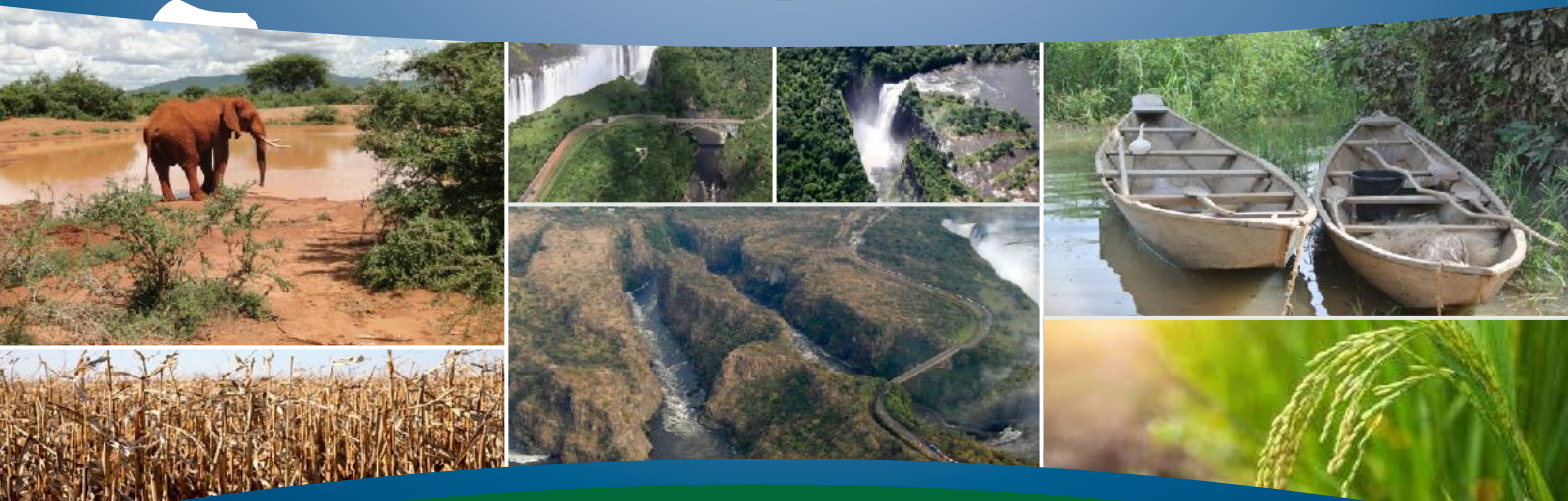
MESA
MONITORING FOR ENVIRONMENT AND SECURITY IN AFRICA

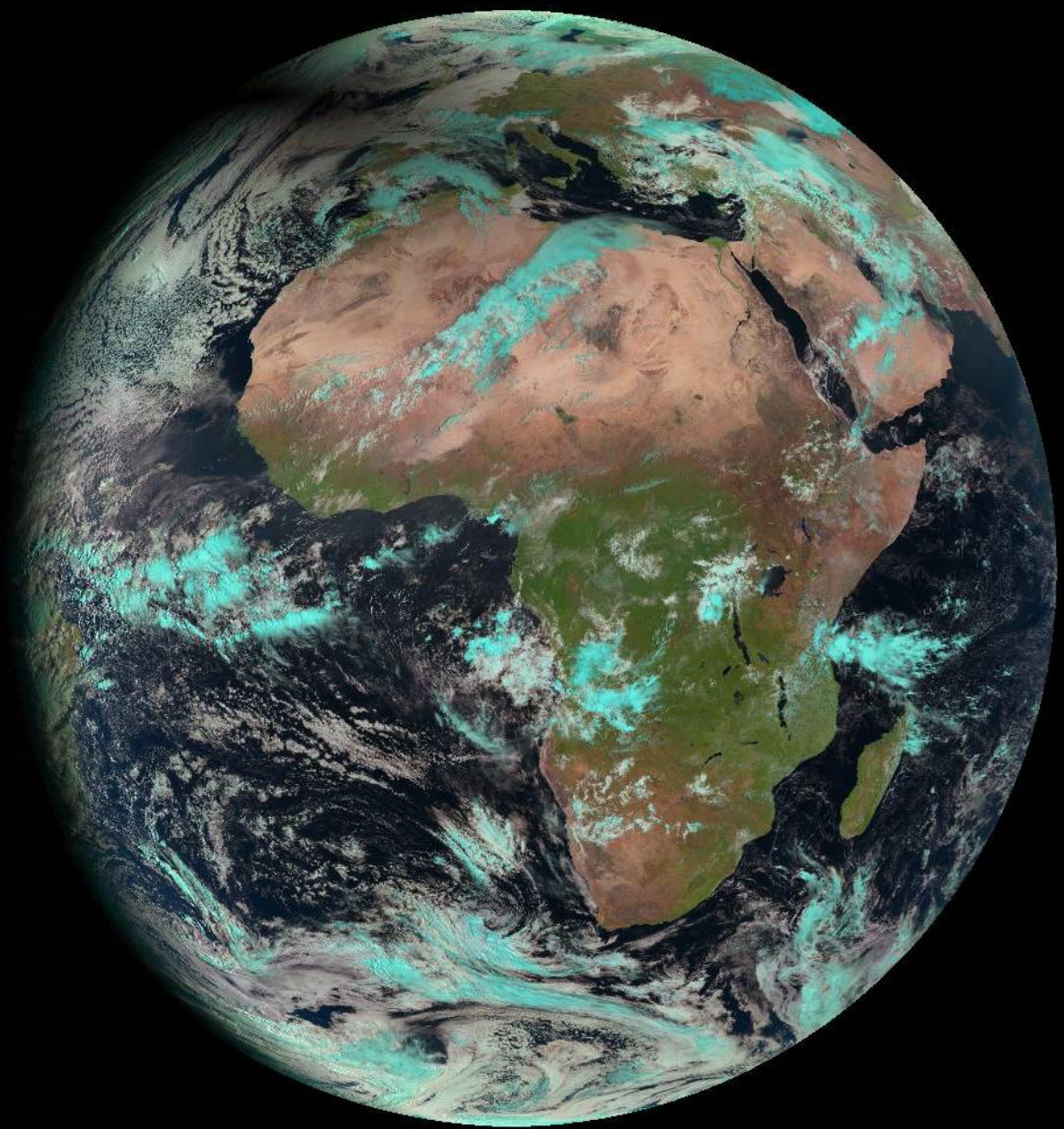
The 1st MESA Forum Report



31st August – 4 th September 2015

Theme:

Streamlining MESA products and services towards the decision making cycle in support of sustainable environmental management



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EUMETSAT

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Abbreviations and Acronyms

ACMAD	African Centre of Meteorological Applications for Development
ACP	African Caribbean and Pacific Group of States
AfDB	African Development Bank
AMCEN	African Ministerial Conference on the Environment
AMCOMET	African Ministerial Conference on Meteorology
AMCOST	African Ministerial Conference on Science & Technology
AMESD	African Monitoring of the Environment for Sustainable Development
AMCOW	African Ministers Council on Weather
ARC	African Risk Capacity
AU	Africa Union
AUC	African Union Commission
CEMAC	Economic and Monetary Community of Central Africa
CIC	Continental Implementation Centre
CICOS	International Commission for Congo-Ubangi-Sangha basin
CNES	National Centre for Space Studies
CVI	Coastal Vulnerability Index
DoDMA	Department of Disaster Management Affairs (Malawi)
DG DEVCO	Directorate-General for International Cooperation and Development
DG-GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EC	European Commission
ECMWF	European Centre for Medium range Weather Forecasting
ECOWAS	Economic Commission for West African States
EDF	European Development Fund
EG	Environmental Governance
EO	Earth Observation
EMA	Ethiopian Mapping Agency
ESA	European Space Agency
EU	European Union
EUD	European Union Delegation
EUMETSAT	European Organisation for the Exploitation of Meteorological Services
FEWS NET	Famine Early Warning Systems Network
FSNWG	Food Security and Nutrition Working Group
GGWSSI	Great Green Wall for the Sahara and Sahel Initiative
GMES	Global Monitoring for Environment and Security
IDDRSI IGAD	Drought Disaster Resilience and Sustainability Initiative
ICPAC	IGAD Climate Prediction and Application Centre
IGAD	Intergovernmental Authority on Development
IGADD	Intergovernmental Authority on Drought and Development
IOC	Indian Ocean Commission
IPCC	Intergovernmental Panel on Climate Change
IRSEN	Institute of Exact and Natural Sciences
ITC	International Training Center

IUCN	International Union for Conservation of Nature
JAES	Joint EU - Africa Strategic Partnership
JRC	Joint Research Centre
KWS	Kenyan Wildlife Services
LDIM	Land Degradation Index Map
MEA	Multilateral Environmental Agreement
MESA	Monitoring for Environment and Security in Africa
MOI	Mauritius Oceanography Institute
NDVI	Normalized Difference Vegetation Index
NEMA	National Environment Management Agency (Uganda)
NEPAD	New Partnership for Africa's Development
NGOs	Non-Governmental Organizations
PUMA	Preparation for Use of MSG in Africa
RA	Result Area
RCMRD	Regional Centre for Mapping of Resources for Development
RECs	Regional Economic Communities
RIC/CIC	Regional/Continental Implementation Centre
SADC	Southern Africa Development Community
SANSA	South African National Space Agency
SDGs	Sustainable Development Goals
SIRDC	Scientific and Industrial Research and Development Centre (Zimbabwe)
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environmental Programme
UNISDR	United Nations International Strategy for Disaster Reduction
VMS	Vessel Monitoring System
WMO	World Meteorological Organization
WPCCAA	Work Programme on Climate Change Action in Africa
WWF	World Wildlife Fund
ZEMA	Zambia Environmental Management Agency

Introduction

The purpose of MESA is "*to increase the capacity in information management, decision-making and planning of African continental, regional and national institutions mandated for environment, climate, food security and related responsibilities by enhancing access to and exploitation of relevant earth observation applications in Africa".* Consequently, it is vital that policy development frameworks are enhanced to ensure more effective environmental policies, improved decision-making structures and enhanced management interventions throughout the decision-making cycle. In order to achieve this objective, the MESA Forum seeks to achieve *"Strengthened political and policy development frameworks sufficient to ensure an active and sustainable participation of African stakeholders in initiatives concerning earth observation for environment and security"*

Forum Participants

1. Representatives of the 49 participating African countries
2. Regional Economic Communities
3. Representatives of African Ministerial Conference (i.e. AMCEN, AMOCOMET, AMCOW)
4. The African Union Commission
5. The European Union
6. The African Development Bank
7. The United Nations Organisations (UNISDR, WMO,UNECA, etc.)
8. European partners, including EU(EC, DG,DEVCO,JRCGROW, EUDs to AU and to Kenya), EUMETSAT , ITC,ESA, CNES, ECMWF, NGOs
9. Development and Research Institutions, i.e.,FEWSNET, programme and projects, the Africa Risk Capacity.

Executive Summary

The 1st MESA Forum, held in Nairobi, brought together delegates from the participating African countries as well as representatives from a number of partner organizations.

The overall objective of the MESA Forum was to streamline MESA products and services towards the decision-making cycle in support of environmental management. The eight specific objectives of the Forum can be summarised as follows:

1. To discuss and analyse how MESA can feed and improve continental policy making as far as environmental governance monitoring are concerned.
2. To present the status of the programme, with emphasis on show-casing product and service delivery in response to the needs of each Regional/Continental Implementation Centre (RIC/CIC).
3. To discuss the continental component of MESA training and how to achieve durable results in capacity development within the objectives of MESA.
4. To present the needs of African policy, planning and decision making communities.
5. To discuss food security and long term climate change over Africa.
6. To present the Sentinel satellite programme missions of the European Commission and European Space Agency to African stakeholders.
7. To discuss and agree a strategy, and consequent action plan, for the integration of MESA services and products in the decision-making cycle.
8. To discuss the GMES and Africa programme.

There were also six expected results set out at the beginning of the Forum. From the evaluation conducted at the end of the Forum (see Appendix 3), these objectives and expected results were largely met.

During the opening ceremony, senior officials from regional bodies and continental bodies welcomed the delegates and emphasized on the importance of developing and using earth observation in Africa. In her keynote speech, Prof Judi Wakhungu, Kenya's cabinet secretary in charge of the Ministry of Environment, praised the growth in the use of earth observation in Kenya and looked forward to further growth in systems and capabilities to enhance these services.

The Forum was divided into six sessions, each tackling unique issues.

- Session 1- Environmental policy – Environmental governance and monitoring: It was roundly agreed that it was absolutely critical that African countries develop sound policies to protect the environment and see to it that the environment is closely monitored to ensure that it is being used sustainably. The involvement of the political class as well as the general public was seen as a necessity if success was to be achieved.

- Session 2- MESA products and services delivery: Delegates were first taken through an overview of the MESA programme, including such aspects as project purpose, structure and result areas. The various thematic areas, the attendant products and services as well as progress made so far were discussed in this session. The thematic areas covered were: water resources; water management for cropland and rangeland management; land degradation mitigation, natural habitat conservation and forest information; agricultural and environmental resource management in southern Africa; and climate services for disaster risk reduction in Africa. This session also saw the presentation on the national land data centre, Theia, in France.

  The recommendations from this session were:
  - There is need for all countries to be at the same level in terms of use of the MESA products.
  - In reducing forest fires in the case of Tanzania, there is need for capacity building (training and sensitization) regarding conservation of the environment, with MESA assisting towards this end.
  - There is need for improvements to be made on the observing system in the waters around Africa.

- Session 3- MESA Training: It was clear that there was great need to develop Africa's capacity in the area of earth observation. Some of the key recommendations from this session were:
  - The MESA trainings need to be formally certified, with learners obtaining diplomas from the training institution.

- More universities need to be involved in the MESA trainings.
- There is need for universities to be linked across the continent, through collaboration, for purposes of delivering the most relevant products and experience sharing.

·Session 4- Parallel Discussions: This session was divided into two: one tackled long-term climate change and food security while the other dealt with earth observation data access and dissemination.

Key recommendations from the first group included:

- A continental framework to deal with drought should be drawn up.
- Approaches should be developed on how best to increase the number of disaster management personnel.
- There is need to rehabilitate climate-observing stations in Africa, considering that they are very few.
- There is need to support development and implementation of multi-hazards contingency plans at regional and national levels with preparedness, responses, recovery and rehabilitation components.
- Need to move away from technical forecasts to hazard forecasts.

Among the issues discussed by the second group, were the possibilities of a single system for data communication and imagery dissemination.

·Session 5- Integration of MESA Services in the decision making cycle: The delegates were taken through how MESA is currently communicating, before discussing other ways in which to better communicate. During this session, the importance of properly packaging information to attract the attention of the media as well as to make it easily understood by the common citizen was discussed and emphasized.

·Session 6- Deepening and broadening Africa-EU Cooperation on Earth Observation: The session covered GMES & Africa, an initiative between the EU and Africa that aims to build the capacity of Africa to gather, disseminate and use earth observation information.

The following were the recommendations from the session:

- GMES & Africa should incorporate and build upon already existing relationships.
- The longer-term value of data will depend on how much data is available in the archives.
- The relationship between RECs and national stakeholders needs to be clearly understood; need for a concrete structure to be put in place.
- There is need to advocate for data sharing policies that cover how earth observation data can be used and shared.
- There is need to look at how best to engage the private sector in the process; they would give a push to implementation, and dissemination of information.

In the Closing Session, Mrs. Anna Burylo, Head of Cooperation of the EU Delegation to the African Union, noted that there had been good progress made in the implementation of MESA. She encouraged delegates to take up the recommendations of the Forum and to address the various challenges being faced.

In addition, Ms. Gina Bonne representing the Indian Ocean Commission at the closing session noted as Chair of the Steering Committee, that Regional organizations need to continue playing their role as facilitators and catalysts to the implementation of the project, all the while ensuring that there is sustainability.

In his closing speech Dr. Mahama Quedraogo, of the African Union Commission (AUC) stated that it had been extremely stimulating and absolutely energizing opportunity to review the progress of implementation of the MESA Project, assess performance, review the challenges and proffer solutions on the way forward. He said the forum had further provided an avenue to extend, consolidate and enhance partnerships and closer collaborations as the Project strive to achieve a successful implementation of the MESA project for intended results and impacts.

Finally, H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary Inter-Governmental Authority on Development (IGAD) emphasized the need for member states to fully own and support the programme, and only then can the programme be prioritised as a policy matter, approved in the respective policy approving agencies in the countries, like the cabinet or parliament and only then can it see the light of day through a budget re-allocation.

Forum Recommendations Relating to MESA

General

1. AUC, MESA RECs and RIC should continue to identify earth observation (EO) technology development and application gaps at national level and endeavour to address these through MESA where possible.
2. Regional Economic Communities (RECs) should continue to facilitate and oversee the implementation of their respective MESA Thematic Actions.
3. The MESA programme should promote collaboration and partnerships between institutions, programmes and projects involved in EO activities, so as to ensure efficiency and synergy in the use of resources and information.
4. African countries should be encouraged to set up inter-ministerial committees to promote the use of earth observations.

Data access (RA1)

5. MESA Thematic Actions should continue to focus on timely, sustainable and reliable access to quality EO data.
6. MESA should continue working towards maintaining and supporting the use of existing receiving stations in all participating countries.
7. MESA needs to work more closely with national beneficiary institutions to ensure that information generated through MESA is made available to the wider stakeholder groups, including communities and NGOs.
8. MESA should encourage national beneficiary institutions to retain technical capacity to maintain and operate the receiving stations.

Thematic Services (RA2)

9. MESA Thematic Actions should strive to ensure that the services developed are fully operational and delivering and that all relevant stakeholders and countries benefit from the MESA services equally.

Cross fertilization (RA3)

10. Regional Implementation Centres (RICs) should facilitate adoption of their existing services by other RICs or interested stakeholders.

Policy (Ra4)

11. MESA should actively engage the national focal points of relevant MEAs and encourage the use of MESA outputs to contribute towards the MEA reporting and negotiation processes.
12. The relevant institutions representing Africa in the upcoming UNCFF COP 21 Paris conference should be encouraged to utilize MESA outputs to contribute towards the negotiation process.
13. The AU should organize a high level meeting to discuss how the capacity gained through MESA can contribute to implementation of Africa's Agenda 2063 on inclusive growth, sustainable development and shared prosperity, and to encourage Governments to integrate MESA products and services into their national planning processes and action plans.
14. MESA Thematic Actions should continue to strengthen national networks of EO user institutions and encourage the networks to engage communities and private sector in the outreach activities.
15. All participating institutions in the MESA programme should give sustainability issues the highest priority to ensure that the gains/results achieved during the MESA programme are maintained.

Capacity building (RA5)

16. MESA should continue to work towards mainstreaming MESA services into tertiary education curricula on the continent, and facilitate linkages (cross fertilization) between these institutions, with the aim of building up a pool of certified EO expertise in Africa.

Communication

17. MESA Thematic Actions should support national beneficiary institutes to develop, strengthen and implement communication strategies aimed at effectively communicating how MESA products and services can be used by policy makers in contributing to action plans and operational programmes, resources permitting.
18. MESA should review its own communication strategy to ensure its effectiveness at all levels, taking facilitation of communication between stakeholders and the need to provide information in appropriate languages (English, French and Portuguese) into special consideration.
19. MESA should aim to establish a good working relationship with media houses and journalists, and assist in improving their knowledge on EO.

Relating to GMES & Africa initiative

Programme design

1. Ownership by the participating countries through involvement of stakeholders in the project design should be given highest priority to ensure involvement in maintaining access to data using the existing receiving stations.
2. AUC should fully involve existing space or similar EO agencies in Africa for advice on the design and implementation of *GMES and Africa*.
3. The designers of *GMES and Africa* should ensure that the programme is positioned to contribute to the monitoring of the UN Sustainable Development Goals (SDGs) and to AfriGEOSS.
4. *GMES and Africa* design should address institutional responsibilities for data archiving and availability of long-term data on the continent.
5. *GMES and Africa* needs to strengthen the links between the RECs and national stakeholders and should build on existing institutions and partnerships while respecting institutional mandates.
6. Focus should be given to how to facilitate private sector participation in *GMES and Africa*.
7. *GMES and Africa* needs to include capacity building of meteorological departments to provide information required by the *GMES and Africa* land, water and marine programmes, particularly the new marine forecasting initiatives
8. Universities should be included as key partners in the implementation of GMES and Africa
9. Problems of internet infrastructure should be considered and data receiving systems should be designed to allow for access to data from multiple sources.

Opening Ceremony

Forum's Master of Ceremony: Mr. Justus Waimiri

Speech by H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary Inter-Governmental Authority on Development (IGAD)

Distinguished Participants, Members of the Press,
Ladies and Gentlemen,

It gives me great pleasure to join you this morning for the official opening of the First Monitoring for Environment and Security in Africa (MESA) Forum. On behalf of the Inter Governmental Authority on Development (IGAD) and on my own behalf, I would like to welcome all the participants to the IGAD region. I would also like to thank the Government of Kenya for hosting this forum and for warm hospitality given to the delegates since their arrival.

As you are aware the Intergovernmental Authority on Drought and Development (IGADD) was founded in 1986 to combat the recurring severe droughts and other natural disasters that resulted in widespread famine, ecological degradation and economic hardship in the Eastern Africa region. The Intergovernmental Authority on Development (IGAD), a revitalized IGADD, with expanded areas of regional cooperation was launched by the IGAD Assembly of Heads of State and Government on 25 November 1996 in Djibouti, the Republic of Djibouti and was mandated to promote regional cooperation and integration to add value to member states' efforts in achieving peace, security and prosperity.
The Monitoring for Environment and Security in Africa (MESA) programme is being implemented simultaneously with the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI). IDDRSI provides a roadmap for ending drought emergencies in the IGAD region by the year 2027 and the MESA programme will contribute to one of the pillars of the initiative.

ICPAC is the Regional Implementation Center for the Intergovernmental Authority for Development (IGAD) in the MESA programme focusing on; Land Degradation Assessment, Natural Habit Conservation and Forest Monitoring Services. The MESA programme intends to consolidate services developed during the African Monitoring of Environment for Sustainable Development (AMESD) project that ended last year, to provide information as a means for addressing some of the afore-mentioned factors.

H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary, IGAD.

Distinguished Participants;
Ladies and Gentlemen,

Africa as a continent is very rich in natural resources, biodiversity and untainted landscapes that require environmental protection and management. Some of the regional natural resources are shared by several communities and cut across national boundaries. These include grazing lands, rivers, lakes, and wildlife among others.

As you are aware much of the IGAD region is arid or semi-arid with highly variable rainfall. Droughts are very frequent in the region and are often followed or preceded by floods. Most of the natural resources that drive the livelihoods and socio-economic activities are therefore regularly exposed to extreme climate events. Such climate extremes impact negatively not only on the environment that drive the basic livelihoods, but also on regional food security, pasture, water, energy, health, wildlife, tourism, infrastructure, conflicts and security among many others. Proper environmental monitoring and management is therefore critical for achievement of security in the region.

As a region, we envision the MESA programme will increase the information management, decision-making and planning capacity of the African continental, regional and national institutions with mandate on environment, climate, food security and related sectors by enhancing access to, and exploitation of relevant Earth Observation applications in Africa.

This includes a range of information to respond to the common man's needs such as monitoring the water level and flow rate of key rivers used for commercial transport; water cycle information to help agriculture (best planting time, improved crop yields, etc.) and warn of flood and drought risks; monitoring of the changing condition of rangelands for livestock management; tracking the depletion and/or degradation of forest resources and biodiversity; monitoring of marine pollution, fisheries resources and coastal erosion among others.

We look forward to the MESA project generating quality products and services based on Earth Observation (EO) data, strengthen policy frameworks and to build the capacity of our region.

In conclusion, I would like to assure you that IGAD will continue to be supportive of not only the MESA project, but all other initiatives fostered by the AUC and our development partners, aimed at improving our region's welfare, environmental governance and security.

Thank you.

Speech by Mrs. Anna Burylo, Head of Cooperation of the EU Delegation to the African Union (AU)

Distinguish delegates
Ladies and Gentlemen

Good morning!
Asubuhi Njema!

