

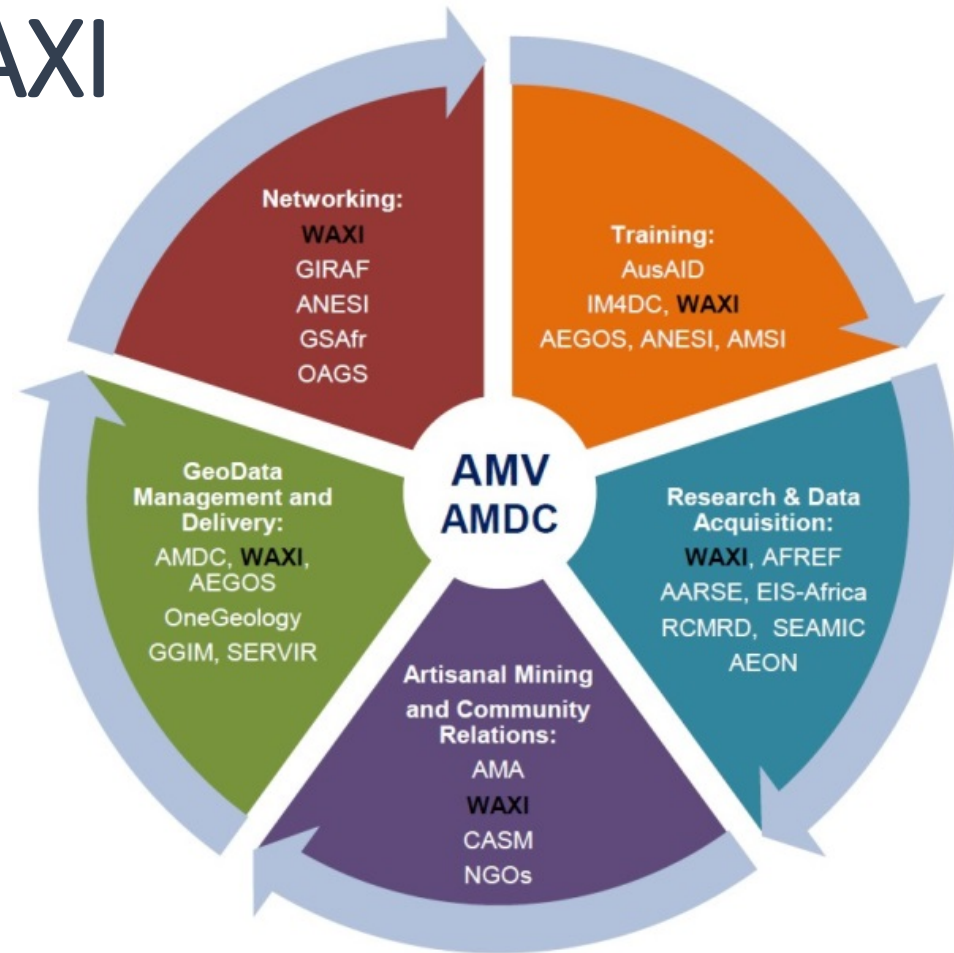


WAXI- West African Exploration Initiative
IXOA- L'Initiative d'Exploration Ouest Africaine

WAXI

Challenges and successes in building geoscience capacity in West Africa

Luc Siebenaller, Kim Hein,
Mark Jessell & Lenka Baratoux

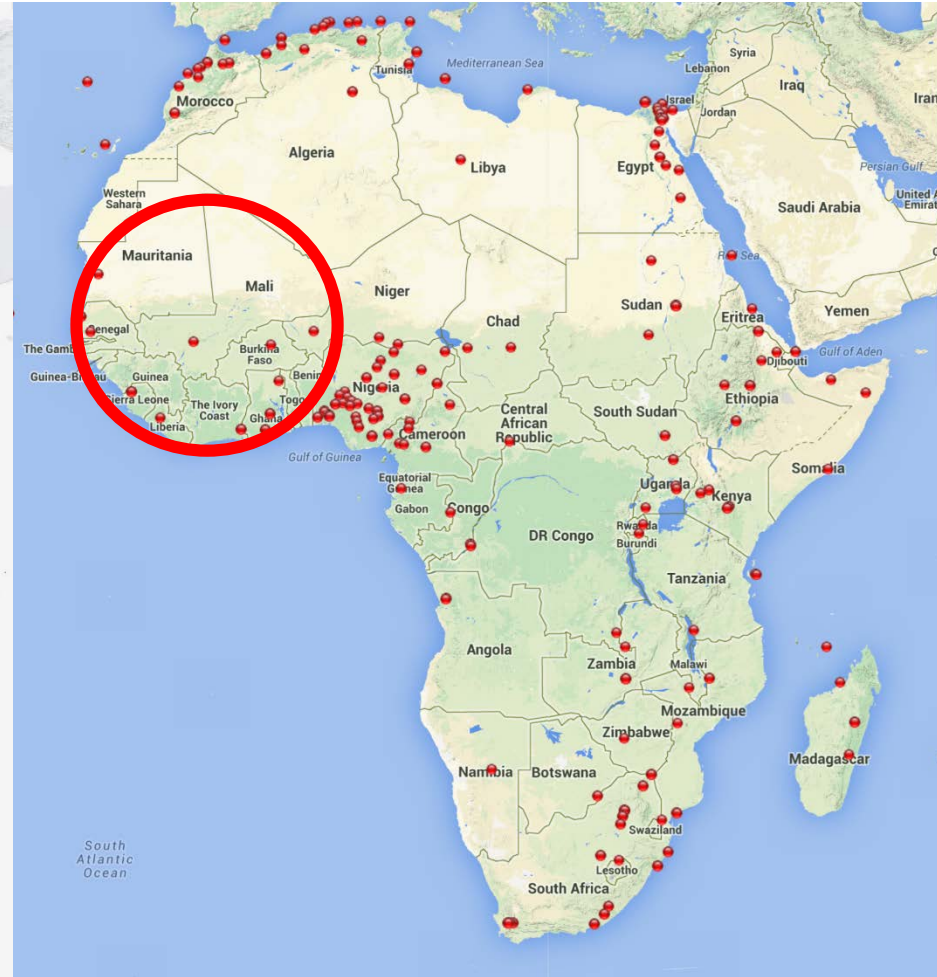
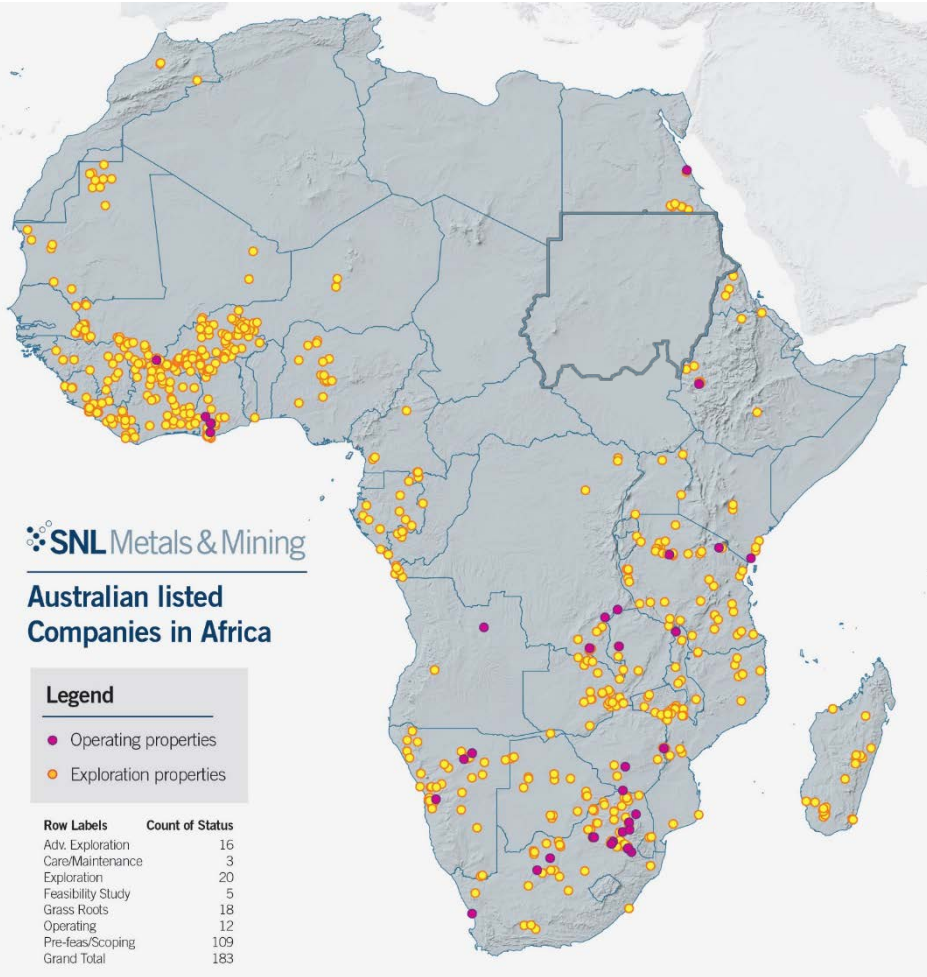


