



# GMES.Africa



## Natural Resources Management Workshop

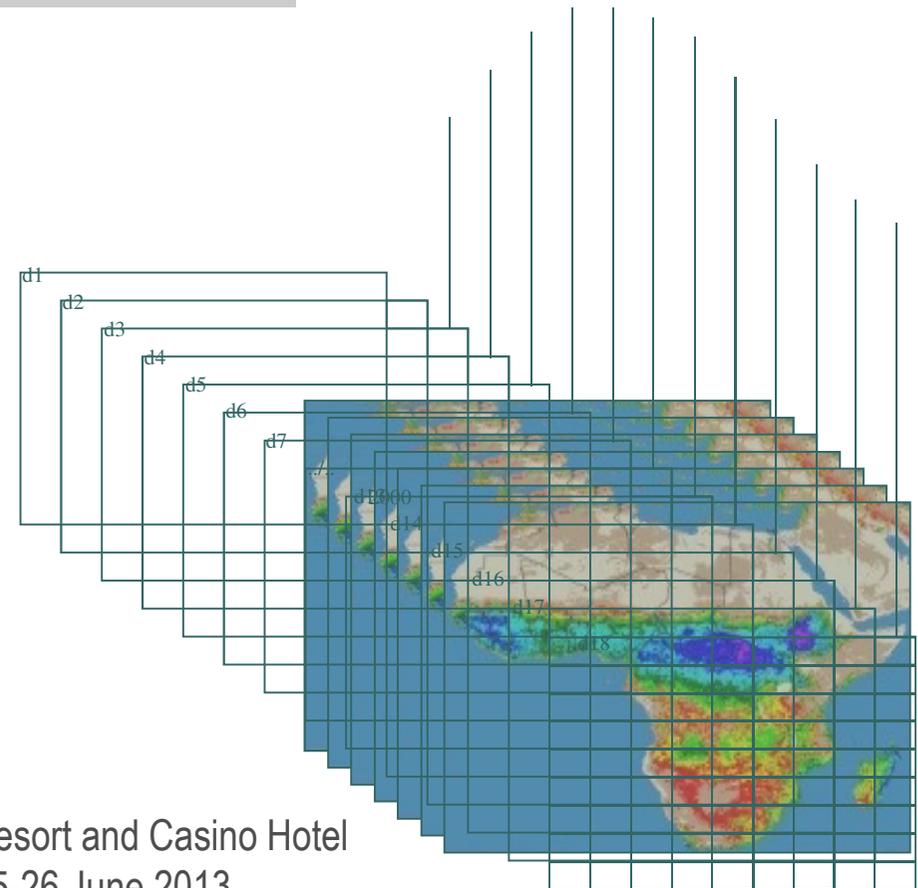
United Nations  
Economic  
Commission for  
Africa

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Geoinformation  
& Spatial  
Statistics

