



## **Report of the 2<sup>nd</sup> West Africa Regional Network Meeting on Earth Observation and Environmental Change**

University of Ghana  
Accra, Ghana  
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Edited by  
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Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) is a coordinated international effort to ensure a continuous program of space-based and in situ forest and other land cover observations to better understand global change, to support international assessments and environmental treaties and to contribute to natural resources management.

GOFC-GOLD encourages countries to increase their ability to measure and track forest and land cover dynamics by promoting and supporting participation on implementation teams and in Regional Networks. Through these forums, data users and providers share information to improve understanding of user requirements and product quality.

GOFC-GOLD is a Panel of the Global Terrestrial Observing System (GTOS), sponsored by FAO, UNESCO, WMO, ICSU and UNEP. The GOFC-GOLD Secretariat is hosted by Canada and supported by the Canadian Space Agency and Natural Resources Canada. Other contributing agencies include NASA, ESA, START and JRC. Further information can be obtained at <http://www.fao.org/gtos/gofc-gold>

## **Summary**

The report describes the results of the Report of the 2nd West Africa Regional Network Meeting on Earth Observation and Environmental Change held from 12-14 November 2007 at Accra, Ghana. The meeting was built on the progress from the first meeting of the Regional Network in 2005 at Dakar, Senegal.

The participants decided to proceed with the establishment of a West African Regional Network to support the applications of Earth observations needed to address the pressing development and environmental problems of the region. To kick off the network, two main thematic aspects were proposed: Land Cover/Land use and Fire. These two issues are known to be of common interest amongst the West African countries and they are studied in several institutions, have global linkages, and have a meaningful impact on people's livelihoods.

It is with this background that the West Africa Regional Network, in partnership with several international organizations and the SAFNet, OSFAC, and Miombo networks, held its second meeting on Earth Observations and Environmental Change in Africa, from 12-16 November 2007 at the Department of Geography and Resource Development, University of Ghana, Accra.

In conjunction with and following the regional network meeting a workshop was organized by GOFC-GOLD to evaluate the requirements for fire early warning systems in Africa. (GOFC-GOLD Report no. 35).

The WARN meeting was opened by Prof. Paul Yankson (Department of Geography, University of Ghana), Prof C. N. B. Tagoe (Vice Chancellor, University of Ghana) Hon. Andrew Adjei Yeboah (Deputy Minister for Lands Forestry and Mines, Ghana). Welcoming statements were provided by Michael Brady (Executive Director, GOFC-GOLD), Philippe Mayaux (GOFC-GOLD Vice Chair with Regional Network oversight) and Chiekh Mbow (UCAD).

The speakers gratefully acknowledged the support for the meeting provided by the University of Ghana; Natural Resources Canada-Canadian Forest Service; Canadian Space Agency; Global change SysTem for Analysis Research and Training (START); US National Aeronautical and Space Administration (NASA); EC-Joint Research Centre; World Meteorological Organization; Group on Earth Observation Secretariat; and the United Nations University.

The goals of the meeting were to:

- broaden and consolidate the organization and work of the West Africa Regional Network and establish linkages with other networks in Africa;
- strengthen the integration of space-based and in situ earth observations of land cover dynamics in West Africa, including operational early warning systems for fire; and
- contribute to the works of the Group on Earth Observations (GEO) and related societal benefit areas in West Africa.

The regional network meeting also provided inputs to the subsequent GOFC-GOLD Workshop on Requirements for Fire Early Warning Systems in Africa, which was also held at the University of Ghana, Accra from 14-16 November 2007.

The following is a list of recommendations by the workshop delegates in respect of the Key Thematic Issues, Institutional/Organizational Issues and Network Structure & Functioning.

## Key Thematic Issues

The following recommendations relate to four key cross-cutting thematic issues: wildland fires, carbon/forest; coastal zone area management; and urban sprawl.

- There are isolated studies in countries on the identified thematic issues and it is important that all these are brought into the mainstream of activities of the Network. A number of validating sites also exist and it is important to identify these sites and utilize their data. Mapping and monitoring products are being developed and made available to national and regional agencies and networks.
- WARN will foster generation and sharing of information among members on research projects, data sources, methodologies and dissemination (harmonize and standardize)
- Whilst Human Resources/Capacity-Building is an important issue, retention of trained manpower maybe more important than training; equal attention should also, be given to training at level of technician
- There are a number of on-going country-level initiatives on carbon research at various stage/levels in some countries e.g. Senegal and Mali; WARN should document inventories of Scientists (by thematic group & country); training and degree programs and Regional measurement and monitoring activities
- The Network should work towards establishing a methods panel to identify best practice guidelines for different types of analysis
- Lack of information on carbon emissions or stock is posing a serious challenge for researchers on carbon issues across Africa. Need to harmonize methodologies on the studies of carbon sequestration or for the measurement of baselines of carbon sequestration.
- Baseline studies on available carbon are important for any studies of carbon emissions in any country; member countries are encouraged to develop required parameter indices at country level; research on biomass emissions should include impacts on human health
- Network to dedicate subsequent meetings to developing methodologies to capture carbon stock across Africa; in the mean time, researchers could still adopt methodologies such as the Honduras methodology. This may require some modification for country- specific applications
- Start a CDM Project to develop required parameters/indices for purposes of carbon sequestration; provide assistance for the network member countries to generate data on carbon emissions; Initiate baseline data/information and further studies in determining biomass emissions (carbon stock). Such data could be made available to all members of the network.
- Identify and implement policies and mechanisms for sharing of data/research findings amongst members.
- Results of research findings should be appropriately and strategically packaged for the attention of policy makers. There should be an integrated and coordinated statement from the regional network to policy makers in the region regarding implementation of research findings.
- Main data used are Landsat XS which are in most cases archival and obsolete. There is need to access near-real time higher resolution data including radar. Network to explore availability of high resolution data from other regional projects such as GCLME (Ghana); and the OKAVANGO Commission for Namibia, Botswana, etc.

- Need to strengthen research capacities of Network members through joint projects, data archiving and accesses and dissemination e.g. through available sources at the Michigan State University presented by Brent Simpson.
- Participation in GOFC-GOLD land cover and fire product validation efforts to develop Africa test beds for global validation, including local interpretation (regional experts) of high resolution imagery.
- WARN should organize future workshops to harmonize standards and methodologies.

## **Organization and Institutional Issues**

- WARN will identify current status of national land cover mapping and change monitoring in the region and other relevant land cover change information needs in various regions of Africa.
- There is a need for a Regional centre of excellence to serve as central data base and training based on the specific needs of individual countries.
- WARN will also address issues of Coordination between regional networks in other matters of linguistic barriers, standardization of software's for trainees, integrating children at the lower levels of education to generate interest.
- Need to involve locals in data acquisition e.g. through joint projects to ensure that they benefit from data validation from test sites, the exchange ground data that suite their needs and also data standardization.
- In order to ensure the relevant critical mass needed for capacity building, intervention models should address the three critical components of migration of trained personnel to non-related fields. The meeting also recognized the lack of job satisfaction for trained personnel.
- Inventory of Global, Regional and Sub-regional Policy initiatives and agreements have been identified on environmental management. Network participants need to become better informed about such initiatives and opportunities. WARN will mandate a committee to review major protocols and recommend how the RN may implement them.
- Membership of the West African Network will facilitate the identification and formulation of clearly defined projects in order to take advantage of GOFC GOLD travel and event funding opportunities. Members also can develop their own projects with proposal for funding by other donors e.g. Maryland University which has a strong collaboration with NASA for data. GOFC GOLD expressed its willingness to give endorsement to such proposals.

## **Designation of Network Structure and Functioning**

- The structure of the Network will be implemented through Working Group or Task Forces within and among participating countries and NOT through National Representatives.
- WARN Secretariat will be hosted at the Dakar University Remote Sensing Laboratory (DURSL), Senegal.
- Network Coordinator is Cheikh Mbow.
- An Interim Steering Committee (ISC) of National Volunteers was mandated to consolidate the vision and activities of the WARN for a period of 6 months
- The WARN coordinator in collaboration with thematic leaders and GOFC-GOLD will implement the recommendation of the ISC.

- GOFC-GOLD will support WARN for workshop, travel and communications during the establishment period and beyond.

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## 1. Introduction

Environmental change, related to both natural processes of climate variability and change and to social processes leading to land use change, is of great importance in Sub-Saharan Africa. The terrestrial impacts of human activities and climate change are most clearly seen in the concern over current and future water availability, the potential loss of the remaining humid forests, risks and uncertainties associated with highly variable rainfall on degrading agricultural, forestry and range lands, including the management and risk of fire.

Few African countries possess the required knowledge and information of environmental change processes taking place. This lack of information limits the ability of organizations to make informed decisions on environmental management. Earth observations are increasingly used in Africa to map and monitor land cover and forest change, including fire. The combination of space-based and on-the-ground observations is particularly useful to monitor environmental changes occurring across national boundaries.

The trans-boundary dimensions of environmental change also require organized efforts to understand, plan and implement effective responses. Of note, there has been recent concern about the impacts of large fires, particularly those burning out of control and endangering human lives, property, and natural resources (Mbow et al. 2006).

While some sub-regions within Africa have developed organizational structures through which coordinated research and action is being carried out – e.g., OSFAC (Observation par Satellite des Forêts d’Afrique Centrale) in Central Africa, the Miombo Network and SAFNet (South African Fire Network) in Southern Africa – West Africa is lagging somewhat behind. Among other responses, an international workshop on earth observations and environmental change was held in 2005 in Senegal. With support from the international panel for Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD), over 50 scientists participated in a science review and synthesis of the long-term impacts of environmental change in West Africa. The workshop identified several research directions, including broad aspects on water issues, vegetation change, pollution, tools and methods, soil fertility and agriculture, rainfall studies, climate change, etc. (Wade 2005).

The participants decided to proceed with the establishment of a West African Regional Network to support the applications of Earth observations needed to address the pressing development and environmental problems of the region. To kick off the network, two main thematic aspects were proposed: Land Cover/Land use and Fire. These two issues are known to be of common interest amongst the West African countries and they are studied in several institutions, have global linkages, and have a meaningful impact on people’s livelihoods.

It is with this background that the West Africa Regional Network, in partnership with several international organizations and the SAFNet, OSFAC, and Miombo networks, held its second meeting on Earth Observations and Environmental Change in Africa, from 12-16 November 2007 at the Department of Geography and Resource Development, University of Ghana, Accra.

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The meeting was opened by Paul Yankson (Geography Department of the University of Ghana), C. N. B. Tagoe (Vice Chancellor, University of Ghana), Hon. Andrew Adjei Yeboah (Deputy Minister of Lands Forestry and Mines, Ghana). Welcoming statements were provided by Michael Brady (Executive Director, GOFC-GOLD), Philippe Mayaux (GOFC-GOLD Vice Chair with Regional Network oversight) and Chiekh Mbow (UCAD).

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Each of the participants introduced themselves (listed in Appendix 1). Philippe Mayaux reviewed the agenda of the meeting. Following a brief discussion, the agenda was approved (Appendix 2).

### **1.1 Review of 2005 West Africa Regional Network Meeting**

A science review and synthesis multi-field and inter-institutional Workshop on the current state of knowledge, with regard to the sub-region's major resources, has been convened in Dakar from 17 to August 19, 2005, at Cheikh Anta Diop University Conference Centre (Presentation 1). A select group of researchers has been invited from West African countries to participate to the Workshop.