The development of geosciences research and training capacity in West Africa

What are the issues? Training vs Local Demand

Australian Listed Companies

Universities teaching Earth Sciences



Crucial need of qualified exploration and mining geologists + technical staff

The development of geosciences research and training capacity in West Africa

What are the issues? Low country investment in R&D

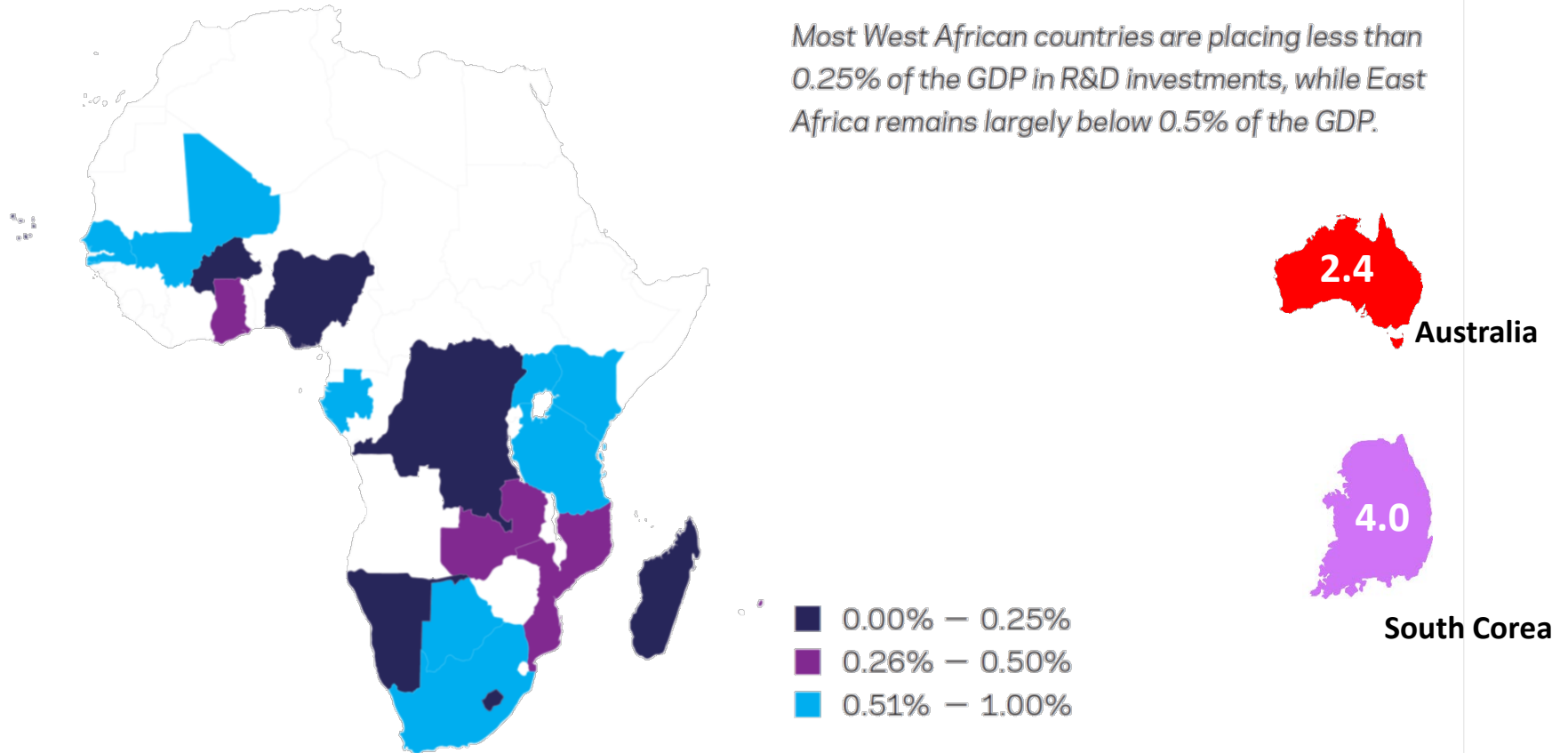


Figure C — Gross domestic expenditure on R&D (GERD) as a percentage of GDP, 2011 or latest available year for sub-Saharan Africa. Source: UNESCO Institute of Statistics.



WORLD BANK GROUP



ELSEVIER



The development of geosciences research and training capacity in West Africa

What are the issues? Important constraints

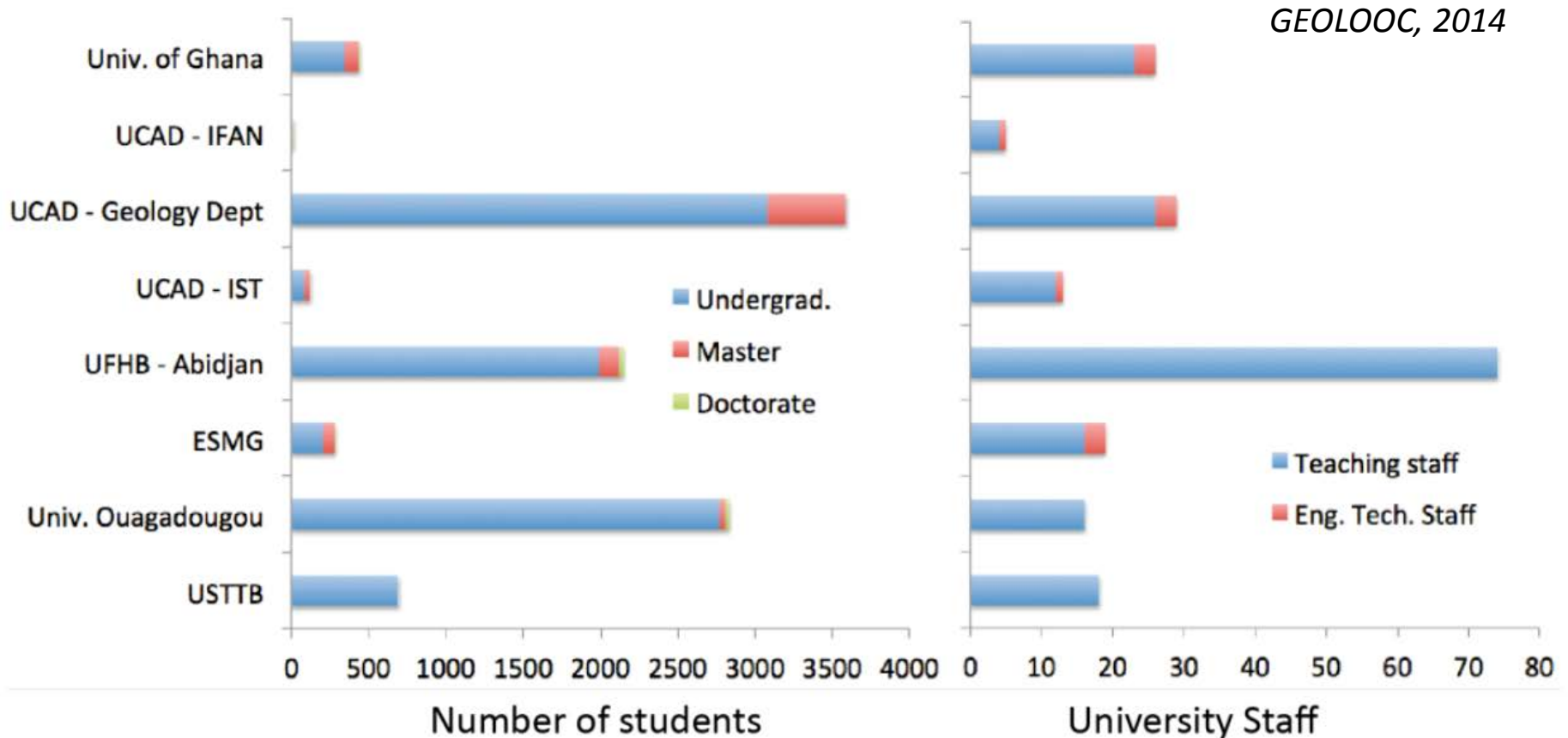
→ Most Universities and Geological Surveys in West Africa are subject to **important constraints** in their ability to:

- **teach students** (only few relevant geoscience textbooks or standard sample sets, libraries are often under-resourced, hard- and software is limited , teaching infrastructures are often severely compromised (ex: 400 students in a classroom of a capacity of 100 students, only 4 operational microscopes for practical teaching and limited funding for field excursions...))
- **organize field training**
- **undertake research** (most laboratories do not have sufficient and operational infrastructures to do research)
- **raise sponsorship** for development programs and student bursaries
- **organize or/and attend key conferences**
- **manage research and resources** (governance → 1 Craton = 13 countries, fragmentation of existing datasets and studies → negative impact for exploration activities)



The development of geosciences research and training capacity in West Africa

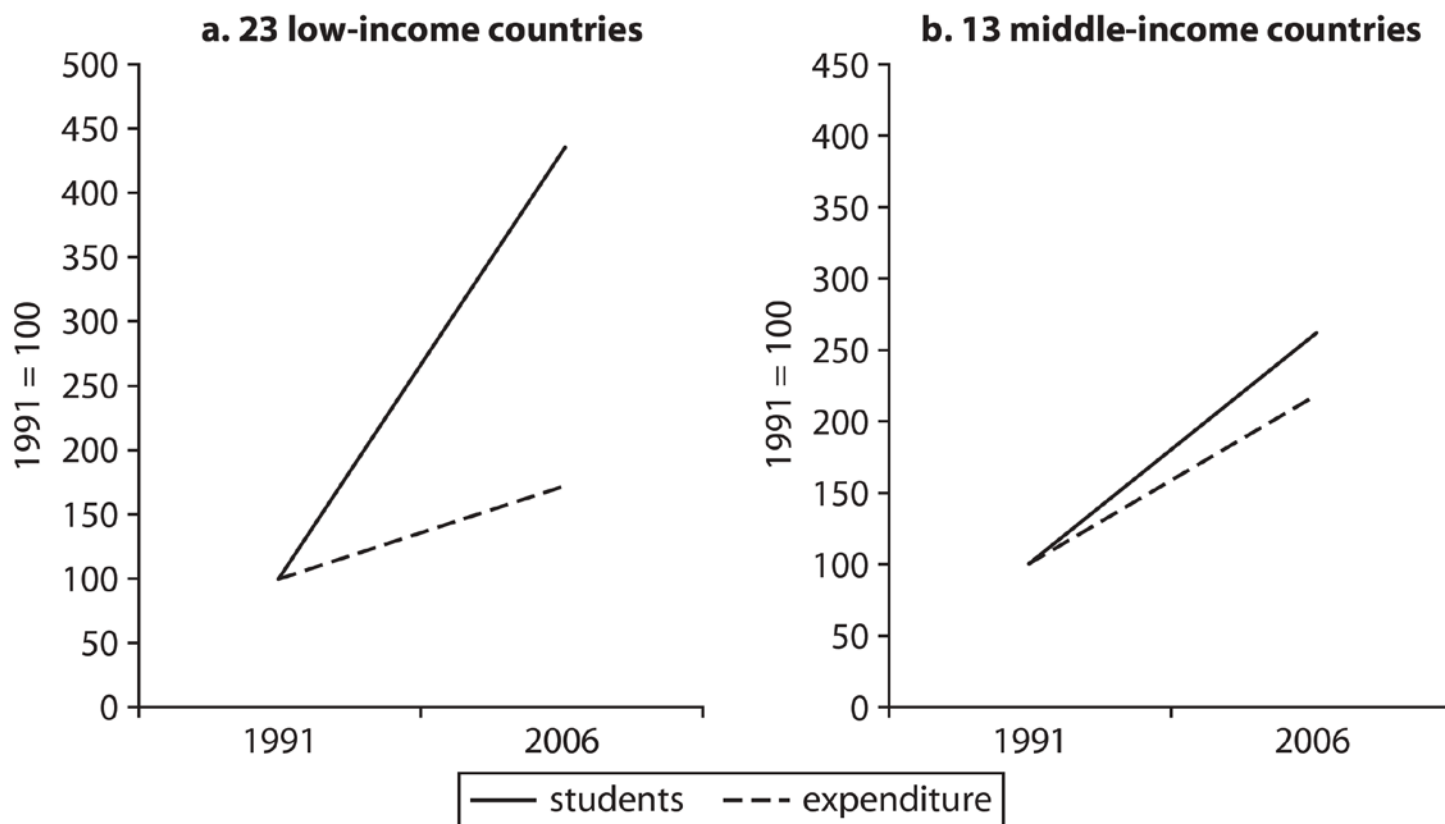
What are the issues? Student population explosion vs. lack of teaching resources (relevant textbooks and people)



The development of geosciences research and training capacity in West Africa

What are the issues? Student population explosion vs. lack of financial support

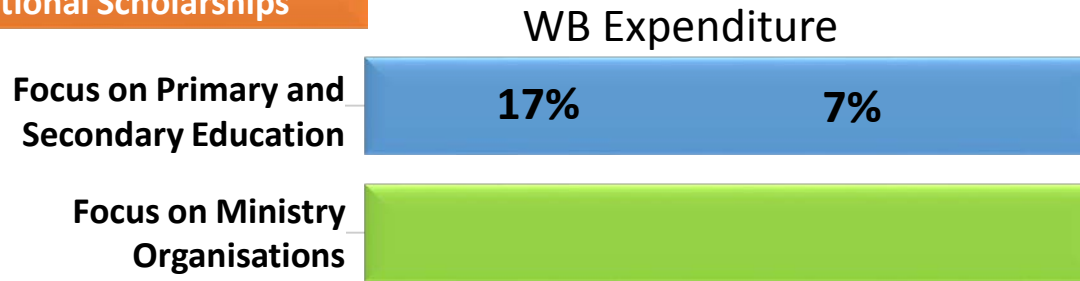
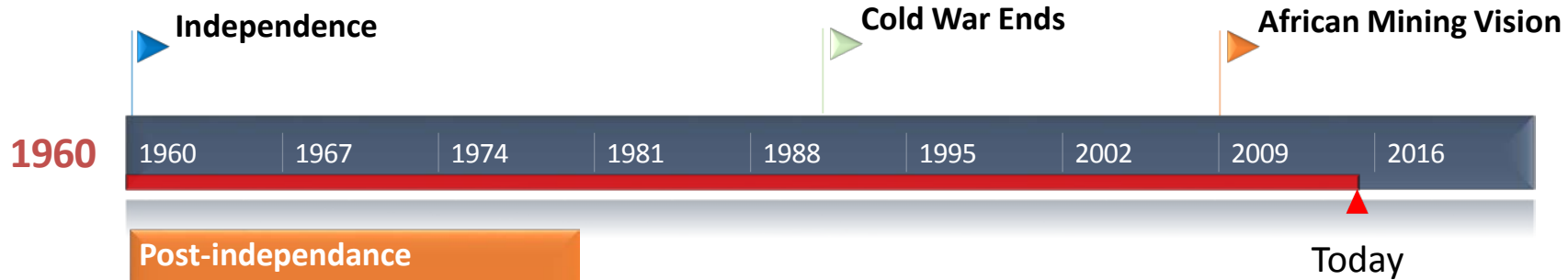
Figure 2.3 Change in the Number of Higher Education Students and Expenditure on Higher Education in Two Groups of African Countries, 1991–2006