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Andre  
Nonguierma



Maritim Jolie Ville Resort and Casino Hotel  
Sharm El-Sheikh, 25-26 June 2013



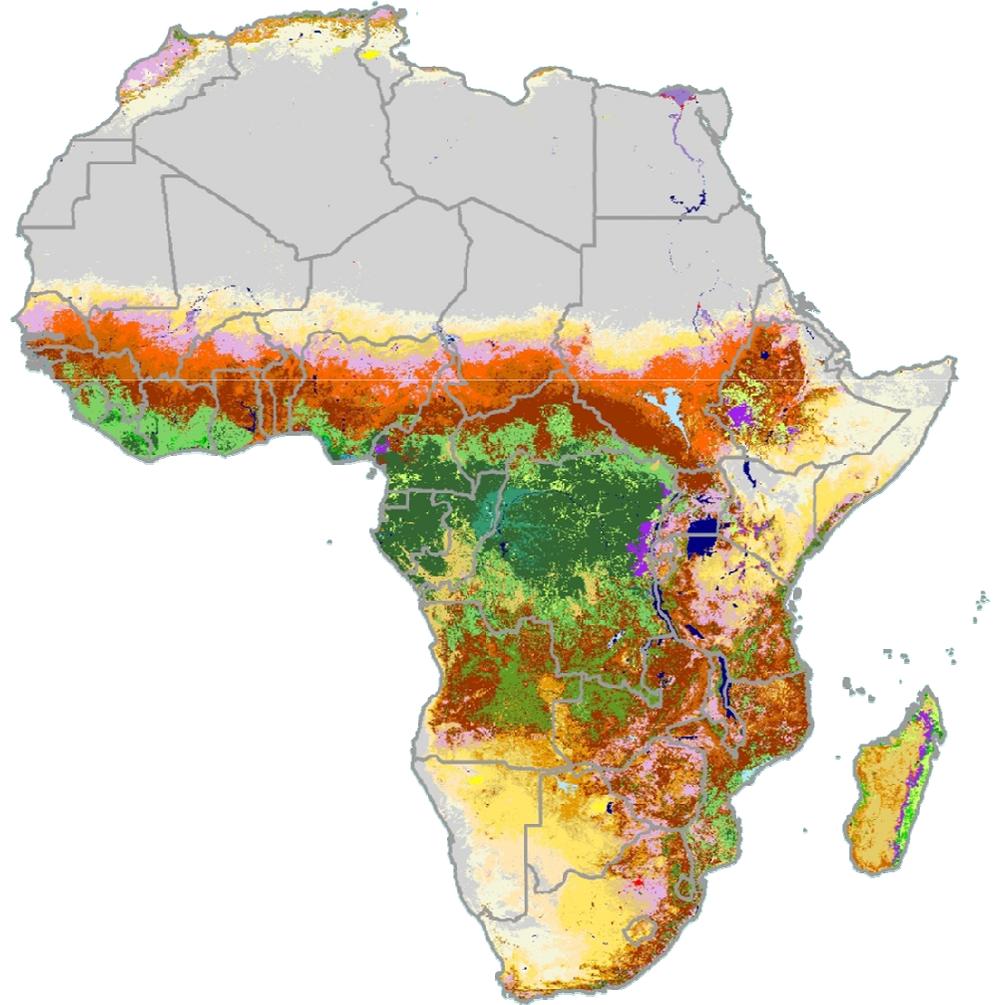
# Outlines

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- ▣ NRM Pressing issues in Africa
- ▣ Policy Drivers
- ▣ Developing an information system on NRM
- ▣ Avenues of Success
- ▣ Way Forward

# Introduction

- The African continent contains a wide variety of ecosystems, from the deserts to the tropical rain forests
- Provide huge ecosystems services to the local population and to the entire planet.
- Nearly 90% of the population draws its subsistence from exploitation of natural resources



# NRM Pressings Issues

- A vulnerable environment subject to various risks as well as structural and conjonctural threats.
- An environment in a form of continuum with many transborder natural resources and where issues are holistic and go beyond geographical localization
- Political and social crises result in displaced populations who migrate within and between borders
- Progressive mutations characterized by



# NRM Key Challenges

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- ❑ Low level of national incomes invested in Environment
- ❑ Poor capacities as regards to planning and complementarities of actions undertaken
- ❑ Inadequate consultation and coordination among the bodies in charge of planning and implementing actions related to Environment
- ❑ Inadequate databases and dissemination of proven techniques and technologies through an appropriate environmental information system
- ❑ Poor rate of development and transfer of appropriate technologies based on research systems
- ❑ Poor coordination of policies and actions as regards to shared and/or transboundary resource management



# Pressures on Natural Resources

Resources	Phenomenon
Land resources	Land degradation Soil salination Loss of chemical fertility Water and wind erosion
Forest and rangeland resources	Deforestation and Forest fragmentation Impoverishment of commercial species Conversion to croplands and Overgrazing Increase in bush fires
Biological resources	Habitat degradation Species extinction Increase of invasive species Pressure on protected areas

**Business Questions : What are the nature and the magnitude of all these changes?**



# Policy Drivers

<b>Society's Needs</b>	<b>Policy Framework</b>	<b>Complex Informations Needs</b>
<b>Food Security</b>	CAADP Land Policy	Rainfall, Yield, Production, Crops Distribution..
<b>Water Resources</b>	African Water Vision	Hydrography, Aquifers, Waterbodies, Quality
<b>Environment</b>	NEPAD - EPF	Ecosystems, Biodiversity, Vegetation, Land cover
<b>Climate Change</b>	Clim.Dev Africa	Rainfall, temperature, wind, aerosols...
<b>Security and Emergency</b>	Africa Regional Strategy on Disaster	Vulnerability, Risk
<b>Mining</b>	African Mining Vision (AMV)	Location and volume of the deposits by resource