On behalf of the European Union, let me first thank the Government of Kenya, the African Union Commission and the IGAD, for hosting and organising this event. I also wish to thank the Executive Secretaries of the IOC and the IGAD for taking part in this 1st MESA Forum, it highlights the strong interest of the African Regional Organisations in the programme and their commitment towards its success.

In a globalized and rapidly changing world, environmental information is of crucial importance. It helps understand how our planet and its climate are changing, the role played by human activities and how all this will influence our daily lives.

Earth observation applications provide this information,and this is exactly what the MESA programme that gathers us today is about.

Ladies and Gentlemen,

We know that Africa's population of around 1 billion will double by 2050. Demographic growth, if supported by education and job creation would be able to boost economic performance and transformation. Such demographic changes bring about both opportunities and challenges. Demographic growth is also estimated to affect natural resources which will come under pressure, possibly magnified by the impacts of climate change, including biodiversity loss, land degradation, etc. To sustain growth and accelerate transformation, African economies will have to prepare for those new global conditions. Unlike countries that industrialised earlier, African economies face the challenge of structural transformation in a global context of climate change and as you all know, Africa is particularly vulnerable to climate change.

> "To know that we know what we know, And that know that we do not know what we do not know, that is the true knowledge"
>
> Nicolaus Copernicus, Astronomer

The related challenges must be taken into account in African development strategies. The well-being and security of future generations are more than ever dependent on the decisions being made today on

Mrs. Anna Burylo, Head of Cooperation of the EU Delegation to the AU.

This is with that background that African and European leaders had reconfirmed their commitment during the last EU-Africa Summit in April 2014 to continue working together towards the establishment of a coherent framework for the development of Earth Observation activities in Africa so that space strategically contributes to Africa's socio-economic development. Both (African Union and European) Commissions have also specifically addressed this commitment during the last meeting in Brussels earlier this year, with the endorsement of a specific roadmap for the implementation of the "*Global Monitoring for Environment and Security and Africa*" *initiative* on earth monitoring with a view to enhance access to earth observation data for policy makers. MESA is an important building block of it.

The Canadian Astrophysician Hubert Reeves said "*Personne ne sait comment sont exactement les choses quand on ne les regarde pas*" (in English: "*Nobody knows how things look like before looking at them*". We have nowadays powerful tools being put in place and data being made available to increase our knowledge though earth observation. In fact, with our successive programmes PUMA-AMESD-MESA, but also Copernicus and "GMES and Africa" initiatives, we are doing this.

However, another astronomer, Nicolaus Copernicus, said a few hundred years earlier: "*To know that we know what we know, And that know that we do not know what we do not know, that is the true knowledge*". This quote should stimulate us to improve our earth observation technologies and applications to best serve people in dealing with environment and climate change challenges.

I know that many success stories will be shared at this Forum on how MESA and other initiatives contribute to these objectives and by also highlighting their huge potential for innovation, growth and job creation.

In terms of progress in the MESA programme implementation and just to add a few figures to these opening remarks, I wish to highlight that most of the commitments are now on track to deliver (a little less than two years before the end of the Programme) and with a rate of commitment of the EU contribution to date of ~98%, representing an amount of more than 36 Mo€ mobilised out of the 37 Mo€ dedicated to the project.

MESA is also an important building block of the "*Global Monitoring for Environment and Security (GMES) and Africa*" initiative, which was officially launched under the Joint EU - Africa Strategic Partnership (JAES) in December 2007, during the 2nd EU-Africa Summit in Lisbon. The European Commission has allocated 40 Million Euros under the "Pan African Programme" to the initiative and the project is expected to start in 2016. This Forum is part of the steps agreed by the African Union and European Commissions during the last College-to-College meeting, as an opportunity for presentation of the GMES & Africa program to the stakeholders. We trust that the sessions foreseen at the end of the week will also allow us to move one important step further towards the implementation of the programme.

Ladies and Gentlemen,
I am convinced that this Forum is a particularly important place to allow us to get to know each other better and to streamline the MESA potential that will be showcased during the Forum, towards informed policy making and planning in support of improved environmental governance.

It is really fantastic to see so many representatives of various organisations and institutions from Africa and from Europe and I trust that this Forum will offer a great opportunity for rich exchanges of experience.
Let me finish these opening remarks by quoting the immensely regretted Mrs. Wangari Muta Maathai who said: "*When resources are degraded, we start competing for them, whether it is at the local level (where we clash over land and water), or at the global level, where we are fighting over water, oil, and minerals. So one way to promote peace is to promote sustainable management and equitable distribution of resources*".

So let's do all efforts for MESA to contribute effectively to these greater objectives.

I wish you fruitful deliberations and all the best for the proceedings of this Forum, thanking again the Government of Kenya, the AUC, the MESA teams and all stakeholders for its organisation.

Thank you very much!
Asante Sana! Kuwa na siku nzuri!

Speech by H.E. Jean-Claude de I Estrac, Secretary General of the Indian Ocean Commission (IOC) and Chairperson of the MESA Programme, Steering Committee

Representative of the Diplomatic Corp
Distinguish delegates
Ladies and Gentlemen

It is an honour and pleasure for the Indian Ocean Commission to be part of this event.
I would like firstly to convey my best wishes and thanks to the Government of Kenya for hosting this forum and for the warm welcome extended to all the delegates.

Excellences, ladies and gentlemen,

I would like at the offset to acknowledge that considerable effort has indeed been made in the development of Earth Observation technology in Africa. Most countries are now equipped with Earth Observation receiving stations and technical capacity has been built but should also be aware that that some countries are still facing difficulties to adopt and mainstream this technology into their decision making process and planning priorities. Others have infrastructural or management problems. I believe that our forum should endeavour to propose concrete solutions to address these difficulties. I think that we should pay more attention to the management issues. For instance I was in Comoros last week and I can confirm that the equipment installed is not being utilised because of lack of technical skills thus depriving local fishermen of very useful information although the project started well.

All the same have also been able to appreciate the potential of the Regional Implementation Centres that are gradually emerging as centres of excellence. I believe that more efforts should be made to encourage these regional institutions to help building the capacity of national institutions.

If Earth observation technology is to be fully optimised, it is crucial to examine the persistent short falls of the project and those of its predecessor in addressing the gaps that exist between technology development and its application at national level.

It is not disputed that accessing updated, reliable and relevant scientific data is a prerequisite for the formulation and implementation of efficient public policies on sustainable development.

H.E. Jean-Claude de I Estrac, Secretary General of the IOC and Chairperson of the MESA Programme, Steering Commitee

However the facility available is not being exploited to their full potential partly because of management issues. The lack of dedicated personal to translate the scientific data to policy, skilled technicians to maintain the receiving stations, inadequate coordination mechanisms amongst institutions at national level, inadequate communication strategy to support the dissemination of the information. We should work more closely with the focal Ministry and strengthen the national networks of user institutions. This will encourage information sharing and efficient utilisation of resources to reach out to the targeted users of the products. Governments should also retain skilled and put in place incentives to encourage trained personal to remain on the job.

Capacity building should be expedited, on hands-on training, training of trainers as well as linkages with national universities should be promoted to allow countries to continuously build up their pool of expertise.

I also believe that the project management should be more proactive and provide the necessary technical support and guidance. The regional organisations should remain in their role as facilitators and oversee the proper implementation of the actions. I therefore call upon my colleagues from the regional organisations for us to be more vigilant and guide the program management team.

For us at the Indian Ocean Commission, we consider the ocean to be our new frontier of sustainable development, growth and employment. MESA is crucial for ocean policy formulation and decision making process.

The application of earth observation data had been integrated into the Indian Ocean Commission's climate change strategy and in its disaster reduction programme. A pilot project has been undertaken for fisheries monitoring and surveillance action plan. Focus is now towards the integration of AMESD and MESA products in the regional fisheries strategy. We are looking forward for governments to fully integrate the MESA products and services into their national planning processes and action plans and also participate fully in providing solution to administrative bottlenecks.

Let me conclude, by expressing our appreciation to the African Union Commission, the organising committee, as well as to the European Union for the continuous support to development in Africa. I will pay close attention to the deliberations and outcome of the forum.

I thank you!!

Speech by H.E. Mrs. Rhoda Peace Tumusiime Commissioner for Rural Economy and Agriculture, African Union Commission (AUC)

It is an honour and pleasure for me to address the opening ceremony of the First Forum of the Monitoring for Environment and Security in Africa (MESA) project. I wish to convey to you the warm greetings and best wishes of H.E. Dr. Nkosazana Dlamini-Zuma, Chairperson of the African Union Commission and to welcome you all to this historic event. I wish to thank the Government and the People of Kenya for the gracious welcome and generous hospitality accorded to me and my delegation. Hon. Cabinet Secretary, we are grateful for all this and the excellent arrangements put in place for the success of this Forum. I further wish to extend our gratitude to the Inter-Governmental Authority on Development (IGAD) for hosting the historic Forum in their region.

This Forum is a great opportunity for all of us: African Decision-makers, Experts, Service Providers and the User Community to exchange views on various aspects of the project in order for the MESA project to remain relevant and useful to the community that it is intended to serve in its multiple sectoral areas of focus including agriculture, coastal and marine resources, climate variability and Climate change including assessment, natural resources conservation, disaster risks reduction, flood and drought monitoring, fisheries, forestry monitoring, land degradation mitigation, livestock management, monitoring of wildfires, and water resources management.

As the First forum, it will help to refine the alignment of our work with the expectations and needs of our clients including the African Policy and Decision- makers, Development Planners, as well as users of products and services, the MESA project generates. Distinguished Guests might also have noted that the African Centre of Meteorological Applications for Development (ACMAD), one of the MESA service providers and the MESA Continental Implementation Centre, is also marking its official kick-off of the MESA Thematic Action on *Climate Services for Disaster Risks Reduction* at this forum. This is a good development as it now means that all implementation centres are in the implementation phase.

H.E. Mrs. Rhoda Peace Tumusiime Commissioner for Rural Economy and Agriculture, AUC.

Africa's strategic direction and MESA

Africa is the world's second-largest and second most-populous continent after Asia. People are the most precious resource and so our efforts must be directed to serving the interest of the people and that is why the vision of the African Union is people-centred. In serving the African citizens' interests, we are cognizant of the fact that the African continent faces diverse socio-economic challenges which manifest through decreasing food production and food supply, increasing vulnerability to drought and famine, natural disasters, land degradation, water pollution, and reduced income especially for poor small-scale farmers, herders and fish mongers.

African leaders recognize that firm strategic direction is critical for the realization of improved socio-economic conditions of African citizens. As such, the leaders have, in recent times, adopted important Decisions and Declarations to whose implementation the MESA project is contributing. Allow me to highlight the key, which are of relevance to MESA:

1. Issues of climate change and disasters feature highly on Africa's Development Agenda. African leaders, in January 2015, adopted Decisions on Climate Change and Disaster Risk Reduction that reaffirmed the adoption of the High Level Work Programme on Climate Change Action in Africa (WPCCAA) as a blue print for climate action on the African Continent. In an effort to align the implementation of the African Regional Strategy for

Disaster Risk Reduction with the Sendai Framework for Disaster Risk Reduction,the African Union Commission, in collaboration with other Pan African Institutions and Partners, has put in place plans to review the Extended Programme of Action for the Strategy. In the same vein, it is pleasing to note that MESA has a dedicated Thematic Action on Climate Services for Disaster Risks Reduction and, through its various thematic actions, the MESA project contributes to the implementation of the Integrated African Strategy on Meteorology (Weather and Climate Services) as well as the African Regional Strategy for Disaster Risk Reduction.

2. At the June 2014 AU Summit held in Malabo, Equatorial Guinea, African leaders adopted the ***Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods,*** outlining a set of specific strategic goals, which, among others, summed up in the commitment to ending hunger in Africa by 2025. The Declaration highlights such critical areas to MESA as:
   - Efficient and effective water management systems;
   - Etrengthened early warning systems for advanced and proactive responses to disasters and emergencies;
   - Enhanced resilience of livelihoods and production systems to climate variability and other related risks for the African farmer, pastoralist, and fish monger;
   - Mainstreaming resilience and risk management in our policies, strategies and investment plans and many others.

3. I wish to urge the RECs and Member States to continue with their efforts towards the implementation of this Declaration and, our development partners, to sustain support to this cause for a food and nutrition secure and poverty free Africa, through programmes like MESA and others.

4. At the same Summit, in Malabo, the African Union expressed concern over the ***"unsustainable utilization and conservation of Africa wild flora and fauna and the dramatic escalation of illegal trade in wild flora and fauna in recent years"***. MESA is already positively contributing to a solution through the ***Land Degradation Mitigation, Natural Habitat Conservation, and Forest monitoring*** thematic action being implemented by the IGAD Climate Prediction and Applications Centre (ICPAC). The African Union Commission in collaboration with Partners have now developed the ***African Strategy on Combating Illegal Exploitation and Illegal Trade in Wild Fauna and Flora in Africa***. This is our strategy to whose implementation we should all commit.

5. Considering the importance of having a coordinated approach on earth observation and other space-related programmes and projects like MESA, as well as the importance of meeting the space needs of African users, the Commission is in the process of finalising the African Space Policy and Strategy. With these instruments, I believe, we will effectively and efficiently exploit benefits derived from space.

6. Distinguished participants, Ladies and Gentlemen, guided by the MESA overall objective of ***"supporting African Decision-makers and Planners in designing and implementing national, regional and continental policies and development plans towards sustainable development,..."***, we should keep the project relevant by ensuring that it addresses the needs of its intended clients. By so doing, the project shall contribute to Africa's regional integration and development which are the key tenets of the AU's Vision of an Africa that is integrated, peaceful, prosperous, people-centred and a dynamic force in the global arena.

Development and Partnership with the EU

We remain grateful to the European Union for the European Development Fund (EDF) that has been the source of funding for MESA and its predecessor projects i.e. the Preparation for Use of MSG in Africa (PUMA) and African Monitoring of Environment for Sustainable Development (AMESD). The funding to MESA amounts to 37 Million Euros excluding 3 Million Euros of administrative arrangement from the EU Joint Research Centre.

As you may be aware, the Africa-EU Partnership is one of the most productive, and has produced concrete outcomes in various areas of socio-economic development including environment, climate change, as well as regional integration. Through this partnership, the EU has been supporting Africa in various programmes such as the Climate for Development in Africa (ClimDev-Africa) programme,

the Great Green Wall for the Sahara and Sahel Initiative (GGWSSI), Meteorology, the Multi-lateral Environmental Agreements (MEAs), the Disaster Risks Reduction and many others coordinated by the African Union Commission in collaboration with other Pan African Institutions and Partners. We value this support highly.

You may also be aware that the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) has been one of Africa's trusted partners for over a decade now. Africa accesses satellite data free of charge via the EUMETSAT's EUMETCast System, receives technical support from EUMETSAT in various areas including in the implementation of the MESA project as well as other meteorological and climate related initiatives, among others. The cooperation between the African Union Commission and EUMETSAT, especially in respect of the MESA project, is supported by the Memorandum of Understanding (MoU) and the Implementation Arrangement which the two institutions signed in 2013. We are grateful to EUMETSAT for this strong partnership.

Thoughts on the way forward

Two years have passed since the start of the MESA project implementation. I wish to highlight a few things for consideration at this Forum:

1. MESA is a project and, like any other project, it has a life span. Although the GMES and Africa programme is in the formulation phase, it is important that concrete sustainability measures are put in place at all levels in order to maintain the gains from MESA. Sustainability is one of the principles in Africa Agenda 2063.
2. Timely, sustainable and reliable access to quality data by Africa is vital if the continent is to deliver and provide reliable information to inform Decision and policy making as well as development planning. This forum should seriously consider debating improvements in data access.
3. Cooperation and forging working partnerships with other institutions, and building synergies with other programmes and projects should be promoted, as this will ensure efficiency and synergy in the use of resources.
4. Defining user requirements and proper information packaging are critical in an effort to meet the needs of intended people.
5. Enhanced capacity is key to sustainability. Thus the AU's establishment and operationalization of the Pan-African University and its Regional Campuses across the continent including here in Nairobi, is testimony to the importance of capacity development in Africa.
6. The continent, RECs, and Member States have policies and strategic directions in various socio-economic development areas. It would benefit the African cause if we design and implement our programmes in line with established frameworks as we strive to roll out Africa Agenda 2063 on inclusive growth, sustainable development and shared prosperity.

To conclude, I wish to thank the Organizing Committee, under the leadership of the IGAD Climate Prediction and Applications Centre (ICPAC) for all the efforts put in making this forum happen. The guidance of the MESA Programme Steering Committee is also highly appreciated. Once again, I thank the Government and People of the Republic of Kenya for hosting the forum and according us such a generous hospitality and excellent arrangements.

I thank you for your attention.

Key Note Address by Prof. Judi Wakhungu, Cabinet Secretary, Ministry of Environment, Water and Natural Resources and Chief Guest of the MESA Forum.

Key Note Address by Prof. Judi Wakhungu, Cabinet Secretary, Ministry of Environment, Water and Natural Resources

Distinguished Guests, Members of the Press,
Ladies and Gentlemen,
Good Morning,

I would like to first and foremost thank the AUC for inviting me and by extension the Kenya Government to this first international forum on Monitoring for Environment and Security in Africa (MESA). We are delighted to host this great event because it gives us an opportunity to showcase our beloved country Kenya. On behalf of the Government of Kenya, I welcome you all and invite you to interact with the Kenyans, to have a taste of our rich culture and visit the beautiful heritage and tourism attractions we take such pride in. It is my hope that your stay here will be memorable "Karibu Kenya".

Ladies and Gentlemen,

I would like to applaud all the stakeholders in this room from across Africa and the world for the gains they have made towards ensuring our environment is kept clean, health and safe not only for this generation but for many to come. Your dedication to using earth observation data through the MESA project has not only supported policy but allowed us as Government through various arms to make decisions that impact on our country at a local, county and national level.

From Ghana thorough to Mauritius, the MESA Project continues to provide relevant information to public and private organizations in industries such as Fishing, Agriculture and also Wildlife conservation, which for us is much closer to home. As you are aware, Kenya has faced an increase in poaching and deforestation we alongside development partners have worked hard to turn around. With the help of MESA IGAD, the relevant government agencies have implemented the use of open source land mapping tools that enable better use of freely available satellite information for natural habitat conservation assessment.

Ladies and Gentlemen,

Before this, my office and team members had to travel physically to protected areas, which took several days and incurred huge costs. Thanks to the MESA projects, Kenya Wildlife Services (KWS) can now get a snapshot of satellite images of the protected areas on a single page.

That is a clear example of how these technologies and the ones to be discussed here over the next five days impact our everyday lives. The funds saved from such initiatives can be now channelled by Government to further research and innovation towards safeguarding our environment.

It is without a doubt that MESA products and services such as these supports and helps curb widespread illegal, unregulated and unreported activities. Our vision as a Ministry is to provide a clean, healthy, and safe and sustainably managed Environment and Natural Resources which can only be done through partnerships such as these with MESA, AU, and all other development partners present today.

I look forward to hearing more on the systems that have been put in place locally and across the continent to enhance environment governance and security. I humbly encourage you to keep going the extra mile as your projects and ideas are not in vain. It is my belief that from today going forward, the MESA Project will contribute further to the increase of information management, decision-making and planning capacity of African institutions and Governments mandated for Agriculture, Environment, Climate, Fisheries, Food Security and related responsibilities thereby bringing about long term social and economic impact on our country, continent and the entire world.

As I conclude I want to reiterate my Ministry's support towards the MESA project. I also wish to quote Kenya's First Lady H.E. Margaret Kenyatta who said that 'The fragility of the planet is easy to forget in Kenya and Africa as we look at our grand scenery and wildlife, yet our natural bases, mainly forests, wetlands, drylands, aquatic and marine resources are under stress from rapid population growth". It is through such initiatives like MESA that we will help us not to forget or neglect our environment.

I take this opportunity to wish the participants good deliberations during the forum and to express our deep and profound gratitude to all the organizers of this forum for your efforts.

It is my pleasure to declare the "1st MESA Forum" officially open.

Thank you.

A group photo of the 1st MESA Forum.

Chief guests at a press briefing.

Session 1: Environmental policy – Environmental governance and monitoring

Session Chair: Professor Laban Ogallo, ICPAC and former Director of the IGAD Climate Prediction Application Centre

Session Objective: How best to handle governance issues at national, regional, continental and at the global level.

1.1 Keynote speech on embracing Earth Observation (EO), GIS and other allied Geo-ICTs for Africa's sustainable development: Experiences and lessons from Emuhaya Constituency, Kenya

By Hon. Wilbur Ottichilo, Member of Parliament, Kenya

In his presentation Hon. Ottichilo outlined how best to handle governance issues at local and national level and how science and technology should form the basis of decision-making. He also outlined what he has been able to achieve using science and technology in his constituency, and the laws and policies he has been able to influence in the Kenyan Parliament.

Hon Otichillo a member of parliament in Kenya making a presentation.

Highlights

- African leadership faces a myriad of challenges, such as the ever increasing land degradation issues, poaching, etc. To be able to understand our environment, there is need to make use of the Earth Observation data, space and ICT technologies.
- Policy makers in Africa need to make decisions based on available information, but this can only be achieved if the local people are empowered with information that would help transform their lives.

There is need to put in place projects in the grassroots that can have a social impact that can be measured. Towards this end, he has adopted the following three-tire strategy together with other partners:

- Information – needed for making sound decisions.
- Initiatives – that are setup based on the information obtained.
- Impacts – must be tangible.

- The following are the three pillars needed to make geo information available to the people:

A) The legal pillar or framework for geo information or earth observation. The following are some of the legal frameworks in place in Kenya:

- Article 10 of the Kenyan Constitution envisages public participation in all planning and decision-making processes and good governance.
- The County Government Act (2012), part XI, paragraph 110, envisages that every county shall create a GIS database for integrated planning.
- Prioritizing community projects based on community needs (as envisaged in the County Government Act, Part VIII, Paragraph 91a).
- Space policy and national remote sensing policy are being developed.

B) Institutional pillar:

- Presence of strong international and national GI institutions.
- Emerging local level centres (especially at county level).
- Presence of strong GI private sector.

C) A vibrant IT sector:

- Presence of an ICT policy and ICT Master Plan (2014-2017).
- Good infrastructure.
- Highly innovative expertise (M-Pesa, Ushahidi, mFarmer, etc.)

- The following are some of the activities he has carried out in his constituency using satellite technology, Earth Observation, GIS and Geo-ICTs that are now getting better, increasingly affordable and convincingly reliable:

- Put in place a legal and institutional framework at the local level to ensure systems are followed. Three strategic plans (which were participatory in nature) have been developed to have more focused development.

- A GIS ICT centre has been developed for all local people in the constituency to have access to information. A constituency development information system, which collates all information within the constituency, has been developed; this information supports the various sectors within the constituency. Development decisions in the constituency are therefore based on accurate and reliable information.
- The local people have been empowered to

I) use hand held smart phones that have GPS systems to help collect required data,

ii) determine the development projects they want undertaken in the constituency, and

iii) manage the development of the projects. For example, the infrastructure for all schools in the constituency has been mapped and the initiatives needed to be put in place identified to improve the school infrastructure.

- All roads, bridges, schools, health centres, personnel, students, water springs, equipment and electricity coverage in the constituency have been mapped using smart phones. This is to be used in determining their status and how to improve it.
- A climate weather station has been opened in the constituency which is manned by local people – data is collected in real time to determine how the season is performing
- The constituents agreed that no child should walk more than 1km to school. Also agreed is that no one should walk more than 1.5 km to a health facility. Using Earth Observation data, areas within the constituency have been determined where new schools and health facilities should be built, based on the existing population density.
- Communication is critical. The constituency has developed a compendium that helps in explaining development to the local people in a language that is understood by all. Communication is done through the production of regular newsletters, and a local radio station has been setup that announces the developments taking place using the terminologies that local people can understand.

Key lessons learnt:

- Need for a strong anchorage (a strategic plan) in law.
- Need for a geo-information champion.
- Institutional capacity development (human, infrastructural, data) should be prioritized by projects and deployed in such a manner that it guarantees full absorption.
- Need for a dedicated mechanism that links information producers and decision makers.
- Need to embrace public-private partnerships.
- Need to embrace emerging technologies.
- Need for focused and targeted communication for different audiences (decision makers, technocrats/scientists, general public, media, etc.).
- Need to have in place monitoring and evaluation systems that track service usage and impacts, e.g. website hits, opinion polls, etc.