Cheikh Anta DIOP University of Dakar, Senegal (UCAD, Senegal) has initiated this meeting with the Centre for Global Exchange and Earth Observation of Michigan State University (MSU, USA) through a project on **the synthesis of the knowledge obtained on the long-term impacts of the environmental changes in West Africa**. This project, granted by the programme START (SysTem for Analysis, Research and Training), aims at identifying the factors structuring major dynamics of the Environment in West Africa, with a particular emphasis on the degradation of forest resources, water resources and the biodiversity, in the context of global change.

This synthesis of acquired knowledge has been realized through a regional, multi-field and inter-institutional Workshop held in Dakar from 17 to August 19, 2005 and which has gathered participants from West African countries.

The Workshop used the opportunity to build up a consensus for a **“West African Research Network on Remote Sensing and Global Change”**. The methodological approach was an iterative and participative process involving the various partners of the countries concerned. A questionnaire was prepared to collect information on the sets of working themes, the environmental problems perceived and the constraints of research with which West African scientists are facing with to answer the decision makers questions. The meeting recommended a quick off meeting for the network set up, to be held in Accra Ghana one year after Dakar. The Accra meeting was suggested to consolidate the research areas for a subsequent network on earth observation under the umbrella of the GOFC GOLD.

### **1.2 Meeting Objectives**

The 2005 Dakar Meeting workshop concluded with the establishment of a network mandate: “The Network will address specific constraints to the West African region in using Earth Observations and GIS technologies to address the pressing development and environmental problems of the region.” The initial objectives of the network included: (Presentation 2)

1. To develop a cadre of human and technical assets to make use of emerging GEOSS resources to the benefit of West Africa.
2. To address common regional challenges for sustainable development.
3. To support linkages and positive synergy within the region and with other relevant international networks and programs.

Cheikh Mbow identified the following activities to further the objectives established during the 2005 workshop. Those objectives were:

- 1) Design the structure of the network including the identification of National Focal points and network secretariat;
- 2) Update the inventory on priority scientific and resource management issues and the associated data and information needs;
- 3) Inventory of current research capacities (use of survey questionnaires to identify research and education programmes in West Africa);
- 4) Definition of starting projects for the Land Cover Change and Bushfires sub groups;
- 5) Define roles and responsibilities of partners; and
- 6) Identify specific sites (or transects) for long term surveys.

In addressing these objectives, the meeting was also to consider the experiences of the central and southern Africa regional networks. Finally, the meeting was to address network cooperation with related international programs including the land and fire implementation activities of GOFC-GOLD, as well as other networks (AfriFireNet, etc.) and international activities (GEO, etc.).

### **1.3 GOFC-GOLD Organization**

Michael Brady provided an overview of GOFC-GOLD and the Regional Networks. Further details are in Presentation 3 (a complete list of presentations is in Appendix 3). The networks summary was based on the report of the 4<sup>th</sup> Regional Network meeting in April 2006, which can be viewed at [http://nofc.cfs.nrcan.gc.ca/gofc-gold/STB3\\_Report/GOLD\\_21.pdf](http://nofc.cfs.nrcan.gc.ca/gofc-gold/STB3_Report/GOLD_21.pdf).

It was also agreed that the meeting would identify action items during discussions and that these would form the basis for follow-up activities to the meeting. Actions are identified throughout the report and listed by responsible groups in Appendix 4.

GOFC-GOLD is a coordinated international effort to ensure a continuous program of space-based and on-the-ground forest and land cover observations for global monitoring of terrestrial resources and the study of global change. GOFC-GOLD is a network of participants implementing coordinated research, including demonstration and operational projects (Figure 1). GOFC-GOLD's vision is to share data, information and knowledge, leading to informed action and decision support. This effort is a long term process of building an improved match between observations, data products and user needs.

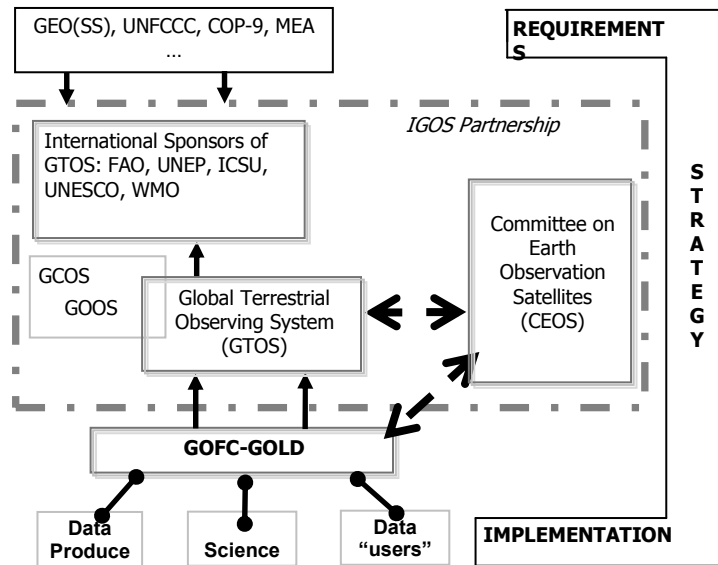


Figure 1. Context of GOF-C-GOLD within Earth Observation community.

Regional Networks are a critical component of the implementation of GOF-C-GOLD. There are seven Regional Networks collaborating with GOF-C-GOLD located in Asia, Africa and South America. A new Regional Network in East Asia is under development.

**Miombo** (Central and Southern Africa) was founded in 1995 under the auspices of the IGBP, LUCC and START. More than 40 scientists and natural resources managers are involved. Miombo's focus is on land cover activities.

**SAFNet** (Southern Africa) was initiated in 2000 during a GOF-C-GOLD regional network meeting. More than 60 members from 12 southern African countries participate in SAFNet's activities on fire.

**SEARRIN** (Southeast Asia) was initiated during the Manila workshop in 2000. Activities have involved more than 60 scientists and natural resources managers. SEARRIN activities include both fire and land cover.

**NERIN** (Eurasia) was initiated at the GOF-C-GOLD Boreal Forest workshop in Novosibirsk, Russia in 2000. It has over 50 scientists and natural resources managers involved in fire and land cover activities.

**REDLATIF-Fire** is a Latin American network based around interest in a regional burned area project. REDLATIF has recently initiated land cover activities.

**West Africa** network had initial discussions focused on land cover and is now discussing a joint collaboration with fire. The initial workshop took place in 2005.

**Central Africa** network was initiated at the GOF-C-GOLD regional workshop in 2000. This network is linked to the GIS/RS lab at the University of Kinshasa, and is focused on land cover with some fire activities.

**East Asia** network focuses on both land cover and fire. The initial workshop was in 2005 and a follow up meeting took place in Mongolia in June 2006.

Regional Networks provide the interface between the panel and national level data users and needs (Figure 2).

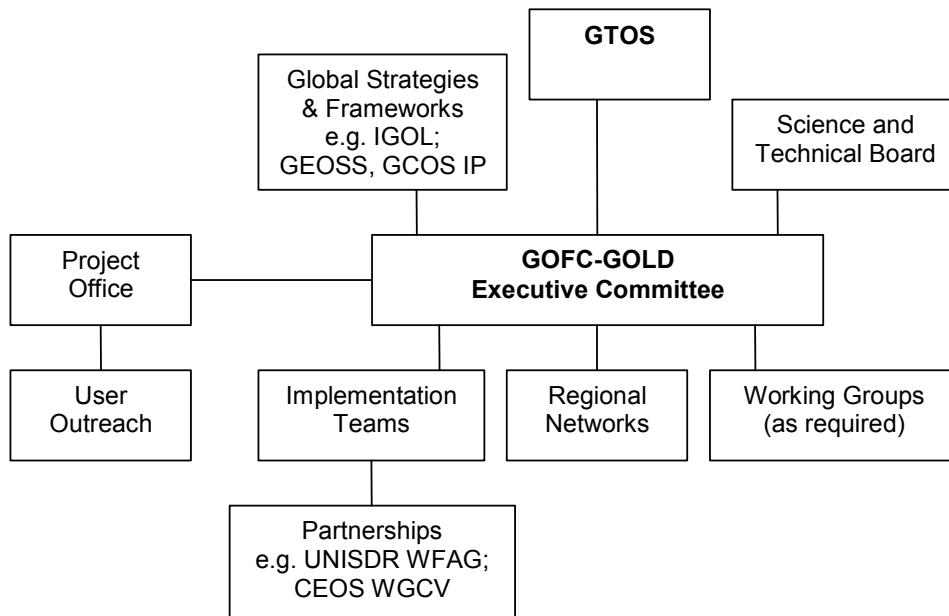


Figure 2. Regional Networks within the structure of the GOFC-GOLD panel of the Global Terrestrial Observation System (GTOS).

### Strategic Guidance for Regional Networks

To assist the regional networks, the GOFC-GOLD Scientific and Technical Board and Implementation Teams have recommended the following guidelines, which are explained below:

1. Amongst others, adopt the goals and functions of GOFC-GOLD
2. Establish membership throughout region
3. Minimize duplication with other networks in the region
4. Develop outreach strategy and promote achievements for mutual benefit
5. Become knowledgeable of GOFC-GOLD EO approaches
6. Maintain inventory of regional data sets and maps (land/fire)
7. Establish network structure and planning mechanisms
8. Articulate regional and national needs for EO information, advisory support and capacity strengthening
9. As able, participate in both GOFC-GOLD themes and IT activities, and ensure their relevance to the region.
10. Maintain regular communication with members, ITs and Executive Committee.

11. Define support required to strengthen network and participate in activities to foster such support, including joint proposals.

The background and link to the GOFC-GOLD functions are explained below for each of the guides.

#### Guide 1 - Amongst others, adopt the goals and functions of GOFC-GOLD

GOFC-GOLD is a coordinated international effort to ensure a continuous program of space-based and on-the-ground forest and land cover observations for global monitoring of terrestrial resources and the study of global change. It is a panel of the Global Terrestrial Observing System (GTOS). By promoting and supporting participation on implementation teams and in Regional Networks, GOFC-GOLD encourages countries to increase their ability to measure and track forest and land cover dynamics.

GOFC-GOLD conducts pilot projects and develops products at regional and global scales in two thematic areas: Land Cover Characteristics and Change; and Fire Monitoring and Mapping. The 1999 Strategy was revisited in 2005 to ensure the global systematic collection of observations of land cover and fire. There are nine key GOFC-GOLD functions:

1. Specifying requirements for products.
2. Assessing algorithms and data assimilation procedures.
3. Ensuring the availability of observations.
4. Harmonization and the development of protocols and standards.
5. Ensuring that operational products meet accuracy requirements.
6. Capacity building and the role of Regional Networks.
7. Creating GOFC-GOLD products and services.
8. Providing information to support international assessments.
9. Advocacy role, especially in relation to the continuity of observations and validation.

The last function of advocacy is a particularly important role for the Regional Networks as EO issues and constraints to their use are likely to be different in each region and can be addressed effectively through regional cooperation. An example of an advocacy activity is the leadership role GOFC-GOLD is playing in the development of the Global Earth Observation System of Systems (GEOSS). In particular, in the work plan of the Group on Earth Observations (GEO) GOFC-GOLD contributes to a task, which advocates for establishing continuity for near real-time, 30-m (or better) resolution, multi-spectral remote-sensing coverage everywhere on the Earth's surface, including support for the launch of a Landsat-equivalent follow-on mission.