Sources: Authors' calculations based on national, UIS, World Bank, and country sector study data.

The development of geosciences research and training capacity in West Africa

What are the issues? Gap in geoscience research and training over time



Important gap in higher education support programs (including PhD bursaries)

Return to Higher Education by WB, AfDB

WAXI training

IMPACT?

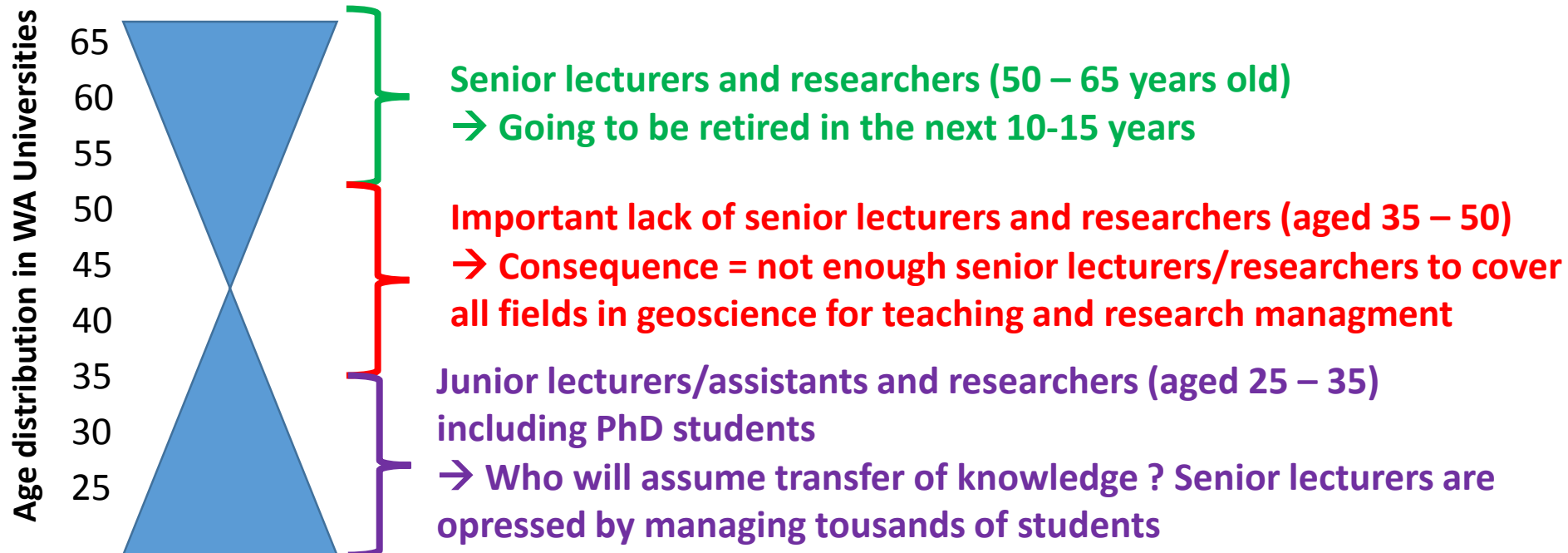
A questionnaire has been send out to all Universities (WAXI partners) from West Africa to create a baseline of the current status of senior and junior lecturers, researchers, technicians and existing PhD projects (inside and outside WAXI).



The development of geosciences research and training capacity in West Africa

What are the issues? Impact of gap in geoscience research and training

Observation:



20-25: thousands of students

Obtain geoscience Bachelor and MSc diplomas to find a job in exploration & mining sector

How to ensure quality of training and Curriculum development facing a continuous lack of human resources?



African Minerals Geoscience Landscape

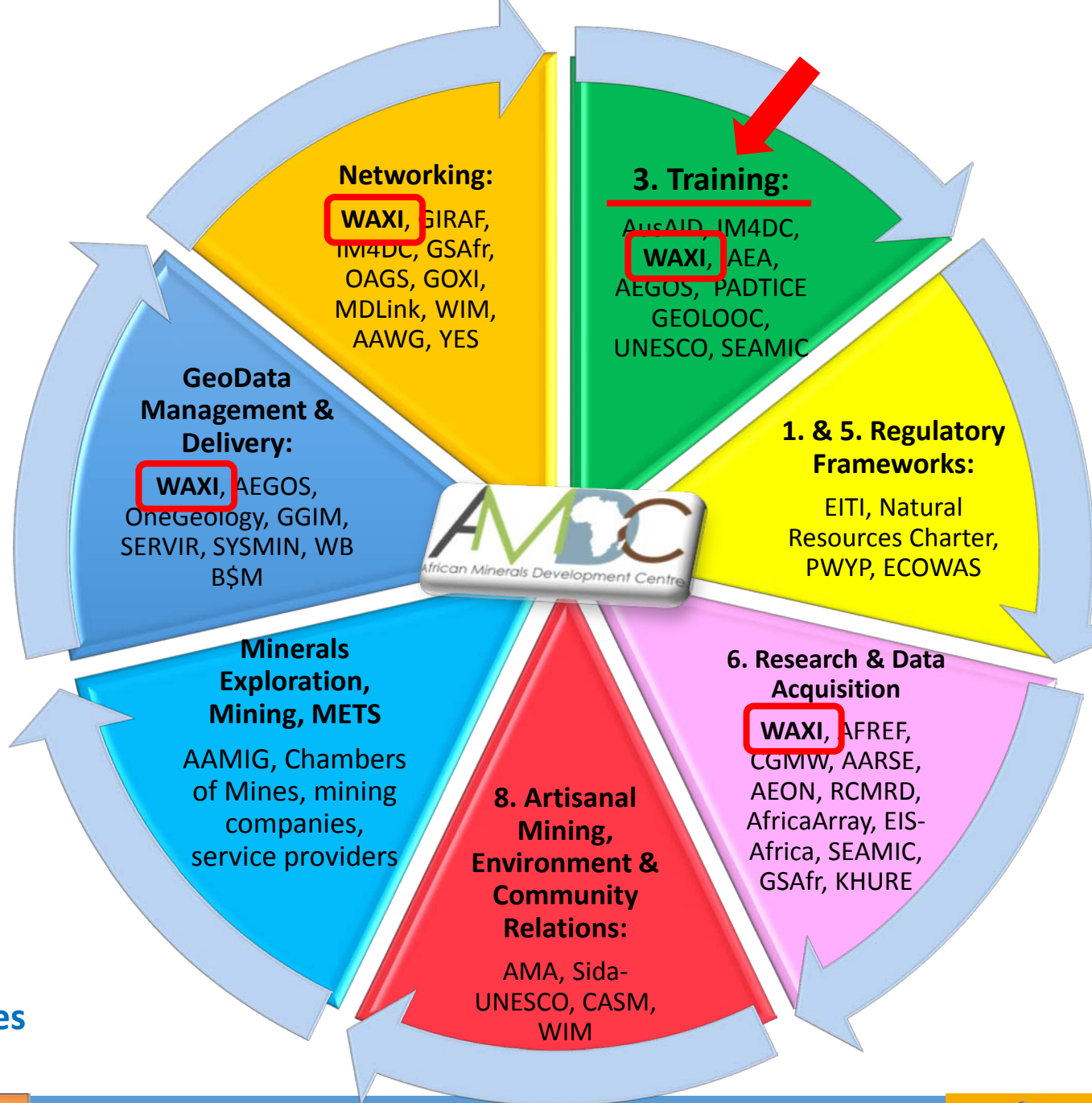
**African Mining
Vision Action Plan
Program Clusters**



