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The First Master Program in Petroleum Geology at the University of Dar es Salaam: Lessons and Challenges

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SUMMARY

The UDSM, supported by group of geoscientists from Universities of the Netherlands has been able to establish the first Master program in Petroleum Geology of the country.
With the crucial financial support of BG-Group 13 students has enrolled for the program.
Courses have been given in the first year covering a wide range of relevant disciplines. Students have demonstrated a remarkable dedication to the course and have all performed at high level.
The second year of the program will be dedicated to research projects developed in close connection with Industry.
Challenges for the future include the development of shared data bases and e-learning facilities, the strengthening of the "training the trainers" component of the project and the establishment of robust relations with Industry

Background

The large discoveries of hydrocarbons which have been made in the last years in East Africa and in Tanzania in particular clearly offer unique opportunities for the social and economic development of the country. A key factor in ensuring its potential is realized, lies in the presence of young skilled professionals in the public sector, in Industry as well as in small and middle-size enterprise.
The need has been recognized by the Tanzanian president and government which have engaged an active campaign aimed at establishing cooperation programs with countries and companies active in Tanzania. Following bilateral discussions, the *Netherlands Enterprise Agency* (rvo.nl) has funded a group of geoscientists from the ITC (University of Twente), University of Utrecht and Delft University of Technology to develop cooperation with Tanzania Academic Institutions through a package of courses aimed at knowledge transfer. The program has been named Knowledge to knowledge (K2K).

During a round of discussions held in Dar Es Salaam in May 2014 with representatives of, among others, UDSM, NMI, University of Dodoma the decision was taken to raise the ambitions and develop a full program aimed at establishing the first Master program in Petroleum Geology in Tanzania. While it was clear that the program could only be based in one University, the general decision was taken that the program should serve the entire national community and that steps would be made to facilitate the participation of young students from universities different from the one which eventually would offer the program. In a rush against time, the UDSM was successful in developing a full program for the Master degree and having it approved by the Senate and the Tanzanian Accreditation authority in time to start in the Academic year 2014-15. Notwithstanding some technical issues, the courses began in January 2015 with a group of 13 students. Scholarships for these students have been graciously provided by BG Group.

The University of Dar es Salaam in collaboration with the BG group and the Embassy of the Netherlands on May 18th , 2015, launched the MSc Petroleum Geology programme along with other three undergraduate petroleum degrees programs (BSc Petroleum chemistry, BSc petroleum Engineering and BSc Petreoleum Geology) at the university. The Guest of Honour who presided over the launching event was the Prime Minister of the United Republic of Tanzania Hon. Mizengo Kayanza Pinda. However, due to other National Commitments the Guest of Honour was represented by the Minister of Energy and Minerals Hon. George Simbachawene.

The Host Institution

The University of Dar es Salaam (UDSM) is the major Academic Institution in Tanzania and has a long history being established in 1961. The Department of Geology at UDSM was established in 1974. The University of Dar es Salaam is among the highest in Africa, being ranked 10th University in the continent in 2015 in terms of quality education delivery.

Traditional activities in education and research the UDSM Department of Geology, have been geared towards the mining industry and, thereby, had substantial expertise in hard rock, mineralization and related issues. Less represented were disciplines related to hydrocarbon studies such as sedimentary basins, brittle structural geology, seismic interpretation and others. To compensate for these shortcomings, the K2K program includes a component of “training the trainers” ensuring the longer term sustainability of the program. This line of activities includes the presence of a counterpart during the courses, sharing the didactic material used during classes and developing e-learning facilities.

The structure of the program

The UDSM Master program in Petroleum Geology is a 2 years program with the first year dedicated to courses and the second one to the execution of a research project, typically focussed on applied problems relevant for the hydrocarbon Industry resulting in a dissertation as part of the degree program.

Courses planned and given during the first year are shown in the attached table (Figure 1). Relevant to note that 50% of the lecturers are from UDSM thereby testifying the strong engagement of the host Institution.

Academic year 2014-2015	
Semester 1	
core:	
GY 600	Advanced Petroleum Geology
GY 601	Rock Properties, Petrophysics and Well-log Analysis
GY 602	Stratigraphy and Sedimentology
GY603	Seismic data Acquisition and Processing
elective:	
GY 604	Gravity, Magnetic and Remote Sensing Methods
IEM 601*	Environmental pollution prevention and control
GY 605	Petroleum Geochemistry
Semester 2	
core:	
GY 606	Petroleum Basin Analysis
GY 607	Seismic data Interpretation
GY 608	Scientific Writing
GY 609	Petroleum Structural Geology
elective:	
GY 610	Petroleum Production
GY 611	Palaeontology and Palynology
GY 612	Reservoir Diagenesis and Quality

Figure 1 *the courses offered during the 1st year of the Master program.*

The second year of the program is dedicated to research projects. At the moment of writing this abstract a package of projects is being developed which will be presented to the students around the summer 2015. Some of the topics are about Sedimentology, reservoir quality, diagenesis, stratigraphy, volumetrics, petrology of the Msolwa Hill.

During the EAGE Meeting, we hope that all students will be actively developing their research topics.

Reflections from first months

While the evaluation of the 1st year will be finalized in the coming weeks, there is little doubt that it was a great success. Despite all difficulties, typically associated with the beginning of complex initiatives like the Master program, the courses have all been given and the students have been participating with great dedication and interest. The foreign lecturers were impressed by the high level of the participants and their ability to perform intensive work for the entire duration of the course. Indeed, the number of participants has remained constant throughout the course. The infrastructures and support provided by the University of Dar Es Salaam have been impeccable.



Figure 2 *The students at work!*

Challenges ahead

Building a stable and robust Master program implies the ability to identify the challenges and difficulties to be tackled. The K2K working group inclusive of the staff of the Department of Geology are fully engaged in this process and committed to the strengthening of the program. Despite the fact that the first year is not finished yet, a number of priorities has been identified.

- Improvement will be developing tools to facilitate sharing of scientific material used during the classes and of other documents relevant to the topics addressed.

- Distant learning tools offer a unique opportunity to provide access to high level education to students of various parts of the world independently of their economic situations. This potential has not been used at full potential. Developing and applying Massive Open Online Courses (MOOCs) is one of the best solutions and will be pursued in the future
- Finding UDSM personnel to act as counterparts of the foreign lecturers and, thereby, being trained to take over the course in a short time, has proven more difficult than expected. Envisaging solution to this problem will contribute to the full embedding of the program in UDSM and in Tanzania at large.
- One of the most important challenges will be to strengthen relations with Industry. This will lead to courses or specific lecturers and, more importantly, to projects and internships co-supervised by UDSM and other Academic personnel during the 2nd year of the Master program.

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