



## ***Implementing UNESCO's Earth Science Education Initiative in Africa***

<b>Geographical scope/benefitting country(ies):</b>	African continent
<b>Duration (in months):</b>	24 months
<b>Name and unit of project officer</b>	S.Felix Toteu, SC/Nairobi
<b>Partner(s) institutions:</b>	Association of African Women in Geosciences Geological Society of Africa International Union of Geological Sciences Africa Earth Observation Network European Geoscience Union Global Geoparks Network YES (Young Earth Scientists) Network University of Witwaterstrand
<b>Total estimated budget inclusive of Programme Support costs</b>	US\$ 2,553,800

### ***Rationale and background***

Based on requests from African National Committees of the International Year of Planet Earth, the Director-General announced a new Earth Science Education Initiative for Africa at the regional launch of the International Year of Planet Earth in Arusha, Tanzania on 8 May 2008.

Five regional scoping workshops were organized across Africa between October 2009 and February 2010 followed by a series of meetings where results were discussed. The objective of these workshops was to assess regional capacities and needs in Earth science education, research and industry underlining existing centres of excellence through conversation with relevant regional and international experts including representatives of universities, applied schools, geological surveys, industry, and government and mapping the way forward for Earth science education. Brief descriptions of these workshops provide a flavor of the partners engaged in this Initiative:

- Northern Region (Arabic, English) 28-29 October 2009 at the University of Assiut, Assiut, Egypt. *Organized with UNESCO Cairo Office and the Geological Society of Africa (GSAf).*
- Western Region (French, English) 9-10 December 2009 at the University of Cheikh Anta Diop, Dakar, Senegal. *Organized with CIFEG, Senegal Ministry of the Environment.*
- Central Region (French, English) 4-5 February 2010 at the Center for Geology and Mining Research of the Congo, Kinshasa, Democratic Republic of Congo. *Organized with the Royal Museum of Central Africa with the support of the Belgian Government.*
- Lusophone Countries (Portuguese) 12-13 November at the University of Agostinho Neto, Luanda, Angola. *Organized with the International Year of Planet Earth and the Angola Ministry of the Environment.*
- Southern Region (English) 26-27 November 2009 at the University of Cape Town, Cape Town, South Africa. *Organized by the African Earth Observation Network (AEON) and the GSAf.*

From these workshops, it was concluded that:

- Earth sciences are a key driver for sustainable development but not well understood or recognized outside of the geoscientific community. Therefore, outreach exercises directed at decision-makers and the general public on the importance of Earth sciences for society are imperative;
- 21<sup>st</sup> century Earth System Science Education must transcend the conventional view of geological sciences and the teaching of Earth sciences needs to be multidisciplinary in its approach;
- Geology is only taught from the university level, not earlier. Earth sciences should be included in the school curriculum at primary and secondary levels;
- Strong connections between industry and universities do not exist. These connections must be built;
- African researchers are isolated. Existing networks must be reinvigorated and new ones built between African researchers and the global research community;
- There is a lack of adequate analytical facilities. This should be addressed through exchange sharing, identification of networks of expertise and obtaining new equipment through new funding mechanisms;
- Existing Earth science education in Africa suffers as a result of all of these elements. Improving Earth science education will require addressing many elements of the status of Earth science in Africa but must also focus on teaching.

## **Why UNESCO?**

As the only UN organization with a mandate in Earth science, and based on a long history of collaboration in the Earth sciences in Africa, UNESCO is uniquely placed with its partners to deliver on these requirements. This project leverages UNESCO's extensive experience in the Earth sciences, specifically with IGCP and Global Geoparks, to respond to specific African requirements.

## **Overall Goal/Objective**

The overall intention of this Initiative is to support the development of the next generation of Earth scientists in Africa who are equipped with the necessary tools, networks and perspectives to apply sound science to solving and benefiting from the challenges and opportunities of sustainable development. The opportunities in the Earth sciences are great, starting with traditional mineral extraction and extending into environmental management such as climate change adaptation, prevention of natural hazards, and ensuring access to

drinking water. These are interdisciplinary challenges that are faced by developed and developing countries alike.

## ***Main expected results***

### **Expected Result 1**

Quality research and training in Africa improved through collaboration and partnership among Earth sciences institutions

### **Expected Result 2**

The involvement of African earth scientists in international projects is enhanced

### **Expected Result 3**

Promote the Geoparks concept among African countries

## ***Activities and outputs/deliverables relating to the achievement of expected results***

<p><b>Activity 1 – expected result 1</b> Establish an African Network of Earth Science Institutions</p>
<p><b>Output/deliverable 1.1</b> Exchange and collaboration among institutions enhanced</p> <p><b>Output/deliverable 1.2</b> linkages between universities/research institutions and industry enhanced</p>
<p><b>Activity 2 – expected results 1</b> Develop a Mobile Geologic Field Mapping School</p>
<p><b>Output/deliverable 2.1</b> Geological field mapping skills developed in African geological surveys</p>
<p><b>Activity 3 – expected results 1</b> Improve the status of Earth science education at primary and secondary level</p>
<p><b>Output/deliverable 3.1</b> Earth science teaching promoted in African schools with a gender responsive approach</p>
<p><b>Activity 4 - expected results 2</b> Support the activities of the International Geoscience Programme (IGCP) in Africa</p>
<p><b>Output/deliverable 4.1</b> Skills for preparing IGCP proposals by Africans developed</p>
<p><b>Activity 5 - expected results 3</b> Support individual Geopark projects in African countries</p>
<p><b>Output/deliverable 5.1</b> Global Geoparks established in Africa</p>

**Activity 6 - expected results 3**

Organise capacity building workshops on geopark development

**Output/deliverable 6.1**

Skills for developing and managing Geoparks in Africa enhanced

### *Beneficiaries and stakeholders*

The scoping of this Initiative and the decision on appropriate initial activities has been a participatory process, through workshops, and sessions at relevant meetings and conferences, involving the identified target groups: African Earth scientists, universities, and related companies. The workshops alone have involved 175 participants from 31 different African countries, plus seven non-African countries and were carefully planned to involve perspectives from all regions of the continent. The subsequent conferences and meetings have involved a much larger audience.