#### Guide 2 - Establish membership throughout region

Regional Networks provide the interface between the panel and national level data users and needs. Thus it is important to establish national members throughout a region. National points of contact and participants will enable a robust identification and prioritization of regional requirements, needs and issues, such as improved data provision and access, product evaluation and validation, and training courses.

While the outcomes of Regional Networks should be based on the overall goals of GOFC-GOLD, the priorities should arise from the needs of regions as identified by members of the Networks. For some regions there may be more need for enhanced delivery of land cover products, whereas

in others the priorities might be fire products. Some regions may choose to have separate land cover and fire organizations or may wish to combine both in a single network structure.

Analysis of the needs and constraints of each network indicates that while the Networks have some areas of common interest, many have unique needs based on differing geography and national circumstances (Table 1).

Table 1. Comparison of needs\* of GOFC-GOLD Regional Networks.

Need	GOFC-GOLD Regional Network				
	Miombo	NERIN	OSFAC	SAFNet	SEARRIN
Training and capacity building	✓	✓	✓	✓	✓
Adequate funding for administration and programs	✓	✓	✓	✓	✓
Standardization of monitoring mechanisms and systems used in the region	✓	✓	✓	✓	✓
Improved access to EO data	✓	✓	✓	✓	✓
Improved dissemination to national and sub national levels			✓	✓	✓
Improved product validation based on standardized protocols		✓		✓	
Stronger program and scientific coordination with implementation teams	✓	✓			
Improved Internet access and capacity	✓		✓		
Better understanding of other EO projects in the region			✓		✓

\*As indicated by Networks at 3<sup>rd</sup> Science and Technical Board meeting, 19-22 April 2005, Beijing, China.

Guide 3 - Minimize duplication with other networks in the region

The GOFC-GOLD Regional Networks collaborate with several other key international organizations and programs related to earth observations. Where possible the Regional Networks should also form strategic partnerships with other networks and organizations, which share at least some of the goals of the organization, including START and the IGBP Regional Network. For example, the current GOFC-GOLD Regional Networks have established numerous partnerships and working relations (Table 2).

Table 2. Status of GOFC-GOLD Regional Networks, including international linkages.

Regional Network	Countries included	Status	International linkages	Website
Miombo Network	Angola, DR Congo, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe	The Miombo Network was founded in 1995 under the auspices of the IGBP, LUCC and START. National level activities in: Malawi, Mozambique, S. Africa, Tanzania, Zambia and Zimbabwe involving over 40 scientists and natural resources managers.	IGBP, WWF-SAPRO, IUCN, ROSA, SADC RRSU, UNFCC, NASA LCLUC, MEA, regional NGOs, START	<a href="http://www.miombo.org/">http://www.miombo.org/</a>
NERIN	Russia, Ukraine, others under development	Initiated at the GOFC-GOLD Boreal Forest workshop in Novosibirsk, Russia, 2000. Over 50 scientists and natural resources managers involved.  Developing points of contact in the region.	Russian Federal Forest Agency, NASA, START	<a href="http://www.fao.org/gtos/gofc-gold/net-NERIN.html">http://www.fao.org/gtos/gofc-gold/net-NERIN.html</a>
OSFAC	DR Congo, Congo (Brazzaville), Cameroon, Gabon, Central African Republic and Equatorial Guinea	Initiated at the GOFC-GOLD regional workshop in 2000. Network linked to GIS/RS lab at the University of Kinshasa.	CBFP, WSSD, COMIFAC, US, EU, regional NGOs, START	<a href="http://www.osfac.org/">http://www.osfac.org/</a>
SAFNet	Angola, Botswana, DR Congo, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe	Initiated in 2000 during a GOFC-GOLD regional network. SAFNET has over 60 members from 12 southern African countries.	IGBP, UNEP – DEWA /GEF, BGCC, regional NGOs, WWF, AWF, APINA, UNFCCC, IPCC, GFMC, AEO-II, START	<a href="http://safnet.umd.edu/index.asp">http://safnet.umd.edu/index.asp</a>
SEARRIN	Thailand, Indonesia, Malaysia, Philippines, Vietnam, Laos, Cambodia	Initiated during the Manila workshop in 2000. Activities have involved over 60 scientists and natural resources managers.  Conducts research on LUCC and Forest Fire.	IGBP, IHDP, CGIAR, UNDP-GEF, Asia Pacific Network, START	<a href="http://www.eoc.ukm.my/searrin/">http://www.eoc.ukm.my/searrin/</a>
East Asia	China, N. Korea, S. Korea, Mongolia, Japan	Initiated during the GOFC-GOLD third STB meeting in 2005. Network under development.	START	
REDLatif		Under discussion, with initial focus on fire monitoring.		



#### Guide 4 - Develop outreach strategy and promote activities for mutual benefit

To be effective the Regional Networks must provide benefit to their member countries. An outreach strategy and plan is thus essential. An example of outreach is the key function of GOF-C-GOLD to ensure the availability of observations through the use of data information systems and services (DISS).

Other examples of outreach include the establishment of regular contacts with national agencies for training, development of regional protocols and cooperation, user needs assessments, etc.

Regional use of GOF-C-GOLD products should be increased by Regional Networks:

- using web sites (e.g. links to GOF-C-GOLD-Fire and land cover websites);
- establishing regional data dissemination nodes;
- encouraging standardization and harmonization of regional products;
- hosting outreach workshops with regional practitioners and decision makers; and
- coordinating regional capacity building and user training.

The Networks can also promote lateral transfer of technology between countries within the region and between regions through training and workshops.

#### Guide 5 – Become knowledgeable of GOF-C-GOLD EO approaches

Regional Networks should become knowledgeable of GOF-C-GOLD EO approaches and determine their application within the context of their regional conditions. The most basic approach includes specifying requirements for land cover and fire products. Examples of requirements at the global level include the 1998 GOF-C-GOLD reports three and four, which outline the design strategy for coarse and fine resolution products. The GCOS adequacy reports with a focus on Essential Climate Variables (ECVs), and the Implementation Plan outline further product requirements (Table 3). Other resources available to Regional Networks include the UNFCCC/SBSTA research and systematic observations; and several GEO work plan tasks.

Table 3. GOF-C-GOLD Product Specifications for Terrestrial ECVs.

Variable	Product
Land cover	Land cover 250 m
	Land cover change 10 m
	Land cover change history
	Vegetation continuous fields
Fire disturbance	Active fire
	Burnt area
	Fire radiative power

Other approaches developed by GOF-C-GOLD include procedures for harmonization of map products (e.g., Land Cover Classification System, FAO) and the development of procedures for global classification validation (e.g., Best Practices Guide, Strahler et al) and validation procedures for vegetation continuous fields starting (Hansen et al 2006).

Approaches including specifying requirements and best practices are included in the Report Series in the Document pages on the GOF-C-GOLD website (<http://www.fao.org/gtos/gofc-gold/>).

#### Guide 6 - Maintain inventory of regional data sets and maps (land/fire)

A key function of GOF-C-GOLD is to ensure access to data sets and maps at the global and regional levels. This includes the provision of and access to the following Global Forest and Land Cover Datasets and Projects:

- AVHRR Global Potential Land Cover Products
- Continuous Fields Tree Cover Project AVHRR
- Continuous Fields Tree Cover Project MODIS
- GISS Global Vegetation Data Set
- Global Land Cover Map for the Year 2000 (GLC 2000)
- Global Land Cover Characterization Program (GLCCP& IGBP DISCover)
- Global Forest Resources Assessment (FRA 2000)
- Global Boreal Forest Mapping Project (GBFM)
- Global Rain Forest Mapping Project (GRFM)
- Global Potential Vegetation Data Base
- International Satellite Land Surface Climatology Project (ISLSCP)
- ISCGM Global Mapping Project
- MODIS Land Cover Products
- MURAI & HONDA World Vegetation Map from UNEP/GRID
- NASA Landsat Pathfinder Humid Tropical Forest Inventory Project (HTFIP)
- USGS Global Land Cover Characterization Program
- WCMC Global Forest Cover Data Set

The Regional Networks can support such access by providing electronic links to the GOF-C-GOLD websites. They can also maintain inventories and portals for regional and local data sets and map products.

#### Guide 7 - Establish network structure and planning mechanisms

The guiding principle in the organization of GOF-C-GOLD is to take maximum advantage of existing organizations and capabilities and create a minimum of bureaucracy to meet GOF-C-GOLD objectives. This principle applies as well to the Regional Networks.

An example for the Regional Networks to consider when establishing their own structure is the GOF-C-GOLD Executive Committee. This is a small, active group of volunteers that takes the important actions necessary to ensure that the panel continues to make progress toward its objectives. The committee meets once per year in person and monthly through teleconferences. Between meetings, members maintain frequent contact by list server, email, and phone. The Executive Committee:

- works to form partnerships which lead to the initiation of project activity;
- helps to arrange sponsorship of projects;

- monitors program and project implementation and progress;
- ensures availability of project outputs and results;
- reviews proposals for inclusion in GOF-C-GOLD against clearly stated criteria; and
- creates short term teams to address specific issues.

#### Guide 8 - Articulate regional and national needs for EO information, advisory support and capacity strengthening

Regional Networks provide the interface between the panel and national level data users and needs. As such, the Regional Networks articulate and document regional earth observation requirements including:

- observations (measurements);
- derived products and their associated accuracy requirements;
- distribution systems; and
- regional data policy issues.

Regional Networks can also identify regional and national EO needs and requirements for capacity strengthening.

Guide 9 - As able, participate in both GOF-C-GOLD themes and IT activities, and ensure their relevance to the region

#### Land Cover Characteristics and Change Theme

The Land Cover Characteristics and Change theme promotes the use and refinement of land cover data and information products for resource managers, policy makers, and scientists studying the global carbon cycle and biodiversity loss. GOF-C-GOLD has proposed a program of coarse resolution earth observations, fine-scale land cover mapping, and integration with in-situ observations on global scales.

The Land Cover theme is carried out by an implementation team that works with the GOF-C-GOLD Regional Networks to secure acquisition of quality land cover data and interacts with users and regional experts for the development and implementation of mapping standards, data assimilation, and product dissemination. The Land Cover Implementation Team maintains a website, which is updated regularly (<http://www.gofc-gold.uni-jena.de/>).

#### Fire Mapping and Monitoring Theme

The Fire Mapping and Monitoring theme focuses on refining international requirements for fire-related observations and making the best possible use of fire products from existing and future satellite observing systems to support fire management, policy decision-making, and global change research. Key goals are to ensure enhanced operational fire monitoring from space and ground measurements, better access and use of data, and standard products of known accuracy.

The Fire theme is carried out by an implementation team that works with the GOF-C-GOLD Regional Networks to bring together fire data providers and users to exchange information on capabilities and needs and to promote strengthening of regional and national fire activities.

Activities include assessing algorithms and data assimilation procedures (e.g., Global Geostationary Active Fire Monitoring Capabilities); creating products and services (e.g., Global Fire Danger Rating System); and providing information to support international assessments (e.g.,

Millennium Ecosystem Assessment). The Fire Implementation Team maintains a website, which is updated regularly (<http://gofc-fire.umd.edu>).