In May 2015, Hon Wilbur Ottichilo was ranked best Member of Parliament in Kenya with a rating of 79.9%.

1.2 Environmental change and policy, especially in Africa

By Professor Nzioka Muthama, Senior Environmental Governance (EG) Consultant specializing in Environmental Change and Policy, especially in Africa

Prof. Muthama stated that the concept of environment pressure could only be effectively tackled if underlying drivers are addressed. Policies, he said, are most effective when they proactively address the cause of environmental degradation, rather than reacting to the effects (GE05).

Highlights

The following key areas, he noted, would be central to the roundtable discussion:

1. Environmental governance: This involves coming up with environmental outcomes that will be of benefit. To achieve this, the whole political process will have to come into play. Discussions will have to focus on issues that are natural forces, which cannot be determined by political boundaries. Negotiations around this will take place when the natural forces are taking their own course.

   There is scientific uncertainty that comes with the current scientific understanding. This constitutes a challenge, hence the importance of environmental monitoring because these uncertainties keep on improving with time. In the absence of environmental data (earth observation) there will be limitations in terms of the agreements that are made.

   The following are the key focus questions in this area:
   - *What reforms are required?*
   - *What are the options?*
   - *How large is the gap between needed reform and current political will?*
   - *What could narrow this gap?*

Is there need for an overarching framework that would inform the countries, through the AUC and RECs, for the benefit of the citizenry?

Prof. Nzioka Muthama

1. Environmental policy issues:

- There is need to develop a way forward in Africa, to see how best to make maximum use of the already available information for the benefit of the citizenry.
- To be able to come up with an effective policy, it is paramount that the causes or drivers of environmental change be fully understood. They include economic development towards moving the continent forward. For this to happen, the areas of development need to be well defined so as to trigger positive change.
- With regards to Agenda 2063, governance is central. Environmental governance therefore becomes a component of this. Towards this end attention should be directed towards, the available resources, consumption and production and link them all for the benefit of Africa. It is possible to bring all policies together through a loose framework that would connect the resources, consumption productivity so that effectively growth can be measurable. This would require Earth Observations that would determine what is available and how it can be extracted sustainably.

Is there need for an overarching framework that would inform the countries, through the AUC and RECs, for the benefit of the citizenry?

1.3 High level roundtable discussion

The round table discussions focused on the following subject areas:

- Policy and strategy
- Environmental degradation
- Environmental governance, green economy and sustainable development

The key questions that guided the round table discussion were as follows:

- *How can we work together regionally and as a continent to take advantage of available resources and global opportunities?*
- *How can MESA support you at country, regional and continental level through the AUC coordination?*
- *How can Africa benefit from Earth Observation applications for environmental treaties and conventions aiming at better governance?*
- *How can policies, at the country, regional and continental level be harmonized?*

The discussants comprised of the following:

- *African Union Commission (AUC)*: H.E. Mrs. Rhoda Peace Tumusiime, Commissioner for Rural Economy and Agriculture, African Union Commission (AUC)
- *RECs Representative*: H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary, Inter-Governmental Authority on Development (IGAD)
- *Indian Ocean Commission*: H.E. Jean-Claude de l Estrac, Secretary General of the Indian Ocean Commission (IOC) and Chairperson of the MESA Programme Steering Committee
- *European Union*: H.E. Mrs Anna Burylo, Head of Cooperation of the EU Delegation to the African Union (AU)
- *Representative of countries*: Mr. Mustapha, Head of Ethiopia Mapping Agency
- *Members of the Ministerial Conference on Environment and Meteorology*
- *Director of ICPAC*

1.3.1 African Union Commission (AUC): H.E. Mrs. Rhoda Peace Tumusiime Commissioner for Rural Economy and Agriculture, African Union Commission Environmental governance

- It is critical to have the environment sustainably maintained for future generations, hence the need for critical discussions around this subject area. Environmental sustainability requires a multi-sectoral approach, as it does not only focus on resources but also on users, the implications thereafter. Focus should also be directed towards:
  - How best to get communities to be benefit from the environment.
  - Who has the responsibility of maintaining the environment.
  - With the limited natural resources in the environment, who gets what?

High level roundtable discussion.

- There is need to ensure that the environment is easily accessed by all, therefore, monitoring of the environment through, for example, GIS, is paramount. Access can be achieved through the provision of information and data on the environment, i.e., what is available, what should be used and what should be preserved by communities.
- Contradictions between the political and economic may remain a challenge. There is need, therefore, to ensure that the information availed underpins the political decisions. This necessitates development of a framework that will help provide the information to political decision makers.
- The MESA programme is providing opportunities to have decisions being made from an informed position. How can capacity be built to ensure that at the local, country, and regional level, this information is internalized and made useful? How can policy makers be made to appreciate the environment? All these issues need to be considered in determining the most appropriate framework that will get this information to be used by decision makers.
- Young people (through schools) need to understand and appreciate the importance of the environment. Effort needs to be put in by schools, and communities at large, towards educating young people on the importance of the environment.
- A continental framework is required to provide data and information to the people who need it, and which would also enable proper communication between stakeholders.
- Pertinent questions that need to be considered:
    - *Is what we are generating getting out there to the users?*
    - *What practical measures can be put in place to ensure we are able to get the results?*

1.3.2 Indian Ocean Commission: H.E. Jean-Claude de I Estrac, Secretary General of the Indian Ocean Commission (IOC) and Chairperson of the MESA Programme, Steering Committee

The following are proposals going forward on what needs to be done in the MESA programme:

- Proposal 1: The MESA project is cross cutting, it therefore cannot be under just one government ministry. Its implementation and results also touch other sectors of national activities such as the use of satellite observations towards solving challenges that are linked to health, the environment, agriculture etc. Yet there is notable lack of coordination, and lack of information sharing between the different organs. It is crucial, therefore, that in each of the member countries inter-ministerial committees be setup e.g. under the presidents or prime minister's office towards making use of the available information. This committee would meet under a national authority specifically aimed at monitoring the results, evaluating them and re-orienting them.
- Proposal 2: The management issues, specifically, implementation and efficiency can only be resolved by political authorities. Political organs will need to be engaged from the first instance and the issues that arise and the sustainability of the project will determine the funding. If this is not done at the political level then a bulk of the results obtained can be lost. The African Union can therefore take the initiative of organizing a ministerial conference to discuss the scientific framework and escalate it to a higher level, thereby involving governments in the analysis of the results, which can serve the interests of each of the member countries as well as to involve them in the long-term towards bringing about sustainability.

1.3.3 RECs Representative: H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary Inter-Governmental Authority on Development (IGAD)

- The subject of discussion is a continental agenda and therefore all countries have to move forward together, only then can they have measurable progress. It however is impossible to do the same thing, at the same time, in different places.
- Under the MESA programme, IGAD has prioritized the following three areas with regards to information:
    - land degradation,
    - natural habitat conservation, and
    - monitoring and management of forests.

Information in these three areas is critical because past emergencies have depleted lives and livelihoods as a result of either too much water or too little water. Up-scaled information that is summarised and encapsulated and which is passed on to policy makers could turn into action plans and operational programmes.

1.3.4 Director of ICPAC

- ICPAC are the MESA implementing agency for IGAD.
- It is implementing projects using earth observation satellites for weather monitoring and by end of 2015 a system will be in place for monitoring drought and floods. MESA is not the only project where earth observation is being used.
- Being IGAD's DRM unit, ICPAC is implementing a web portal where data on floods and droughts can be obtained, detailing the impact, the number of people affected, the amount of agricultural land that has been lost as a result of the catastrophe, etc.
- Satellite data, which is now readily available, is critical and can be used in monitoring weather conditions as well as looking at the trends.

1.3.5 Representative of countries: Mr. Sultan Mohamed, Director General of the Ethiopia Mapping Agency

- Earth Observation data is essential for policy planning and decision-making. Africa now needs to sensitize its politicians towards using this data for their decision-making.
- Geospatial information is therefore critical towards planning, implementing and monitoring change in our countries, as it is authoritative, accurate and reliable. This information is freely available or at a very low cost compared to the costs countries are incurring to setup other infrastructures.
- MESA is providing the way towards using geospatial information, in the case of the IGAD region, specifically with regards to problems of land degradation, natural habitat conservation, forest information, etc. Availability of such information can pave the way for Africa to be successful in the implementation of the 2063 agenda for sustainable development.

1.3.6 European Union: H.E. Mrs Anna Burylo, Head of Cooperation of the EU Delegation to the African Union (AU)

- Africa is a crucial partner to the EU for success in international negotiations and fora, such as the post 2015 Development Agenda and the Climate Change negotiations, with very important milestones being made later in 2015.
- The EU is committed to supporting Africa in the implementation of its long-term development vision in Agenda 2063. Environment, agriculture and climate change are important elements of Agenda 2063, in this respect, governance is therefore of paramount importance.
- The EU and Africa have had a long history of cooperation on environmental issues including through the Earth Observation related programmes such as PUMA, AMESD and the current MESA, as well as at different governance levels: regional, national and continental. In this context, environmental governance is an important part of the European Union and Africa's mutual commitments.
- The earth observation related programmes have a great potential to effectively contribute to Africa's social economic development including its commitment in the context of the global agenda as well as in the broader sense of Agenda 2063.
- Several examples can be shared of how the MESA programme and other earth observation related programmes support decision-making:
  - Tackling illegal, unreported, and unregulated fishing
  - Dealing with droughts
  - Tackling deforestation
  - Land degradation
  - Biodiversity
- The EU is willing to share in its experience with regards to how it has dealt with the same issues and how it has progressed on the same. The success of this is however dependent on how the data and services provided by earth observation can fit into adequate policies, and their effective implementation.

Africa has its own mechanisms and processes, and the importance of the different levels is clearly acknowledged by the EU, as demonstrated by the different cooperation tools put in place at continental (with collaboration with the AUC and the continental organisations such as UNECA, AfDB, NEPAD or in support to the work of the Ministerial conferences and Specialized Technical Committees), at regional (with the collaboration with the Regional Economic Communities) and at the national levels.

- Links between all these levels, including the local level, are crucial. MESA will therefore need to build on the existing networks and on enhanced working mechanisms between the technical (e.g. the regional implementation centres), and the political (e.g. the RECs) levels.
- To succeed, MESA must provide the right type of information in the right format and to the right decision makers. To ensure that this happens, there will be need for dialogue and feed-back between the implementers of the programme, the policy makers as well as the end users. The dialogue between both the governance and technical bodies will also need to be enhanced.

Plenary Discussion

The following were the outcomes of the discussions.

1. Mobilization of communities to use geo-tech technologies: The achievements made by Hon. Wilbur Ottichilo demonstrate the success that can be brought about by effective community mobilization: he empowered his constituents to collect social and economic data using geo-tech on their smart phones.
2. Electricity in Africa: The availability of electricity in Africa is a critical issue that warrants discussion in the Forum, including the resources available to generate it, including solar, water as well as wind energy, which can be used to light the whole continent.
3. Knowledge management: This is critical for institutions, as they need to have the right data.
4. Paris Conference on Climate Change: MESA should be well represented at this conference.
5. Approaches to community empowerment by Hon Wilbur Ottichilo: The way the technology is introduced to the community is critical; they need to be guided to the point of appreciating it and using it. The community should be empowered to identify and prioritize for themselves key aspects within the community that need to be developed, such as infrastructure. They should be given the freedom to form committees and choose leaders amongst themselves to lead the process towards development. The committees should then cost and budget for the identified projects and implement them. In his case, Hon. Ottichilo provided the finances as well as the technical backstopping. Communication in is absolutely critical.
6. Recommendations by Mrs. Rhoda Peace Tumusiime, Africa Union Commission (AUC)

   - Information is key and useful once it is made available in the right way and to the right people.
   - The continent's decision-making points all need to be empowered
   - Climate Change Paris Agreement meeting: Africa has been organized at the highest level with a committee of heads of state and a committee on climate change. These committees have been meeting regularly towards seeing how best they can provide guidance to the ministers. The MESA outputs should be included into the on-going discussions towards the Paris Agreement.
   - Need to map out some of the existing gaps to see how the continent can move towards getting the MESA outcomes into the minds of decision makers at different levels of government as well as to the communities as this is where change should happen.

Session 2: MESA products and services delivery

Session Chair: Gina Bonne, Indian Ocean Commission (IOC)

Session Objective: Provide an overview of the entie MESA programme and thematic actions

2.1 Overview of the MESA Programme

By: Dr. Jolly Wasambo, Project Coordinator, AUC-MESA

Dr. Wasambo explained that MESA is a project funded by the European Union and is within the framework of the earth observation (EO) services between Africa and Europe. The project addresses the need for Africa to have reliable, timely and accurate land, marine and climate data as well as information for all aspects of the environment.

The implementation of the programme is organised within thematic actions, which are based on the priorities that the different regions in Africa have. Each region is therefore implementing a thematic action. The programme is building on previous initiatives that were present in each of these regions

The following table outlines each of the earth observation projects to the current MESA programme, all of which have been funded by the European Union.

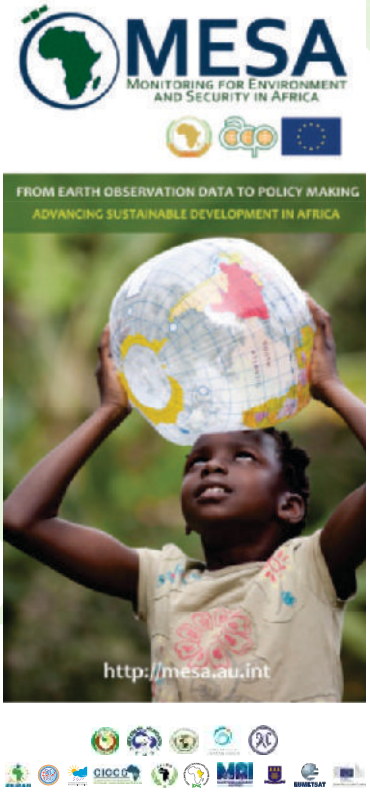


Table 1: Earth observation pojects

	PUMA	AMESD	MESA
Funding	EDF-8, 11M€	EDF-9, 21M€	EDF-10, 37M€
When	2001-2006	2007-2013	2012-2017
Implemented	KMS	AUC (5 RICs)	AUC (6 RICs+CIC)
Infrastructure	53 PUMA stations	53 PUMA upgraded +58 environmental	Maintain + upgrade all PUMA/AMESD stations +4 PUMA +=57 new MESA stations
Training	350	1000	First course started. Plans to use training channel.
Services	Meteorology + 6 pilots	Meteorology + environment services	Meteorology + environment + climate services

Project Beneficiaries	The African, Caribbean and Pacific (ACP) Secretariat General and member states of the following 5 regions: – The Communauté Economique at Monétaire de l'Afrique Centrale (CEMAC) – The Economic Community of West African States (ECOWAS) – The Intergovernmental Authority on Development (IGAD)

Project Structure

The MESA project is structured as follows:

- The Programme Steering Committee (PSC)
  - ACP, AUC, CEMAC, ECOWAS, IGAD, IOC, SADC
  - Observers: these include the European Union, UN agencies, among others
  - Non-voting members
- Regional/continental steering committees: These give guidance to the implementation of the project at regional level.
- Regional/continental implementation centres: Each region has their own specialised technical institution that spearheads the implementation of the MESA project within the region.
- Programme coordination team

Objective of the project

To support African decision makers and planners in designing and implementing national, regional and continental policies and development plans towards sustainable development, thereby advancing the socio-economic progress and well-being of African populations.

[1] Currently being chaired by the Indian Ocean Commission (IOC)
Adaptation and implemenation of informamation vices and products by other RICs
Integration of O-based informaation to REC and MS procedures for monitoring and reporting on evironmental matters

Purpose of the project

Increase the information management, decision-making and planning capacity of African continental, regional and national institutions mandated for environment, climate, food security and related communities.

Result areas

The following are the five result areas of the project:

- Improved access to Earth Observation (EO) data
- Provide earth observation data and information
- Cross fertilization (geographically and thematically) and cooperation
- Strengthened political and policy development frameworks
- Capacity enhancement of African stakeholders

Thematic Action	Region	Services	RICI
Water management for cropland and rangeland management	ECOWAS	· Pastoralism · Bushfire · Agriculture	AGRHYMET regional centre
Coastal and marine resource management	ECOWAS	· Potential Fishing Zone (PFZ) maps · Forecasting ocean conditions	University of Ghana
Water Resource Management	CEMAC	· Alert system of water level in the major sub-basins in the region · Monitoring water balance (flow levels and rates) of the major sub-basins of the region	CICOS
Land degradation mitigation, natural habitat conservation and forest information	IGAD	· Land degradation mitigation · Natural habitat conservation assessment · Forest monitoring	ICPAC
Coastal and marine resource management in the Indian Ocean Commission (IOC) Region	IOC	· Marine Resource Management	MOI
Agricultural and environmental resources management in Southern Africa	SADC	· Agriculture services · Drought services · Wildfire services · Flood services	BDMS/SADC-CSC
Climate services for Disaster Risk Reduction	Africa	· Climate change assessment · Drought service and seasonal climate forecast	ACMAD

[4]It is not part of CEMAC but is involved in the project.

2.2 Thematic Action: Water

2.2.1 Water Resources Management in Central Africa Theme

By: Georges Gulemvuga Guzanga, CEMAC-CICOS

CICOS, Mr. Guzanga explained, is the centre of implementation of the MESA Project in the central Africa region. It is comprised of a committee of Ministers (decision-making), the Experts Committee (consultative organ), and the General Secretariat (implementing organ). The vision of CICOS is to ensure the sustainability of water resources in the Congo Basin for the welfare of the population.

- He went on to list the countries that are beneficiaries of the Water Resource Management thematic action:
  - Republic of Cameroon
  - Republic of Congo
  - Central African Republic
  - Republic of Chad
  - Democratic Republic of Congo
  - Gabonese Republic
  - Republic of Equatorial Guinea
- In terms of natural resources, he noted, the region is rich with dense forests (the biggest in Africa), exceptional biodiversity and also more than 25,000 km of navigable waterways, with 15,000 km categorized and used as a means of communication. It is a region that presents good opportunities in terms of information flow.

This region has however been affected by climate change; since the 1970s, there has been a significantly reduced amount of water in the region's water bodies, e.g. Lake Tanganyika, as well as large quantities of sand being deposited into them (silting of the watercourse channels). The region's rain pattern has also been affected, with a reduced five months of rain being experienced throughout the year.

In terms of the MESA projects, the regions thema is on Water Resource Management. The Economic and Monetary Community of Central Africa (CEMAC) is responsible for this activity while the centre of implementation is the International Commission for Congo-Ubangi-Sangha basin (CICOS). The following are the 5 result areas expected from the project:

- Result 1: Access to Earth Observation (EO) data
- Result 2: Improved operational services
- Result 3: Cross fertilization
- Result 4: Political network
- Result 5: Capacity development

The project will also work towards the following:

- Rehabilitation of e-stations in 7 countries (CEMAC + DRC)
- Rehabilitation of PUMA stations of all the national meteorological services of the 7 countries (CEMAC + DRC)
- Installation of new data receiving stations in 7 MESA universities of CEMAC +DRC

The project has made great progress in the 5 Result areas such as having carried out trainings both at the regional and country levels, established national and regional networks as well as communicated to policy makers about the project. Other project achievements include:

- The Research Institute of Exact and Natural Sciences (IRSEN) in the Republic of Congo has begun generating a map for flood monitoring in the Brazzaville zone.
- In Gabon and Congo Brazzaville, the meteorology and agriculture departments are using MESA data to elaborate the periodical agriculture calendar.
- There has been a reduction of inland navigation accidents due to the use of MESA project information as reported in annual reports of the CICOS observatory.
- In DRC, the water level alert information is successfully being used by vessel owners to navigate the Kasai River.

2.2.2 ECOWAS Marine Theme of MESA

By Dr. George Wiafe, ECOWAS, University of Ghana

Dr, Wiafe noted that the fisheries resources in West Africa contribute significantly to the socio-cultural and economic wellbeing of coastal countries in the ECOWAS region. The industry is estimated to directly or indirectly employ approximately 3 million people. Its contribution to the GDP, which is based on earnings alone, is approximately 30%. Despite this, the industry remains threatened by poor management practices, illegal and unregulated fishing activities, poor knowledge of current fish stock and sustainable yield, incomplete fishing fleet registry, and limited monitoring, control and surveillance.

The MESA project therefore, he stated, seeks to curb these challenges by using Earth Observation data to help decision makers effectively manage the environment, help local fishermen understand the

weather conditions at sea, as well as curb illegal fishing. The ECOWAS Coastal and Marine Resources Management Centre, under the University of Ghana is expected to coordinate and support the fisheries monitoring and management in the sub-region. The MESA project will therefore focus on the implementation of the following two services:

- Service 1: Potential fishing zone maps overlaid with fishing vessel traffic. This will help determine the locations the fish will be and create a map of their location. These maps are then passed on to the fisheries departments. Going forward, this Service will also be able to provide information on the potential fishing areas by vessels and determine the licensed and un-licensed vessels.
- Service 2: Monitoring and forecast of ocean conditions. The EO data (forecasting) will be carried out and this data provided to fishermen via SMS on their cell phones.

In order to succeed, he noted, regional and national centres have been established, designation of national focal points in each country done, and formation of partnerships with national research centres and universities also done. These collaborations are geared towards building synergies to avoid duplication and maximise on resources.

The following are the key milestones made by the programme at the regional level:

- ECOWAS marine theme fully developed at RIC level.
- The marine theme will be developed in each country as soon as countries receive MESA stations.
- Each country will produce and disseminate the two services.
- REC to spearhead the harmonization of the legal framework on satellite surveillance of small fishing vessels in the region.
- Cross fertilization with MOI, AGRHYMET, CICOS (and non-MESA partners).
- EO products and services supporting fishery resource management.

2.2.3 Monitoring small fishing fleet in Ghana with ABSEA technology

By Godfrey Baidoo-Tsibu, Monitoring Control and Surveillance, Fisheries Commission

Mr. Baidoo-Tsibu reported that the Ghana fisheries sector comprises marine, inland and aquaculture fishery. The sector contributes 4.5% to the country's GDP with a production total of 413,241MT of fish, which is less than half of the country's fish demand. The sector provides direct employment to 2.2 million people. Ghana's aquaculture fisheries sector comprises 3,000 operators who have set cages along Volta Lake.

Since 2012, a vessel monitoring system (VMS) was put place. Its limitations include high operating costs, it monitors only industrial vessels licensed to Ghana, and the system does not see other vessels.

The Ghana Maritime Authority also manages the vessel traffic management information system whose specific purpose is to ensure safety at sea. They have established monitoring centres.

Semi-industrial and artisanal fisheries are not monitored; they do not have tracking or surveillance devices installed in them. This is quite challenging to the authorities.

The MESA ECOWAS project collaboration has seen the installation of ABSEA transponders on 18 inshore boats and 2 canoes. Satellite data is now provided by Exact Earth, allowing the fisheries department to monitor vessels through the Ship View system. The ECOWAS Marine Centre provides technical support.

Through these advances in technology the following have been the results:

- Information is available on fishing grounds and vessel activities.
- Mapped fishing activities within Ghana's territorial waters.
- The data provides input for decision-making and enforcement actions.
- Plans are in place to define closure areas for certain periods during the year.

Key successes of the project:

- Being able to sensitize and work with artisanal fishers.
- Using available data, the Fisheries Enforcement Unit is able to plan its enforcement actions.
- ECOWAS Directors of Fisheries planning harmonization of legal framework for monitoring small fishing vessels and up-scaling Ghana's success story through the region.

2.2.4 Marine resource management and monitoring of coastal environment – MOI-IOC

By Eric Martial, Mauritius Oceanography Institute (MOI)

Mr. Martial began by explaining that the Indian Ocean Commission (IOC) is a regional economic community while the Mauritius Oceanography Institute (MOI) is the regional implementation centre under the thema *Marine and Coastal Management in the South West Indian Ocean*. The MOI is, therefore, responsible for developing products and services to ensure political awareness around the activities that are being carried out around the thema, as well as ensure that capacity is built at regional and national levels.

