Joint Closing Workshop of the IGCP/UNESCO/SIDA Projects 594 and 606

25 - 28 May, 2014, Prague, Czech Republic

On completion of the four year tenure (2011-2014) of the projects on “The impact of mining and mineral processing on the environment and human health in Africa” (IGCP/UNESCO/SIDA Project 594) and “Environmental health impacts of major and abandoned mines in Sub-Saharan Africa” (IGCP/UNESCO/SIDA/MUT Project 606) a “Joint Closing Workshop” was organised at Prague, Capital City of the Czech Republic, whose Geological Survey has been the home of IGCP/UNESCO/SIDA Project 594 since its inception. The theme for the Joint Closing Workshop was: “Addressing Environmental and Health Impacts of Active and Abandoned Mines in Sub-Saharan Africa”. The Joint Closing Workshop was organized in order to: (i) optimise the synergy resulting from the consanguineous nature of the two projects’ mandates, (ii) consolidate research outputs that emerged out of them, and (iii) collate, synthesize and put in summary form, the vast array of contributions from the various research groups working under the ambit of these two projects (594 and 606).

A total of about 60 delegates representing 8 African nations (Cameroon, Kenya, Morocco, Namibia, Nigeria, Senegal, South Africa and Zambia), 9 European countries (Belgium, the Czech Republic, Croatia, Germany, Great Britain, Italy, Poland, Sweden, Switzerland) and the USA participated. The proceedings which ran from 25 to 28 May, 2014, concluded with a ‘Business Meeting and Closing Workshop Session’ on the evening of 28 May, 2014.

Prof. I. Nyambe of the University of Zambia, Lusaka, chaired the opening ceremony that featured 6 introductory speeches. **Dr. Z. Venera**, Director, Czech Geological Survey (CGS) officially declared the event opened and noted, *inter alia*, that the Geological Survey of the Czech Republic has statutory obligations to (i) undertake systematic geological mapping and investigation of the whole of the Czech Republic, and to (ii) monitor and

evaluate the impact of mining and of hazardous mining wastes on the environment, after mine closure. This was followed by welcome and introductory addresses by **Dr. S. Opluštil**, Czech IGCP Committee for Geosciences; **Prof. N.J. Ndlazi**, Dean, Faculty of Natural Sciences of Mangosuthu University of Technology, South Africa; **Dr. S. Felix Toteu**, UNESCO Earth Science and Ecology Specialist, Nairobi, Kenya; **Prof. B. Kofibek**, Project IGCP/UNESCO/SIDA 594 Team Leader, and Prof. T.C. Davies, Project IGCP/UNESCO/SIDA/MUT 606 Team Leader. These speeches set the stage for the ‘Scientific Programme’ which comprised seven invited lectures, six scientific sessions, including a ‘Business Meeting and Closing Workshop Session’, as well as a poster session.

The Scientific Programme focused on the following themes, which broadly represent the combined mandates of the two projects:

- Soils and surface contamination by metals and gaseous emissions in mining and mineral processing districts
- Response of plants to heavy metal stress and bioremediation
- Contamination of wetlands, surface- and ground-waters
- Modeling of dispersion of dust and gaseous emissions from mining operations and smelters
- Geochemical modeling of the pollutant cycle in contaminated areas
- Evaluation of potential links between contamination and health in mining districts
- Environmental issues in small-scale and artisanal mining districts
- Environmental policy and legislation – best practices
- Progress made in compilation of a complete inventory and database of abandoned and derelict mines in Sub-Saharan Africa
- Particulate matter in the mining environment: From air to human lungs
- Natural hazards: noise; vibration and machinery; vehicular disturbances; oxygen deficiency; extreme temperature and humidity
- Radiation and radon gas

The scientific sessions were concluded by attendance of participants at a full day’s field visit to nuclear waste processing sites at the Strá Uranium Deposit, depicting best practice approaches in remediation and in-situ leaching.

Delegates at the Workshop venue, Hotel ILF Prague, Czech Republic

In summary, the interactive workshop with lively debates achieved the desired objectives of the two projects and brought out clearly the need for further collaborative and interdisciplinary studies on the relationships between mining and environmental health in the Sub-Region. The intensity of research on improvement in remediation and rehabilitation strategies by large mining concerns augurs well for the environmental health of miners and the surrounding mining communities. Selected papers presented at this workshop are expected to be published early next year in a special issue of a high impact journal.

The 'Business Meeting and Closing Workshop Session' proceeded by collation of the observations, impressions, lessons learnt and suggestions for the 'way forward', from each of the delegates, which were synthesized and translated into discrete resolutions that include:

1. The need for improved data quality and better, more rigorous statistical analysis of data.
2. The establishment of more capacity building components in the projects.
3. Future IGCP/UNESCO/SIDA projects should be made more interdisciplinary; e.g., addressing ethical issues; socio-economic problems, especially in relation to small-scale mining; the impact of coal mining; more involvement of public health practitioners, dieticians and so on.
4. Project participants should aspire towards production of far more research output, expressed in the form of publications in high impact journals. Much more should be done by project leaders to facilitate access (encourage subscription) to high impact journals by junior and middle-level researchers.
5. The importance of knowledge-sharing with colleagues in Africa was emphasized. This, it was noted, would help stem duplication of effort by other scientists working within the region. This need not detract from the necessity to strengthen collaboration with established research centers outside Africa, and the involvement of post-doctoral fellows in such linkages.
6. The good relationship between mining communities and mine management that is being created, should be strengthened and maintained.
7. The subject of 'phytoremediation' holds great prospect in our efforts at remediation. Much encouragement ought to be given for sustained research in this area.
8. We still have knowledge gaps on pathways, bioavailability and bio-accessibility of potentially harmful elements (PHEs) from mine wastes and from ore processing activities. Research in this area ought to be intensified, as only with this knowledge would we be able to perform better risk assessments, and obviate exposure routes of contaminants.
9. It is important to establish national and regional background values in Sub-Saharan Africa, so that local thresholds can be more accurately captured, and the use of foreign standards could be largely obviated.
10. We should seek to obtain improved medical records for miners and those in mining-related communities.
11. At this end phase of Projects IGCP/UNESCO/SIDA 594 and 606, the need for follow-up studies should be urgently considered.
12. Much stronger mechanisms for dissemination of the results from these projects (IGCP/UNESCO/SIDA 594 and 606) should be put in place.
13. Project leaders are considering the publication of selected full length papers based on the Workshop presentations in a 'Special Issue' of a high impact journal, yet to be identified.
14. We have to seek effective ways of reaching out to Government and policy advisors with our results. It was noted that the preparation and dissemination of "policy briefs" is in progress by project leaders.

On behalf of the organizing committee of this Joint Closing Workshop we extend our gratitude to all the institutions that were involved in its preparation and organization – the Czech Geological Survey, Mangosuthu University of Technology, UNESCO Regional Office for Africa and the Swedish International Development Agency. Our sincere thanks go to the many people who worked tirelessly to ensure the success of this Workshop.

**T.C. Davies^{1*}, B. Kofibek², V. Ngure³,
T.T. Poswa¹, G.D. Arthur¹ and V. Ettler⁴**

1 Mangosuthu University of Technology, Umlazi, South Africa

2 Czech Geological Survey, Prague, Czech Republic.

3 Laikipia University, Nyahururu, Kenya.

4 Charles University, Prague, Czech Republic

*E-mail: theo.clavellpr3@gmail.com