The Regional Networks participate in the Land Cover and Fire Teams by:

- refining user requirements;
- developing regional harmonized products;
- assisting in validation of products;
- assisting in the design and evaluation of data delivery systems;
- identifying regional and national GOFC-GOLD contributory projects;
- assisting with GOFC-GOLD project implementation;
- evaluating observing subsystems with an emphasis on forest and fire management; and
- providing an interface to national and regional operational users.

The Regional Networks evaluate the utility of global land cover and fire products for regional use (e.g. for regional assessment, national reporting, and natural resource/fire management) by:

- participating in regional product inter comparison and validation initiatives by providing local expertise; and
- providing feedback to producers.

Guide 10 - Maintain regular communication with members, ITs and Executive Committee

The Regional Networks maintain a roster of active members and communicate with members on a regular basis. Face to face meetings should be held at least once a year. Members can receive information about the activities of the GOFC-GOLD Executive Committee and Implementation Teams, which are regularly posted on the respective websites.

Representatives of the Regional Networks are regularly invited to participate in thematic and strategy meetings and workshops organized by GOFC-GOLD. Some resources have been secured to assist with travel support to ensure participation.

Guide 11 - Define support required to strengthen network and participate in activities to foster such support, including joint proposals

The Regional Networks must identify and communicate the resources and support required to strengthen their programs. This information is important for joint planning and proposal development for activities addressing both global and regional issues.

## **2. Experience and Insights of Other Regional Networks in Africa**

For consideration in initiating the West Africa Regional Network the experiences of regional networks from Central and Southern Africa were reviewed, including the SAFNet, Miombo and OSFAC Networks.

### **2.1 Southern Africa Fire Network**

M.S. Gamedze of Swaziland explained the lessons learnt from the Southern Africa Fire Network (SAFNet) (Presentation 4). The Southern Africa Fire Network (SAFNet) was initiated in 2000 during a GOFC-GOLD regional network meeting. It is an activity of The Botswana Global

Change Committee (BGCC) More than 60 members from 12 Southern African countries participate in SAFNet’s activities on fire.

The goal of SAFNet is to achieve more effective and appropriate fire management policies and practices in southern Africa – through the use of remote sensing, GIS and other geospatial information technology. Specific objectives include:

- To increase information on fire issues through research and to raise public awareness as well as inform policy makers on issues of fire and the value of geospatial information in fire control.
- To communicate regional fire needs at an international level.
- To collate and disseminate regional fire information, data and best practices for field observations.

SAFNet focuses on 4 key areas of fire management: (Team leaders in parenthesis)

1. Institutional/policy issues of fire (Kolethi Gumbo – Forestry Commission for Zimbabwe)
2. National to Regional fire monitoring (Ceba Mtoba & Tshepo Malatji – DWAf South Africa)
3. Satellite-based fire information products (Philip Frost – South Africa)
4. Capacity building and training (Opha P. Dube – Botswana)

SAFNet’s growth is dependent upon its links with existing programs and activities in other organizations. Figure 3 illustrates SAFNet’s relationships with other organizations.

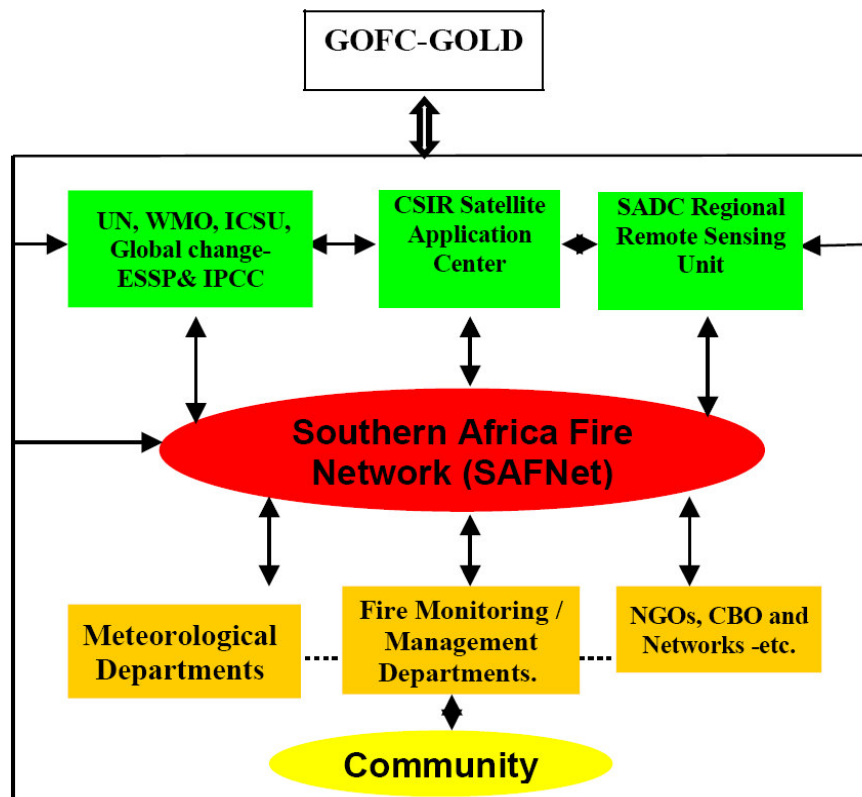


Figure 3. SAFNet and its external network

GOFC-GOLD has supported SAFNet from 2000-2006 with seed funding as well as supporting participants to SAFNet meetings. Due to lack of funding all SAFNet initiatives remain only partially fulfilled.

## **2.2 *Miombo Network***

Dominick Kwesha from Zimbabwe presented the experience of the Miombo Network (Presentation 5). The Miombo Network covers Central and Southern Africa and was founded in 1995 under the auspices of the IGBP, LUCC and START. More than 40 scientists and natural resources managers are involved. Miombo's focus is on land cover activities.

## **2.3 *OSFAC Network***

Nsoyuni Ayenika Lawrence of Cameroon presented the experience of the Central African Regional GOFC-GOLD Network (OSFAC) (Presentation 6). The Central Africa network was initiated at the GOFC-GOLD regional workshop in Libreville, Gabon in 2000. This network is linked to the GIS/RS lab at the University of Kinshasa, and is focused on land cover with some fire activities.

OSFAC's vision is to promote the rational use of Earth Observation data to meet the forest information requirements of Central African Countries. Its current activities are to:

- Present GOFC concept to organizations, institutions and individuals in the region who are concerned with operational forest inventory and monitoring.
- Identify institutions able to contribute to GOFC activities and GOFC pilot projects.
- Develop recommendations to CEOS partners on user-requirements for data and information resources.

As other regional networks begin to form, OSFAC looks back and reflects on some important lessons they wish to pass on:

- Firstly, develop a clear regional structure, constitution and operational modalities.
- Legalize the organization regionally and nationally.
- Identify funding sources; strengthen existing ties with the Congo Basin Forest Partnership.
- Improve collaboration with GOFC-GOLD and partners.

## **2.4 *Synthesis of the Organizational Structure and Functions of Existing GOFC-GOLD Regional Networks in Africa***

- The operational structure SAFNET has coordination, national contact persona and local area leaders/personnels.
- The chair for the political committee (COMFAR) is rotational, hosted for 2 years in one country and the networks act as an advisory board.
- The regional networks provided innovative/dynamic and adaptive mechanisms for addressing unique regional challenges.
- Operational mechanism was based on participatory, selfless and volunteer leadership

### **Funding**

- All the networks are unsustainable in funding
- GOFC GOLD is providing most of the assistance
- Funding is still a major problem; it is spontaneous and relies on proposals.
- Funds raised are used to pay volunteers.

## Language and communication

- Language is not a problem in Central Africa
- Information/data on their website is accessible in both English and French.
- In Mozambique and Angola where there is a language barrier because of Portuguese, but the rest of the southern African nations use English.

## Conclusion

- Each Network is unique and responds to the scientific research agendas of the respective sub-region region.

## 3. 3. Review and Update of Network Thematic Issues in West Africa

With a view to providing an update and review, the meeting discussed in detail the following key thematic issues important in West Africa: forest management, land degradation, fire and rangeland management, Carbon issues, urban sprawl, and water resources and coastal zones management.

### 3.1 Forest Management

Von V. Vordzogbe of Ghana presented the Highlights of Fire Risk Mapping and Fire Danger Rating in Ghana (presentation 7). The Fire Danger Index in Ghana used Ghana Atomic Energy Commission Land (GAEC) to conduct experiments. The land cover used in the experiment was ‘grassy with sparsely scattered woody species’ usually a thicket or grassy area.

The study determined that during the morning and evening, the thicket had a higher FDI rating than the grassy area (44 to 41 and 47 to 44 respectively) but in the afternoon the grassy area had an FDI of 63 compared to the thicket’s 58. (See Table 5) The calculations were based on EnviroNET Solutions Fire Danger Rating system, which utilizes temperature and relative humidity levels to determine Burning Index (BI) then adding the wind correlation factor to compute FDI.

Table 4. Results of the FDI study on GAEC land.

	Fire Danger Rating (FDI)	
	Thicket	Grassy area
Morning	44	41
Afternoon	58	63
Evening	47	44

In addition, Dominic Blay of Ghana discussed the African Forest Research Network (AFORNET) Fire Impact Project. Francis A. Balfour of Ghana described Forest Risk Mapping.

## Synthesis/Comments

- A number of on-going projects were discussed in participating countries (Table 4)
- Experiences from previous studies should be harnessed to help in streamlining the WARN
- Data already collected could be used by the Network
- Different activities were designed in the various projects to achieve desired results.
- Landsat MSS images (30m resolution) was used in most cases
- Most projects did not employ any real time monitoring and field validation of test sites

The overall objective was to reduce fires through following components.

- Awareness creation
- Use of fire in farming
- Fuel treatment
- Fire detection and communication
- Suppression/fire fighting

Table 5. List of on-going projects in the respective countries

<i>Country</i>	<i>List of Projects</i>	<i>Implementing Agencies</i>	<i>Donors</i>
Ghana	1. Sustainable Forest Management Categories: (i) protected forest, (ii) timber production (iii) convalescence (iv) reforestation 2. Wildfire Management (i) TBFM (ii) FORM (completed)	1. FC/FSD with key stakeholders: MOFA, KNUST, GNFS, EPA, FORIG  2. RSMC of FC, FORIG	Royal Netherlands Govt., GOG and ITTO  ITTO, Ghana Govt, German Govt
Senegal	Forest Management 1. Forest in the South of South East Savannah of wetlands) 2. Sub-regional project for combating fire, regional fire alert, project on water resources	Environment Ministry (CSE, DEFCCS and UCAD)	Govt. of Senegal and International Funding
Niger	1. ROSELT 2. Wildfire management: protocol on bushfire (Sahelian African Protected Ecosystems)	1. Biology Plants Dept, Observatory Sahel of Sahara 2. Ministry of Environment	
Gambia	Forest Management	Dept. Of Forestry	FAO, GTZ and UNEP



### **3.2 Land Degradation, Fire and Rangeland Management**

Albert Allotey of Ghana discussed the USGS LU/LC Eco-regional classification and land change detection. Amidou Traore of Mali presented on the disappearance of surface water; dune stabilization; fire presentation, and community-based resource management (Presentation 8). Papa Ndiaye of Senegal explained the National Fire Prevention Strategy. Ahmed Balogun of Nigeria described the comparative analysis of different algorithms in fire detection using TRMM/VIRS data.