He went on to note that the region experiences a number of environmental challenges, some of which include:

- Marine resources management, specifically fisheries management as well as monitoring and control of fishing activities
- Climate change impact monitoring mostly with sea level rise/warming, extreme weather events such as tropical cyclones and coastal erosion.

The MESA programme, Mr. Martial reported, is developing tools and services to assist the countries in this region address these challenges. The *Marine and Coastal Management in the South West Indian Ocean* thema seeks the following:

- To sustain and improve access to earth observation data.
- To further develop existing AMESD operational services and products for an improved management of fisheries and marine resources.
- To develop new services for addressing climate change and security issues.
- To encourage cooperation with other regional implementation centres facing similar environmental challenges.
- To strengthen the political and policy development framework to ensure an active and sustainable participation of regional stakeholders in initiatives concerning earth observation for environment and security.
- To further develop the capacities of national partners in using earth observation data and products for coastal and fisheries management.

The end users for this thematic action within the IOC region, specifically the national beneficiary institutions include, Fisheries Research Institute, Ministry of Fisheries/Fishing Authority, Fishing Monitoring Centres, Ministry of Environment, National Meteorological Services, he noted. The secondary end users of this thema are policy and decision makers, marine operators, artisanal fishermen, coast guards, the scientific community at large as well as NGOs.

Mr. Martial stated that the two services being carried out under the MESA programme are:

- Service 1:Focuses on: i) marine resource management with a focus on the potential fishing zones, which will benefit fishermen as well as the centres for monitoring and surveillance, and ii) monitoring of oceanography variables. Monthly bulletins arising from the monitoring and surveillance activities are mostly being produced at the regional level by MOI. Capacity, however, is being built at the national level to ensure that different partner institutions can produce similar types of monthly bulletins at their respective local levels.
- Service 2: Monitoring of coastal environment whose aim is to obtain operational marine information on wave data so that the different meteorological services can use this data to improve on the existing models. The service, therefore, is divided into the following two components:
  - Waves and surge monitoring, and focuses on the setting up of a small network of wave buoys.
  - Coastal area management; an assessment is currently being undertaken on the coastlines of the different IOC member states by using the coastal vulnerability index to produce a coastal vulnerability index map to identify the regions most affected by coastal erosion, detailing the sites most prone to erosion.

The services and products that would be developed under the MESA programme, Mr. Martial stated, will help support the following:

- Identification of new fishing grounds.
- Targeted control of fishing activities.

[5]The IOC member states include, Mauritius, S ychelles, Comoros, and Madagascar. Also included in the
thematic action e countries from the eastern coast of Africa: Kenya, Tanzania, and Mozambique.
The communication th t takes place between MOI and the secondary users is channelled through naational

- Analyse variation and trends of oceanic parameters and their consequences on fishing resources and coastal management.
- Acquisition of operational information on waves.
- The data to help in the detection, monitoring and prediction of algal blooms.

2.2.5 Activities that have been carried out in South West Madagascar

By Dr. John Bemiasa, Institut Halieutique et des Sciences Marines

Data from MESA programme has contributed towards ending the phenomenon of toxic products (bloom) provoked by marine species that infect the animals, Dr. Bemiasa stated. Over the years this had resulted in deaths of people who had consumed these infected animals such as fish and tortoise.

The MESA programme, he reported, has worked on this issue and collected data (from a distance of 4km) that is being used to monitor the bloom algae and analyse it. The statistical analysis, he went on to state, has shown the increased temperature on the surface of the ocean resulting in increased concentration or proliferation of toxic elements. Through this determination, authorities can be alerted early enough to advise fishermen to stop fishing in the affected areas.

This monitoring unit, Dr. Bemiasa noted will have the role of ensuring follow-up on the environmental parameters and educate the local population through all communication means.

Plenary discussion

The following were the outcomes of the discussions:

1. Cross fertilization: An approach that can be implemented towards effectively communicating and getting data from each other would be through the setting up of implementation centres. These centres would determine (through an MOU) how best to service each other, e.g. through the regional implementation centres or focal point institutions in the respective regions. This would then be rolled out to member states in the other regions.
2. Fish farming: The data being used for navigational planning should also be used to promote aquaculture through mapping out suitable areas that can be used for fish farming towards increasing fish production.
3. Capacity building: This is critical, especially, in the area of administration including that of equipment and services. Passing on of information to the users who need it, e.g. fishermen, should be in a language that is easily understood by them.
4. Capacity building at the level of the RECs is needed at national level so that users can use various products and services that are being developed for the benefit of their respective countries.
5. Access to developed tools: There is need to have a programme in place on which tools that have been developed in MESA countries can be shared out to institutions within the respective countries. Being open source, the institutions could further develop these tools to enhance capacity building actions.
6. The coastal vulnerability index: The CVI index method that uses six variables is being used to achieve this. This methodology will be adapted, depending on whether the data will be readily available in the different countries.
7. Access to data: Fishermen should have access to data on the climate to enable them effectively plan their fishing trips. The same goes with the farmer who will need this data before planting his/her crop. Climatic data should therefore be made available 2-3 months in advance so that farmers and fishermen can be well guided.
8. Regional centres: A lot more needs to be done in investing on regional centres so that respective teams can scale up their interventions and production of material as quickly as possible – a lot more needs to be achieved simultaneously. French and English translations of documents are a case in point where interventions are needed.

9. Validation of data satellites: If data from satellites are not validated this can create gaps in terms of services that may be produced from the data. Validation and analysis should therefore be carried out, e.g. using fixed systems before the thematic services can use it.

10. Mapping marine data with environmental pollution data: This should be integrated with what is being done in the marine sector. Data on pollution monitoring should be made available, e.g. monitoring of oil spills, erosion, and pollution. Coordination, therefore, will be key.

11. Tools and information dissemination: Member states should ensure this is effectively carried out; whatever is done at regional level should be transferred to national level. This is already inbuilt within the MESA grant and the overall programme.

12. Training: Through the MESA programme, training will be carried using the following approaches:
    a. through partners,
    b. regional programmes,
    c. through a training contractor, and
    d. through regional WMO centres.

2.3 Thematic Action:Water management for cropland and rangeland management

Chair: Mr. Isidore Embola, Chair of CEMAC

Themes:

- Water management for cropland and rangeland management.
- Land degradation mit agation,tural habitat conservarvation and forest information.

2.3.1 Water management for cropland and Rangeland: ECOWAS-AGRHYMET

By Issa Garba – AGRHYMET

Mr. Garba explained that AGRHYMET, which is the implementing centre, is a specialized institution for CILSS and has been in operation for the last 40 years. Its mission is to produce information in the area of food security, and the fight against desertification.

ECOWAS, he stated, works on water management for land crop and rangelands. He revealed that the amount allocated for the MESA project is5M€ for a period of 3 years, covering 16 countries with an estimated total population of approximately 366 million people. These populations live in an area characterized by conflicts and a high birth rate. Floods, drought as well as food shortages are recurrent in these areas. Data from Earth Observation, therefore, allows services to help alleviate these challenges.

Services identified under the MESA projects, Mr. Garba noted, are the results of the services developed under the framework of AMESD that include, i) monitoring of dry seasons of water points ii) agricultural services iii) wild fire services. Besides these services there are also training actions (given by universities) and sensitization services that are planned. These services are under the responsibility of the Ministry of Agriculture. Training needs were identified in order to develop modules that are identified in the framework of the project.

Mr. Garba outlined the different stages towards the implementation of the three services, which had been on-going under AMESD as: i) definition of the services, ii) development of the services, iii) integration of the service and iv) operationalization of the services. The project is currently in the operationalization stage.

Mr. Garba explained each of the services as follows:

- *Agriculture service*: Monitors production of food. Data from earth observation is used to obtain, e.g. estimated levels of rain, imagery from the vegetation, present in the e-stations. These indicators are interpreted to monitor the environment. Profiles are also used to compare and contrast the change in vegetation. Tools that have been developed help in predicting the yields.

- *Pastoralist service*: Monitors water points, croplands as well as the rangelands. Its key focus is to have indicators of the cropland as well provide information to the authorities towards managing conflicts between farmers and cattle keepers. Studies are based on data that comes from the estimation of rain, vegetation and data collected from the ground

- *Wildfire service*: Monitors active fires, evaluation of bad surfaces and detection of areas prone to wildfires. A lot of the information on this service has been produced.

In terms of communication, Mr. Garba explained that AGRHYMET produces monthly newsletters on these three services, a special note and also does briefings by the various institutions. The AMESD/MESA project is now facilitating it through improving access to data. All information shared out on these services has undergone validation actions.

- Sixteen national networks, he noted, are currently in place with each one having a focal point and four thematic focal points. There are also main actors at the continental and regional levels who participate in the training.
- Some of the actions and success stories of the project that Mr. Garba shared include the following:
  - The centre, through its tools and methods developed with different projects, has developed a rapport with the Ministry to have them carry out the monitoring and taking stock of what has been done with regards to the cropland.
  - A conference of Minister's recommended that this method be used in other countries, so that these actions can be implemented.
  - For the agro-pastoral campaign held every year, a monitoring campaign takes place, followed by the production of a newsletter that gives the state in terms of production, needs and gaps that need to be filled. This information is then transmitted to the National Assembly, NGOs, and international organizations for planning actions.

  that exist in the regional centre.

[7] www.agrhymet.ne

[8] Benin, Burkina Faso, Chad, Gambia, Ghana, Guinea, Guinea Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo

[9] This is a new element in the framework of the project

- Example of Burkina Faso: Through the products and services of the station, they have benefited from all the opportunities to sensitize policy makers and the producers.

In conclusion, Mr. Garba noted that:

- Results from AMESD have been consolidated and have improved prediction. The national networks were involved to ensure integration.
- The MESA project is now integrated in the regional project, both technically and politically.
- Sustainability will be ensured beyond MESA through a regional network and the integration of the services and training that exist in the regional centre.

2.4 Thematic Action: Land degradation mitigation, natural habitat conservation and forest information

2.4.1 Land degradation assessment, natural habitat conservation and forest monitoring services. IGAD-ICPAC

By Zachary Atheru, ICPAC

Mr. Atheru reported that the IGAD thematic action covers eight IGAD countries and two additional countries: Rwanda and Burundi. ICPAC is the implementation centre for the project, which begun in 2013 and runs to August 2016.

The project key partners are:

- Regional Centre for Mapping of Resources for Development (RCMRD)
- Ethiopian mapping agency (EMA)
- National Environment Management Agency (NEMA) Uganda

Sixty per cent (60%) of IGAD, Mr. Atheru noted, is under arid and semi-arid land with more than 40% of the population living in the semi-arid to hyper-arid zones that are vulnerable to land degradation. The region has challenges of climatic extremes, longer and more frequent droughts followed by floods resulting into soil erosion, land degradation as well as food insecurity. Some of the other key challenges facing the region include the following:

- Uncontrolled fires – leading to land degradation.
- Loss of biodiversity.
- Poaching.
- Degradation of natural habitats.
- Deforestation as a result of population pressure and high poverty levels.
- Lack of policies, legislation and support for environmental protection.
- Lack of up to date and accurate information for the whole region.
- Fragmentation of information, which is spread over a number of institutions and thematic areas.
- Lack of a pan IGAD infrastructure for storing, processing, presenting and disseminating data.
- Inadequate mechanisms for tracking existing information.

Some of the key opportunities, according to Mr. Atheru, include:

- National and political commitment.
- Unique and endemic fauna and floral species that act as a source of income and contributor to poverty reduction.
- Diversification of shared resources e.g. pastureland, watersheds, rivers and wildlife areas.
- The revitalisation of the IGAD mandate from the narrow focus of drought and desertification control to a more holistic development including integrated environmental and natural resources protection and management approach.
- IGAD platforms for technical experts from the member states to discuss and participate on issues related to its mandate as well as programmes such as environmental management and conflict and security issues.

Through the MESA programme, earth observation data as well as remote sensing bridge the gap and help to answer some of the key questions by providing a number of relevant products.

The general objective for the region, Mr. Atheru stated, is to enhance land degradation assessment, natural habitats assessment and forest monitoring for sustainable management of environmental resources, which can be through:

- developing operational geo-information services, and
- strengthening the information management capacity of regional and national institutions in order to support decision and policy-making processes.

With regards to data access, it was noted that there are 10 AMESD receiving stations in all countries, 9 PUMA stations. The training institute in Kenya was equipped with computers.

The programme has three services, with two previously carried out under AMESD being consolidated (land degradation assessment and natural habitat conservation). The new services include the forest monitoring service and cross-fertilization AMESD agriculture service from SADC.

- *Land degradation assessment*
  - Objective – Enhance assessment of extent and severity of land degradation at the regional and national levels.
  - Key products –Land Degradation Index Map (LDIM) over IGAD and regular bulletins.
  - Key users –National ministries of environment, meteorological services, IGAD Secretariat, regional institutions, and researchers.

- *Natural habitat assessment*
  - Objective –To provide an assessment tool on the state of natural habitats to support conservation policies in IGAD.
  - Key product –Land cover change at high resolution on IGAD protected areas, fire and biomass.
  - Key users –National ministries in charge of environment, IGAD Secretariat, IUCN, WWF.

- *Forest monitoring*
  - Objective – To set up an operational system for monitoring forest cover, forest changes and forest vulnerability.
  - Key product –Forest cover change and degradation, forest vulnerability information.
  - Key users –National ministries on environment, forest services, IGAD Secretariat, regional institutions and researchers.

- *Agriculture monitoring*
  - Key product – Crop status and conditions, crop statistics.
  - Key users – National ministries in charge of agriculture, IGAD Secretariat, regional institutions, FSNWG, and researchers.

The following were identified as the key successes of the programme:

- Use of the e-Station products mainly NDVI in the State of the Environment Report in Uganda by National Environment Management Authority (NEMA).
- Ministry of Environment in Kenya uses land degradation index maps products from MESA for State of Soil Erosion reports.
- Ministry of Environment, Directorate of Land Reclamation in Kenya uses Land Degradation Index Map for land reclamation recommendations and policy review.
- World Food Program uses land degradation products for vulnerability assessments.
- World Resource Institute used land degradation products for awareness of land degradation in Kenya and Ethiopia.
- Support of Emuhaya constituency with the data for vegetation/crop monitoring with e-Station data.
- Amboseli Trust for Elephant regularly uses NDVI and obtains products from the e-station for elephant's habitats monitoring.
- Land cover change in protected areas of IGAD (The LCC product of Mt Kenya was one of the factors considered for fencing the park).

2.4.2 Presentation by Kenya Wildlife Service: Example of Partnership with the MESA Project

By Wycliffe Mutero, Kenya Wildlife Services (KWS)

One of the users, Mr. Wycliffe Mutero from the KWS outlined how they have used information from MESA towards furthering their objectives on wildlife protection as well as monitoring wildlife movement.

- Together with MESA staff, validation of land cover mapping for 32 wildlife-protected areas has been carried out. The land cover maps are currently being finalised using JRC's Land Cover Mapping tool.
- Undertaken land use/land cover change in Marsabit Forest Ecosystem using Landsat TM data for three epochs: 1990, 2000 and 2010. This work is featured in a chapter of a baseline survey report for Marsabit Forest Ecosystem.
- NDVI anomalies, matrices and cluster analyses to monitor vegetation health in Kenya's WPAs.
- Used e-Station NDVI data as an input for identifying biodiversity hotspots in Kenya's protected areas in collaboration with Kenya Water Tower Agency and the National Museums of Kenya.
- KWS has obtained Landsat data and in particular data for 1990, 2000, 2010 and 2014 epochs.
- The MESA Project has supported the capacity building of KWS staff, in particular training on Land Impact Tool and SPIRITS software.

Plenary discussion

The following were the outcomes of the discussions.

1. Management of stations: The effectiveness of these stations, particularly in ECOWAS countries, in terms of how they are being technically managed needs to be improved.

2. Predictions in crop production: In ECOWAS countries, seasonal predictions have been established using products developed by AGRHYMET whereby the most ideal dates for planting can be predicted. Movement of insects that affect these crops are also monitored using products developed.

3. Collaborations: AGHRYMET has developed collaborations with sub-regional institutions in West Africa including in the area of monitoring forest fires.

4. Monitoring of surface water: JRC is developing products that provide validated information on water points.

5. Involvement of Focal Points in land degradation: In IGAD, the Focal Points were directly involved from the point when the methodology was being drawn up. They were also trained to carry out the modelling themselves. Both focal points and experts carried out ground truthing; there is collaboration in this regard. The focal points are also trained in other services for them to be able to carry out the modelling. The overall intention of this approach is to have national bulletins to be produced by the national focal points and which then will be disseminated through the national networks.

6. Up-scaling through cross-fertilization: AGHRYMET has an MOU with ICPAC towards having the land degradation thema adopted by AGRHYMET. The same approach is being carried out for ECOWAS and SADC to adopt the thema. The forest services is a new service, as such, there has been no cross-fertilization.

7. Key learning's on using MESA products for wildlife management: Kenya Wildlife Services is at the stage of creating awareness and seeing the potential of these products. The stage whereby the products can be practically used, e.g. by park managers to make decisions, is yet to be reached.

[10] Djibouti, Eritrea, Ethiopia, Kenya, Somali, South Sudan, Sudan, Uganda
[11] Associates are present in each of the countries, as well as key focal points

Chair: Ms. Olayide Olushola, African Union Commission (AUC), Department of Rural Economy and Agriculture

Themes:

- Agricultural and environmental resources management in southern Africa
- Climate services for disaster risk reduction in Africa

2.5 Thematic Action: Agricultural and environmental resource management in southern Africa

2.5.1 Introduction on the MESA products and services towards decision making in the SADC region

By Isaac Kusane, SADC

Within the SADC region, Mr. Kusane noted, MESA focuses on agriculture and environment resources management. There are four specific geo-information services that are being developed, they include, i) agriculture, ii) drought, iii) wildfires and iv) floods. The following are the expected results:

- Provision of appropriate earth observation infrastructure to beneficiary institutions.
- The development of geo-information services to track the evolution of environmental hazards.
- Exchange of services and expertise with other regions.
- A better-informed decision-making process and policy development framework to include earth observation information.
- Enhanced technical capacity in national and regional institutions to ensure sustainability.

Quick, complete and unbiased information from the earth observation satellites is needed in order to support planning and decision making for better management of agriculture and the environment at a time when all are threatened by the impact of climate change.

Mr. Kusane talked about the MESA products and services within the SADC region, which are:

- *Drought*: The MESA drought services monitors drought and delivers drought maps as well as monthly, quarterly and bi-annual drought outlooks in order to generate early warnings and identify potential hotspots. This service will help governments within the SADC region to plan interventions such as emergency food supplies and agricultural credit to alleviate the effects of drought.
- *Agriculture*: The MESA agricultural service supports this sector by providing information every ten days on crops and rangeland conditions, crop development and tools for yield forecasting towards better planning for food security within the SADC member states.
- *Wildfires*: The MESA service provides timely data and information on fires. Near real-time wildfire maps and monthly burn area assessments are geared towards preventing and managing wildfires. The fire danger risk index supports the process of assessment of burning permission requests. The 15-minute wildfire detection updates support effective reactive measures to active wildfires while the burn area assessment plays a pivotal role in estimating costs and carbon emissions and climate change.
- *Flood Monitoring*: The MESA flood monitoring service will contribute to flood prevention and preparedness, real time information on flooding as well as flood damage assessment. The flood service will provide information such as flood risk maps to contribute to effective flood risk planning and management.

Universities, it was noted, will be expected to ensure that the legacy of MESA services goes beyond the project by developing and carrying out the MESA/SADC training plan as the MESA capacity building is integrated into the curriculum of the institutions. Integrating other leading universities in the SADC region to the national MESA networks and providing them with MESA receiving stations will further contribute to the development of human capital even beyond the life of the MESA programme.

Currently, up to 50% of the user communities are actively using the MESA products and services at varying degrees of competence. The following presentations are a sample, among the user community within SADC, on how they are using the MESA products and services towards streamlining them for decision-making.

[12] www.mesasadc.org

[13] At least 25% of the country experiences wildfires every year. In one single year approximately 18.3 million hectares were burnt.

2.5.2 Wildfire Products and Services: *Tanzania, Ministry of Natural Resources and Tourism (MNRT), Tanzania Forest Service*
By Kekillia Kabalimu

Ms. Kabalimu informed the gathering that the Ministry of Natural Resources and Tourism hosts a fire information receiving station through which various datasets for fire monitoring are received and disseminated to stakeholders. It also ensures that that field staff are trained and have the necessary equipment for combating fires. The ministry has done comparisons to identify which months of the year are most prone to wildfires and taken action towards identifying the causes and combating them. Reports on wildfires are received, registered and sent out to fire fighters.

A) Zambia Environmental Management Agency

By Gift Sikaundi (ZEMA), Zambia

Mr. Sikaundi explained that ZEMA is a statutory body, mandated to implement and enforce the Environmental Management Act in Zambia, as well as to provide advice to government on all environmental related issues. Every five years, it conducts an assessment of the environment and produces the state of the environment report. ZEMA is a recipient of a fire monitoring station, which is being used to monitor fire activities in the country.He reported that the MESA station has been utilized in the following ways:

- Provide fire statistics in the country. Data can now be provided in terms of numbers, type of vegetation burnt and the extent.
- Provide coordinates of where the wildfire is, through SMS.
- Evaluating the impact of fires on the ground.
- Provide early warning to the relevant institutions.
- Using data received for research purposes.

B) Zimbabwe, Environmental Management Agency (EMA)

By Ntandokamlimu Nondo

Mr Nondo explained that the Environmental Management Agency is a statutory body responsible for ensuring the sustainable utilization and protection of the country's environmental goods and services.

The agency hosts a fire information receiving station that is used to monitor and predict fires as well as produce reports and disseminate information to stakeholders.

He highlighted the following as the key benefits experienced from the MESA fire station:

- Highlights areas that are at high risk of catching fire resulting in fire suppression and awareness being enhanced in the area.
- Being able to identify fires in real-time as well as coordinating the monitoring and putting the fires. This is disseminated using a dedicated messaging service.
- Data received from the stations is being used for reporting to key decision makers.
- Quarterly and annual fire reports are produced.
- The data received is used to carry out fire behaviour research in the country. Results show that most fires come about within three kilometres of the road network.
- Improved linkages in fire management, resulting in improved decision-making and improved fire reporting.

2.5.3 Flood Products and Services

A) Malawi, Department of Disaster Management Affairs (DoDMA)

By Madalitso Mwale

Mr. Mwale reported that the department coordinates and directs all disaster risk management programmes in Malawi. With the coming of MESA, the department has been appointed to coordinate its activities at national level with regards to the flood service. A focal point from DoDMA has been trained in flood monitoring. The MESA service will help to provide real-time monitoring as well as information on flooding in the country towards better preparedness and response.

2.5.4 Agriculture and Drought Services

A) Malawi, Department of Land Resources Conservation, Ministry of Agriculture and Water Development

By Joseph Kanyangalazi

Mr Kanyangalazi explained that the department's mandate is the promotion of programmes that ensure the proper management of land based natural

resources for improved agricultural production and other uses. The department is a beneficiary of the agricultural monitoring station. He reported that the station had benefited the country in the following ways:

- Using maps to help determine the planning cycle for agriculture within the country.
- Monitoring of vegetation performance as the seasons progress through the use of maps.
- Predicting crop yields before the end of the growing season.

B) *Zimbabwe, Scientific and Industrial Research and Development Centre (SIRDC)*
By Farai Kuri

SIRDC, Mr. Kuri explained, is mandated to carry out strategic research and development for the benefit of manufacturing, service, agricultural and mining sectors of Zimbabwe as well as to commercialise research and development outputs.

He went to explain that SIRDC is a drought focal point for MESA and is also a beneficiary for the fire station, which has had the following positive contributions in as far as flood monitoring is concerned:

- Providing earth observation data sets that are used to monitor drought in the country, right from the onset to the end of the season.
- Monitoring vegetation conditions as the season's progress, which helps determine their performance.
- Determining how crops are performing in different parts of the country.
- Predicting the likely yield of maize in the country before the end of the growing season.
- Through the use of maps, information is obtained of the areas affected by drought and those areas that urgently need attention.
- Together with the Ministry of Agriculture, this information is put together by district and disseminated.
- The Ministry of Agriculture provides crop statistics used to predict the end of season yield. 80% of the maize yield can be predicted by the earth observation data from MESA. This helps inform the authorities on the areas that will likely need food aid in the country.