# Needs Analysis

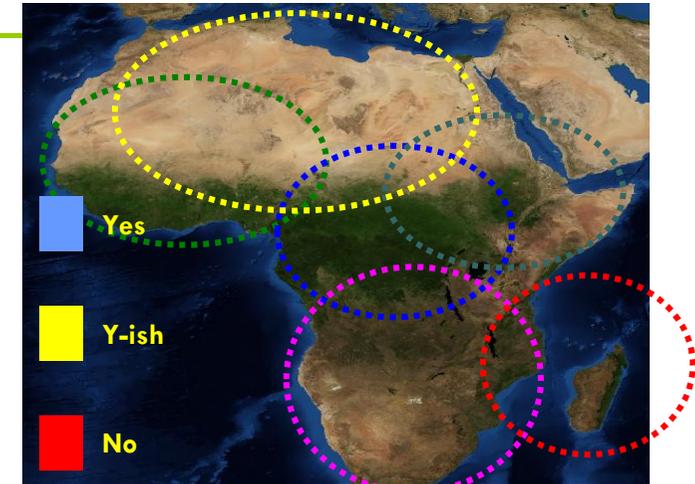
<b>Scale</b>	<b>Type of action</b>
Local	<p>To set up multi-scale information systems enabling any user or decision maker to know what information resource is available locally</p> <ul style="list-style-type: none"><li>– Seasonal trends and dynamic in rural area</li><li>– Quantification of available resources : water, soil, vegetation</li><li>– Vulnerability Analysis and Identification of risk area</li><li>– Assessment of land tenure</li></ul>
Regional	<p>To set up a regional reference system for assessing and characterizing the state of natural resources and the environment</p> <ul style="list-style-type: none"><li>– Vegetation : Cover, Biomass, Deforestation rate</li><li>– Lands : Degradation rate, available arable lands, etc.</li><li>– Climat &amp; Water : Seasonal characteristics, spatial patterns</li></ul>
Global	<p>To assess and forecast environmental phenomena and set up operational early warning systems</p> <ul style="list-style-type: none"><li>– Land use and Land Cover : Change and trends</li><li>– Vegetation : Resilience, Carbon sequestration</li><li>– Climate Change effects and impact</li><li>– Ecosystems: dynamics monitoring and assessment</li><li>– Global Changes intensity</li></ul>

# Communities of producers and users

Level	Constituencies	Information needs
High Political	Head of State Conferences African Ministerial Conferences : AMCEN, AMCOW, AMCOST AUC, AfDB RECs : ECOWAS, SADC, IGAD, ECCAS, AMU UN (ECA, FAO, UNEP, UNDP...) EU Aid Agencies Conventions' Secretariats	Global trends in the status, quality and nature of the environment Carbon Potential The information should be global through an Early Warning System
Technical Decision-Makers	Relevant National Ministries (Forests, Environment, Land planning, Agriculture, Regional and national development agencies (COMIFAC, RAPAC...) Managers of protected area Development banks (WB, AfDB) Technical services of development Agencies: EC, Member States, USAID, ACIDI...	All aspects of environment, such as vegetation status, vegetation change, surface water, fire, carbon stocks... The information should be in near real time at subregional to national scales and combined with ancillary input such as socio-economic data
Scientific Community and Information Producers	Networks : GOF-C-GOLD, NESDA, EIS-AFRICA, AARSE, UICN, OSS, FARA, ASARECA, CORAF, OFAC RICs : AGRHYMET, RSAU, RCMRD, RECTAS Regional and National Research Institutions: CGIAR, JRC, ITC, WRI, IRD, USGS National Centers : SAC, CRTS, CSE, CERGIS, etc.	Forest Cover status Land Use Land Cover Vegetation phenology (Biomass variation, foliar index, etc...) Biodiversity (change in the floristic composition), etc...
Ultimate Beneficiaries	Producers of Goods : OIBT, OAB, National Forest Services, Private forest companies Local NGOs : WWF, BirdLife Africa, UICN,	Forest logging Deforestation

# Institutional Capacities

- ▣ Cross-cutting content between thematic action
- ▣ Commonalities between sub-regions
- ▣ Improved capabilities of the RICs
  - Data collection, accessibility & integration
  - Monitoring and Assessment



	Data collection, accessibility & integration			Monitoring and Assessment			Inform. Diffusion & Capacity	
Institution	Collect	Access	Integration	Assessment	Monitoring	Forecasting	Diffusion	Capacity
RICS	Yes	Y-ish	Yes	Yes	Yes	Yes	Yes	Yes
National	Yes	No	Yes	Y-ish	No	Yes	Yes	No
Research	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Reg. Organ.	Yes	No	Yes	Yes	No	Yes	Yes	No
River Basins	Yes	No	Yes	Yes	Y-ish	Yes	Yes	Y-ish