The Activities proposed have been carefully selected as important interlinked progress, at various levels of education and society, which are achievable by UNESCO and partners and will have concrete outcomes in the near future. Students, school children, residents and visitors to Geoparks and the general public, both African and European, will benefit.

### *Implementation strategy*

In order to start to implement these recommendations, participants in the Workshop on Earth Science Education in Africa during the 23<sup>rd</sup> Colloquium of African Geology held in Johannesburg, South Africa in January 2011 have endorsed these conclusions and have urged UNESCO to facilitate and help African countries to respond accordingly with three initial activities:

(1) Establish an African Network of Earth Science Institutions (ANESI) to foster collaboration between universities, research institutions and related industries. This network has already been endorsed by the Geological Society of Africa and the African Conference of Vice Chancellors and Deans of Science, Engineering and Technology in November 2011. The ANESI website is now accessible and the registration of experts in the database is ongoing. This Network was launched in January 2013 and a business plan has been developed by an international working group. Funds are needed to implement the programmes of this network (exchange of student and staff, promoting women in geosciences, connections of geoscience training and research with industry).

(2) Develop a Mobile Geologic Field Mapping School which will focus on teaching geologic field mapping to early career Earth scientists as an important geologic tool for their careers, and a vital exercise for countries to identify and manage their mineral resources. This is based on the established fact that graduates from most of African universities lack geological mapping skills because universities themselves are poorly equipped for such training. The school proposed here is not meant to rival existing higher education institutions, but will instead provide professional training to African geologists, with a focus on women scientists, who have missed out on the opportunity to develop this crucial skill. The proposed dedicated school is expected to progressively achieve sustainability and become an “African Centre of Excellence in Geological Mapping Training” to support the continent to generate its own sustainable ‘supply’ of trained mapping geologists. The first collaborative geophysical field mapping school was organized in June-July 2013 with AfricaArray of the University of Witwatersrand, South Africa. This activity will contribute to the AU African Mining Vision.

(3) Review the status of Earth science education at primary and secondary level to forge the

future generation of 'Earth stewards' and give Earth sciences a status that reflects the importance that this discipline plays in the everyday life of the African people. The European Geoscience Union has committed to hold Geoscience Information for Teachers workshops in Africa over the next four years. The first workshop takes place at the Nelson Mandela Metropolitan University in Port Elizabeth, South Africa the final week of February 2014 with a focus on climate change and human adaptation for teachers from Southern Africa. Although UNESCO has committed to equal financial contributions to these workshops for the next four years, currently Regular Programme funds are insufficient. UNESCO is working to position itself as the education and research contribution to the AU African Mining Vision.

In addition, the Global Geopark Network has taken off in Africa with the first International Meeting of African and Arabic aspiring Geoparks in El Jadida, Morocco in November 2011, organized by the African Association of Women Geologists and the UNESCO Cairo Office under the patronage of UNESCO. UNESCO organized a workshop on Global Geoparks in Africa at the 24<sup>th</sup> Colloquium of African Geology in Addis Ababa in January 2013 and will co-convene a workshop on African Geoparks with the YES network (Network of Early Career Earth Scientists) at the 25<sup>th</sup> Colloquium of African Geology in Dar es Salaam, Tanzania in August 2014. Multiple African Member States have requested support to develop their aspiring Global Geoparks. We propose an additional cross-cutting item to build societal awareness of Earth science and develop stewardship of natural resources through supporting the development of three flagship Global Geopark projects in Africa.

### ***Sustainability and exit strategy***

A major goal of this Initiative has been to improve the public-private partnership in the Earth sciences in Africa, in the area of extractive industries. This is an area with lots of potential, especially in resource-rich countries which have extensive private sector investment, but may lack locally trained Earth science skills as a result of weak public universities. In a few cases, the private sector has developed its own training programmes in African countries. The launching of ANESI is a first step in improving connections between public universities and private companies to improve the education and job opportunities for African earth scientists, regardless of whether they pursue private sector careers, government geological survey work, or academic careers. The field mapping school will also involve and benefit both the public and private sector.

The Earth sciences, by their nature cross-cut environmental issues, have many crucial applications for the sustainable development of society in a world undergoing dramatic environmental change. Our international partnerships in this Initiative aim to learn and build on best-practice developed elsewhere and applied in an appropriate African context.

ANESI is at the core of the UNESCO strategy to promote Earth sciences in Africa. Rooting ANESI to the implementation strategy of the Africa Mining Vision may generate a wide range of opportunities; in this regard and for greater visibility, it is important to seek endorsement of the network by the African Union. Finally, partners probably represent the best asset for the sustainability of this project and it is important that ANESI serve as a platform to channel the various opportunities that may exist through the network of partners.