#### **Key Observations:**

- Example of biomass (rangeland) monitoring in Senegal (quantity, type, life cycle), with information communicated to herders;
- Importance of ground truthing in land degradation research;
- Human dimensions – Do we understand the physical nature of degradation; do we know how to measure it; can we communicate the significance to policy makers; do they understand and can take action?

#### **Key Research Issues**

- Land cover analysis/land cover change detection
- Surface water monitoring
- Fire
- Protection/restoration efforts

#### **Identified Challenges for the Network Members:**

- Harmonization:
  - Analytic methods
  - Classification schemes;
- Data archiving/availability:
  - Data are not available in National archives
  - Aghrymet (and others) have important datasets – how to access?
- Human Resources/Capacity-Building:
  - Retention maybe more important than training;
  - Training at level of technician has been overlooked

#### **Identified Network Tasks:**

- Inventories of:
  - Scientists (by thematic group & country)
  - Training and degree programs
  - Regional measurement and monitoring activities
- Establish a methods panel to identify best practice guidelines for different types of analysis

### **3.3 Carbon Issues**

Ali Mahamane and Saaou Mahamane of Niger presented on Réseau D'observatoires et de Surveillance Ecologique A Long Terme Au Niger (Presentation 9).

Dominic Blay of Ghana presented on the African Forest Research Network (AFORNET) (Presentation 10). Current forestry knowledge remains weak. This is due to a lack of public spending constrained by macro-economic challenges faced by African countries, ranging from rapidly urbanizing populations and health crisis.

AFORNET is a network of individual scientists who are active in tree and forest research in Africa. The network helps improve collaboration and access to research resources. Its main objective is to contribute to the social and economic well-being of African people through sustainable management of tree and forest resources that is supported by high quality research.

AFORNET offers two competitive, merit based, and peer reviewed research grant programs.

1. The young scientist program targets scientists in the early stages of their career to help them acquire essential skills and qualification needed to undertake quality research.
2. The Thematic Research program targets teams of senior scientists from at least two African countries. It aims at fostering collaboration across political and institutional boundaries, to capture economies of scale, and prevent duplication of effort.

The shortage of researchers poses a serious threat to Africa's innovative strength, knowledge capacity and productivity growth. Thus, building the capacity of the individual scientists is paramount.

Since 1991 over 200 grants have been awarded, resulting in over 150 Master's and Doctorate level graduates. On average an additional 15 other persons benefited from each grant awarded, while almost half of the grantees obtained additional research funding as a result of their experience with AFORNET.

Brent Simpson of the USA provided an Overview of Global Carbon Market (Presentation 11). Climate change is a recognized threat. All governments have signed the Framework Convention on Climate Change. Mechanisms such as the Kyoto Protocol have been a powerful force in raising awareness and helping to set emission reduction targets. Figure 4 shows the increasing global temperature and CO<sub>2</sub> concentrations since 1880.

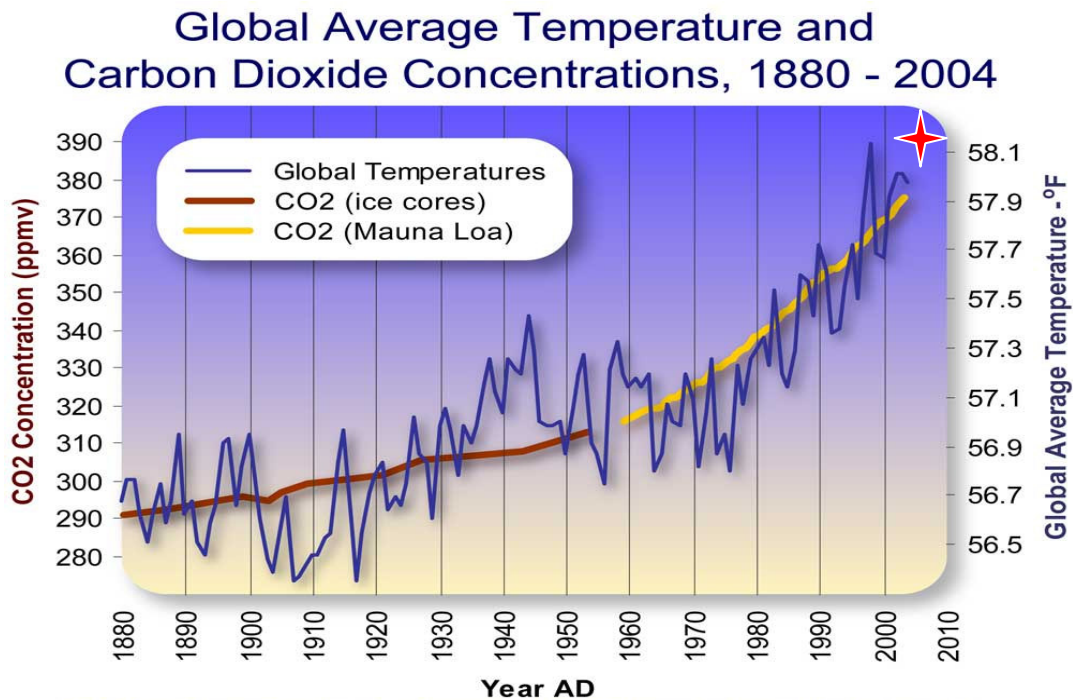


Figure 4. Global Average Temperature and Carbon Dioxide Concentrations, 1880 – 2004.

There are two possible ways to reduce greenhouse gas emissions:

- Emission reduction: switching to better technologies with lower emissions.
- Off-setting by sequestration: biotic uptakes from the atmosphere. (ie. Tree planting)

Carbon trading is the process of governments setting overall emission levels that are then passed down to specific industries and companies. Companies who cannot meet targets can buy offsets, and efficient companies who reduce emissions below target levels can sell their 'credits'. (Sellers can also be bio-based sequestration projects)

There are two types of markets for carbon trading:

- Compulsory, driven by Kyoto and established as a formal exchange.
- Voluntary, driven by companies who want to reduce carbon risk and invest in sequestration projects.

Carbon markets can also help in reducing poverty, now that carbon is a commodity that can be grown on farms. Rural farmers can promote conservation practices while also benefiting from carbon sales. However, there are some issues surrounding this: carbon buyers need to know they are buying real carbon sequestration, while carbon sellers need to learn both: a) what land management practice will maximize their income and carbon benefits and b) how to account and report the carbon they have.

### **Key points/Observations**

- Lack of information on carbon emissions or stock is posing a serious challenge for researchers on carbon issues across Africa.
- There are a number of on-going country-level initiatives on carbon research at various stage/levels in some countries e.g. Senegal and Mali.
- Absence of existing data on carbon emissions.
- Baseline studies on available carbon are important for any studies of carbon emissions in any country
- Possible sources of funding for research include the World Bank.
- United States is looking for partners in carrying out pilot projects aimed at generating data on carbon sequestration in East Africa.

### **Key Research Issues**

- Development of required parameter indices at country level
- Need to harmonize methodologies on the studies of carbon sequestration or for the measurement of baselines of carbon sequestration.
- Biomass emissions and impacts on human health

### **Identified Challenges for Network members**

- Need for capacity building in carbon emission calculation methodologies.
- Network to dedicate subsequent meetings to developing methodologies to capture carbon stock across Africa, in the mean time, researchers could still adopt methodologies such as the Honduras methodology. This may require some modification for country- specific applications
- Sharing of data and research findings amongst network members

### **Network tasks/ way forward**

- Start a CDM Project to develop required parameters/indices for purposes of carbon sequestration.
- Provide assistance for the network member countries to generate data on carbon emissions

- Initiate baseline data/information and further studies in determining biomass emissions (carbon stock). Such data could be made available to all members of the network.
- Identify and implement mechanisms for sharing of data/research findings amongst members
- Organize future workshops to harmonize standards and methodologies

### 3.4 Urban Sprawl

Richard Kofi and Paul Yankson of Ghana presented on monitoring urban growth; urbanization of the fringe areas of Accra (Presentation 12). The area of Accra has been growing at a rapid pace (4% per annum) since 1984 but no spatial information existed to track the urban sprawl. Landsat-TM satellite imagery was used to generate land cover maps of Accra and surrounding areas, and then compared with satellite-based maps from 1985 and 1991. The results showed remarkable physical growth of the urban areas. (Table 6 displays the results) Urban sprawl had increased in 2002 to 25 km<sup>2</sup>/year compared with 10 km<sup>2</sup>/year in 1991.

Table 6. Urban growth between 1985 and 2002 based on satellite-derived maps.

Label	Year	Total area (km <sup>2</sup> )	Growth in period (km <sup>2</sup> )	Yearly growth in period (km <sup>2</sup> )
Urban	1985	216	-	-
Urban	1991	276	60	10
Urban	2002	555	279	25
Transition + Urban	2002	751	196	-

A number of implications can be attributed to this fast pace of growth:

- Areas are being converted to urban use without any prior development plan and without a corresponding investment in infrastructure.
- The results of the poor land management are urban areas with inadequate provision of services and infrastructure, and with a corresponding inaccessibility that may prove very costly to resolve.
- Environmental impact and other dangers. (ie. urban encroachment into forest land around cities, haphazard development with houses often standing on access roads and waterways)
- Creation of land markets characterized by rapidly rising land prices, multiple sales of land and delays in land documentation and associated fraud.

Ahmed A. Balogun of Nigeria discussed observations of the urban heat island over Akure, Nigeria (Presentation 13).

### **Synthesis/Matters Arising**

- Urban explosion a major problem in West African countries. The role of urban planners, governments, environmental scientist and researchers is critical to solving the problem using measurement, modeling, remote sensing and GIS.
- The impact of urbanization on space and societies
- The urgency to tackle the problems of urbanization
- The need for operational products for managing cities
- What variables to choose for understanding and studying urban problems/kinds of methodologies to use
- What indicators to look out for/means and access to data sources
- Documentation of case studies in respective West African countries key knowledge sharing and a guide to other studies

Two fold difficulties were identified namely:

- Patterns and influences of rurality on urban growth
- Genuine problems of modern city management

### **Key challenges:**

How do we solve the problem of urban explosion?

How do we link research with policy implementation?

- The need for planning infrastructure, equipments, services e.g. Remote sensing
- Tackle governance and managerial problems related to space activities
- Network should reach out to the grassroots.
- There should be an integrated and coordinated statement from the regional network to policy makers in the region regarding dissemination and implementation of research findings

### ***Water Resources and Coastal Zone Management***

Four brief presentations were made by participants on water resources and coastal zones management. These are summarized below.

### **Highlights of key Thematic/Science issues and Projects**

- Sub-regional inventories and Arcview for vegetation mapping
- Wetlands and biodiversity monitoring and management
- Degradation of coastal wetlands including erosion
- Coastal pollution including flood management
- Coastal Zone Vulnerability mapping
- Varying needs of maritime and landlocked countries

### **Data/Information Needs**

- Main data used are XS obsolete archival
- Need for near-real time data higher resolution data including radar
- Software
- Research capacities

### **Comments on regional data**

Kakari Edward, the CIDA-PSU Advisor on Environment and Natural Resource Management in Ghana pointed out availability of high resolution data in massive regional projects such as GCLME (Ghana); and the OKAVANGO Commission for Namibia, Botswana, etc.