Programme cluster 3 :
Building human and institutional capacities
At national level

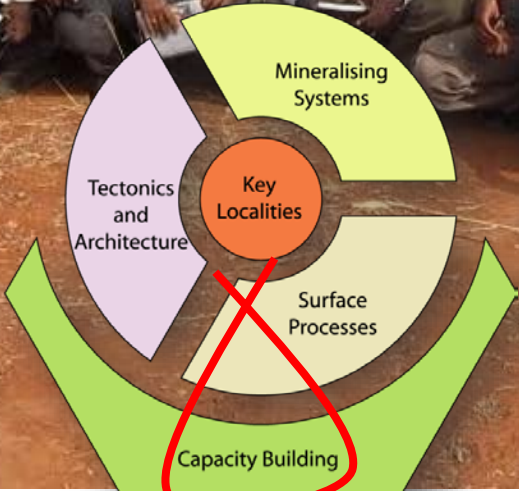
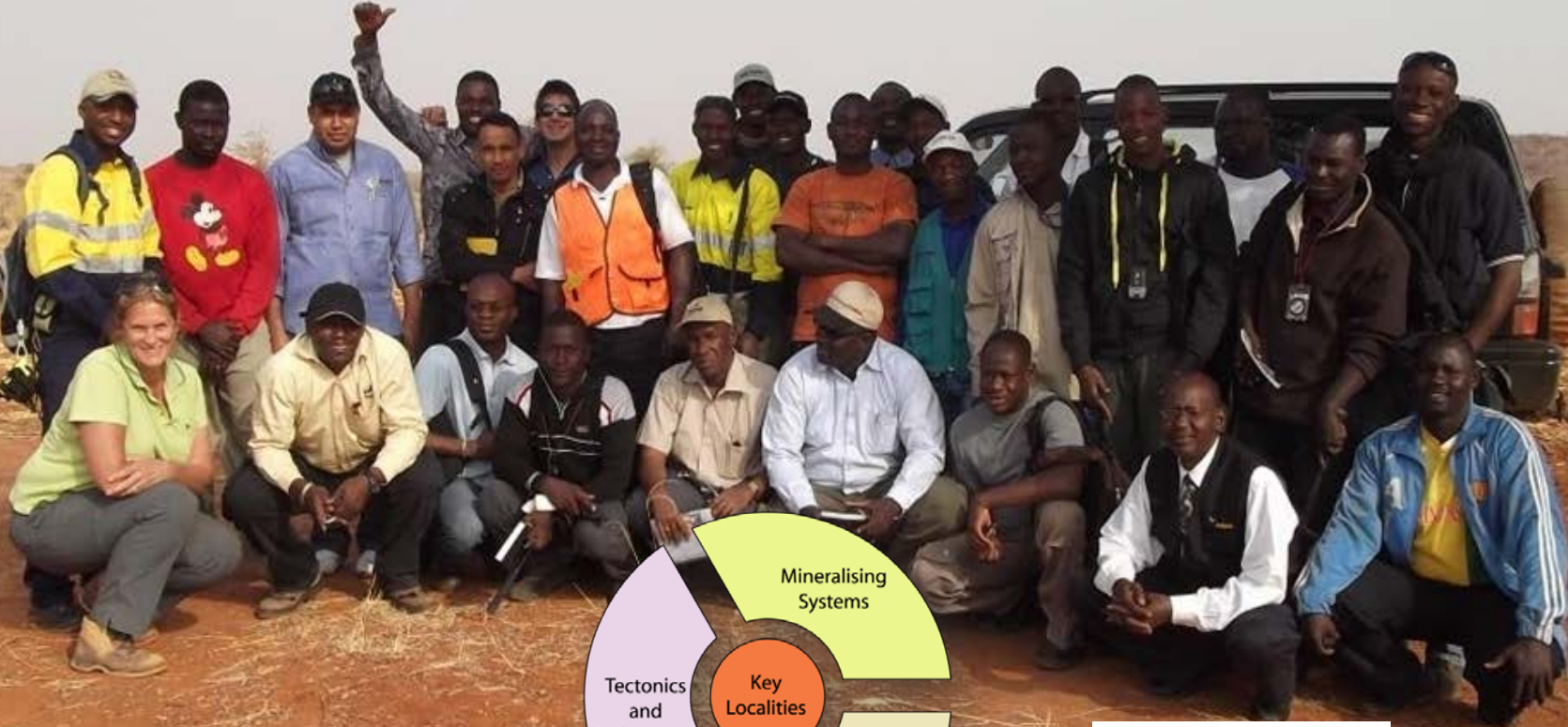
- Diversify education, academic and professional training funding sources to include private sector
- Strengthen continuing professional development through short courses
- Align human resources development to AMV policy direction and needs of industry

= Central theme of WAXI Capacity Building activities



Capacity Building – the underpinning theme of WAXI

Initiated by Mark Jessell (IRD) & Kim Ncube-Hein (Wits)



Sponsored by:



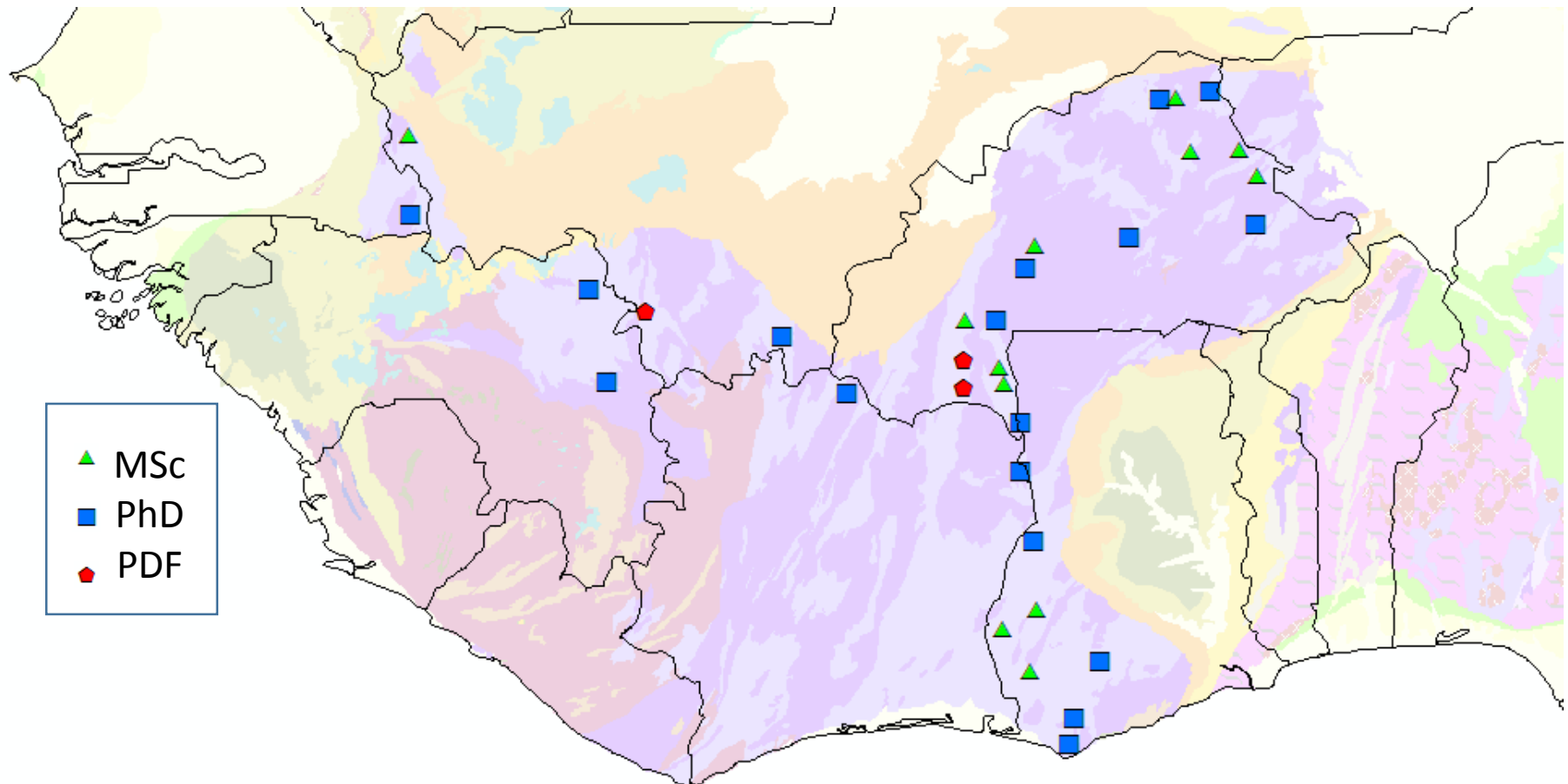
Australian Government
AusAID

WAXI 2 (2010-2013): What has been done so far

1. Student Scholarships and Research Support:

→ 31 graduate research projects, 52% African

→ First year WAXI 3: 16 new PhD/MSc projects for African students started



WAXI 2 (2010-2013): What has been done so far

2. Research Training Courses:

→ 17 laboratory and field training courses for 281 participants with 90% African participants (206 from industry, 65 from local governments and 10 from Universities) over a total period of 80 days were organized

Classroom/Laboratory Courses

- Exploration Targeting
- Exploration Geochemistry (2x)
- Structural Geophysics (3x)
- Practical and effective integration of cadastral, geoscience and geophysical data in GIS systems for exploration and mining (5 weeks)
-



Structural Geophysics, April, 2012, Dakar, Presented by Mark Jessell, Laurent Ailleres, 25 participants. 5 days



Exploration Geochemistry, Jan 2012, Ouagadougou, Presented by Yann ITARD, Consultant 20 participants. 3 days



WAXI 2 (2010-2013): What has been done so far

2. Research Training Courses:

Field Courses (including courses @ mine sites)

- Structural Mine Mapping
- Structural Field Mapping (2x)
- Regolith Mapping
- Exploration Geochemistry
-



Field Structural Mapping, Jan 2012, Kaya. Presented by Kim Hein, 27 participants. 6 days.



Applied Structural Geology in Mineral Exploration and Mining (SW Ghana), 4th Quarter, 2012, Presented by John Miller. 25 participants. 4 days



WAXI 2 (2010-2013): What has been done so far

3. Research management training course

→ Representatives of four Universities were funded to attend sponsors and research meetings and a 4 day Research Management Course was held in Ouagadougou in March 2013

The course on Science Research Management was organized by Mark Jessell (IRD), Morou F. Ouédraogo (TTG), Adama P. Traoré (Ex-BUMIGEB) & Pr. Séré (UO), and covered topics including:

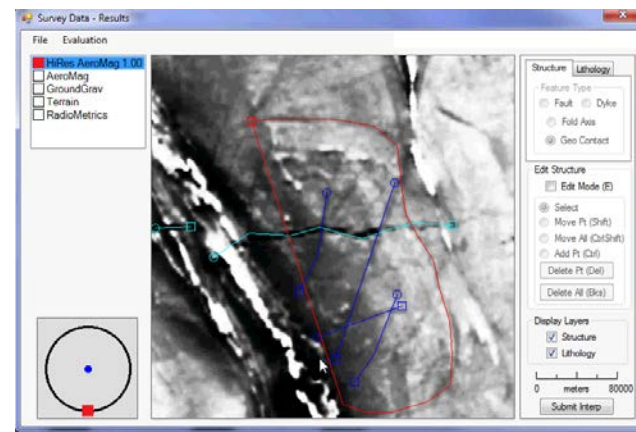
- Ethics & professionalism
- How to prepare proposals
- Budgeting and financial management
- How to work with the mining sector
- How to win sponsorship
- How to deliver on time without losing your customer
- Training graduates for the mining sector
- Research relevance
- Business skills, planning and business focus



WAXI 2: What has been done so far

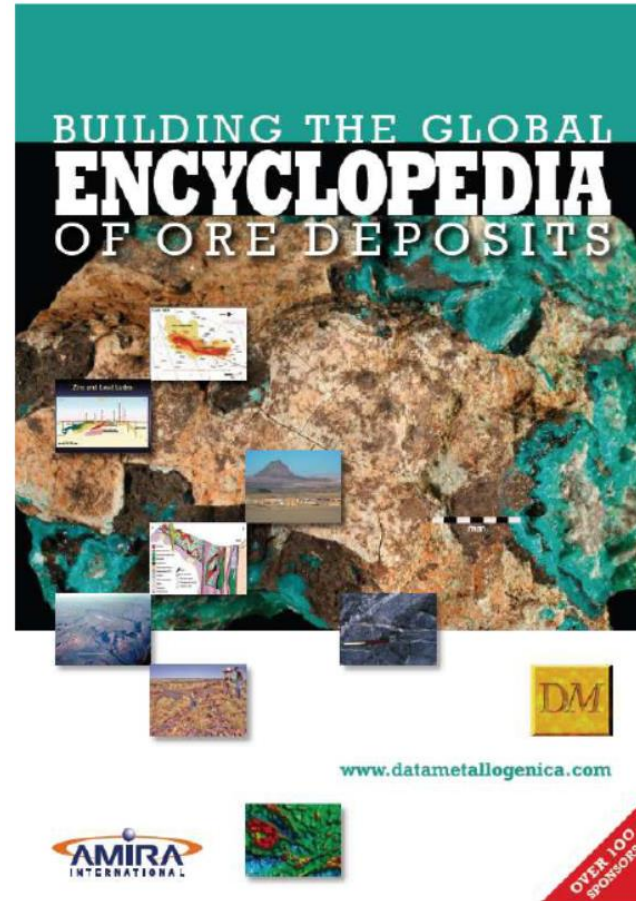
4. Structural Geophysics Training Manual:

→ A bilingual manual consisting of Lecture materials, worked GIS-based practical exercises and an Atlas of Structural Geophysics with accompanying 3D modelling software has been compiled



5. Data Metallogenica:

→ Partner West African government institutions have been granted free access to Data Metallogenica for the duration of the project.





