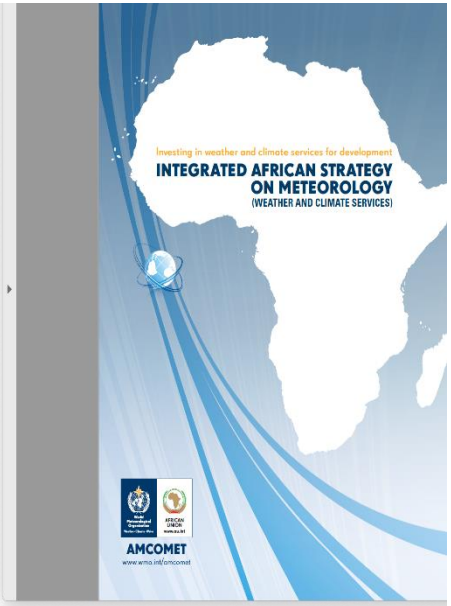
1) SP1: Increase Political Support and Recognition of NMHSs and related WMO Regional Climate Centres
2) SP2: Enhance the Production and Delivery of Weather and Climate Services for Sustainable Development
3) SP3: Improve Access to Meteorological Services in particular for the Marine and Aviation Sectors
4) SP4: Support the Provision of Weather and Climate Services for Climate Change Adaptation and Mitigation
5) SP5: Strengthen Partnerships with Relevant Institutions and Funding Mechanisms



SUMMARY (1)

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- Priorities in NMHSs
  - Data Rescue and Digitization; DBMS; value addition to data
  - Capacity Development (e.g. computational skills)
  - Need to have the right leadership; political backing; NMHSs should have a plan that engages the WE vis-a-vis research, operations and applications communities, that addresses developmental challenges
- NMHSs need a change of mindset:
  - User-focused services (strengthening of service mindedness)
  - Value addition to data
  - PPP/functional business model

SUMMARY (2)

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- Need to have a strategy to optimize the improvement in the factors that affect adaptive capacity of a nation or continent and thus the Weather Enterprise.
- NMHSs plans should link to global targets, continental and sub-regional strategies so they can optimize benefits from projects and partnerships

THANK YOU