### **3.6 Prioritization of Thematic Issues**

Participants agreed that the following four cross-cutting thematic issues are to be the priority focus of the West Africa Network:

- Bush fires and other disturbances
- Forest Management/Carbon Sequestration
- Water and Coastal areas (Coastal Zone area management)
- Urban Sprawl

It was also agreed that the network is to be structured around thematic working groups within and among participating countries, and NOT through a system of National Representatives.

## **4. Organizational Matters of the Regional Network**

The meeting addressed organizational matters of the West Africa Regional Network. Discussions focused on the following four topics: Capacity-building; Institutions, policies and international agreements influencing African environment; Network funding; and International Cooperation opportunities.

### **4.1 Capacity Building**

Philippe Mayaux of the EC led a discussion of data acquisition and capacity building, which included suggestions on contributions from GOFC-GOLD.

#### **Data Acquisition – Metadata**

- Data exist in various countries hence the need for network to push for systematic data harmonization, access and sharing.
- Need for a central data base
- Need to involve locals in data acquisition and ensure that they benefit from the exchange ground data that suite their needs.
- Need for joint projects.

#### **How do we deal with data inconsistency?**

- Gap filling for data consistency by external patterns.
- Need for joint publications
- Exchange of research findings for data of a specific area.

#### **Capacity Building**

A critical question was what capacities the WARN should seek to build? Delegates agreed that critical mass is a dynamic process hence the need for a consistent improvement of skills. Assessment of institutions reveals there is no critical mass. The reasons being

- Migration of trained personnel to non-related fields
- Lack of job satisfaction

#### **Suggestion for solution**

Any model on capacity building should embody the following

- Capacity requirements
- Capacity building
- Capacity keeping

## **Capacity Building**

- The need for a centre of excellence
- Coordination between regional networks
- The need to address linguistic barriers
- The need for a practical experience of what is learned

## **Contribution of GOFC-GOLD**

- The type of training should be based on the specific needs of individual countries
- Standardization of software's for trainees
- Integrate children at the lower levels of education to generate interest.

## **4.2 Institutions, Policies and International Agreements Influencing African Environment**

Aggrey Agumya of Ghana led a discussion by presenting on the institutions policies and conventions agreements in the African environment (Presentation 13). The key points of the presentation include:

Institutional & environmental policy initiatives at the regional level include:

- AU, NEPAD, CAADP, Frameworks for implementing CAADP
- African Ministerial Council for S&T (AMCOST)
- UNEP – Africa Environmental Outlook Process (GEOP)
- Global Monitoring of Environment for Sustainable development (GMES-Africa, €250m)
- Africa Monitoring of the Environment for Sustainable Development (AMESD)
- Forest Resources Assessment
- Millennium Assessment
- CBD, UNCC

Sub-regional agreements for trans boundary management of natural resources exist among:

- South Africa, Zimbabwe and Mozambique--national park;
- Zimbabwe, Zambia, Botswana and Namibia

## **Action Points**

The network needs to:

- Become better informed about the institutional and policy initiatives concerning environmental management at sub-regional and continental level.
- Identify how it can support implementation of these initiatives:
  - as part of its mandate;
  - to raise funds; and
  - to leverage capacity building opportunities.
- Convene a committee to review major protocols and recommend how the RN may implement them.

The network should aim to enhance the utilisation of its outputs in influencing policy by:

- strengthening the capacity of its members in communicating the outputs (packaging);
- involving government and other users in the development of its outputs (innovation system);
- at national level, play a coordinating role among ministries responsible for implementing initiatives that draw on geographical data; and

- seeking political endorsement (e.g. ECOWAS) to enhance its capacity to influence policy

### **4.3 Network Funding**

Michael Brady of Canada led the discussion by presenting on funding for the West Africa Regional Network (Presentation 14). The key points of the presentation and discussion include:

Mode of collaboration and nature of GOFC GOLD funding

- Membership of the West African Network can come out with clearly defined projects to take advantage of GOFC GOLD funding.
- Members also can develop their own projects with proposal for funding elsewhere.
- Projects must have some of the following criteria:
  - o Proposals must relate to the objectives of the sponsors
  - o Teamwork (i.e. inclusion of students engaged in research)
  - o Situated within the problem of the region
  - o In collaboration with AFRINET
  - o Brief breakdown of findings

GOFC GOLD financial/support to regional networks

- Member countries should bring a project that meets GOFC-GOLD requirements to give credibility.
- It is also very important for the RNs to share experience to enable them build their capacities on methodologies.

Presentation of proposals directly to GOFC-GOLD for funding or to the funding organizations

- GOFC-GOLD will give letters of endorsement to give assurance to such funding agencies.
- To obtain such endorsements proposal must meet the requirements of GOFC-GOLD.
- Regional level projects must similarly meet the standards at that region/level
- Some networks also have collaborations with Maryland University which has a strong collaboration with NASA
- Data can be obtained at reduced cost for research organizations.

Possibility to enhance access to foreign journals which demand subscription

- What GOFC-GOLD can do is to know what organizations want from that journal to be able to relate or coordinate with such journals to send those papers or articles that are expected. This is why it is necessary to develop contact.

### **Funding Organizations for the RNs**

The meeting participants identified the following organizations as sources of potential funds for regional network projects:

#### **Cameroon:**

- USAID through OSFAC
- European Union
- Geospatial Data Infrastructure (GSDI)
- International Federation for Science
- START

#### **In Ghana:**

- International Tropical Timber Organization (ITTO)
- GETFUND
- AFRONET (African Forestry Research Projects)
- Bilateral Agreements with some countries



- JICA
- GTZ
- CIDA

#### **South Africa**

- SAFNET
- FAO

#### **Senegal**

- IDIS
- French JEF
- GTZ
- UNDP
- DANIDA (Denmark)

### **4.4 International Cooperation Opportunities**

The meeting addressed network cooperation with related international programs including the land and fire implementation activities of GOFC-GOLD, as well as other networks (AfriFireNet, etc.) and international activities (GEO, etc.).

Regarding data availability, Philippe Mayaux of the European Commission explained the range of datasets available to the West Africa Regional Network (Presentation 17).

Brent Simpson of the USA explained the data available through the GOES and Landsat programs (Presentation 18). He provided specific details on existing inventories of Earth Observation data available at the Global Observatory for Ecosystem Services at the Michigan State University that can be assessed by Network partners. This covered data format and conditions of data availability, distribution, cost and terms of purchase. He also explained the types of international cooperation that exist, using an example from the Global Deforestation Project (Presentation 22).

#### **Topics for Cooperation**

Topics identified at the meeting for cooperation could include, among others:

- Identify current status of national land cover mapping and change monitoring in the region and relevant land cover change information needs in various regions of Africa.
- Land cover data and applications for fuel type and burned area mapping and monitoring.
- Participation in GOFC-GOLD land cover and fire product validation effort to develop Africa test beds for global validation, including local interpretation (regional experts) of high resolution imagery.
- Data information services and systems to improve data use and distribution through regional networks.

### **4.5 Summary of Organizational Issues**

#### **Capacity Building**

Data Acquisition – Metadata

- Need for a central data base
- Need to involve locals in data acquisition and ensure that they benefit from the exchange ground data that suite their needs.
- Need for joint projects

Dealing with data inconsistency

- Gap filling for data consistency by external patterns.
- Need for joint publications
- Exchange of research findings for data of a specific area.

Critical mass

It was generally agreed that critical mass is needed for a consistent improvement of skills. In the case of the Network, the discussions showed that there is no critical mass because of:

- Migration of trained personnel to non-related fields
- Lack of job satisfaction for trained personnel

Any attempt to solve the problem was to work with a model which addresses the three components of: Capacity requirements, Capacity building and Capacity keeping

### **Key issues of Capacity Building**

- The need for a centre of excellence
- Coordination between regional networks
- The need to address linguistic barriers
- The need for a practical experience of what is learned

### **Contribution of GOFC-GOLD**

- The type of training should be based on the specific needs of individual countries
- Standardization of software for trainees
- Integrating youth at the lower levels of education to generate interest.

### **Institutions**

A number of Global, Regional and Sub-regional Policy initiatives and agreements have been identified concerning environmental management to WARN objectives within and outside in the Region. The network needs to further become better informed about such initiatives. The network should also:

- Convene a committee to review major protocols and recommend how the RN may implement them
- The network should aim to enhance the utilisation of its outputs in influencing policy

### **Network funding**

Besides the major GOFC-GOLD funding mechanisms and sources including START and CFS, a list of other funding organizations and their operational mechanisms has been initiated for the benefit of Network members.

## **5. Network Principles and Functions**

### **5.1 Discussion and Synthesis**

#### **Thematic Areas/Groups**

Participants agreed that the Network is to function around the following four thematic areas:

- Bush fires and other disturbances
- Forest Management/Carbon Sequestration
- Water and Coastal areas, and
- Urban Sprawl

#### **Network Structure**

Participants also agreed on the structure for the Network (Figure 3). The structure will be implemented through Working Group or Task Forces within and among participating countries and NOT through National Representatives (Figure 5).

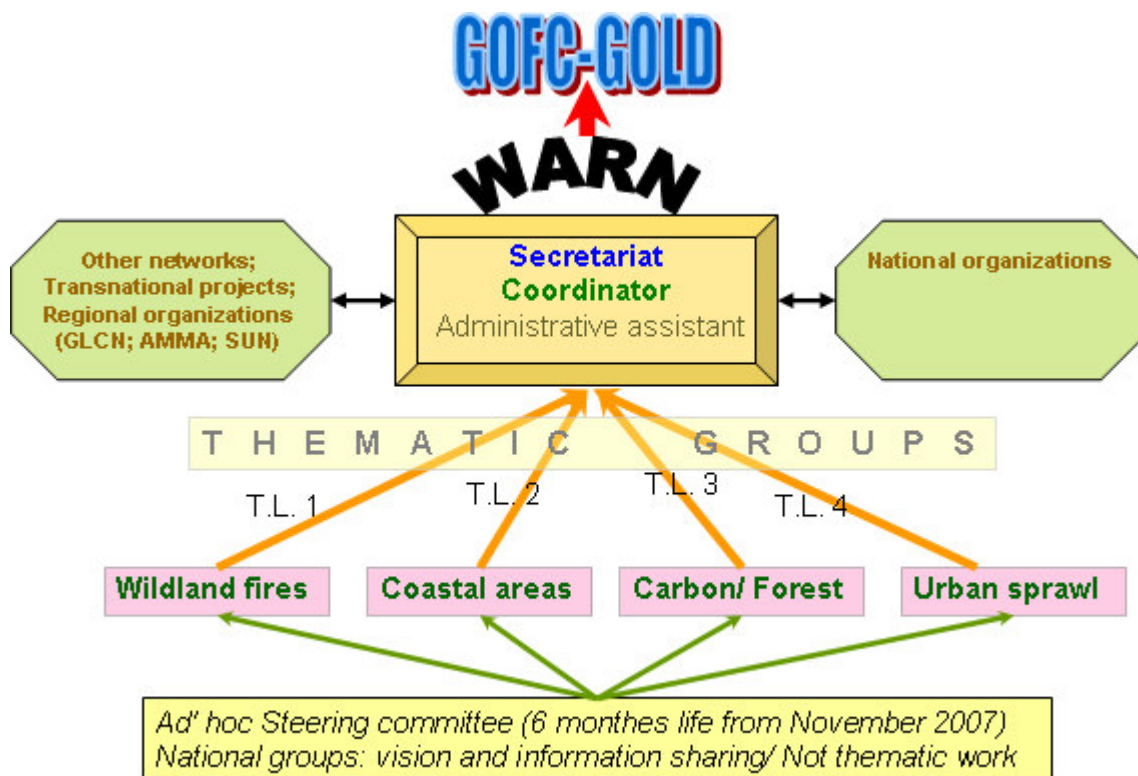


Figure 5. The structure of WARN showing the four thematic groups.