WAXI 3 2014-2018

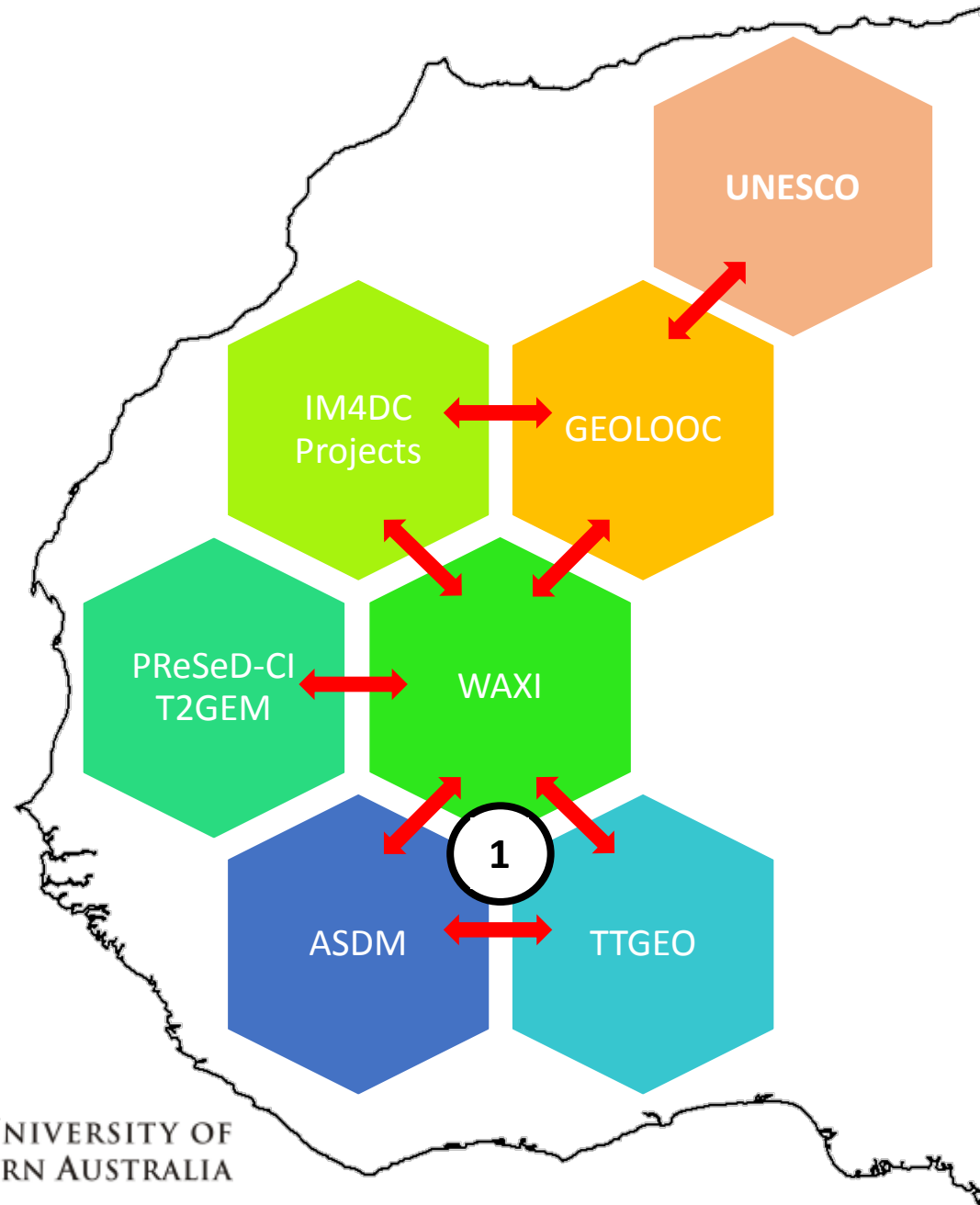
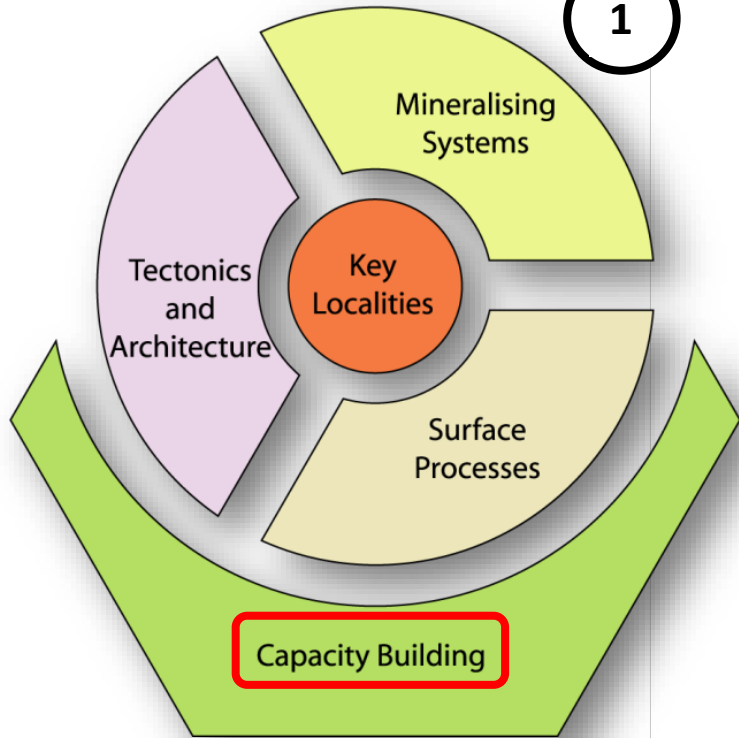


- Research themes have been defined by current industry partners at the Toulouse kick-off meeting in September 2014
- Continued focus on the Metallogeny, craton-scale structure and surface processes of West African Craton
- **Long-term Capacity Building strategy currently being developed**

