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Excellence in Agricultural Research and Development

Soil Remediation Workshop

(With special presentation on Nextgen sequencing)

27 - 28 May 2014

Soil Health is an important aspect of terrestrial agricultural production with high impact on environmental health and on both quality and quantity of the type of food being produced. As soil serves as an environmental filter and regulates the partitioning of water flow through the environment as part of the hydrological cycle, soil health is directly affected by contamination and pollution, either through anthropogenic or natural means. As soil provides a medium for terrestrial plant growth, contamination and pollution adversely affect the food chain. Soil can be contaminated by a variety of chemical substances such as oil and pesticides, as well as by industrial and mining wastes.

In this workshop, participants will learn about a variety of ways to test for soil contamination as well as remediation technologies that can be used to deal with soil contamination. They will then deliberate different strategies to mitigate and remediate compromised soils.

The Soil Remediation Workshop provides an ideal opportunity for concerned parties and stakeholders to share perspectives, to pose questions and to develop ideas conducive to the formulation of guidelines for best work practices that will support safe and sustainable biological remediation practices in South Africa.

PROGRAMME

Day 1	Topic	Presenter
08:20 – 08:30	Welcome address	Dr. Rasheed Adeleke
08:30 – 08:45	What we represent as ARC	Dr. Jasper Rees
08:45 – 09:00	Introduction to ARC-ISCW	Dr. Mphekgo Maila
09:00 – 10:00	General overview of Bioremediation • Biostimulation • Bioaugmentation • Phytoremediation	Prof. Damase Khasa
10:00 – 10:10	**TEA BREAK**	
10:10 – 11:10	Microbial ecology and Bioremediation	Prof. Don Cowan
11:10 – 12:10	Relevance of Contaminated Land Assessment in today's South Africa	Dr. Eric Igbinigie
12:10 – 12:40	Phytoremediation in Agroforestry	Prof. Damase Khasa
12:40 – 13:30	**LUNCH**	
13:30 – 13:40	**Group Photograph**	
13:40 – 14:40	ARC Biotechnology platform – our roles in soil and plant biology	Dr. Dirk Swanevelder
14:40 – 14:50	**TEA BREAK**	
14:50 – 16:15	Group discussions of the topics above and other points that may be brought up by the workshop participants	To be co-ordinated by Prof. Don Cowan

Day 2	Topic	Presenter
08:20 – 09:20	Bioremediation in wetlands: outcome of a field study	Prof. Don Cowan
09:20 – 10:20	Environmental Due Diligence: Case Study	Dr. Eric Igbinigie
10:20 – 10:30	**TEA BREAK**	
10:30 – 11:50	Challenges of using treated acid mine drainage water for irrigation	Prof. Jannie Maree
11:50 – 12:05	Using reactivated AMD for irrigation purposes	Mr. Peter Mohasoa
12:05 – 12:20	Potential use of bamboo in phytoremediation	Mr. Jan Van Zyl
12:20 – 13:20	**LUNCH**	
13:20 – 14:10	Soil ecotoxicology and vermitechnology	Prof. Mark Maboeta
14:10 – 15:20	General discussion session	To be co-ordinated by Prof. Damase Khasa
15:20 – 15:30	**TEA BREAK**	
15:30 – 16:30	**SPECIAL PRESENTATION** 1. Importance of Next generation sequencing in Agricultural Science 2. Challenges of setting up a Nextgen sequencing facility	Prof. Charlie Johnson

Workshop venue : ARC-Head Office, 1134 Park Street, Hatfield, Pretoria
Organizers : ARC-Institute for Soil, Climate and Water
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About the Presenters:

Prof. Damase Khasa, Université Laval, Canada

Prof. Khasa is a co-founder and Executive Director of Forestry Without Borders, a non-profit organization whose mission is to reduce poverty in developing countries and promote sustainable development of the world's forests. He is also the director of training support management of natural resources in the Congo Basin Project. He is a member of the Interdisciplinary Group for Research in Agroforestry (GIRAF) and is also the Université Laval representative on the Poplar Council of Canada and scientific expert advisor of the International Foundation for Science Stockholm (FIS). His research interests range from forest genomics, environmental genomics and plant symbioses to applications in agroforestry, forestry and rural development in tropical, subtropical and temperate environments.