An Interim Steering Committee (ISC) made up of national volunteers (Table 5) was constituted to serve for a period of six months to develop research proposals based on the prioritized thematic issues. The working groups are to be convened over the months following the meeting to develop their research plans and activities.

## 5.2 Decisions of the Network- Designation of Network Coordinator and National Representative Members

### WARN Secretariat and Coordinators

On the basis of national consensus and the amount of work already done by the various countries the following proposals and volunteers from national representative members were accepted:

- WARN Secretariat: Dakar University Remote Sensing Laboratory (DURSL), Senegal.
- Network Coordinator: Cheikh Mbow
- GOFC-GOLD will provide support to the Secretariat by supporting workshops and travel
- The Workshop further agreed to establish an Interim Steering Committee (ISC) of National Volunteers (Table 7)
- The WARN coordinator in collaboration with thematic leaders and GOFC-GOLD will implement the recommendation of the ISC

### Mandate of the Interim Steering Committee

Duration: 6 months, from November 2007

Terms of Reference (TOR):

- to review and consolidate the vision and activities (Action Plan) of WARN
- to update inventories of activities/actions and set priorities
- Could seek further assistance from the wider network including sponsoring institutions/organizations
- To develop research proposals based on the prioritized thematic issues

Table 7. Membership of the ISC of the West Africa Regional Network.

#	Name	Country/Institution	Email
1	Dr. Ali Mahamane	Niger	<i>ali_mahamane@yahoo.fr</i>
2	Jean-Marie Gregoire	Italy-JRC-EC	<i>jean-marie.gregoire@jrc.it</i>
3	Amidou Traore	Mali	<i>amtraore22@yahoo.fr</i>
4	Dr. Ahmed Balogun	Nigeria	<i>abalogun99@yahoo.com</i>
5	Dr. Dominic Blay	Ghana	<i>dblay@forig.org</i>
6	Andre Bassole	GLCN	<i>abassole@fasonet.bf</i>

### **Suggestions for Effective Network Functioning**

The following suggestions were put forward to guide the effective functioning of the WARN:

- National coordinators as gatekeepers must not pose barriers to the functioning of the network.
- The structure should facilitate scientific research and the sharing of knowledge.
- As has been seen from experiences from existing networks in Central and Southern Africa, it was agreed that it is better to work on themes with task or team leaders specific to such themes.
- Network should function as a taskforce of scientists interested in specific themes of common interest at different times. Accordingly, the organizational structure should revolve around thematic leaders.
- Network functioning should not be identified with organizational hierarchies.
- Structure should be flexible.
- Structure must have primary links with GOF-C-GOLD.
- The Secretariat will act as an interface between donors, GOF-C-GOLD and team leaders.
- The Network should develop and build on dynamic and synergies with other existing Networks.

## **6. Workshop Recommendations**

The following is a synthesis of the workshop recommendations made by delegates in respect of Thematic Issues, Institutional Issues and Network Principles and Functions.

### **6.1 Thematic Issues**

#### **Forest Management**

- Experiences from previous studies should be harnessed to help in streamlining the WARN
- Data already collected could be used by the Network

#### **Land Degradation, Fire and Rangeland Management**

- Importance of ground truthing in land degradation research;

- Human dimensions including policy issues are equally important and should be incorporated into earth observation-based environmental research
- Identified Challenges for the Network Members include Harmonization of methodologies for analytic methods, classification schemes, data archiving/availability
- Whilst Human Resources/Capacity-Building is an important issues, retention of trained manpower maybe more important than training; equal attention should also, be given to training at level of technician
- The WARN should document inventories of Scientists (by thematic group & country); Training and degree programs and Regional measurement and monitoring activities
- The Network should work towards establishing a methods panel to identify best practice guidelines for different types of analysis

### **Carbon Issues**

- Lack of information on carbon emissions or stock is posing a serious challenge for researchers on carbon issues across Africa.
- There are a number of on-going country-level initiatives on carbon research at various stage/levels in some countries e.g. Senegal and Mali.
- Baseline studies on available carbon are important for any studies of carbon emissions in any country
- Development of required parameter indices at country level
- Research on biomass emissions should include impacts on human health
- Need to harmonize methodologies on the studies of carbon sequestration or for the measurement of baselines of carbon sequestration.
- Need for capacity building in carbon emission calculation methodologies.
- Network to dedicate subsequent meetings to developing methodologies to capture carbon stock across Africa, in the mean time, researchers could still adopt methodologies such as the Honduras methodology. This may require some modification for country- specific applications
- Sharing of Data/Research findings amongst members
- Start a CDM Project to develop required parameters/indices for purposes of carbon sequestration.
- Provide assistance for the network member countries to generate data on carbon emissions
- Initiate baseline data/information and further studies in determining biomass emissions (carbon stock). Such data could be made available to all members of the network.
- Identify and implement mechanisms for sharing of data/research findings amongst members
- Future workshops to harmonize standards and methodologies

### **Urban Sprawl**

- Urban explosion has become a major problem which needs to be tackled in West African countries. The urgency to tackle the problems of urbanization
- The role of urban planners, governments, environmental scientist and researchers is critical to solving the problem using measurement, modeling, remote sensing and GIS. The need for operational products for managing cities
- Documentation of case studies in respective West African countries key knowledge sharing and a guide to other studies
- Results of research findings should be appropriately/strategically packaged for the attention of policy makers.
- There should be an integrated and coordinated statement from the regional network to policy makers in the region regarding implementation of research finding

## **Water Resources and Coastal Zones Management**

- In spite of the varying needs of maritime and landlocked countries, delegates agreed that there is need to harmonize and standardize coastal zone research among affected member countries on wetlands and biodiversity monitoring and management; Degradation of coastal wetlands including erosion, coastal pollution including flood management and vulnerability mapping
- Main data used are Landsat XS which are in most cases archival and obsolete. Need for near-real time higher resolution data including radar. Network to explore availability of high resolution data in massive regional projects such as GCLME (Ghana); and the OKAVANGO Commission for Namibia, Botswana, etc.
- Need to strengthen research capacities of Network members
- Sub-regional inventories and Arcview for vegetation mapping

## **Prioritization of Thematic Issues**

The following key cross-cutting thematic issues have been identified and prioritized for the WARN

- Wildland fires
- Carbon/Forest
- Coastal Zone area management
- Urban sprawl

## **6.2 Institutional Issues**

### **Capacity-Building**

Data Acquisition – Metadata

- Need for a central data base
- Need to involve locals in data acquisition e.g. through joint projects to ensure that they benefit from the exchange ground data that suite their needs and also data standardization.

Key issues of Capacity Building

- In order to ensure the relevant critical mass needed for capacity building, intervention models should addresses the three critical components of, Capacity requirements, Capacity building and Capacity keeping
- The need for a centre of excellence
- Coordination between regional networks
- The need to address linguistic barriers
- The need for a practical experience of what is learned
- Migration of trained personnel to non-related fields
- Lack of job satisfaction for trained personnel

Contributions of GOFC-GOLD

- The type of training should be based on the specific needs of individual countries
- Standardization of software's for trainees
- Integrating children at the lower levels of education to generate interest.

## **Institutions, Policies and International Agreements Influencing the Africa Environment**

- A number of Global, Regional and Sub-regional Policy initiatives and agreements have been identified on environmental management. The network needs to further become better informed about such initiatives.
- Convene a committee to review major protocols and recommend how the RN may implement them
- The network should aim to enhance the utilisation of its outputs in influencing policy

## **Network Funding**

- Membership of the West African Network can come out with clearly defined projects to take advantage of GOFC GOLD support.
- Members also can develop their own projects with proposal for funding by other donors e.g. Maryland University which has a strong collaboration with NASA for data. GOFC GOLD expressed its willingness to give endorsement to such proposals.
- Travel support
- Network consolidation activities
- Administrative support for website development, brochures, etc.
- Planning & Implementation meetings
- Seed money totalling \$10,000

## **International Cooperation Opportunities**

The meeting addressed network cooperation with related international programs including the land and fire implementation activities of GOFC-GOLD, as well as other networks (AfriFireNet, etc.) and international activities (GEO, etc.).

Topics for cooperation could include, among others:

- Identify current status of national land cover mapping and change monitoring in the region and relevant land cover change information needs in various regions of Africa.
- Land cover data and applications for fuel type and burned area mapping and monitoring.
- Participation in GOFC-GOLD land cover and fire product validation effort to develop Africa test beds for global validation, including local interpretation (regional experts) of high resolution imagery
- Brent Simpson provided specific details on existing inventories of Earth Observation data information services and systems that can be assessed by Network partners. This covered data format and conditions of data availability, distribution, cost and terms of purchase.

## **6.3 Network Principles and Functions**

### **Thematic Areas/Groups**

Delegates agreed that the Network functions around the following four thematic areas and associated working groups:

- Bush fires and other disturbances
- Forest Management/Carbon Sequestration
- Water and Coastal areas, and
- Urban Sprawl

The structure of the Network will be implemented through Working Group or Task Forces within and among participating countries and NOT through National Representatives.

An Interim Steering Committee (ISC) made up of national volunteers (Table 5) was constituted to serve for a period of 6 months to develop research proposals based on the prioritized thematic issues. The working groups were to be convened over the next few months to develop their research plans and activities.

### **WARN Secretariat and Coordinators**

- WARN Secretariat: Dakar University Remote Sensing Laboratory (DURSL), Senegal.
- Network Coordinator: Cheikh Mbow.
- GOF-C-GOLD will work with the network ISC to find funding support for the Secretariat to enable it operate for two years.
- Interim Steering Committee (ISC) of National Volunteers with the mandate to consolidate the vision and activities of the WARN for a period of six months.

## **7. References**

Mbow, Cheikh, Amadou T. Diaw, Brent Simpson, David Skole, Kjeld Rasmussen 2006. Action Plan for West African Remote Sensing/GIS Network. Draft proposed by LERG (UCAD), Institut des Sciences de l'Environnement, Faculté des Sciences et Techniques, LERG, ESP, UCAD (Sénégal).

Wade, Souleye 2005. Setting the benchmark – What do we know/What is our future? A science review and synthesis workshop on the long-term impacts of environmental change in West Africa. 17-19 August 2005, Dakar, Senegal, UCAD-II Conference Centre. Volume 1: Science.

Brady, Michael 2006. Report of the GOF-C-GOLD Regional Networks Meeting, 25 March 2006, Jena, Germany, GOF-C-GOLD Report No. 29 ([http://nofc.cfs.nrcan.gc.ca/gofc-gold/Report%20Series/GOLD\\_29.pdf](http://nofc.cfs.nrcan.gc.ca/gofc-gold/Report%20Series/GOLD_29.pdf))

Townshend, John and Michael Brady 2006. A Revised Strategy for GOF-C-GOLD. GOF-C-GOLD-24. ([http://nofc.cfs.nrcan.gc.ca/gofc-gold/Report%20Series/GOLD\\_24.pdf](http://nofc.cfs.nrcan.gc.ca/gofc-gold/Report%20Series/GOLD_24.pdf))

de Groot WJ, Goldammer JG, Keenan T, Brady MA, Lynham TJ, Justice CO, Csiszar IA, O'Loughlin K (2006) Developing a global early warning system for wildland fire. In 'Proceedings of the V International Conference on Forest Fire Research', Figueira da Foz, Portugal, Nov. 27-30, 2006. (Ed. DX Viegas) (Elsevier, B.V., Amsterdam).