A crop failure early warning systems is due to be developed towards helping alleviate drought in the country, right from the onset.

C) *Botswana Department of Meteorological Services (BDMS) By Radithupa Radithupa*

Mr. Radithupa reported that the department is mandated to monitor and analyse the country's weather as well as that of the region by providing weather forecasts, bulletins, and an extensive range of meteorological and climatological data and reports.

The MESA products, he explained, have helped bring out the extent of vegetation and severity of the drought in the country. This report is sent to the office of the President. Based on the drought assessment report, e.g. in 2015, the President declared a drought in the country.

With regards to forecasting the weather, he noted that the input from MESA (PUMA) had helped in the following ways:

- Improved skills on diagnosis of atmospheric developments.
- Improved accuracy of weather forecasting through easy interpretation of satellite imagery.
- The capability to superimpose or overlay all the different elements assists in coming with a better consensus with regards to forecasting.
- The products have been integrated into the existing BDMS forecasting system.

The PUMA/AMESD product, Mr. Radithupa explained, has helped the BDMS improve on its weather forecasting especially for the aviation sector, accurately monitor storms as well as in mitigating the risks of weather related disasters. The PUMA system has been integrated into the daily weather forecasting

Some of the notable challenges experienced include:

- Technical competence on the thema as well as in system administration. Training is therefore needed.
- Delayed deployment of the LOT 1 supplies contract.
- Need for high-level support of the MESA product.

[14] The flood monitoring staation should be in place by December 2015.

2.6 Thematic Action: Climate services for disaster risk reduction in Africa

2.6.1 *Presentation by ACMAD*

By Dr. Andre Kamga, Chief Climate and Environment Department ACMAD-MESA Project Manager

Dr. Kamga began the presentation by explaining that ACMAD is a continental organization whose role is to:

- Act as the African weather and climate watch centre (weather/climate forecasts and warning).
- Be the African centre of excellence on the application of meteorology for development (DRR, agriculture/food security, water and other natural resources management, among others).

Its involvement in MESA is therefore focused towards the application of meteorology for development.

ACMAD is involved in the *drought service and seasonal forecast* product service, which is trying to generate focused information that can be used in advance so as to have preparation activities implemented well in advance.

Dr. Kamga gave the following as the success and opportunities of ACMAD.

Success stories

- April –June 2014: Provided expected hazards for the season and the potential impact of the hazards as well the measures needed to be taken. The hazard was the late start of the season.

  The President of Niger used the focused information given by ACMAD, reviewed the hazards and instructed different department and agencies to act and implement resilience measures. ACMAD was mentioned in the President's speech.

Opportunities

- Need for countries to have the legal instruments to apply early warning information.
- Need for collaboration towards having declaration of emergences in advance.
- Expected hazard maps over Africa produced.
- RECs to facilitate success stories in countries that are lacking these instruments on early warnings.

2.7 Presentation of the National Land Data Centre, Theia, France *By Dr. Marc Leroy, Technical Director, Theia Land Data Centre of the Centre National d'Etudes Spatiales at Toulouse*

Dr. Leroy explained that Theia is a remote sensing network at the national level directed at the observation of the ocean and atmosphere. Ten partners are involved in this network, with a number of partners focusing on the areas of research in agronomy and environment. There are institutions that have an operational mandate in various areas that include, transport, meteorology and environment, as well as on the use of spatial data.

Theia, he elaborated, seeks to promote the use of spatial data in the scientific community and among public actors at the national level. Theia seeks to facilitate the use and access of this data. It also seeks to make the national effort more visible at both the national and European levels.

The Theia structure is made up of:

- services and data infrastructure for analysis and use of the data, and
- network science expertise centres.

In terms of governance, there is a technical committee within Theia, with a representative for each stakeholder. This committee meets every six months.

Plenary discussion

The following were the key outcomes of the discussions.

1. Benefits of the MESA products and services to the African group of negotiators: The MESA products are now being used in discussions. The AUC is to participate in meetings of the African group of negotiators on climate change, starting with raising the awareness on what the global warning signal over Africa is, as well as on precipitation patterns, and hazard scenarios. The operational phase of the programme begins in September 2015.

2. Negative impact of satellites in space: The issue of space debris is under discussion and is being dealt with at the UN corpus.

3. Predicting crop yields: Crop yields in Zimbabwe can be estimated in advance, 6 to 8 weeks before harvest, and this information is passed on to farmers. Conventionally, it would mean that officers go round the wards to get information on the yields, however, by using earth observation, this information can be obtained much earlier.

4. Key comments
   - MESA should be looked at in the context of the previous initiatives– PUMA and AMESD – that is when a fuller picture will be seen in terms of what want the programme is trying to achieve. The approach taken in SADC is not to carry out the work on behalf of the member states, but to support them to do what they are mandated to do towards maximizing on the technology availed to them
   - The flood monitoring service is new and is expected to be at the pre-operation service stage by December 2015.

5. Recommendations
   - There is need for all countries to be at the same level in terms of use of the MESA products.
   - In reducing forest fires in the case of Tanzania, there is need for capacity building (training and sensitization) regarding conservation of the environment, with MESA assisting towards this end.
   - There is need for improvements to be made on the observing system in the waters around Africa.

Session 3: MESA Training

Session Chair: Stephane Flasse

Session Objectives: To showcase what MESA is doing with regards to capacity building, specifically:

- Provide an overview of the MESA programme, focusing on the contine tal aspect of the programme.
- Overview of training on the e-station.
- How the MESA training is integrated at University level.

The following questions were addressed by the discussants in this session:

1. *How is training being carried out?*
2. *How is the University of Zimbabwe using MESA data for its curriculum?*

3.1 Training in MESA

By Dr. Ben Maathuis, Particip /International Training Centre /VITO

The presentation by Dr. Maathuis gave an overview of the MESA programme, focusing on the continental aspect of the programme.

The team of trainers in this MESA capacity building programme comprises the following three organizations:

- Particip
- International Training Centre (ITC)
- Vito

These three organizations have developed a consistent training programme, which is an online digital learning management system, with the training office based in Addis Ababa. This facility can support training at the continental level as well as at the regional level through the RICs/CIC. A training calendar has already been developed that encompasses 20 different courses.

The topics in each course are placed into blocks that can be followed in a sequential manner to ensure that appropriate knowledge is at the disposal of the participant prior to the onsite training. The entire course can be downloaded in the form of a single zip file from within the learning management system. A number of other courses are still in the process of development.

The training approach involves distance education courses, classroom courses as well as blended training, which is a combination of distance and classroom training events. In total, the courses run for 40 hours spread out over three weeks.
The courses are offered multiple times, and only when the number of registered participants is over 10 individuals. The maximum is 22 individuals per course.

The website contains all the information related to the training programme, as well as the schedules of each course. The EUMETCast training channel is being used to ensure delivery of all the training materials.

Table 3: The courses in each training approach:

Training Approach	Courses
Distance education	• Generic technical courses • Selected thematic courses • Communication and policy oriented courses • Training delivery support courses to RICS/CIC
Classroom education	• System administration training • Environmental thematic courses • Meteorological thematic courses
Distance and classroom education	• Communication and policy oriented courses

3.2 The Joint Research Centre (JRC) and training for MESA

By Dr. Marco Clerici, European Commission
Joint Research Center

In his presentation, Dr. Clerici explained that the Joint Research Centre acts as the Directorate-General of the European Commission. Its mandate is to provide customer-driven scientific and technical support to community policy making. One of its key objectives is to provide unbiased information for the decision-making process in Africa.

JRCs contribution to the MESA project, he noted, is through its earlier contribution to PUMA/AMESD projects. In this regard, an administrative arrangement is in place, with JRC tasked with the following:

- E-Station maintenance and upgrade.
- Training session in Africa and at JRC.
- Institutional support by participating in the relevant meetings e.g. the PSC, as an advisory body.

[16] Participants to these courses are nominated by the RECs and CIC.
[17] www.training4mesa.org
[18] The overall objective of the MESA stations iso have in place automatic processing so as to increase the relevant information fom the data.

Dr. Clerici stated that JRC will work towards ensuring:

- Access to earth observation data (Result 1). More than 160 e-stations will be delivered in Africa, which includes both PUMA and MESA stations.
- Implementation of operational monitoring services (Result 2).
- Capacity building (Result 5).

The system and the technologies behind it (Linux) run on open source technologies, which means no licenses and they are highly customizable. Therefore, they can be adapted to the needs of the RICs thema. The data from these systems allows for easy passing of data to other applications. The system can be further developed or customized to the needs of a specific thema. The main data sets include the Copernicus, EUMETSAT and MODIS products as well as other such as FEWSproducts NET, TAMSAT and CHIRPS.

Image 1 E stations used or training.

Capacity Building Session.

Capacity Building Session.

With regards to the MESA training, Dr. Clerici explained that JRC's mandate is around the following three components:

- System administration training: This will enable staff to maintain the system and its functionality. Specifically, this training will ensure the full exploitation and maintenance of e-Station 2.0 in the field. The documentation of this training will be made available within the LMS system.
- On the job training: The objective is to train RIC/CIC IT administrators on the functioning of e-Station 2, identify the relevant EO datasets for the various activities and implement the specific activities needed by the thema. The contents of this training are adapted according to the audience and the user needs. The full list of products for this training (data sets) have been defined and made available on the system
- Thematic training: This training is focused on reaching the policy dimensions of the programme. It consists of a number of themes and employs a multi-disciplinary approach in which operational solutions are also developed. The tools developed are on fire, agriculture, and for analysing land occupation. A number of applications have also been developed and specifically adapted for this training.

3.3 The role of universities in Earth Observation

By Prof. Dr. Amon Murwira, University of Zimbabwe

According to Prof. Murwira, for anything to qualify as a syllabus, it has to have societal benefits. In his presentation, he explained that GIScience and earth observation are key knowledge areas of the 21st century, alongside biotechnology and nanotechnology. The realization of this, especially in the African context, is absolutely critical for the development of the continent, he noted.

The University of Zimbabwe, Prof. Murwira said, had developed the GIScience and earth observation curriculum and developed programmes around them, including research programmes. The research is organized around the data received from MESA receiving stations. The University of Zimbabwe is therefore actively involved in staff development programmes at PhD level to support the GIScience and earth observation curriculum. It has also been supported in developing new GIS and EO labs. The university has also partnered with learning institutions from the region towards capacity building in various thema that include drought, wildlife, agriculture and flood service.

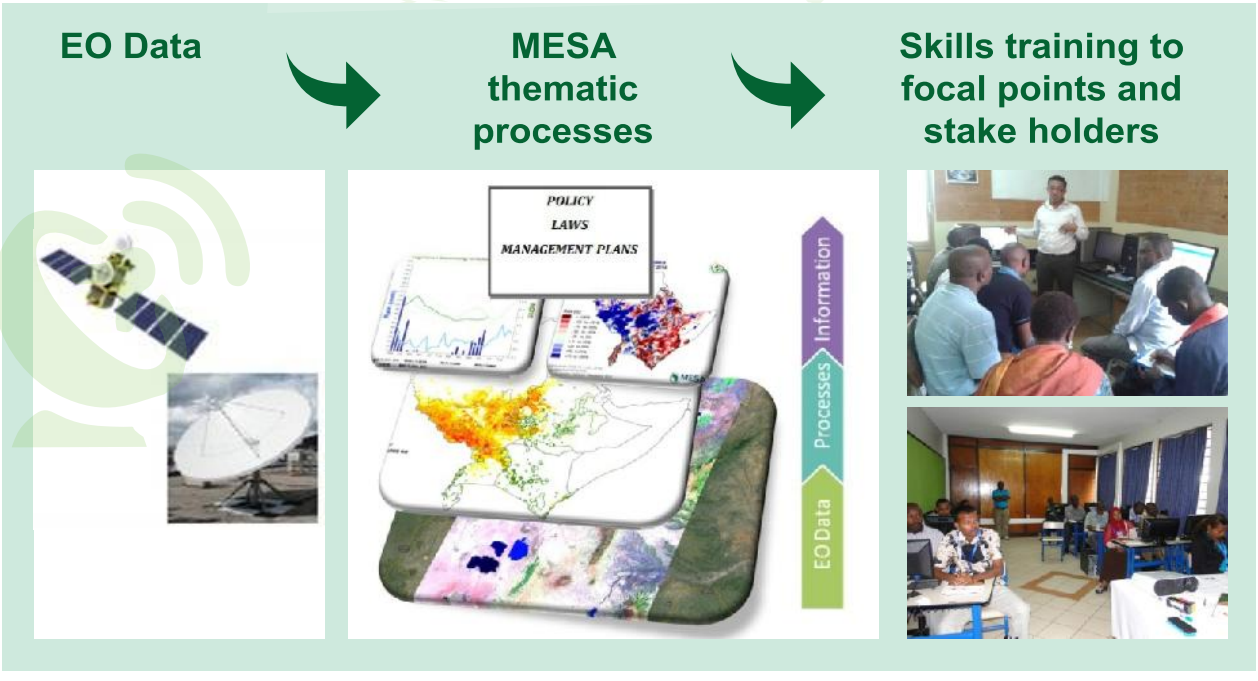
In conclusion, he expressed the need for universities to realise their critical role in the earth observation landscape.

Plenary Discussion

The following were the outcomes of the discussions:

1. Capacity building recommendations
   - The MESA trainings need to be formally certified, with learners obtaining diplomas from the training institution.
   - Users suitable for the MESA trainings need to be identified in different ministerial departments and trained for purposes of utilizing them as trainers and towards sustainability of the programme.
   - More universities need to be involved in the MESA trainings.
   - Emphasis should be directed towards the training units in different areas.
   - MESA to contribute in terms of training material to be utilized in the proposed short courses.
   - There is need for universities to be linked across the continent, through collaboration, for purposes of delivering the most relevant products and experience sharing.
   - Pan African universities across the continent need to be drawn into these continental programmes

2. MESA tools recommendations
   - The MESA tools should be tailor made for fisheries monitoring, e.g. of fishing vessels.



Session 4: Parallel Discussions

Session approach: Parallel sessions focusing on the following:

- Long-term climate change and food security: Prospects and policy directions

In this session, participants broke into two parallel groups to discuss the following topics:

1. Group 1: Long-term climate change and food security: Prospects and policy directions
2. Group 2: Earth observation data access and dissemination

4.1 Long-term climate change and food security: Prospects and policy directions (Group 1)

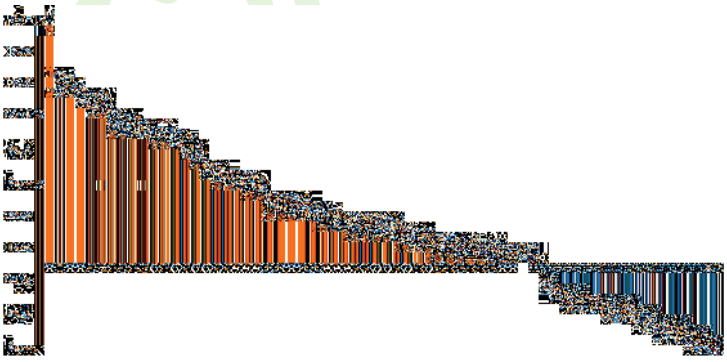
The following organizations made presentations:

- African Centre of Meteorological Application for Development (ACMAD)
- FEWSNET
- African Risk Capacity

4.1.1 Climate Services for Disaster Risk Reduction – African Centre of Meteorological Application for Development (ACMAD)

By Dr. Andre Kamga, Chief Climate and Environment Department ACMAD-MESA

Dr. Kamga, began by stating that risk has two main components, i) vulnerabilityand ii) hazards. He went on to explain that MESA therefore needs to move from the regular regional climate group products to a kind of hazard product that can be used in combination with vulnerability assessment to generate an effective risk map.



[19] Vulnerability consists of exposure, fragility, and adapting apacity. These three factors combined build vulnerability.

[20] FEWS NET is a food security decision support information ystem with its own climate services.

To be effective in this thema, he added, there is need to have in place an early warning system that should entail the following:

- Risk assessment
- Warning on hazards
- Communication
- Preparation and response

ACMAD-MESA climate services, Dr. Kamga said, provides hazard monitoring, outlooks and warning information. FEWSNET, on the other hand, is tasked to collect observed impacts and provide risk assessment while the ARC Agency provides responses options with insurance schemes

Dr. Kamga reported that ACMAD is seeking to implement the centre for disaster risk reduction. But the following still remains to be done:

- operationalizing an early warning system in the four components and,
- developing risk products combining vulnerability and hazards.

He said that ACMAD seeks to improve the assessment activities that are able to determine the number of people affected by a disaster and the cost of giving them support. With its intended collaboration, it seeks to improve on this and have the response measure come during the season or at least two months in advance, which would then determine, for example, the agricultural calendar adapted to the expected season. This would lead to an improvement in food production. To effectively carry this out at the regional, national and continental levels, there is need to have in place contingency planning with preparation, response and recovery components.

4.1.2 Climate change and food security

By Mr. Chris Shitote, Farming Early Warning Systems Network (FEWS NET)

In Africa, the year 2013 ranks as a second warmest year (see figure 1) since 1950 with a temperature anomaly of +1.04°C above the 1961-1990 average. 2010 was the warmest year in Africa for the contine t since 1950 with a warming trend of 2°C per century. However, recent trend since the 90s is significant higher reaching 3°C per century

Mr. Shitote began by noting that components of food production analysis include climate, crop production, market prices, conflict, nutrition and livelihood. FEWS NET, he said, majors in the following components:

- Agro-climatology –involves understanding the climatology of an area.
- Markets and prices – who buys from who and who sells to who.
- Nutrition – who are mostly affected when the yield is low.
- Livelihoods – includes accessing the welfare breakdown, quantity of food coming and going out of the area.

From this information, Mr. Shitote explained, convergence of evidence is created and scenarios drawn up as to what may happen. Climate change, therefore, has a direct effect on water resources, crop yields, etc. bringing about food security issues.
FEWS NET, therefore, does analysis on the condition of the vegetation in a specific area, the trends as well as determining the drivers of the trends.

4.1.3 Linking early warning to early action

By Mr. Federico Doehnert, African Risk Capacity (ARC)

Mr. Doehnert explained that the African Risk Capacity (ARC) is a specialised agency of the African Union, established in 2012, that provides participating AU member states with contingent funds in the case of drought, and in future, other natural disasters, to implement predefined contingency plans.

He stated that the ARC is designed to:

- Provide quick-disbursing funds after drought, enabling a more timely response.
- Reduce risk management costs by pooling risk across regionally diverse weather systems.
- Help countries develop effective response plans for early action.
- Reduce the impact of drought and increase the effectiveness of external assistance.

ARC, Mr. Doehnert, said uses a software application called *Africa Risk View,* which is a drought risk-modelling platform that allows countries to analyse their drought related food security risk and define their participation in the ARC insurance pool using transparent criteria.

ARC also does the following:

- Monitor and analyse rainfall throughout the continent in near real-time.
- Estimate the impact of vulnerable populations' in-season.
- Calculate the associated response costs.

Quantifying risk is modelled by going through a number of steps, including using satellite rainfall estimates and carrying out a vulnerability profile. This information is then used to determine the level of risk a country is facing e.g. impending drought or floods. The modelled impact is then converted into a response cost. At this point, countries can determine the amount of response costs or risk they would want transferred to ARC.

With regards to linking early warning and early action, ARC combines the following three fundamental aspects, by working with countries, to allow governments to move from managing crises to managing risk through:

- Effective national early warning systems.
- Contingency plans to respond to natural hazards efficiently.
- Objective and transparent funding mechanisms.

Mr. Doehnert provided the following case example:

Senegal was part of the first ARC risk pool in 2014/15. Poor rains led to a partial failure of the 2014 agricultural season, particularly in central and northern Senegal. Modelled drought conditions were verified on the ground together with national technical experts. The country then received a payout of USD 16 min early 2015, ahead of the 2015 humanitarian appeal for the Sahel (the appeal sum was USD59m).
Subsidised livestock fodder sales were carried out in the most affected areas together with targeted food distributions.

Two other countries in the region (Mauritania and Niger) also benefited from the ARC pay-outs.

[21] ARC is a micro-level insurance that works directly with governments. Countries have to sign a treaty to be part of ARC. It also works with regional institutions and it is cu ently in the process of developing a partnership with AGRHYMET.
[22] A flood model is currently in development with cyclone risk to be added in the near future.

4.2 Earth observation data access and dissemination (Group 2)

Six presentations were made in this group from the following organizations:

- European Commission
- EUMETSAT
- ESA
- South Africa Space Agency
- RCMRD
- AfriGEOSS

4.2.1 Dissemination and access to data and information

By Peter Zeil (DG GROW), European Commission

Mr Zeil's presentation outlined the process of dissemination and access to data and information under the Copernicus programme. He went on to state explain that policies are defined and managed by EU while data access and dissemination is implemented through ESA and EUMETSAT. All data is free, and there is full and open access.

Mr Zeil enumerated some of the Copernicus Services that were useful for Africa they included the following:

- Land service: Supports specific EU policies at international level as well as EU commitments under international treaties and conventions.
- Emergency service: Provides information for emergency response and disaster risk reduction.
- Marine service: Provides information on the state of ocean and marine ecosystems for the world and European regions.
- Atmosphere service: Provides air quality, atmospheric chemistry and composition, essential element for climate change monitoring and the future provision of ECVs on a regular basis and at regional and global levels.

4.2.2 EUMETSAT Data Access

By Vincent Gabaglio, EUMETSAT

In his presentation, Mr. Gabaglio stated that a core characteristic of EUMETSAT Weather data delivery is continuity of delivery for meteorological applications and well-defined user needs, helping and empowering African users.

The EUMETSAT strategy is to help African users gain access, obtain data and make use of the satellite data. Towards this end, Mr. Gabaglio expressed the need to have two main aspects dealt with: i) legal/commercial aspects (data policy) and ii) the technical aspects of how to access the data. EUMETSAT will work with the users to provide the best solution possible and open national access to the data.

The presentation cited several dissemination systems, which include: webportals, and the EUMETSAT near real time data stream (based on the DVB television technology), which is core to the MESA and PUMA programmes. The Sentinel 3 marine data will be distributed via EUMETSAT as well.

The recently launched Meteosat satellite, will have coverage until 2040 while the Third Generation Meteosat will be launched in 2020. Meetings with African users on their satellite needs are underway.

4.2.3 Copernicus Space Component and Data Access Overview

By Bruno Greco, ESA-ESRIN

Mr. Greco, in his presentation of available Sentinel products, proposed possible options to facilitate data distribution through:

- Setup of mirror sites in Africa, or
- Development of tools to move application to data instead of moving data to application (pilot activity). A survey of users on access and use of data from the TIGER initiative showed strong demand for the products.

4.2.4 SANSA EO Data Products and Services

By Dr. Jane Olwoch, Managing Director, South Africa Space Agency (SANSA).

Dr Olwoch informed the gathering that SANSA receives and distributes Modis imagery (Aqua, Terra) EUMETSAT datasets, Landsat 7 and 8, Spot 6 and 7 (1.5 m resolution).The latter is currently only available for SADC countries. Trainings are also regularly organized in collaboration with ESA, NOAA, and NASA partners.

> *"There is no plan B, as there is no Planet B."*
>
> Dr. Jane Olwoch

4.2.5 Progress on concept for data dissemination

By Dr. Hussein Farah, Executive Director, RCMRD (represented by Eunice Wangui)

Dr. Farah stated that the Mission of RCMRD is to promote sustainable development through generation, application and dissemination of geo-information and allied ICT services and products in the member states and beyond.

In the presentation, it was explained that RCMRD has on-going services related to land degradation, food security, early warning, and floods etc. It is using "Space to Society" for solving societal problems via geo-informatics towards the achievement of sustainable development and influence policy in Africa and beyond. In this regard RCMRD has collaborated with several institutions towards EO access to data.

RCMRD, the meeting was informed, has two data reception stations (Geonetcast and Landsat),which are able to acquire data across a wide part of Africa, and to process and archive the data using its state of the art archiving servers as well as disseminating the high-resolution satellite data to service a wide variety of African user needs. The users of its data are drawn from government line ministries, research institutions, and institutions of higher learning as well as civil society organizations.