# Infrastructural Capacities

Programmes & Projects	Data collection, accessibility and integration			Monitoring and Assessment			Information Diffusion & Capacity Building	
	Data Collection	Data Access	Data Integration	Assessment	Monitoring	Forecast/	Information Diffusion	Capacity Building
Africover	Field Data EO data	Accessibility for value-added data	Processed data	Land Cover Land Use	No	No	Thematic data bases	Workshops
GOFC-GOLD	EO Data							
Global Land Cover Network	No	No	No	Land Cover Land Use	No	No	No	Workshops
GLC2000	Field Data EO Data							
Globcover	EO Data	Thematic data	No	Land Cover Land Use	No	No	No	No

# Infrastructural Capacities

Programmes & Projects	Data collection, accessibility and integration			Monitoring and Assessment			Information Diffusion & Capacity Building	
	Data Collection	Data Access	Data Integration	Assessment	Monitoring	Forecast/ Early Warning	Information Diffusion	Capacity Building
FAO/JRC - FRA								
AMESD	Field Data EO Data	Thematic data	No	Environmental Status	No	No	No	Short-term training Workshops
TIGER	EO Data	Yes		Water resources	Water Spatial Patterns	Flooding	DDS Stations	Short-term training Workshops
CarboAfrica	Field Data	No	No	Carbon stock	No	No	Bulletin	Workshops
BIOTA-Andre Nonguierma Africa	Field Data	No	No					
AMESD-GMES Africa NFM Workshop								