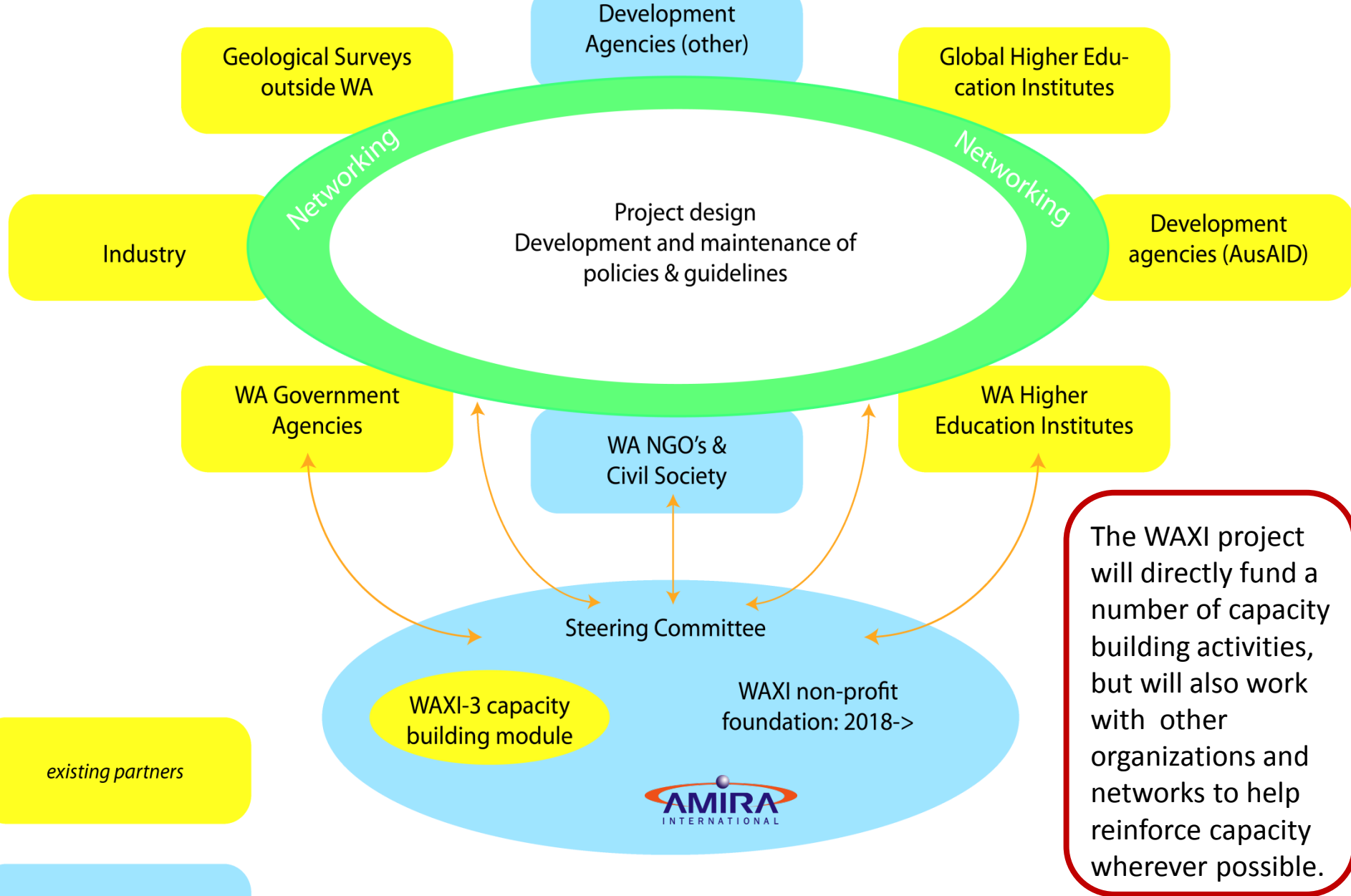


West African Research and Training Cluster linked to WAXI

1



THE UNIVERSITY OF WESTERN AUSTRALIA



Operational structure of WAXI-3 Capacity Building Theme.

WAXI-3 Capacity Building Activities (ranked by demand after a survey)

1. **Short term activities:** 2014 ⇔ 2018 (Training & support)
 - a) WAXI Geophysics Resources
 - b) Intra-African Collaborative Research Grants
 - c) Student Scholarships and Research Support
 - d) Research and Language Training Courses
 - e) Exploration Excellence Summer Schools
 - f) Access to Data Metallogenica
 - g) Annual Transfer of Knowledge Workshop and Survey Forum
 - h) Project management courses (institutional development)

2. **Medium term activities:** 2016 ⇔ 2018 (Steering committee charged with search for longer-term funding)

3. **Long term activities:** 2019 ⇔ (Funding through a not-for-profit foundation for all kind of activities related to geosciences and resource management in West Africa)



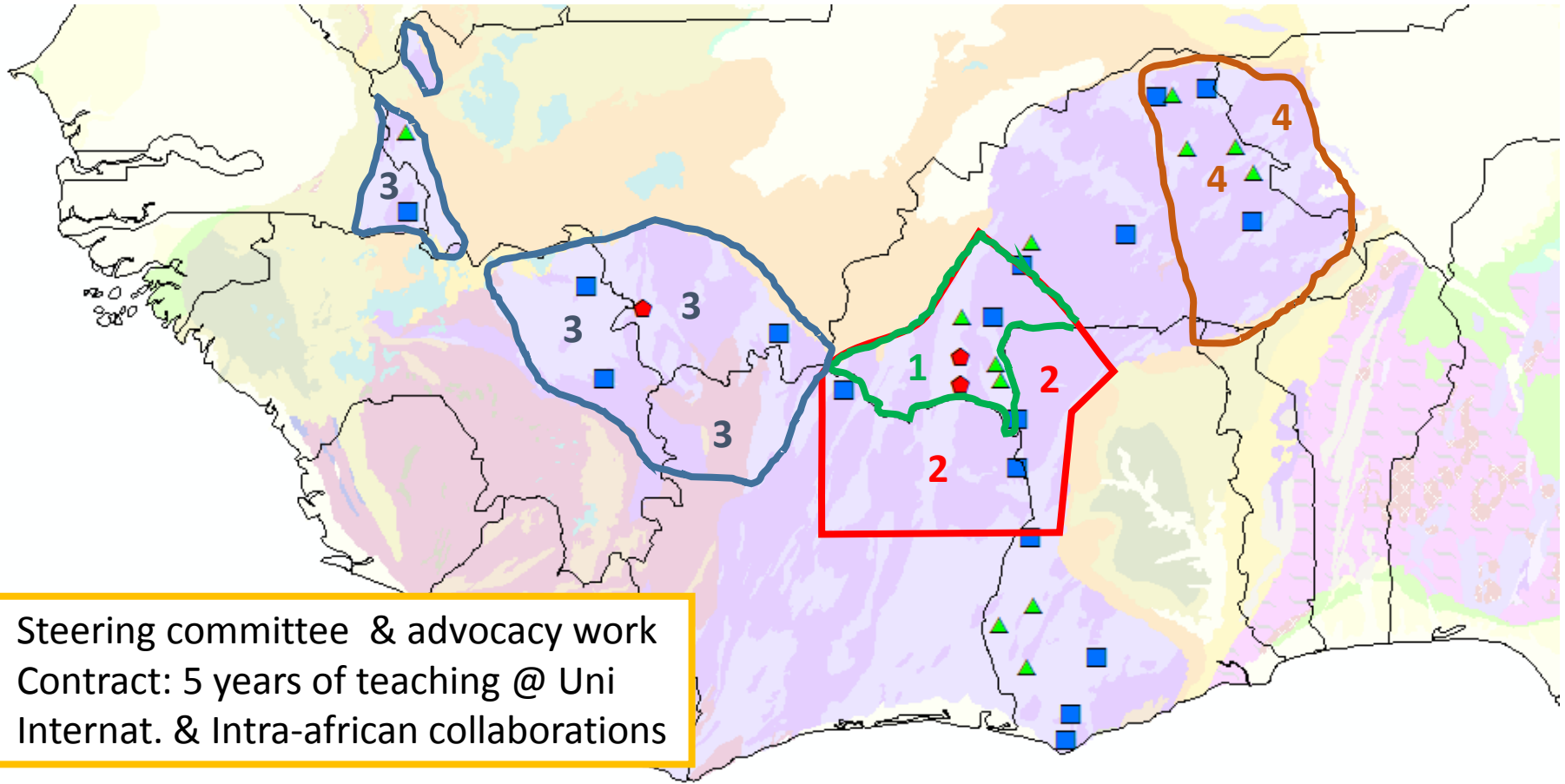
WAXI-3 upcoming training courses

- Field training course: **Structural and metamorphic geology**, North-West Ghana :
23rd – 29th of November by Sylvain Block;
 - **Structural Geophysics**, Abidjan, Ivory Coast :
7th – 11th of December by Mark Jessell and Laurent Aillères;
 - **Field geomorphology and regolith mapping** in the West African context, Kaya, Burkina Faso: **31st January – 5th of February 2016 by Dominique Chardon.**
- + Optional non-WAXI course : **Practical applied geophysics for geologists**, Ouagadougou, Burkina Faso: **26th of September – 1st of October by Peter Williams & Morou François Ouédraogo & Tibo Yanogo**



More WAXI-3 Student scholarships – coherence with respect to needs

Setup of pilot project for student bursaries: field laboratories



1. **Pilot project Burkina Faso: early 2016 (WAXI funding: ASDM & TTG)**
2. **Extension of pilot project (Ghana & Ivory Coast): late 2016 (WB, UMEOA, ECOWAS, SEG, AfDB, Ind., ...)**
3. **New CB project based on project 1 & 2 (Senegal, Mali, Guinea, IC): 2017 → need funding)**
4. **New CB project based on project 1 & 2 (Niger, Togo?, BF): 2017 → need funding)**





WAXI - West African Exploration Initiative

IXOA - L'Initiative d'Exploration Ouest Africaine

11 Sponsors in kind (Geological Surveys)



Liberia



Mali



Guinea



Niger



Burkina Faso



Ghana



Senegal



Togo



Sierra Leone



Mauritania



Côte d'Ivoire

Project Broker & Coordinator



36 Sponsors

Fonds National de la Recherche Luxembourg



RioTinto



AZUMAH RESOURCES LIMITED



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22 Research and Capacity Building Partners