4.2.6 Data Dissemination Infrastructure

By Ayman Mahmoud, AfriGEOSS

In his presentation, Mr Mahmoud stated that AfriGEOSS is the framework used to coordinate earth observation activities in Africa, specifically to enhance Africa's capability to use and manage EO for decision-making, create synergies and reduce duplication. This, in turn, contributes to the Africa space and policy strategy and to fostering the activities of African countries in GEO by linking existing capabilities and initiatives in Africa.

A SWOT analysis for defining the way forward has already been carried out. The objectives include facilitating access to free data sources such as Landsat, Sentinel, SPOT World Heritage etc. via Data & Infrastructure Coordination Team consisting of 5 agencies (NARSS, Ghana, Nigeria, SANSA, RCMRD).

4.3 Group feedback

Rapporteurs from each of the groups provided reports of the outcomes of each of the group discussions around the following two themes:

1. Long-term climate change and food security: Prospects and policy directions
2. EO data access and dissemination

4.3.1 Group 1 Feedback: Long-term climate change and food security: Prospects and policy directions

Recommendations

- Since drought affects majority of the countries at continental level, a continental framework should be drawn up. At the RECS level there should be a regional framework, and also support countries to have pastoralism codes.
- Approaches should be developed on how best to increase the number of disaster management personnel.
- There is need to rehabilitate climate-observing stations in Africa. considering that they are very few.

[23] Website to access the data: www.spacedata.copernicus.eu , www.sentinels. opernicus.eu , www.data.copernicus.eu

[24] Data can be accessed via http:/apps.rcmrd.org/index.phpn

- There is need to expand the use of the nine steps for more reliable seasonal forecasts at regional and national levels. The steps used for seasonal forecasts include dynamical models, statistical models, multi-global climate models that will need to be downscaled to suit the African continent.
- There is need to support development and implementation of multi-hazards contingency plans at regional and national levels with preparedness, responses, recovery and rehabilitation components. This should be done towards supporting preparedness, response and rehabilitation components.
- All national meteorological services should be well capacitated during the El-Nino season to enable them issue hazard warnings at least two days before it happens.
- There is need to incorporate FEWSNET outputs into country's' agriculture calendars so as to help improve livelihoods.
- The Africa Risk Capacity (ARC) should work closely with other institutions in the continent to cover more countries in Africa.
- Need to move away from technical forecasts to hazard forecasts.

4.3.2 Group 2 Feedback: Earth observation data access and dissemination

1. *Sustaining regional programmes:* In ECOWAS, there have been more than 80 regional projects over the last 20 years in the marine environment, without there being a regional centre (such as RCMS). All these projects come to an end once the funding is exhausted. Will GMES be similar? Can some regional organization be established to ensure sustainability? National programs for marine monitoring are implemented but are often are not integrated in regional efforts (e.g. World Bank's 24 million support to the Ghana marine sector). Governments need to invest in these programmes for purposes of sustainability.

2. *Access to data:*
   - National governments have a mandate to provide communication infrastructure (data access). There should be a continental guide to improve access via existing infrastructure.
   - A number of AMESD stations are not in operation, therefore, access to data is not guaranteed, often the problem is infrastructure, energy supply and internet connectivity. One way of enhancing sustainability is adequate training at institutional level.

3. *Single system for data dissemination:* It would be difficult to have a single system as opposed to having several distribution systems, which is currently the case, because of policies of the individual organizations. It may also not be cost effective.

4. *Availability of SANSA data:* For this data to be made available to other regions in Africa, specific agreements by the countries would be required to obtain access to the commercial high resolution SPOT 7 and 8 imagery.

5. *Satellite cover in Seychelles:* The island is only covered by an old Meteosat 1st generation satellite, which will be taken out of service in the coming years. The existing MSG 2nd generation will be moved to 40 degrees when the 3rd generation satellite comes into operation. Agreements also exist on Chinese satellite over the Indian Ocean.

6. *Imagery dissemination:* Dissemination of large imagery archives in Africa over the Internet remains a challenge. It is up to national governments to provide adequate communication infrastructure. Reception and archiving capabilities must also be made available as well.

7. *Mauritius:* Following the flood workshop held in Namibia, the proposed service is not relevant for Mauritius because of the coarse image resolution. A way is needed to make an operational tool for small areas using appropriate imagery.

8. *Maritime security:* The African maritime strategy covers illegal fishing and all issues leading to security aspects in the waters.

9. *Use of drones:* Is MESA using imagery from drones?

10. *The letter "S" in MESA:* The way "S" for security is conceived with regards to protection of population from the threats that may be brought about through environmental stress. It does not look at civil security.

11. *Sentinel 1:* In addition to offering terrestrial products, it has potential for vessel surveillance in African waters.

Session 5: Integration of MESA Services in the decision making cycle

Chair: Brad Garanganga, SADC Secretariat

Approach: The Session took the form of PowerPoint presentations, a panel discussion format, as well as an interacti e plenary discussion.

Focus: MESA communication o erview, informaation paaging, media

Key question: "*How is MESA working with partners to disseminate its information "*

5.1 How is MESA currently communicating its services and products?

By Hailu Wudineh, Communication Officer, African Union- MESA

The presentation outlined MESA's Communication Strategy, which has been produced in consultation with implementing centres, RECs and key stakeholders. It is both in English and French and details MESA's core messages, target audiences, channels of communication as well as the visibility guidelines and action plan.

Table 4: MESA on Communication

Question	Response
What is being communicated?	• MESA services and products e.g. maps, advisories, etc. • Continental environmental bulletins • Briefing notes • MESA News communicated through news letters
What are MESA's channels of communication?	• AU-MESA website • Social media • Email campaigns • Face to face meetings • Events • Exhibitions • Working with the media • Press releases • Media advisories • Media networks/media contacts e.g. using the African Press Organization • Media monitoring
What is MESA's feedback mechanism?	• Involves reports of products • Comment logs in which people give their feedback in written form • Auto reports of MESA campaigns showing number of successful deliveries, total opens, etc.
Where are MESA's products accessed?	• Africa, Asia, Europe

5.2 Information packaging for MESA

By Justus Waimiri, Corporate Media Specialist and Information Packaging Consultant

The following are the key points of Mr. Waimiri's presentation:

- Communication is simple we just over complicate it.
- Available data, which is the building block of all knowledge, presents a great opportunity to tell a story that should bring out the following:
  i) *what are we doing?*
  ii) *How are we changing the world through what we are doing?*
- How much of the available data is understood, correctly interpreted and how much is acted on? Harnessing this abundance in data and turning it into real insight and knowledge remains a big challenge.
- How much is understood about MESA by the key policy shapers? How much of this data is being optimized for policy decisions?
- A content analysis carried out in 2013 on Kenya's Daily Nation newspaper revealed the following:
  - Between 2008 and 2013 there were only 10 mentions of ICPAC in the media. Out of these, 3 were media adverts. Most of the remaining reports were mere mentions.
  - 15 journalists across the region were asked if they had heard of ICPAC and whether they had used their stories. The results showed that 7 had heard of ICPAC, however only 1 of them had used their story.

- *"The single biggest problem in communication is the illusion that it has taken place." - George Bernard Shaw*

Decision makers communicating with the media at a press conference.

[25] www.mesa.au.int

The following conclusions can be drawn:

- Although the media is interested in statistics and data, they are not using much of what they have on ICPAC.
- Audiences need quantitative evidence of what is happening around them.
- All data needs to be openly shared with the media; it will be up to the media to decide what they need from it.
- The media do not have enough insight of what MESA is and what it is about. This lack of insight affects how MESA is understood.
- People do not want too much information, they want snippets of it, well packaged and well articulated. Short-form messages should therefore be availed to stakeholders
- Imagery or information presented in graphical form is key, more than text.
- The jargon needs to be significantly reduced in communication. Messages should be kept simple and easy to understand.
- There is need to determine how best data can be shared out.
- MESA should be well prepared to deal with crises that occur as a result of misconceptions and factual errors.
- Goals need to be set in terms of:
  - what is to be achieved
  - adequate resourcing in terms of funds and human capacity
  - ability to influence policy and legislation
  - social media engagements
  - third-party endorsements
  - request for information.

5.3 Down to earth: The place of media in environmental policy and decision-making.

Presentation by Joe Ageyo, News Manager, Editor and Journalist specializing in environmental issues

The following are the highlights of the presentation:

- Information needs to be simplified for easy uptake by journalists and readers of the story.
- Understanding how the media functions are critical for purposes of getting a story out.
- Journalists want information "now" and they thrive in getting different opinions around the same subject.
- Journalism exalts proximity. Stories from far away are often ignored or given less prominence in favour of local stories.
- The key gap that needs to be addressed is on how best to bridge the gap between the process of producing information, disseminating it and communicating it.

> *"The press may not be successful in telling its readers what to think but it is stunningly successful in telling its readers what to think about." Benard Cohen.*

Recommendations:

- MESA should avail information to the media in a media-usable format (short and simple). The media will then transmit the same to the public policy space and possibly influence decisions.
- There is need to mainstream what MESA is doing so that everybody is talking the same language.
- There is need to actively pitch story ideas to editors.
- There is need to have regular interactions with media representatives while giving tips on upcoming findings and events.
- Expose journalists to real life examples of success stories from people or organizations using MESA services, i.e. a focus on impact.

5.4 Panel discussion on effective communication

Facilitator: Ms. Rosalia Omungo, the science and environment editor of the Kenya Broadcasting Cooperation (KBC).

Discussants:

1. Mr. Justus Wamiri, Corporate media specialist and information packaging consultant
2. Mr. Joe Ageyo, News manager, editor and journalist specializing on environmental issues
3. Ms. Gina Bonne, IOC
4. Dr. Mohamed Mursa, IGAD
5. Ms. Olayide Olushola, AUC
6. Isador Embola, CEMAC
7. Samuel Medu, ECOWAS

The panel discussion took the form of a question and answer session. Below are the key outputs of the discussion:

1. *What kind of information do policy makers receive?*
   - The information obtained from earth observation stations on environmental security and which is given to policy makers is key to enabling them make certain policy decisions, e.g. flooding that needs to be communicated ahead of time so that relief efforts can be put in place in advance.
   - MESA is a critical component of a whole suit of products that are necessary to have in order for policy makers to make the right decision through optimizing the availed information or data. To achieve this, there is need for partners at the national level to downscale the information to make it more relevant to the user groups at country level. The information will need to be tailored to specific country level requirements.

2. *With Africa being a continent of erratic weather patterns that result in floods and droughts, how are you preparing as RECS to provide such information? (IGAD)*
   - IGAD has a specialized institution focusing on climatic prediction and application (ICPAC). This institution, in collaboration with the national meteorological services and international institutions regularly follow the status of the climate and provide the necessary updates on events before they happen. This information is provided through websites at the ICPAC and IGAD, as well as through other specialised institutions of IGAD, through regular bulletins. One of the key forums through which information is disseminated is at the Greater Horn of African Climate Outlook Forum whereby IGAD specialized institutions and users convene every three months to discuss weather patterns and how they will look like in the coming seasons. At this forum, mitigation measures and strategies are prepared including contingency measures.

3. *How do you ensure there is a sustained coverage in the media and that policy makers are constantly reminded of an impending catastrophe, e.g. the El-Nino rains?*
   - Among other approaches used, the media is informed regularly such as by having specialized trainings for journalists, e.g. on environmental sustainability, and for them to be ambassadors in both their respective countries and communication outlets.
   - Systematic involvement of the media is of essence.

4. *In the process of involving the media systematically, are there some policy issues that CEMAC has been able to influence through the media?*
   - Information which is produced by the RECs is needed in order to allow transportation in the African waters to flow.
   - Newsletters are also produced by CICO, which is the implementing centre. These newsletters show the water levels at 10km, the boats can therefore be loaded appropriately. Before this information is availed to policy makers, it is first transmitted to technical personnel who relay the same information to ships for them to know the water levels before setting out.

5. *With regards to "too technical data", what will make the difference between that story going on air and killing it? (Joe Ageyo)*
   - Many stories do not make it on air because there is no time to make head or tail of what the story is about. There has to be an indication that the story is extremely important for extra effort to be directed towards it.
   - It is important for the journalist to know the importance of the story and also to understand the field they are dealing with e.g. on climate change.
   - The difference on whether a story makes it on air or not lies on both sides; the media needs to put in more effort in understanding the subject matter and the people who own the story should make sure that the media house understands what it is trying to communicate. They should also ensure that the story is told in a particular way that increases the likelihood of them being aired.

6. *How do we get journalists more interested in reporting technical stories? (Joe Ageyo)*
   - It has to go beyond just sending out emails to journalists; there is need to be more engaged, that is, taking a more proactive approach when dealing with journalists, e.g. calling them to inquire if they are following a

particular story, offering someone to come and give insight in the studio about a specific story, bringing in data that would add value, giving a dimension of a story that is not being covered, etc.

- There is need to be deliberate and tactical on where the story is going by ensuring that the story tallies with what people are talking about or by adding a new dimension to it.

7. What are the gaps that impede the smooth transmission of information? (Gina Bonne)

- The approach of communication on a very wide range needs to be reviewed. There is also need to understand or get to know who the communication is being directed towards and the type of information being communicated. The information should be at the level of the users of the information; the language used in the communication should suite the users requirements.
- It is critical to appreciate the contexts in which the work is being done, where it is, the available facilities and the language used: technical or non-technical communication.

8. What is the IOC doing to make the information being sent out less voluminous and simpler to understand? (Gina Bonne)

- The language used is critical and it depends on the targeted persons and what they understand.
- The IOC uses pictorials to demonstrate what it is doing. It also takes the media to the sources of the stories e.g. with the fishermen.

8. How is ECOWAS getting its information out to policy makers to have its technical ideas advanced? (Samuel Medu)

- ECOWAS first seeks to obtain parliamentary backing at country level. It encourages its member states that when they have their national discourse towards any regional programme to ensure that they have the backing of their respective parliaments.
- At regional level, ECOWAS has a strong parliament; whatever policies or laws that need to be made at regional level, they must all go through this parliament, hence the importance of obtaining their backing. The information is first passed to the appropriate parliamentary committee for ratification before being passed to the Council of Ministers and before being passed on to the Summit.
- ECOWAS also encourages experts to put ministers from their respective countries in the know of the policies or laws being developed before the information gets to the Summit for discussion.

10. How can we streamline earth observation products? What is the importance of preparation? What are some of the ways to have more media engagement, in terms of preparation, so the stories can be given more prominence in the media? (Joe Ageyo)

- Knowing why the data is important is critical; this lies with the organization that is generating the information. When one is aware of its importance they will pitch it as such to the media.
- The information should be able to answer to the following questions: So what? Who cares? Why is the information important?
- Being able to talk to journalists to enable them understand the importance of the data or information is critical towards increasing the chances of the data and information going on air or getting printed.

11. Are there journalist groups that the African Union Commission (AUC) relays its messages to? (AUC)

- The AUC has a network or a pool of journalists that it reaches out to, mainly African journalists. For example, when the AUC is to hold a Summit, it prepares a media advisory note, which is sent to the pool of journalists. The challenge, however, is on whether they use the information or not. Together with the help of member states this needs to be established. It will also be important to establish whether the information reaches the grassroots.
- The AUC has identified the African Network of Environmental Journalists with whom it works closely. In 2011, the AUC had a training of over 3,000 African journalists, with information from this training disseminated to the respective member states.
- National structures through extension workers in countries are critical in relaying information, e.g. to farmers. They need to be continuously capacitated to relay accurate and up-to-date information.

12. Give an example of a particular issue that resulted in a change of policy? (Justus Wairi)

- Maternal health in Kenya: This was not given much prominence in Kenya until the First Lady began to communicate on the issue in a compelling fashion such as through organizing marathons to increase the profile of the issue. The Kenya government has now taken keen interest in this issue and has begun by scrapping hospital fees for expectant mothers.
- Cancer: People have begun realising the value of communicating well; resulting in more awareness, change of policies and more funding towards improved treatment.

13. How do policy makers receive information from media as well as from the regional information centres? (IGAD)

- Policy makers need to receive this information in a concise visualized report supported by maps, tables and graphics, as well as videos or films. This information should be packaged at an appropriate level and in a way that is easily understood.

14. What has impeded the proper packaging of information for policy makers in the specific regions?

- IOC: The information needs to be packaged in simple language, avoiding jargon and abbreviations. The information should clearly demonstrate how whatever is being proposed is actually happening on the ground. The information, if necessary, should also bring in the economic dimensions and provide examples of what is working and what is not working.

15. What are some of the ways in which communities benefited?

- IOC: Wherever there is a possibility of carrying out exchange programmes with, for example, fishermen, to enable them understand what works in different areas, a media alert is sent out, alerting them on the reasons for the exchange programme, the benefits, the importance of reporting on it, etc.

16. What kind of information is given to policy makers to enable them influence policy? (ECOWAS)

- The national planning programme for each country is identified, as well as what the state would need. This is tailor-made to the needs of both the states and the region, which includes languages and dialects
- Language remains a key gap in communication, which needs to be urgently bridged.

17. What is the importance of branding/making yourself known and being an authority in a specific field? (Joe Ageyo)

- The organization needs to be proactive and known as the authority in a specific field.
- Organizations need to look for opportunities to showcase their expertise and look for opportunities to give informed opinions. Journalists look out for such.
- There is need for individuals or organizations to constantly be in the face of journalists and keep the conversation going, such as being there to breakdown information for them.

> *"Anything that requires more time o be explained will not have time o get aired."*
>
> -Joe Ageyo

Plenary Discussions

The following are the key outcomes of the discussions:

1. Anything that requires more time to be explained will not have time to get aired; there is need for continuous engagement.
2. There is need to invest in continuous training of journalists to enable them understand subject matters, e.g. on the MESA Forum, climate change, etc.
3. Journalists need to cross check their stories on a given subject matter with technocrats as the stories may work against whatever they are supposed to achieve due to factual errors and misrepresentation.
4. Effective approaches on how best to work with journalists needs to be determined.
5. The media house works on deadlines and on breaking stories, it is of importance, therefore, to learn how the media works.
6. Technocrats need to write or communicate in a way that ordinary people can understand.

Session 6: Deepening and broadening Africa-EU Cooperation on Earth Observation

Session Chair: Gina Bonne, Indian Ocean Commission (IOC)

Theme: Deepening and broadening Africa-EU Cooperation on Earth Observation

6.1 GMES & Africa

By Mahama Ouedraogo, African Union Commission (AUC)

Mr. Ouedraogo began his presentation by informing the gathering that GMES & Africa was launched in December 2007 in Lisbon during the 2nd EU-Africa Summit, which is a clear part and parcel of the overall partnership between Africa and the European Union. This was in response to the Maputo Declaration of October 2006 calling for an extension of the GMES initiative to Africa as well as to ACP countries.

GMES & Africa seeks to build Africa's capacity to be able to use earth observation to address the various issues related to social-economic development in Africa, which includes management of natural resources, preparedness to mitigate disasters (natural or human), health, food security, etc.

Other highlights from Mr. Ouedraogo's presentation are:

- The GMES & Africa coordination team that guides the action of this initiative is composed of the following:
  - African member states (South Africa, Kenya, Nigeria, Tunisia, Egypt)
  - RECs
  - African Union Commission, UNECA
  - Ministerial Conferences (AMCOST, AMCEN, AMCOW, AMCOMET)
  - European M.S. Portugal, France, Belgium, Austria
  - European Commission (JRC, DEVCO, GROW)
  - ESA and EUMETSAT
- The initiative also has the Space Troika, which was established to enhance the Africa Union and European Union cooperation on outer-space affairs and ensure implementation of agreed projects including GMES and Africa. The Space Troika was instrumental in providing the political leadership to move the initiative forward.
- With regards to implementation of this initiative, based on advice received from all stakeholders, it was deemed necessary for the initiative to take a phased approach, the first of which was to have three priority thematic areas, out of the nine, namely:
  - Marine and coastal areas
  - Water resources management
  - Long-term management of natural resources
- The identification of the first GMES & Africa project involved the rolling out of the implementation process, building on past achievements and lessons learned from previous programmes and projects that would ensure continuity and help close the gaps. Towards this end, the process ensures:
  - That there is wide consultation of stakeholders
  - The definition of an appropriate GMES & Africa governance structure Endorsement by European Union member states
  - The definition of the most appropriate technical solution for Copernicus data and product access for the actors in Africa.
- The following are the planned activities:
  - Adoption of the financing decision.
  - First semester of 2016: Negotiation of the contract.
  - Second semester of 2016: Launch of the activities and transition phase.

6.2 Presentation by the European Union Commission

By Jonathan Van Meerbeeck, DEVCO

Mr Van Meerbeeck's presentation highlighted the steps taken to formulate the GMES & Africa initiative, taking into consideration all that has already been done by MESA, how best to have the project extended to other African countries (North and South Africa), how to link this initiative to Copernicus and how to improve the main objective of the programme.

Cooperative Arrangement signed during the 4th Africa-European Union Summit in Brussels 2014, endorsed and agreed to gradually implement GMES and Africa in phases, with the first phase focusing on the 3 thematic areas. This Agreement led to the launch of an identification study resulting in the Formulation Report that detailed services and application for the 1st Phase, which concerned the three thematic areas.
The nine thematic chapters include: i) Long-term natural resource management, ii) Water resource management, iii) Marine and coastal areas, iv) Food security and rural development, v) Climate variability change, vi) Disaster risk reduction, vii) Health, viii) Conflict and political crisis, xi) Infrastructure and territorial development.
The European Development Fund is used for Africa only in sub-Saharan countries.

The GMES & Africa initiative will be contributing specifically for the three thematic areas. A new financial instrument will be used in this initiative called *The Pan African Programme*, which is under the budget of the European Union (and no longer under the European Development Fund., as for instance for AMESD and MESA). The initiative is in the process of securing €28m for the first phase, which will be over and above the support to be received from EUMETSAT, JRC as well as the European Space Agency. It is hoped that additional funding will be provided for the implementation of the new products that need to be developed; this will be based on the results of a mid-term evaluation.

The programme will be implemented through three main commitments: (i) indirect management with the AUC (amounting to about 78% of the total allocation) to coordinate implementation and grants; (ii) technical assistance to AU, through a service contract managed by the European Union (~17% of allocation); and (iii) an administrative arrangement with DG JRC (~5% of allocation) to ensure technical backstopping and contribution to training.

The Secretariat of the programme will be at the African Union Commission and will be supported by a technical assistance team. This initiative (through RECs and regional implementing centres) seeks to reach out to policy makers, the private sector, and end users at country level.

Grant contracts will be concluded with consortia in the different regions, specifically with regional organizations and regional centres towards implementation of the expected applications. These grants will specifically be used for the development and implementation of the products, which are:

- Consolidation of the existing MESA services.
- Extension of the MESA services in other regions.
- The development of new products and applications, which will be done under a framework of additional funds under phase 2.

The initiative seeks to achieve much more with less money using various approaches including:

- Consolidation of the existing services rather than creating new ones.
- Cross fertilization between the different regions.
- Gains in terms of efficiency through improved operational capacity to implement the project.
- Co-financing from beneficiaries, up to 20% of the grant.
- Additional funding from other partners as well as the private sector.

The following is the process of implementing the initiative:

- Feedback from the regional centres, RECs and coordination team, on i) the relevance of the various services and applications for specific regional nodes, ii) the needed capacity for the centres and consortia to implement the applications in the respective regions, iii) advice on other priority applications needed.
- Adoption of the financing decision from the European Union: November 2015.
- Contracting with the African Union Commission.
- Contracting between the African Union Commission and the implementing centres.

6.3 Overview of the GMES &Africa Programme

By Herve Trebossen, Consult Africa

The GMES and Africa programme is a four-year project that is expected to begin in mid 2016. The overall objective of the programme will be to help improve "policy decision-making and surveillance capacity in African countries". This will be achieved through the following five components:

- Access to EO data by maintaining, improving and sustaining access to EO data and products.
- Maritime and coastal services.
- Outreach.
- Sustain and improve capacity building.
- African land services.

The main benefits expected from the GMES &Africa Programme at country level are that service providers at national level in the three thematic areas will support national projects and environmental priorities. National agencies will also be expected to avail tools and skills to improve surveillance capabilities and policy decision-making.