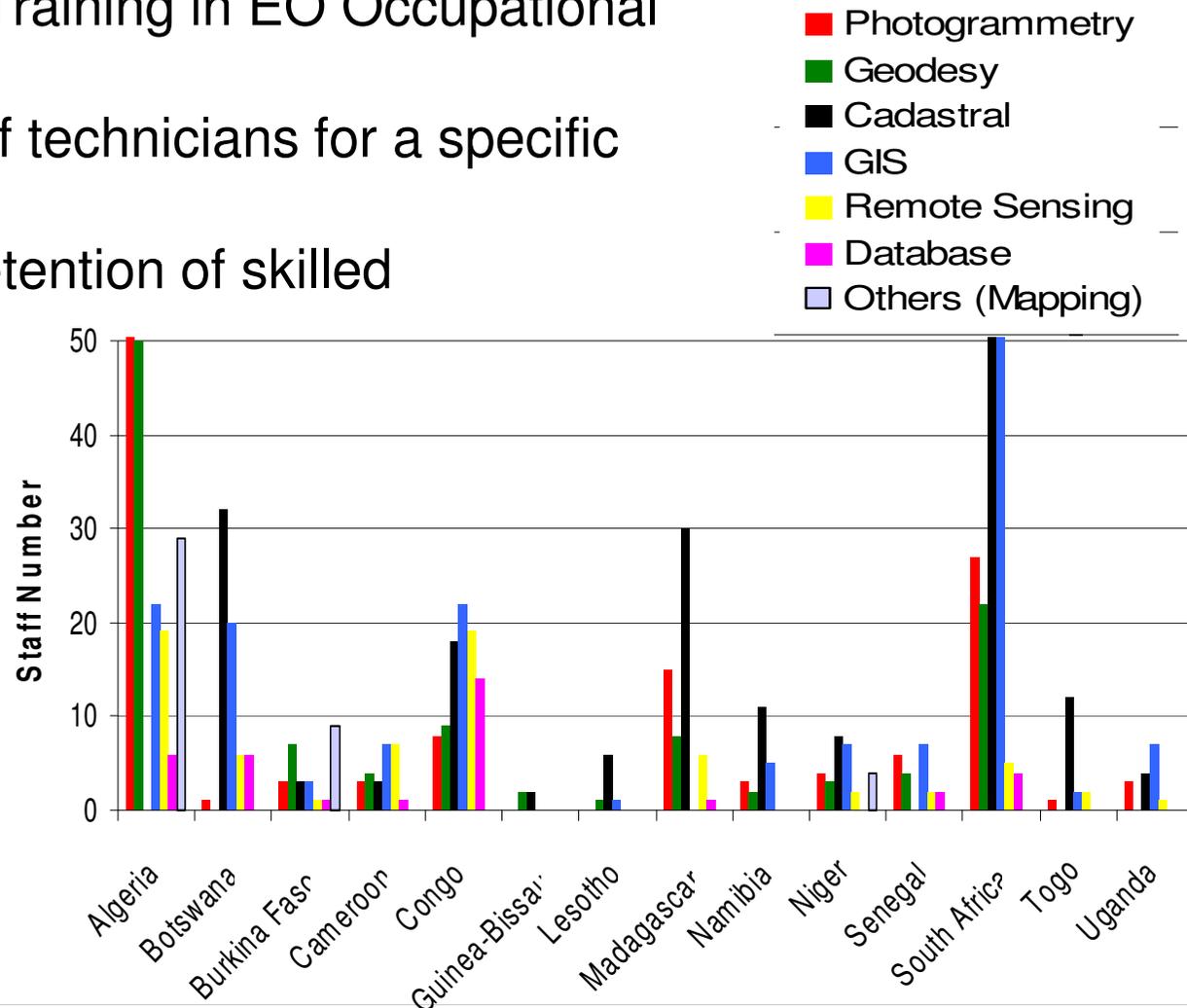
25/06/2013

# Individual Capacities

- Large spectrum of Training in EO Occupational Fields
- “On-Job” Training of technicians for a specific task

Photogrammetry	15%	151
Geodesy	11%	112
Cadastral	41%	424
GIS	19%	197
Remote Sensing	7%	70
Database	3%	35
Others (Mapping)	4%	42
<b>Total</b>	<b>100%</b>	<b>1031</b>

Retention of skilled



# Identification of EO Data Gaps

Category of Data	Sensor / product	Acquisition strategy	Operational Environment (Ground Stations)	Identification of gaps
Low Resolution (300m-1km)	MSG NOAA SPOT-VGT MERIS MODIS ASAR	daily	53 African Countries AGRHYMET (Niger) RSAU (Botswana) ICPAC (Kenya) RCMRD (Kenya) CSE (Senegal)	
Medium Resolution (10-50m)	LANDSAT SPOT CBERS IRS NigeriaSat-1 7 X	Complete coverage yearly	Maspalomas (Canary) Hartebeeshoek (South Africa) Aswan (Egypt) Jos (Nigeria) Malindi (Kenya)	Lack of receiving stations in large key regions (Central Africa, West Africa...)
High resolution (2-5m)	SPOT NigeriaSat-2	Complete coverage 3-5 years	Murzuq (Lybia) Hartebeeshoek (South Africa) Maspalomas (Canary)	Few sensors are acquiring information but rarely on the African continent; lack of receiving stations or on-board recording
Very High resolution (<1m)		Sampling for statistical applications and validation		Few sensors are acquiring information but rarely on the African continent (low economic demand)

# Identification of EO Data Gaps

Category of Data	Sensor / product	Acquisition strategy	Operational Environment (Ground Stations)	Identification of gaps
Radar high resolution (1-50m)		Complete coverage yearly		Lack of receiving stations in large key regions (Central Africa, West Africa...) Lack of fully validated procedures
Geodetic Measurement	GNSS GPS CORS		Hartebeesthoek EMA (Ethiopia) ECA-SROWA (Niger) CICOS (DRC) Kilimanjaro (Tanzania)	
Data Dissemination	EUMETCAS T VGT4Africa		53 African Countries RICs Programme / Projet	ftp transfer rate is very low in many countries

# Identification of In-Situ Data Gaps

Biophysical parameters		Existing and planned capacities	Gaps
Soil	Carbon, Erosion, Moisture...		
Vegetation and forest	DBH, height Biomass Phenology Carbon flux	Basic forest parameters are collected in timber concessions; a network of carbon flux towers is starting under the CarboAfrica program	No network of forest inventories measurements Missing elements for biomass (allometric equations, dead wood, litter..) No network of phenology measurements
Biodiversity	Species inventories Habitat description	Excellent inventories exist in many protected areas Continental distribution (GBIF, IUCN)	No consolidation at national and African level for many species No systematic inclusion to GBIF or IUCN databases
Hydrology	River discharge River gauge		No recent observation in many critical basins (Congo)
Land-cover	LC attributes	Some national or regional initiatives exist (Senegal, South Africa)	No consolidated network of land-cover attributes No standardised protocol of data collection