Prof. Don Cowan, University of Pretoria

Prof. Cowan is a full professor in the Department of Genetics in the Faculty of Natural and Agricultural Sciences at the University of Pretoria. He is the Director of the UP Interdisciplinary Research Theme in Genomics, and of a new research centre, the Centre for Microbial Ecology and Genomics. His research activities are linked by the theme of 'environmental extremes'. Researchers in his laboratory use the methods of microbiology, genomics, metagenomics and microbial ecology to investigate organisms living in deserts and hot pools at high temperatures, in the Antarctic Dry Valleys at very low temperatures and in other extreme environments. His collaborators include researchers in South Africa, Namibia, Kenya, Zambia, Argentina, New Zealand, UK, Germany and the USA.

Prof. Cowan has published over 210 research papers, review articles and book chapters, and is on the editorial boards of nine international journals. He holds the post of Adjunct Professor at the University of Waikato (New Zealand). He was elected a member of the Academy of Sciences of South Africa in 2008 and an honorary fellow of the Royal Society of New Zealand in 2009. He is a fellow and current president of the Royal Society of South Africa.

Prof. Cowan received a A2-rating from the NRF.

Prof. Jannie Maree, Tshwane University of Technology

Prof. Maree received his M.Sc. in chemistry in 1975 and his Ph.D. in 1988, both from the University of the Free State. He worked at CSIR from 1976 to 2007 where he focussed on the development of processes in the field of neutralization, chemical sulphate removal and by-product recovery. Several publications, patents and full-scale plants resulted from his research. Since July 2007 he has been in the position of Rand Water Chair in Water Utilization at the Tshwane University of Technology.

Dr. Eric Egbe Igbinigie, Coastal and Environmental Services

Dr. Igbinigie is a seasoned environmental consultant working with Coastal and Environmental Services based in South Africa. He has a Ph.D. in Environmental Biotechnology and over 6 years experience as an environmental scientist, including 4 years of international consulting experience in numerous African countries (e.g. Liberia, Mozambique, Madagascar, Zambia, South Africa, Malawi, Ghana, Sierra Leone and Kenya). Apart from his wealth of experience as an environmental consultant, he also has an outstanding record in research and academic scholarship with Rhodes University. His research has yielded sound scholarly publications in reputable local and international journals. His areas of expertise include Bioremediation, Environmental Impact Assessment (EIA), Environmental Due Diligence (Phases I, II & III), Environmental Management Systems, and Waste and Wastewater Impact Assessment. Among his qualifications are certification in Environmental Management System ISO 14001 and EIA. Dr. Igbinigie is a member of the South African Council for Natural Scientific Professions and the Water Institute of Southern Africa. He has served as a reviewer for some notable journals including the South African Journal of Science. He has mentored young scientists as a teacher and research supervisor at Rhodes University, his *alma mata*.

Prof. Mark Maboeta, North-West University

Prof. Maboeta's research focus is on soil ecotoxicology which is done to assess the effects of pollution on the soil environment with special interest on the use of earthworms as bioindicators. At present, his research grouping is the leading soil ecotoxicology group in South Africa and Africa. Another facet of this research is organic waste management utilizing earthworms. An example of this is the environmental risk of organic waste produced by platinum mines and to use earthworms to bioconvert it for use in tailings dam rehabilitation strategies (seeing waste as a commodity). He also has experience in the rehabilitation of tailings produced by mines and the environmental impact assessment of metals in the tailings and soil.

Prof. Charlie Johnson, Texas A&M University, USA

Prof. Johnson is Director of Genomics and Bioinformatics at Texas A&M AgriLife in College Station and Associate Director for the Texas A&M Center for Bioinformatics and Genomic Systems Engineering (CBGSE). His centre houses the latest in next generation sequencing technologies and bioinformatics research. The CBGSE includes 12 faculty and over 30 graduate students. Prof. Johnson has over 20 years of scientific research and organizational leadership experience with an established track record in genomic and bioinformatics research and technology development. At Texas A&M he has built a collaborative network of over 650 scientists spanning academic groups around the world, with a large number of private sector life science and agricultural industry partners. Last year they completed over 150 sequencing projects (>7000 samples) and supported over 250 grant submissions over the last three years, resulting in over US$30 million of funding. This year he launched the largest internal genomic seed grant programme in Texas A&M history.

Prof. Johnson received his Ph.D. from the Texas A&M University Department of Soil and Crop Science with a focus on plant physiology. His postdoctorate was at the University of Louisville medical centre. From there he founded the statistics and bioinformatics division at Ambion Inc., now Asuragen (Austin, TX), and oversaw and participated in over 400 research projects for top pharmaceutical, biotech and academic clients. While at Asuragen Inc. he led the development of the first Affymetrix™ miRNA microarray and associated bioinformatics pipeline. He was recruited to lead the next generation sequencing and bioinformatics centre at Texas A&M in 2010.

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