The principles of the GMES &Africa programme:

- It will cover Africa fully.
- It will support programme to start from where MESA will have got to in terms of EO information services and capacity development related to its ten land, marine and coastal services themes.
- It will cover all the MESA thema except the "Climate Services for Disaster Risk Reduction in Africa" thema.
- It will provide support to accompany the migration of some of the services to focus on specific issues.

The two proposed services the GMES & Africa programme will implement are: the African land service and the African marine and coastal service.

Table 4: Services breakdown

Service	*Breakdown*
African land service	• Each component of the service will be divided into themes and each theme into applications. • It will be based on the following two components: i) Water resources monitoring and ii) management of natural resources. • It has been designed to contribute to regional policies and strategies.
African marine and coastal service	• Each component of the services will be divided into themes and each theme into applications. • Will be divided into four components, namely: i) monitoring and forecasting of oceanography variables, ii) coastal area monitoring, iii) ship traffic and pollution monitoring, and iv) marine weather forecasts.

All in all, the first phase of GMES & Africa will seek to:

- Provide a chance to better involve the RECs and the national stakeholders.
- Contribute towards improving the decision making and planning capacities at national level.
- Provide an opportunity to consolidate and to expand the institutional linkages at the continental level.

Plenary Discussions

The following are the key recommendations of the plenary discussions around the GMES & Africa initiative:

- In the language and positioning of the GMES activities, that we position ourselves to support member states to track and monitor progress that they will be making in the implementation of the SDGs.
- There is need for stronger engagement with the specialised technical committees.
- There is need for increased efforts towards Africa Agenda 2063.
- There is need to empower the national services to enable them prepare their own forecasts, particularly marine forecasts, as in the case of Mauritius.

6.4 Panel Discussion on the GMES & Africa initiative

The panel discussion involved 5 panellists with discussions centred on their perspectives (expectations and recommendations) on the GMES & Africa initiative.

Panellists:

1. Dr. Islam El-Magd, Egypt
2. Dr. Mahama Ouedraogo, African Union Commission (AUC)
3. Dr. Jane Olwoch, South Africa Space Agency (SASA)
4. Regional Economic Communities (CEMAC, ECOWAS, SADC)
5. European Union

6.4.1 Country perspectives on the GMES & Africa project

The following are the expectations and recommendations from Dr. Jane Olwoch, South Africa Space Agency and Dr. Islam El-Magd, Egypt:

Expectations of the initiative

- An opportunity for Africa to show in many different aspects the value of earth observation as well as an opportunity for Africa to strengthen its relationship with Europe at the African Union and European Union levels, at the space agency level as well as at institutional and national levels.
- Strengthen Africa's cooperation with European partners.
- Strengthen engagement of stakeholders on a national, regional and continental level.
- Enable the prioritization of needs at the national and regional level.

Recommendations

- GMES & Africa should incorporate and build upon already existing relationships.
- The longer-term value of data will depend on how much data is available in the archives; data will need to be archived in data centres in order to be used later in other projects and for other users.
- There is need to recognise that countries have institutions with various mandates; ways of linking up with institutions that have specific mandates e.g. on monitoring oceans and working with them must be sort.
- The relationship between RECs and national stakeholders needs to be clearly understood; need for a concrete structure to be put in place.
- There is need to link up with sustainable development goals.
- There is need to advocate for data sharing policies that cover how earth observation data can be used and shared.
- There is need to look at how best to engage the private sector in the process; they would give a push to implementation, and dissemination of information.
- There is need to discuss how best to build on existing blocks, initiatives and projects towards the smooth transmission of the continental framework of GMES & Africa.
- There is need for mechanisms or guidelines for implementation towards actively implementing the project on a continental scale.

6.4.2 Perspectives from RECs

The following are the expectations and recommendations from the following RECs: CEMAC, ECOWAS and SADC.

Expectations

- An opportunity for the RECs to consolidate and apply new technologies from Europe, which can be put to the service of member countries.
- The project will help improve the livelihoods of the African population.
- Member states to effectively participate in this project.

Recommendations

- Most of the actors, e.g. in the oil industry, are largely the private sector. There is need for them to be actively engaged and informed of the benefits of their cooperation and benefits to the host communities.
- There is need to ensure that all initiatives build capacity within existing institutions rather than running the risk of creating parallel ones.
- There is need to capacitate national metrological services of respective countries so that they can produce a product informed by this initiative and give it directly to the user community.

6.4.3 *Perspective of the African Union Commission (AUC)*

Recommendations

- The processes of GMES & Africa need to be moved forward to arrive at concrete actions.
- The AUC wants to see more involvement of stakeholders towards owning this process so as to make it sustainable. Participation could be through voicing opinions.
- Engagement with the private sector to make the GMES & Africa initiative efficient.
- The African Space Policy states that the private sector should actively play its role, e.g. through education and capacity building.

Plenary Discussions

The following are the key outcomes of the plenary discussions around the GMES & Africa initiative.

Comments

- The East African Community welcomes the three thematic areas of the GMES & Africa initiative as the region has massive resources (land and coastal areas) that can be fully and effectively utilized.
- In the proposal, universities will have an important role in the training component at the continental level and will have an opportunity to continue with the collaboration already built at the regional level. They will also have a role in working with the private sector as well as facilitating the collaboration process.
- One of the mandates of the GMES & Africa project will be to involve all the local meteorological services.
- The project has to be owned at the country level and this is where the impact will be felt. Impact at country level can only happen when there is a clear mandate of the organizations and institutions involved in the related services. In the choice of implementing partners, the RECs and regional organizations involved need to play a role in this so that duly mandated organizations are involved.
- Support provided by the programme for country involvement is the funding of training and support for data access by the different initiatives.

Recommendations

- There is need to emphasise the issue of actual capacity in Africa earth observation and GI-science, as well as the involvement of universities, government institutions and the private sector to be taken in as a framework. Universities and research institutions will drive the process in terms of long-and short-term capacity building as well as on the job training in order to beef up capacity on the continent.
- The scope of the discussion should be widened. Space agency is a narrow definition; in some countries it is an earth observation or remote sensing agency or institution.
- There is need for improved Internet connectivity within Africa.
- There is need for African countries to develop their own space strategies.
- More coordination and cooperation of the project at the local, national and regional networks among all implementation centres is needed.
- The project should focus on inland water bodies.
- The GMES & Africa programme should be owned and operated by Africa for Africa. Ownership will create sustainability. National space agencies should therefore contribute through providing knowledge transfer, data accessibility, availing information and capacity building.
- National space agencies should play an advisory role at the policy level with regards to earth observation.

Closing Session

Session Chair: Gina Bonne, Indian Ocean Commission (IOC)

Speakers:

- Gina Bonne, Indian Ocean Commission (IOC)
- Mrs Anna Burylo, Head of Cooperation of the EU Delegation to the African Union (AU)
- Mahama Ouedraogo, African Union Commission (AUC)
- H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary Inter-Governmental Authority on Development (IGAD)

Speech by Gina Bonne, Indian Ocean Commission

Ms Bonne began by thanking the conference delegates. The following are highlights from her speech:

- For a long while, countries have been manually tracking progress but have now been enabled by new technologies to do this more efficiently. Even though a number of countries still face system challenges, there is hope and potential for improvement.
- Institutions in Africa, especially the academic institutions are showing their involvement and engagement to continue working towards the achievement of developing capacity in Africa, and this is something to be proud of.
- As Chair of the Steering Committee, she will ensure that within their programme they focus their energies into getting capacity building rolled out and implemented to satisfy the various institutions at national level.
- Regional organizations need to continue playing their role as facilitators and catalysts to the implementation of the project, all the while ensuring that there is sustainability.
- There are hurdles in the implementation process and things are changing, all must therefore adjust and adapt to them.
- Regional organizations are here to help those at the national level and not to replace them.
- It has been ten years since earth observation was started, and there has been good progress.
- She thanked the European Union for the support and guidance that they have provided during the implementation of the programme, colleagues from the ESA EUMETSAT as well as the technical assistance team for their contributions.

Speech by Mrs Anna Burylo, Head of Cooperation of the EU Delegation to the African Union (AU)

Ladies and Gentlemen,

On behalf of the European Union, I want to congratulate and thank the organizers and all participants for making this 1st MESA Forum a success.

I wish to refer once again to my opening remarks and specifically to Nicolaus Copernicus, said a few hundred years earlier: "*To know that we know what we know, And that know that we do not know what we do not know, that is the true knowledge*". After this four-day Forum we have clearly more knowledge and that we know what we know more on MESA and what MESA can bring us. I also think we know what we do not know and what will need to be addressed in the future.

In terms of the progress of the implementation of the MESA programme, I wish to highlight that most of the commitments foreseen in the financing agreement signed between the African Union Commission, the ACP Secretariat and the European Commission are on track to deliver a little less than two years before the end of the implementation of the programme. With the rate of commitment with the European Union contribution to date of nearly 98%, they represent an amount of more than €36M out of the €37M that dedicated to the project. We are therefore quite successful in terms of the commitments; the fact that we have committed almost 100% of the funds allocated does not mean that we have delivered on all the results expected from this project.

There have been many success stories and examples of good practices, many of which have been presented at this Forum. We need to apply them towards pushing MESA forward.

We have a little less than two years to ensure that all the services developed, already developed and those that are to be developed by the regional and continental implementing centres will be fully operational, this is very important. Let us bring back home the results and recommendations of this forum so that our institutions and organizations would be able to address the numerous challenges that we are still facing as was highlighted by H.E. Jean-Claude de I Estrac, Secretary General of the Indian Ocean Commission (IOC) and Chairperson of the MESA Programme, Steering Committee during his opening remarks.

MESA is a building block of the GMES & Africa initiative, and while implementing MESA we are working on the future. This Forum is now coming to a close, however, the work continues.

In conclusion, I want to thank the MESA team, including the African Union Commission (AUC) who is very much committed to actively play its coordination role as well as the technical assistance team. I also wish to thank the MESA Forum organization, coordination team including the ICPAC team and other partners such EUMETSAT and JRC for the continued and constructive support they continue to give. I also want to thank the Government of Kenya and IGAD for hosting this Forum. I finally want to thank all participants for your intense and dynamic participation that allowed this Forum to be a real success.

I am looking forward to our fruitful and constructive cooperation in the future to create even more comfortable space to strategically contribute to Africa's social economic development. I hope to see you all at the next MESA Forum where we will be able to demonstrate even more results as well as lessons learned for the implementation of the future GMES & Africa initiative.

Thank You!

Speech by Dr. Mahama Quedraogo, African Union Commission (AUC)

Distinguished Delegates, we have come to the end of four active and productive days at the First MESA Forum. It has been extremely stimulating and absolutely energizing as it has afforded us the opportunity to review the progress of implementation of the MESA Project, assess performance, review our challenges and proffer solutions on the way forward. It has further provided an avenue to extend, consolidate and enhance our partnerships and closer collaborations as we strive to achieve a successful implementation of the MESA project for intended results and impacts. We wish to assure you that the African Union Commission as a key Pan African institution and as the Delegated Authorizing Officer of MESA, would make all efforts to ensure the successful implementation of the MESA project.

Distinguished Delegates, as we come to the conclusion of the First Forum, I have the honour to express our appreciations and gratitude to you all for your presence, active participation and valuable contributions at this Forum. We valuable your presence, appreciate your contributions, commitments and active engagements.

Distinguished Delegates, once again, we express our thanks to the government and the people of the Republic of Kenya for graciously hosting this First MESA Forum and for their generous hospitality. Permit me to convey our appreciations to the Honourable Minister for sparing time to open this First Forum on Monday despite her tight schedules and further reiterate as stated during the opening ceremony, that this is an attestation of the focus of the Republic of Kenya on the protection and management of our Environment including Climate Change and Biodiversity in the spirit of Pan-Africanism and African Renaissance. We wish to pay tribute to IGAD for jointly convening this First MESA Forum in their region and for the putting this admirable facility at our disposal. We appreciate the presence of the His Excellency, the IGAD Executive Secretary to grace this closing ceremony, Your Excellency's words of wisdom and continued leadership. Thank you Sir.

Distinguished Delegates, I also want to use this medium to congratulate the Organizing Committee for the excellent preparations and dedicated support that has enabled us to have a hitch free Forum. We thank the Technical Assistance Team (TAT) for all the efforts put in place. Permit me to recognize the personal efforts of the Chair of the Organizing Committee – Dr. Zachary Atheru and the MESA Project Coordinator – Dr. Jolly Wasambo. We appreciate your diligence. Thank you.

Distinguished Delegates, I would now turn to recognize the enthusiastic Master of Ceremony – Mr. Justus Waimiri for the outstanding professional manner he has facilitated and animated this Forum. Thanks so much for this. This is much appreciated. We also salute the Chair of the MESA Programme Steering Committee, IOC for her passion and thoroughness in guiding the MESA Project. We appreciate the presence of the General Secretary of the IOC for participating at this Forum and the High Level Roundtable.

We further appreciate all the Chairpersons and Facilitators of the different Sessions. We thank all the Presenters and Panellists for their tireless work, efforts put in to enhance high quality presentations that have helped to enrich the discussions that have led us to concrete outcomes.

Once again, we want to also express our sincere gratitude to the European Union for funding this laudable project that is helping us to address our environmental challenges, providing us with Earth Observation data and information for Decision making process in the African continent. We also recognize our key Partners the EUMETSAT, EC JRC and other Partners for their continued support. We also thank all the Implementing RECs – CEMAC, ECOWAS, IGAD, IOC and SADC and all the Regional Implementation Centers and the Continental Implementation Center – CICOS, AGRYMET, University of Ghana, ICPAC, MOI, BDMS, SADC CSC and ACMAD for the tireless work that our delivery and visibility. We also appreciate all participants and let me particularly recognize the participation of our Honourable Parliamentarians, Delegation of Member States, Researchers, Civil Society Groups including the Private Sector and Members of the Press. Your participation has enhanced the high profile of participation at this MESA Forum. We appreciate and thank you all. We also commend the representative of the different esteemed organizations AMCEN, AMCOW, AfDB, UN Agencies and other Partners for your sustained partnership.

We would further like to use this forum to urge other organizations and Partners to come on board to support the activities of Earth Observation data, meteorological and climate information for the benefit of all our African populace because the work of environment protection and management is very enormous and critical for sustainable development, which is the hallmark of Agenda 2063.

Distinguished Delegates, you will all bear with me that the convening of this First MESA Forum and the implementation of the MESA Project and the follow up GMES and Africa is very unique and strategic in the implementation of some milestone Decisions of the African Union and as we move towards landmark global events. Permit me to mention a few:

1. African Agenda 2063.
2. Sendai Framework for Disaster Risk Reduction including the Roadmap for the alignment of the Extended Programme of Action for the implementation of the Africa Regional Strategy on Disaster Risk Reduction.
3. Implementation of the Sharm Sheikh Commitment on Water and Sanitation including the African Water Vision 2025 and the Kigali Action Plan.
4. Implementation of the Integrated Africa Strategy on Meteorology (Weather and Climate Services) including its Implementation and Resource Mobilization Plan and its roadmap for 2025 adopted in Cape Verde in February 2015 by the African Ministerial Conference on Meteorology (AMCOMET).
5. Draft African Space Policy and Strategy when adopted
6. Post-2015 Development Agenda including the Sustainable Development Goals (SDGs) when adopted later this month in New York and the
7. Climate Change Agreement that is expected to be adopted in Paris, France in December 2015.

Distinguished Delegates, We would like to assure you of the full commitment and support of the African Union Commission to the implementation of the MESA Project. I would not want to take much more of your time but allow me to thank you all for the success of this First MESA Forum, and to convey our appreciations to all that have contributed to the successful Forum – the local organizing committee including the secretariat working just behind us, the Exhibitors, the interpreters, technicians, the Protocol, Transport and Finance officers, logistics team and

everyone that have supported this Forum in one way or the other for us to achieve a successful Forum.

Distinguished delegates, I would like to conclude by wishing you all bon voyage to your respective destinations, sustained follow up on the Forum recommendations that will help to contribute to Africa becoming prosperous and a dynamic force in the global arena. We look forward to seeing you all by the grace of God at the next MESA Forum.

I thank you all for your patience, kind attention and God bless.

Asante sana!

Speech by H.E. Ambassador (Eng.) Mahboub Maalim, Executive Secretary Inter-Governmental Authority on Development (IGAD)

The following are highlights from Ambassador Maalim's speech:

He thanked the delegates for attending the forum, and the African Union Commission and the European Union for being sponsoring the meeting and being long-term and close working partners with IGAD and with EASIO. He also thanked the IGAD Centre for Climate, Prediction and Application Centre (ICPAC), the organizing committee and the Project Coordination Unit.

There is need to sustain the MESA meetings so that regional organizations get to know that they are not only responsible for what they are supposed to do in their region but open up and interact with other regional organizations. This will promote learning.

The member states, he stated, must fully own and support the programme, only then can the programme be prioritised as a policy matter, approved in the respective policy approving agencies in the countries, like the cabinet or parliament and only then can it see the light of day through a budget re-allocation.

Collaboration between and among institutions is key for the success of the programme, It will therefore be important to package information appropriately; if the information and technology is left at the level of experts then it is as good as not having been done. It should therefore be broken to something that is understandable at the grassroots level.

In conclusion, he assured the delegates that IGAD would implement the recommendations that arose from the Forum.

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Appendix 1: List of Participants

No.	Title	Family Name	First Name	Institution	Country
1.	Mr.	ABDY	Mohamed Mahmoud	Ministère de l'Agriculture Direction de l'Aménagement Rural	Mauritania
2.	Mr.	ABOUBAKAR	Halilou	CICOS	DRC
3.	Mr.	ADOUKONOU BAGAN	Gilles Brice	ACMAD	Niger
4.	Mr	AGATSIVA	Jaspat	Ministry of Environment and Mineral Resources	Kenya
5.	Mr.	ALATI	Victor Mwakha	Kenya Marine & Fisheries Research Institue	Kenya
6.	Mrs	ALFA	Safia	ACMAD	Niger
7.	Mr.	ALOYSIUS CHEBET	Aloysius Chebet	East African Community (EAC)	Tanzania
8.	Mr	AMAL	Layachi	Centre Royal de Teledetection Spaciale	Morocco
9.	Mr.	AMOROSI	Massimo	Mesa-Programme Head Quarter	Ethiopia
10.	Mr.	APLOGAN	Patrick	AUC	Ethiopia
11.	Dr.	ARTAN	Guleid	ICPAC	Kenya
12.	Mr.	ASFAW	Tseday	MESA -Programme Head Quarter	Ethiopia
13.	Mr.	ATHERU	Zachary	ICPAC	Kenya
14.	Mr.	AYISSOU	Levy	Groupe d'Intérêt Economique pour le Service Commun d'Entretien des oies Navigables (GIE -SCEVN)	République du Congo
15.	Mr.	BA	Babacar	Commission Sous Régionale des Pêches (CSRP / SRFC)	Senegal
16.	Mr.	Djaby	Bakary	MESA -Programme - AGRYHMENT	Niger
17.	Mr	BALLO	Abdou	Direction N ationale du Génie Rural	Mali
18.	Mr.	BARTOLOMEU	Alexandre	Ministry of the Coordination of Environmental affairs Minister's Office	Mozambique
19.	Ms.	BECHWA	Sarah	BDMS/SADC -CSC	Botswana
20.	Mr.	BEDJA	Ediamine	Ministère de la Production, de l'Environnement, de l'Energie, de l'Industrie et de l'Artisan t	Comoros
21.	Mr.	BEMIASA	John	Institut Halieutique t des Sciences Marines	Madagascar
22.	Mr.	BENDA	Fortunate	ICPAC	Kenya
23.	Mr.	BERABAYE	Ngarleita	Ministère de l'Agriculture et de l'Environnement	Tchad

No.	Title	Family Name	First Name	Institution	Country
24.	Dr.	BERHE TEDLA	Debalkew	IGAD Secretariat	Djibouti
25.	Dr.	BERNARD	Stewart	Ecosystems Earth Observation	South Africa
26.	Mr.	BIJOUX	Gerard	Seychelles Meteorological Service	Seychelles
27.	Mr.	BIMBA	Francisco	Department of Planning and Operations Officer	Angola
28.	Mr.	BOEH	William Y.	Bureau of National Fisheries	Liberia
29.	Mr.	BOINA	Said	Centre National de Co trôle et Surveillance des Pêches	Comoros
30.	Mrs	BONNE	Gina	IOC	Mauritius
31.	Ms.	BONNELAME	Elpha Catherina	Seychelles National Meteorological Services	Seychelles
32.	Prof.	BOUAFOU	Kouamé Guy Marcel	AGRHYMET	Niger
33.	Mr.	BOUBACAR	Sidikou	Direction Généale du Génie Rural	Niger
34.	Ms.	BOYJOONAUTH	Ranjeeta	MOI	Mauritius
35.	Mr.	BOYKOV	Dimitar	MESA -Programme HD	Bulgaria
36.	Mr.	BROWN	Robert	MESA -Programme Head Quarter	Ethiopia
37.	Mr.	BUCH	Manfred	MESA -Programme -ACMAD	Niger
38.	Mrs	BURYLO	Anna	EUD to the AU	Ethiopia
39.	Mr.	CAMILLE	Loumouamou		Congo
40.	Ms.	CARTHERON	Roselyne	TELESPAZIO FRANCE	France
41.	Mr.	CHABVUNGUMA	Stanley D.	Malawi Meteorological services	Malawi
42.	Mr.	CHIGONA	Aaron	Environmental Management Agency	Zimbabwe
43.	Ing.	CIZUNGU	Musole	CICOSc	Democratic Republic of the Congo
44.	Dr.	CLERICI	Marco	JRC	Italy
45.	Prof.	CLOBITE BOUKA BIONA	Clobite Bouka Biona	AMCO ST	Republic of CONGO
46.	Ms.	COBBINA	Rosina	Fisheries Commitee for the West Central Gulf of Guinea (FCWC)	Ghana
47.	Prof.	DALMAR	Abdi	Benadir University	Somalia
48.	Prof.	DAOUDA	Hamani	Université Abdou Moumouni	Niger

No.	Title	Family Name	First Name	Institution	Country
49.	Mr.	DE L'ESTRAC	De L'Estrac	IOC	Mauritius
50.	Ms.	DERGU	Frezewd	Mesa-Programme Head Quarter	Ethiopia
51.	Mr.	DIALLO ALHASSANE	Adama	ACMAD	Niger
52.	Mr.	DIEYE	Papa Oumar	AGRHYMET	Niger
53.	Mr.	DIEYE	Amadou Moctar	Centre de Suivi Ecologique (CSE)	Sénégal
54.	Mr.	DIMBELE KOMBE	Michel	Commission du Bassin de Lac Tchad	Tchad
55.	Dr.	DIOP KANE	Mariane	Agence Nationale de l'Aviation Civile et de la Météorologie -ANACIM	Sénégal
56.	Prof.	DJELOULI	Yamna	Université du Maine	France
57.	Mr.	DLADLA	Daniel Thini	Senior Extension Officer	Swaziland
58.	Mr.	DOEHNERT	Federico	African Risk Capacity	Italy
59.	Dr.	DOMTANI	Ali	Direction des Pêches et de l'Aquaculture	Togo
60.	Mr.	DOOL	Riaan Van Den	CSIR Meraka	South Africa
61.	Mr.	DUVANE	Anacleto	Instituo Nacional de meteorologica	Mozambique
62.	Dr.	EL -MAGD	Islam	Member States Representati es	Egypt
63.	Mr.	EMBOLA	Isidore	CEMAC	République Centrafricaine
64.	Mr.	ENGONGA OSONO	Santia o Francisco	Ministère de la Pêche et de l'environnement	Guinée Equatoriale
65.	Mr.	ESEME	Eric Akwo	Ministry of Transport and not National m terological and hydrological service	Cameroun
66.	Dr.	FADZAI	Zengeya	University of Zimbabwe	Zimbabwe
67.	Mr.	FAFEH	Aubin	MESA -Programme Head Quarter	Ethiopia
68.	Dr.	FAKA	Nsadisa	SADC CSC	Botswana
69.	Dr.	FARAH	Hussein	RCMRD	Kenya
70.	Ms.	FARRINGTON	Birgita	MESA -Programme -BDMS	Botswana
71.	Mr.	FLASSE	Stephan	EUMETSAT	Germany
72.	Mr.	FOX	Stephan	EUD to the AU	Ethiopia
73.	Dr.	GABAGLIO	Vincent	EUMETSAT	Germany