# Identification of In-Situ Data Gaps

<b>Socio-economic parameters</b>		<b>Existing and planned capacities</b>	<b>Gaps</b>
Population	Density, structure... Poverty		
Land tenure	Ownership		Nearly inexistent
Development	Energy Infrastructure		No information on status of transport infrastructure
<b>Management parameters</b>		<b>Existing and planned capacities</b>	<b>Gaps</b>
Territorial units	Protected areas, Logging concessions Mining concessions Climate projects	World Database of Protected Areas National databases for logging and mining	Global databases often obsolete Lack of accessibility of validated information
<b>Management Institutional</b>			

## Future and Planned Activities

- In addition to existing capacities already listed
- Group on Earth Observations has put in place a specific working group on Biodiversity Observations, including space and field data;
- OFAC model under institutionalization in a perennial structure funded by several donors;
- Intra-ACP budget line of EDF, a specific component is reserved for setting up a facility on biodiversity observations at panafrikan level;
- Others programmes dealing with REDD are now trying to set up a reliable system for carbon accounting at national level, to strengthen the local capacities for monitoring, reporting and verifying the carbon fluxes, and to create the mechanisms of redistribution to the local population.



# Building GMES.Africa NRM Services

- ▣ Near-real time monitoring systems
  - seasonal trends in vegetation conditions (i.e. phenology, productivity, surface water availability and fires)
- ▣ Land-cover characterisation
  - the regular land-cover characterisation at coarse resolution and the baseline map at medium resolution (20-50m) updated every 10
- ▣ Land-cover change estimates
  - national estimates or local estimates with a finer spatial detail (2-5m)



# Building GMES.Africa Capacities

- A comprehensive, holistic, vision-driven, long-term transformative development of capacities and enhanced collaborations and partnership
  - Technicians involved in the day-to-day management of resources
  - Technicians for the production of geospatial information
  - Managers of natural resources involved in the planning and implementation of policies
  - High profile scientists for adapting tools and methods to the African context.
  - Local communities for using earth observation service into problems solving

# Priorities & Requirements

## □ Institutional priorities

- The Programme must be set up in an operational environments for internalization and sustainability
- The Programme must contribute to build of a critical mass of expertise at two levels: Production and Application

## □ Technical priorities

- The Programme must establish a swift, efficient and appropriate communication's infrastructure

## □ Informative (Thematic) priorities

- Needs to monitor seasonal and global dynamics
- Needs to assess environment vulnerability

## □ Psychological priorities

- “User-pull” and not “Technology-push” Programme:  
The needs must precede and determine the means

# Organisational Scheme

- Principles : All-inclusive Continental coordination and national implementation
- Key role of the Continental and International Bodies (AUC, UNECA, EU) for strategic orientation
- Regional Economic Communities (RECs) + RICS in supervision of the technical activities
- National institutions running the technical services
- Scientific partners and bilateral and multilateral co-operation partners (UNEP,

# Schedule & Budget

Phase	Year	Activity	Budget (EUR)
<b>Phase 1 (2yrs):</b> <b>Exploratory phase</b> with installation of the governance model and the political dialogue.	<b>2010</b>	Action plan adopted by Heads of State	<b>(EUR)</b>
	<b>2011</b>	Installation of the political dialogue	<b>10 000</b>
	<b>2012</b>	Installation of satellite data acquisition in missing regions Identification of regional processing and training centres Development of exploratory products	<b>000</b>
	<b>2013</b>	Setting-up or strengthening of regional/national processing facilities	<b>15 000</b>
<b>Phase 2 (4yrs): Pilot phase</b> with test over large areas of exploratory products, training activities in specialised and thematic centres.	<b>2014</b>	Strengthening on training institutions for production of geo-spatial information	<b>000</b>
	<b>2015</b>	Awareness-raising of policy-makers	
	<b>2016</b>	Test over large areas of exploratory products	
	<b>2017</b>	Development of operational services	<b>20 000</b>
<b>Phase 3 (4 yrs):</b> <b>Operational phase</b> with provision of complete GMES services with full deployment of	<b>2018</b>	Full deployment of regional/national processing facilities	<b>000</b>
	<b>2019</b>	Maintenance of acquisition infrastructure and processing facilities	
	<b>2020</b>	Amplification of the capacity-building activities	



# GMES Africa Avenue of Success

- ▣ Consolidation of existing regional and national institutions and initiatives (E.g. : AMESD/MESA or OFAC)
  - Models to consider and learn from.
- ▣ Partnership and co-operation between African (information producers and users) with international community.
- ▣ Targeted applications and institutions must be privileged in a first time (community of users well identified) with a further broadening of the spectrum of activities.

# ● ● ● Contacting Us...

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