## 8. Appendices

### *Appendix 1. List of Participants*

NO.	COUNTRY	NAME	ORGANIZATION
1	Ghana	Yankson, Paul	University of Ghana
2	Ghana	Kufogbe, Sosthenes	University of Ghana
3	Ghana	Kofie, Richard	CSIR
4	Ghana	Vordzorgbe, Vincent	University of Ghana
5	Ghana	Allotey, Albert	University of Ghana
6	Ghana	Boateng, Kyereh	Faculty of Renewable Natural Resources
7	Ghana	Agurugo, Francis Baffour	Ghana Wildlife Management
8	Ghana	Amponsah-Agyemang, Oheneba	Resources Management Support Centre
9	Ghana	Duodo-Asare, David Kofi	GWMP
10	Ghana	Laing, Ebenezer	University of Ghana
11	Ghana	Attua, Emmanuel	University of Ghana
12	Ghana	Blay, Dominic	Forestry Research Institute of Ghana
13	Ghana	Karikari, Edward	CIDA Ghana
14	Ghana	Wiafe, George	University of Ghana
15	Ghana	Vincent Antwi	Ghana Meteorological Agency
16	Ghana	Agumya, Aggrey	Forum for Agricultural Research in Africa (FARA)
17	Burkina Faso	Bassole, Andre	GLCN/EIS-Africa/FAO
18	Burkina Faso	Nonguierma, André	UN ECA
19	Burkina Faso	Zoungrana, Pierre	University of Ouagadougou
20	Gambia	Ebraima , Ceesay	NEA
21	Mali	Traoré, Amidou	STP/CIGQE
22	Mali	Kassibo, Brehima	University of Bamako
23	Mali	Goita, Kalifa	ICRISAT/Agrhymet
24	Niger	Mahamane, Ali	University AM de Niamey
25	Niger	Saadou, Mahamane	University AM de Niamey
26	Nigeria	Balogun Ahmed, A	Federal University of Technology, Akure
27	Nigeria	Adeaga, Olusegun	University Lagos
28	Senegal	Mbow, Cheikh	UCAD
29	Senegal	Diaw, Amadaou Tahirou	UCAD
30	Senegal	Diouf, Aliou	CSE
31	Senegal	Ndiaye, Papa	DEFCCS
32	Senegal	Ndiaye, Cheikh T.	DEFCCS
33	Togo	Johnson, Dodé B	CGILE
34	Swaziland	Gamedze, Mduduzi	SAFNet
35	Zimbabwe	Kweshu, Dominick	Miombo

NO.	COUNTRY	NAME	ORGANIZATION
36	Cameroon	Lawrence, Nosyuni Ayenika	OSFAC
37	Canada	DeGroot, Bill	Canadian Forest Services
38	Germany	Goldammer, Johann	GFMC
39	Italy	Mayaux, Philippe	EC JRC
40	Italy	Grégoire, Jean-Marie	EC JRC
41	South Africa	Held, Alexander	AfriFireNet
42	Switzerland	Rum, Giovanni	GEO
43	USA	Simpson, Brent	Michigan State University
44	TANZANIA	Nssoko, Edwin	Forest Resources Management and Fire Prevention
45	NAMIBIA	Otsub, Mike	Ministry of Agriculture, Water and Forestry
46	SUDAN	Elgamri, Mohamed	Sudan University of Science and Technology
47	ZIMBABWE	Odreck Sibanda	Forestry Commission of Zimbabwe

## **Appendix 2. Agenda**

<b>Date</b>	<b>From</b>	<b>To</b>	<b>Session</b>	<b>Title of Session</b>	<b>Chair</b>
12/11/2007	08:30	09:00		Registration of Participants	S. Kufogbe
	09:00	09:20	<b>Opening</b>	Background and Introductions and Welcome Address (University of Ghana, West Africa Regional Network)	Speaker: P. Yankson, Vice Chancellor, U.G. and C.Mbow
				Keynote Address; Honorable Minister, Ministry of Lands, Forestry and Mines	Minister
	09:20	10:00		Welcoming Statements: Selected Agencies and International Organizations/Donors; GOFC-GOLD, JRC, GEO, EPA Ghana	M. Brady P. Mayaux C.Mbow
	10:00	10:30		Break	
	10:30	12:30	<b>Session 1</b>	Meeting Context: (i) Overview of GOFC-GOLD and the Regional Networks (ii) Review of 2005 workshop results (iii) Objectives for the meeting	C. Mbow M. Brady B. Simpson & Chiekh Mbow P. Mayaux
	12:30	14:00		Lunch	
	14:00	15:30	<b>Session 2</b>	Steps forward for the West African Network (Guidelines for the network, draft science plan), including insights from other Africa networks (SAFNet, Miombo, OSFAC). Charge to break-out groups	S.Kufogbe Speakers: M. Gamedze, D.Kweshu, N. Lawrence
	15:30	16:00		Break	
	16:00	17:30	<b>Session 3</b>	Breakout groups: (i) forest management (ii) land degradation, fire and rangeland management	E. Laing B. Simpson
13/11/2007	09:00	10:30	<b>Session 4</b>	Breakout groups: (i) carbon issues (ii) urban sprawl (iii) water resources and coastal zones management	A.Traoré A.Balogun A. Nonguierma
	10:30	11:00		Break	
	11:00	12:30	<b>Session 5</b>	Breakout groups:  (i) capacity-building (data availability)	  P. Mayaux

Date	From	To	Session	Title of Session	Chair
				(ii) institutions, policies and international agreements influencing African environment (Conventions and protocols, bilateral/multilateral cooperation)	A. Agumey
				(iii) network funding (how and where to find funding/ endorsement)	M. Brady
	12:30	14:00		Lunch	
	14:00	16:00	<b>Session 6</b>	Summary of breakout groups and prioritization of thematic issues	P.Yankson / S.Kufogbe/ Rapporteurs
	16:00	16:30		Break	
	16:30	17:30	<b>Session 7</b>	Network Principles and Functions (règlement intérieur) (secretary, Scientific/Steering Committee, Coordination, mandate of the leading bureau, funding)	A. Diaw
14/11/2007	09:00	10:30	<b>Session 8</b>	International Cooperation Activities (GEO, FAO, JRC), including presentation of datasets of thematic interest (e.g., VGT4AFRICA, MODIS, EUMESAT, DAAC, etc.)	P.Mayaux / M.Brady Speakers: G.Rum (GEO), A.Bassole (GLCN, FAO, FRA), B.Simpson (MSU)
	10:30	11:00		Break	
	11:00	12:30	<b>Session 9</b>	Development of the meeting report and recommendations Designation of Network coordinator and national representative members	A. Diaw, P. Yankson C.Mbow and B.Simpson
	12:30	14:00		Lunch	

### **Appendix 3. List of Presentations**

No.	Presentation	Presenter
1	Review of 2005 Workshop Results	Cheikh Mbow & Brent Simpson
2	Meeting Objectives	Cheikh Mbow & Philippe Mayaux
3	GOFC-GOLD Overview November 2007	Michael Brady
4	Lessons Learnt from SAFNet	Gamedze S. Mduduzi
5	MIOMBO Network	Dominick Kwesha
6	OSFAC	Lawrence Ayenika Nosyuni
7	Fire Risk & Danger Rating	Vincent Vordzogbe
8	Suivi de l'utilisation de quelques ressources Naturelles au Mali	Amidou Traoré
9	ROSELT NIGER	Ali Mahamane & Saadou Mahamane
10	AFORNET	Dominic Blay
11	Carbon Market Overview	Brent Simpson
12	Monitoring Urban Growth	Yankson et al
13	Observation of the Urban Heat Island Over Akure	Ahmed Balogun
14	Institutions Policies and Conventions Agreements in the African Environment	Aggrey Agumya
15	WARN Funding	Michael Brady
16	The Global Forest Resources Assessment 2010	Andre Bassole
17	GEO Activities and Initiatives	Giovanni Rum
18	Datasets Available in West Africa	Philippe Mayaux
19	GOES Landsatorg	Brent Simpson
20	WARN Senegal Case Study	Cheikh T. Ndiaye & Papa Ndiaye
21	Land Use Trends_ Ecological Zones of Ghana	Albert Allotey
21	Global Deforestation Project	Brent Simpson

### **Appendix 4. List of Acronyms**

AFORNET	African Forest Research Network
AfriFireNet	Regional Sub-Sahara Wildland Fire Network
AFRINET	African Fire Network
AMCOST	African Ministerial Council for S&T
AMESD	African Monitoring of the Environment for Sustainable Development
AU	Africa Union
CAADP	Comprehensive Africa Agriculture Development Programme
CBD	Convention on Biological Diversity
CDM	Clean Development Markets
CIDA	Canadian International Development Agency
CSE	Centre de Suivi Ecologique
DANIDA	Danish Agency for International Development
DEFCCS	Forest Fire Statistics of the Forest Department
DURSL	Dakar University Remote Sensing Laboratory
EC	European Commission
ECOWAS	Economic Community of West African States
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organisation
FC	Forestry Commission
FORIG	Forestry Research Institute of Ghana
French JEF	Jeunes Européens Fédéralistes
FORIG	Forestry Research Institute of Ghana
GCLME (ghana)	Guinea Current Large Marine Ecosystem
GEO	Group on Earth Observations

GEOP	African Environmental Outlook Process
GET FUND	Ghana Education Trust Fund
GIS	Geographical Information Systems
GIS	Geographical Information Systems
GLCN	Global Land Cover Network
GMES	Global Monitoring of the Environment for Sustainable development
GNFS	Ghana National Fire Service
GOFC-GOLD	Global Observation of Forest and Land Cover Dynamics
GOG	Government of Ghana
GSDI	Geospatial Data Infrastructure
GTZ	Deutsche Gesellahft for Technische Zusammenarbeit
IDIS	-
ISC	Interim Steering Committee
ITTO	International Tropical Timber Organisation
JICA	Japan International Cooperation Agency
JRC	Joint Research Centre
KNUST	Kwame Nkrumah University of Science and Technology
Landsat	Land Remote-Sensing Satellite
LU/LC	Land Use/ Land Cover
MOFA	Ministry of Food and Agriculture
MSS	Multi Spectral Scanner
NASA	National Aeronautics and Space Administration
NEPAD	New Partnership for African Development
OSFAC	Observation par Satellite des Forêt d’Afrique Centrale
PSU	Programme Support Unit

RMSC	Resource Management Support Centre
RN	Regional Network
S&T	Science and Technology
START	SysTem for Analysis, Research and Training
TOR	Terms of Reference
TRMM	Tropical Rainfall Measurement Mission
UCAD	University Cheikh Anta Diop-Dakar
UNCC	United Nations Compensation Commission
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USA	Unites States of America
USAID	United States Agency for International Development
USGS	United States Geological Survey
VIRS	Visible and Infra-red Scanner
WARN	West African Regional Network
XS	Multi-Spectral