No.	Title	Family Name	First Name	Institution	Country
74.	Dr.	GARANGANGA	Brad	SADC Secretariat	Botswana
75.	Mr.	GARBA	Issa	AGRHYMET	Niger
76.	Mr.	GARDEA	Roman	MESA -Programme HD	Austria
77.	Mr.	GEENENS	Pierre	MESA -Programme Head Quarter	Ethiopia
78.	Mr.	GETACHEW	Abraham	MESA -Programme Head Quarter	Ethiopia
79.	Dr.	GOUDIABY	Mamadou	Direction des Pêches Maritimes	Senegal
80.	Mr.	GRECO	Bruno	ESA -ESRIN	Italy
81.	Ing.	GULEMVUGA GUZANGA	Georges	CICOS	DRC
82.	Mr.	GWITIRA	Isaiah	University of Zimbabwe	Zimbabwe
83.	Prof.	GYAPONG	John Owusu	University of Ghana	Ghana
84.	Dr.	HADJI	Ben	Member States Representati es	Tunisia
85.	Mr.	HEETUN	Bhye Muslim	Mauritius M teorological Services	Mauritius
86.	Ms.	JALLOW NDOYE	Fatoumata	African Union Commission	Ethiopia
87.	Mr.	JOAO	Jenoval	Land Resources Conservation Department	Angola
88.	Mrs.	KABALIMU	Kekilia	Tanzania Forest Services	Tanzania
89.	Mr.	KAGAMBA SINGOMA	Julius	African Union Commission	Ethiopia
90.	Ms.	KAHURI	Sera	Kenya Forest Service	Kenya
91.	Dr.	KAMGA	Andre Foamouhoue	ACMAD	Niger
92.	Mr.	KAMUNGA MUSUNGAYI	Donatien		DRC
93.	Mr.	KANHONOU	Léopold	Centre National de élédéttection et de Suivi Ecologique (CENATEL)	Benin
94.	Mr.	KANYANGALAZI	Joseph	Land Resources Conservation Department	Malawi
95.	Dr.	KAUDIA	Alice	Ministry of Environment and Mineral Resources	Kenya
96.	Mr.	KAYIJAMAHE	Eugene	ICPAC	Kenya
97.	Mr.	KEOTSENE	George	BDMS/SADC -CSC	Botswana
98.	Mrs	KIDIAVAI	Victoria	ICPAC	Kenya
99.	Mr.	KIRINGUINZA SINGA	Françoise	Ministère des Mines, Energie et Hydrauliques	République Centrafricaine

No.	Title	Family Name	First Name	Institution	Country
100.	Mr.	KONATE	Daouda	National M teorological and Hydrological Services (NMHSs)	Cote d'Ivoire
101.	Mr.	KUGURU	Baraka Lameck	Tanzania Fisheries Research Institue	Tanzania
102.	Mrs.	KUPOLATI	Bola Aduke	Federal Department Of Fisheries	Nigeria
103.	Mr.	KURI	Farai	SIRDC	Zimbabwe
104.	Mr.	KUSANE	Isaac	BDMS	Botswana
105.	Mr.	KWAI PUN	Marc	JAES Support Mechanism	Belgium
106.	Mr.	LAMIN	Jawneh	National E vironment Agency, Environment Information Systems	Gambia
107.	Ms.	LEBOGANG	Kamiwa	BDMS/SADC -CSC	Botswana
108.	Dr.	LEROY	Marc	CNES -THEIA	France
109.	Mr.	LOUKAKA	Jean Claude	Economic Community of Central African States (ECCAS)	Gabon
110.	Miss.	LUTCHMANEN	Divambal	Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Islands	Mauritius
111.	Dr.	MAATHUIS	B.H.P	MESA Training Programme	Ethiopia
112.	Mr.	MADULA	Remy Avhashoni	Ministry of Agriculture, Forestry and Fisheries	South Africa
113.	Mr.	MAGASHI	Umar Bashir	Federal Ministry of Water Resources	Nigeria
114.	Mr.	MAHMOUD	Roushdi	National ater Research Center	Egypt
115.	Mr.	MALATJI	Adolph	SADC THEMA	Botswana
116.	Dr.	MALHERBE	Johan	Agriculture Research Council	South Africa
117.	Mrs.	MAQHANOLLE	Tsekoa	National M teorological services	Lesotho
118.	Mr.	MARTIAL	Eric Laurence	Mauritius Oceanogaphy Institue	Mauritius
119.	Mr.	MARUMBWA	Farai	BDMS/SADC -CSC	Botswana
120.	Mr.	MASSART	Michel	GROW	Belgium
121.	Mr.	MBWAMBO	Zawadi	Tanzania Forest Services	Tanzania
122.	Ms.	MCHIHIYO	Rosemary P.	Tanzania Meteorological Agency	Tanzania
123.	Mr.	MEDU	Samuel	ECOWAS Commission	Nigeria
124.	Mr.	MEHRETEAB	Michael	Department of Environment	Eritrea

No.	Title	Family Name	First Name	Institution	Country
125	Mr.	MOHAMED	Moussa	IGAD Secretariat	Djibouti
126	Mr.	MOHAMED	Sultan Alya	Environment Mapping Agency	Ethiopia
127	Amb. Eng.	MOHAMOUD	Maalim	IGAD Secretariat	Djibouti
128	Mr.	MOITLHOBOGI	Thembani	BDMS/SADC -CSC	Botswana
129	Mr.	MOKANGO MAMY KOBO	Gabriel	Régie des Voies Fluviales	Rép. Démocratique du Congo
130	Mr.	MOLAHLEHI	Lebone	Ministry of Agriculture and Cooperati es	Lesotho
131	Mr.	MOLEFE	John Isaac	BDMS/SADC -CSC	Botswana
132	Mrs.	MOORUTH	Partima	Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Islands	Mauritius
133	Ms.	MORGADO	Ana	Member States Representati es	Portugal
134	Mr.	MOSAHEB	Javed Iqbal	Mauritius Oceanogaphy Institue	Mauritius
135	Mr.	MOTHUPI	Russell Charles	BDMS	Botswana
136	Prof.	MURWIRA	Amon	University of Zimbabwe	Zimbabwe
137	Mr.	MUSSA	John	Department of Land Resources and conservation	Malawi
138	Mr.	MUTARONI	Vincent	RCMRD	Kenya
139	Mr.	MUTERO	Wycliffe	KWS	Kenya
140	Mr.	MVE AKWE	Pierre	Ministère de Transports, de l'Aviation Civile t du Tourisme	Gabon
141	Mr.	MWALE	Madalitso	Department of Disaster Management Affairs	Malawi
142	Mr.	MWAMBA NYEMBO	Jean Paul	Ministère de l'Environnement et Développement Durable	DRC
143	Mr.	MWANGI	Kenneth	ICPAC	Kenya
144	Mr.	N'DAFA PANSAU	Antonio	Secrétariat d'Etat de l'Environnement AV. Combatant de libérâttes de partie	Guinea Bissau
145	Mr.	NABIL	Ben Khatra	OSS	Tunisia
146	Mrs.	NAESS WANAMBWA	Leah	African Union Commission	Ethiopia
147	Mr.	NDLOVU	Nomzamo	SADC THEMA	Botswana
148	Mr.	NDWANDWE	Ishmael	Swaziland Environment Authority	Swaziland

No.	Title	Family Name	First Name	Institution	Country
149.	Mr.	NEGUSSIE	Kaleb	Polytechnic of Namibia	Namibia
150.	Mr.	NELSON	Gomonda	AMCOW	Nigeria
151.	Mr.	NIANE	Mamadou	MESA -Programme -UoG	Ghana
152.	Mr.	NIMUBONA	Alexis	Institut Géogaphique du Burundi	Burundi
153.	Mr.	NJAU	Leonard	ACMAD	Niger
154.	Mr.	NKEMELANG	Tiro	BDMS/SADC -CSC	Botswana
155.	Mrs.	NOASILALAONO MENJANAHARY	Ambinintsoa Lucie	Ministère de l'Environnement et des Forêts	Madagascar
156.	Mr.	NONDO	Ntandokamlimu	University of Zimbabwe	Zimbabwe
157.	Mr.	NONGUIERMA	Andre	UNECA	Ethiopia
158.	Mr.	NOUMONVI	Kokouvi Julien	Ministère de l'Agriculture de l'Elevage et de la Pêche /Directeur de la Production Halieutique	Benin
159.	Mr.	NTONGA	Jean Claude	Centre de Recherches Hydrologiques	Cameroun
160.	Mr.	NWAGWU	John	NARSDA	Nigeria
161.	Prof.	OGALLO	Laban	ICPAC	Kenya
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165.	Dr.	OMBOSI	David	AMCEN Secretariat	Kenya
166.	Mr.	ONAK	Timothy Thwol	Directorate of Forestry	South Sudan
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170.	Mr.	OUSMAN	Mamoudou	Ministère de l'Eau et de l'Energie	Cameroun
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193.	Mr.	SINYANGWE	Joy	Ministry of Agriculture & Livestock	Zambia
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195.	Dr.	TANGEM	Elvis Paul	African Union Commission	Ethiopia
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197.	Mr.	TCHOUADANG	Kadjonga	Direction Généal du Génie Rural	Tchad
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216.	Mr.	ZEIL	Peter	GROW	Belgium
217.	Mr.	ZENEBE	Seblu	African Union Commission	Ethiopia
218.	Mrs.	ZEROM	Israel	AUC	Ethiopia
219.	Mr.	ZEWDE	Geremew	AUC	Ethiopia
220.		ANDISWA	Mulisa	GEO Secretariat	Switzerland

Appendix 2: Forum's Expected Results

Expected Results

1. In-depth understanding of how MESA can inform Africa's environmental governance. Knowledge is gained and a higher level of coordination is reached, on how services are generated and disseminated at a regional and country level.
2. Plans and strategies for training and capacity development in MESA plans will be improved as a result of discussions.
3. Improved knowledge on how the Sentinel earth observation missions could assist African policy makers, using suitable applications.
4. Potential policies in mitigation measures for the critical issues linking long-term climate change with food security.
5. Continental policy makers will be informed of the potential of continental climate services.
6. Better understanding and execution of complementarities between the MESA and GMES and AFRICA programmes.

Appendix 3: Forum's Evaluation Report

At the end of the Forum, a short evaluation questionnaire was distributed to the participants. The evaluation was aimed to get feedback on how the forum met participants' expectation. The survey was completed by participants from 38 different countries .The results of the survey below are based on the total of 115 completed evaluation questionnaire. Participants' qualitative comments about what they appreciate and what needs to be improved are presented below:

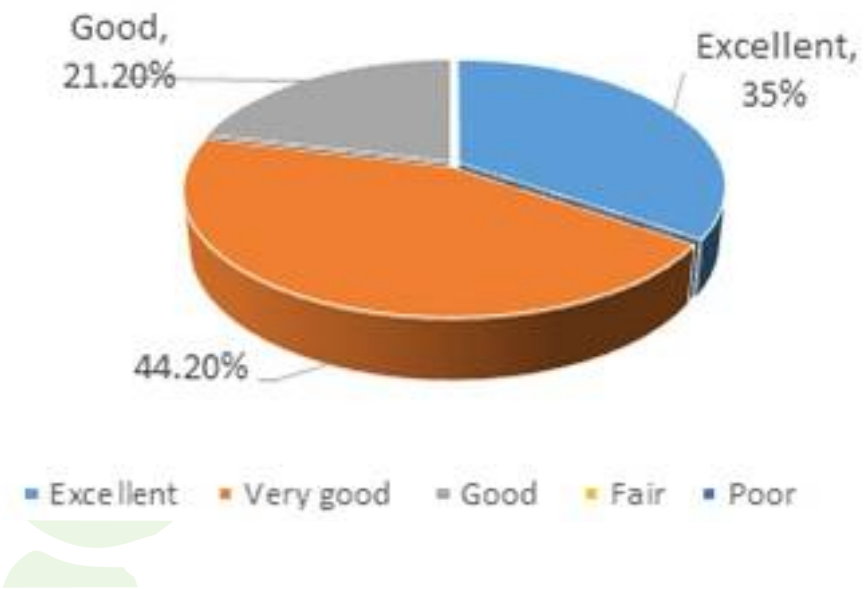
What did participants appreciate best about the forum?

- Presentations of the RICs about MESA success stories
- The level of experience sharing
- Networking and meeting people from relevant institutions
- The roundtable and panel discussion
- Logistic arrangements

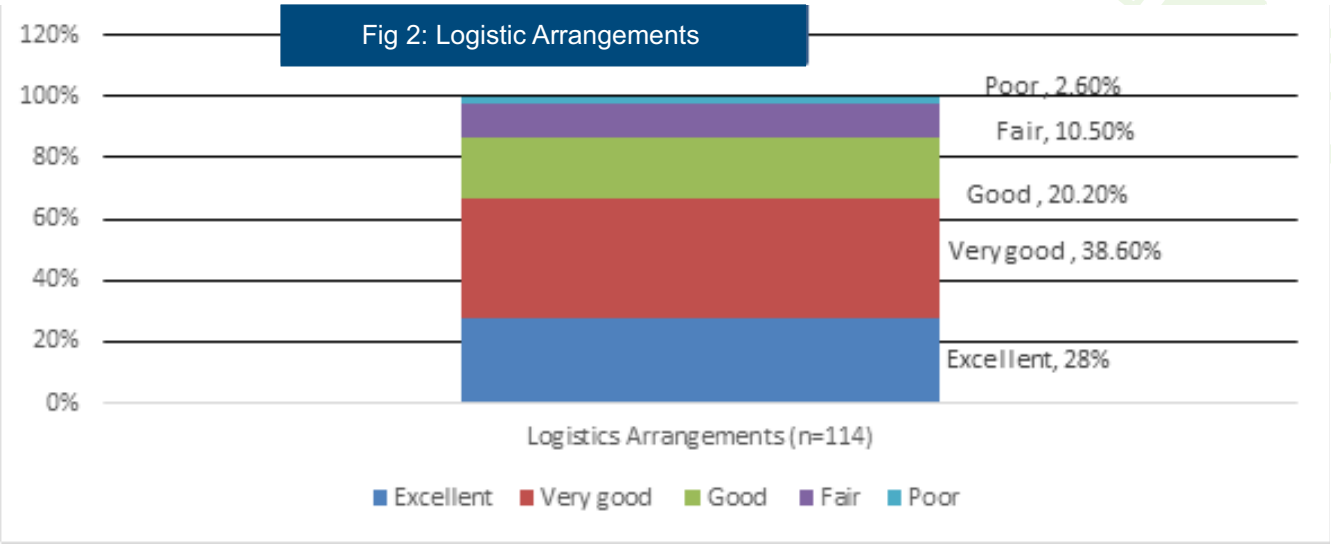
i Participants' suggestions from improvement
ii Put all participants in one hotel or arrange two or more buses for transportation
iii Involve more national level actors, NGOs and CSOs
iv Provide more number of translation/interpretation apparatus in the meeting hall
v Make presentations available immediately (use -I clouds)

Participants were asked to rate the overall program in five measurement scale that ranges from poor to excellent. The result showed that 79% of the participants rated the first MESA Forum as Excellent or Very good (35% and 44 % respectively); the rest 21 % rated the workshop as good. And no participant rated the forum as fair or poor.

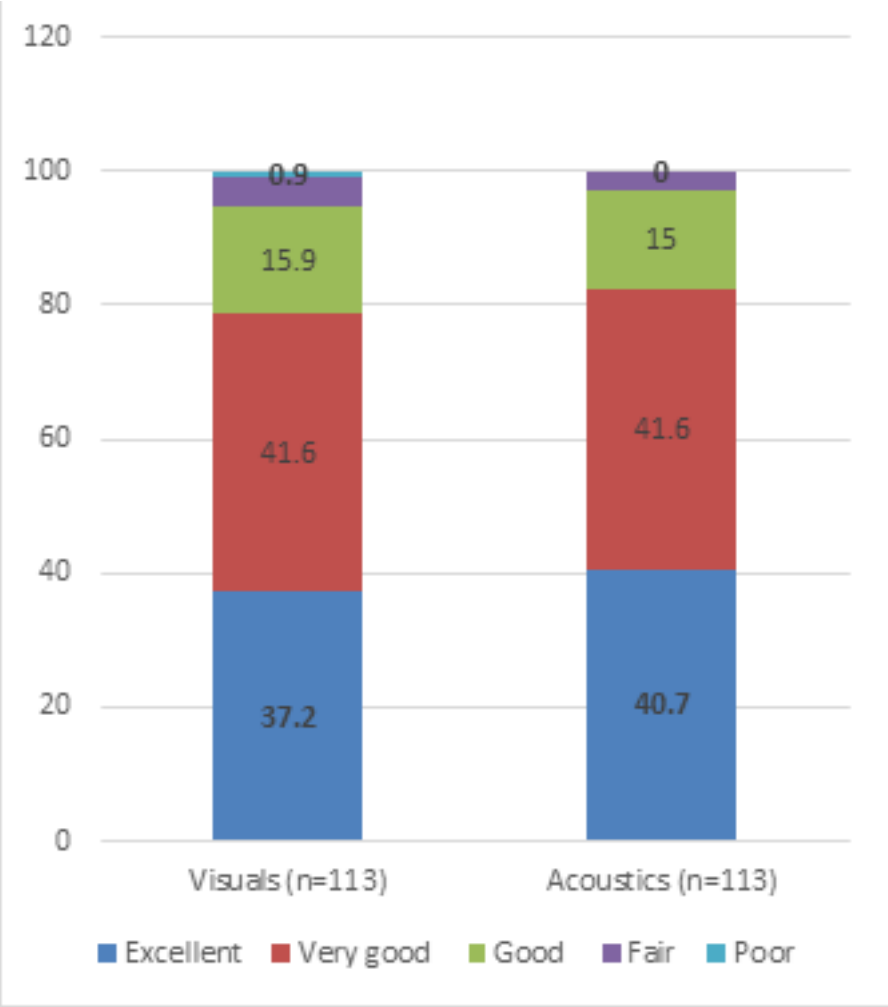
Fig 1: Overall Program



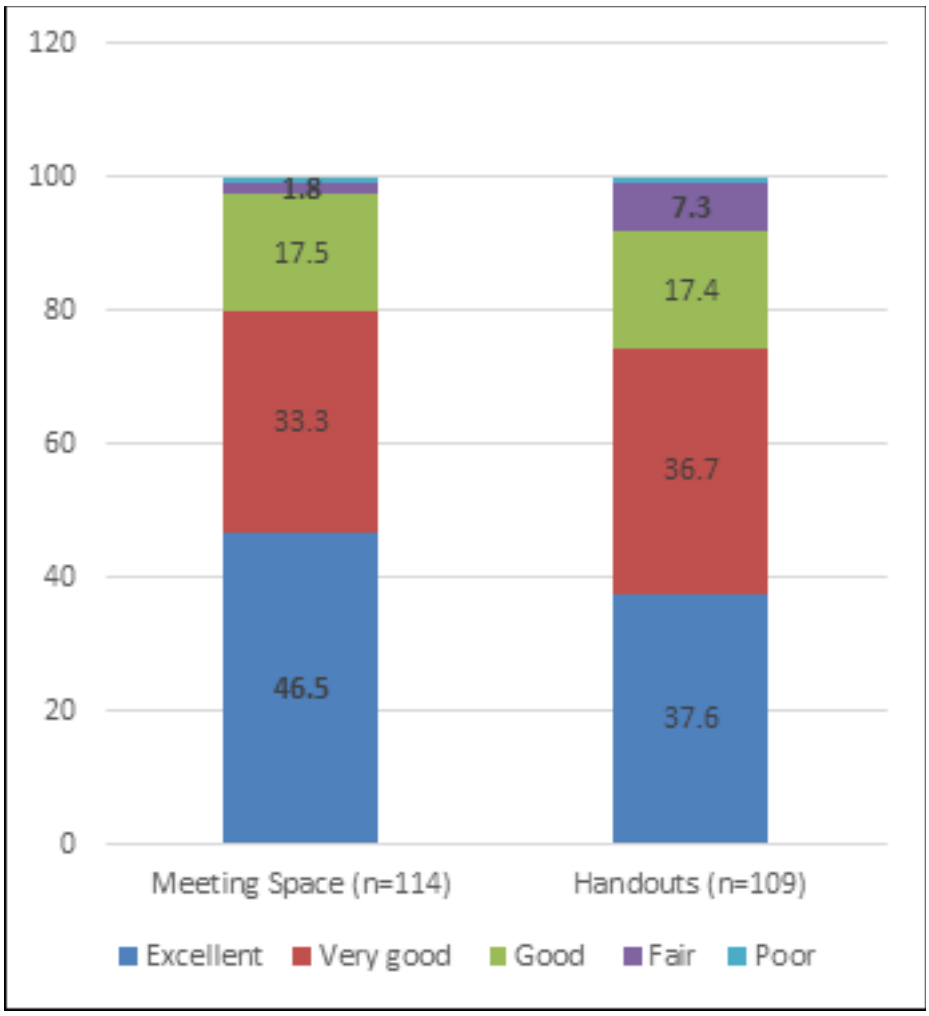
Participants also gave favorable rating for the logistic arrangements. 68 % rated the logistic arrangement as very good or excellent, 20 % rated as good and 13 % rated fair or poor. Bigger venue that accommodate all participants, more transport service to and from the hotel and DSA payment arrangements were raised by participants as issues that needs to be improved with regard to forum logistic (Fig. 2).



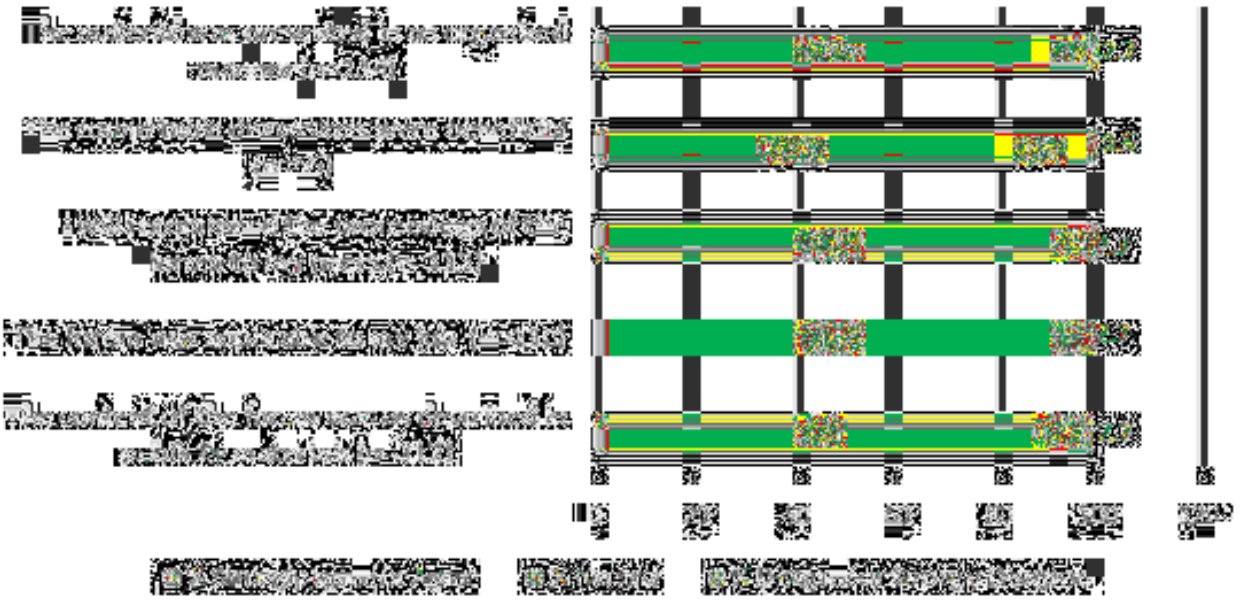
Participant's perception about visuals and acoustics (%)



Participants' perception about meeting space and handouts (%)



Participants were also asked to rate the content of the Forum in terms of the presentations, the round table discussions and applicability of the forum to their jobs. The graph below captures participants' impressions about these different aspects of the Forum. The numbers in bracket show the number of responses obtained and the number on the bar graphs graph show the percentage rating obtained for that statement.



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