

Russia-Africa Collaboration in the Area of Soil Science



A meeting Report of The Fifth African Higher Education Week and RUFORUM Biennial Conference, 17th – 21st October 2016, Cape Town, South Africa

The Russia-Africa Collaboration in the area of Soil science is a new undertaking by the Eurasian Center for Food Security based at the Lomonosov Moscow State University, The World Bank and The Regional Universities for Capacity Building in Agriculture (RUFORUM) to bring together varied expertise from Russia and Africa to collaborate in neglected yet critical disciplines in Africa. This consultative meeting was part of the wider World Bank undertakings to broker partnerships for global collaboration and RUFORUM's effort to undertake avenues for institutional transformation so as to facilitate network universities transform to meaningfully contribute to agricultural, national and regional development in Africa. The Eurasian Center for Food Security and Lomonosov Moscow State University together with the RUFORUM network universities from 13 African countries discussed Africa's challenges in soil science, resources available in Africa, what can be done and shared experience of excellence from Russia. A joint perspective for collaboration between RUFORUM, The World Bank and the Eurasian Center for Food Security was launched with Soil Science as the anchor point for intervention.

The World Bank, Moscow State University and RUFORUM. ©October 2016



Introduction

The Eurasian Center for Food Security is a think-tank affiliated with the Lomonosov Moscow State University and funded through the Russian Agricultural Development Aid Cooperation mechanism. Ensuring food security and agricultural development is one of the priority areas of international development assistance of the Russian Federation. Since 2011, there has been an ongoing collaborative partnership between the World Bank and the Government of the Russian Federation, whereby the Bank has been assisting the Lomonosov Moscow State University in developing the Eurasian Center for Food Security. This Center is housed in the University's Soil Sciences and Economics Faculties with the objective of promoting inter-disciplinary research and analytical knowledge in Food Security issues in the Eurasian region and beyond.

The Center builds on the strong educational and research reputation of Lomonosov Moscow State University, specifically in the area of soil science. The University houses one of the unique soil science faculties in the world, and is known for its scientific and educational resources.

For several decades, a gradual but steady deterioration of the fertility of soils in Africa has posed a challenge to economic development on that continent and to the livelihoods and food security of rural people. Even so, this situation has not had significant profile nor has it received the attention it requires. Further, agricultural research and training programs at universities and at dedicated research organizations (including at the CGIAR) have gradually diminished their attention to soils per se, while turning their focus to more holistic issues around crop production. While this latter focus has value and merit, the diminishment of attention to soil science threatens to become a constraint to the agricultural production on the continent. After several decades on this trend line, Africa has limited human and institutional capital with which to address the profound soil challenges that it faces.

In light of the aforementioned concerns, Eurasian Center has expressed interest in expanding its focus beyond Eastern Europe and Central Asia to include Africa. In particular, the Center is interested to explore the possibility of developing a program of support to help to address the soil situation in Africa. Initially, this would likely be through the development of collaboration in capacity building with African universities and other agricultural research institutions in the area of soil science. More specifically, the Center has expressed interest in making its resources available to African students, researchers and professors.

In building a comprehensive agenda, the Center and the World Bank have approached RUFORUM as a key actor and aggregator of African Higher Education institutions with a strategic focus on agriculture and agricultural development in Africa. Through this collaborative arrangement, the World Bank and the Eurasian Center hope to better engage African universities, students and academics to successfully revolutionize research and soil science practice in Africa. The 2016 Africa Higher Education Week and the RUFORUM Biennial Conference in Cape Town provided a unique opportunity to commence exploration of possibilities for developing a collaborative program of support and collaboration for soil science in Africa.

Meeting proceedings

Welcome remarks

Participants from 18 African countries (see list of participants in annex) present in the meeting were welcomed to the session. Participants were provided with the objectives and purpose of the convened meeting to include: (i) discuss the soils situation in Africa, and the current state of affairs with respect to soil science training and research in Africa; (ii) initiate a discussion on whether the Center can become a partner with the selected African Universities and to help identify ways on how to build partnership; and (ii) to explore the interest of selected African Universities and the Center in developing joint education programs or in supporting African students' or practitioners' participation in the Center's educational courses. From the RUFORUM perspective, this collaboration brings to the forefront the need to address neglected disciplines and fields yet critical in Africa's agricultural development. Specifically important in making universities to meaningfully contribute to Africa's food security, growth and development. The World Bank, believes, this kind of collaboration offers opportunity to aggregate resources, expertise and experience that will increase global collaboration and increase scientific relevance and leadership across Africa and Russia.

Eurasian center for food security

The Eurasian Center for Food Security (ECFS) located in Moscow at the Lomonosov Moscow State University was founded in 2011 as a response of the Russian Federation to the L'Aquila Food Security Initiative which was launched at the 2009 G-8 Summit in L'Aquila, Italy (see Figure below describing the center's evolution). The center has a range of experts from soil science and agroeconomics. The Center is developed around the vision "*Food security through sustainable management of natural resources and food market regulation*" and a mission seeking to

"Encourage and coordinate collective action to strengthen food security in Eurasia through research and development". Accordingly, the Center is focused on four broad to specific areas including: Research, Education and extension, Expertise, and Coordination of intergovernmental projects.

The timeline diagram illustrates the evolution of the Eurasian Center for Food Security (ECFS) through three key milestones:

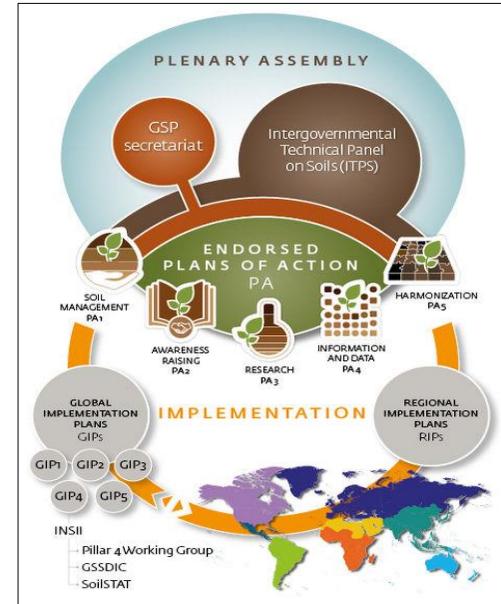
- July 2009:** L'Aquila Food Security Initiative at the G-8 Summit, Italy. This is represented by an orange circle labeled "G8".
- April 2011:** Cooperation with the World Bank, which provides the analytical and advisory services to support ECFS. This is represented by a black circle labeled "WORLD BANK".
- March 2013:** The launch of the Eurasian Center for Food Security to the global arena. This is represented by a blue circle containing a microphone icon.

The timeline also indicates the signing of the Food Security Doctrine into force by the Russian President Decree (January 2010) and the establishment of the Eurasian Center for Food Security (December 2010), which occurred between the initial G-8 summit and the final launch.

The Center runs three core departments that assist it to deliver its mandate; these units include the; Land Resources, Agro-economics, and Information and education. Each of these departments has a strategic focus and delivers of specific functions of the Center. For example, the Department

of Agro-economics seeks to provide global food situation analyses and its influence on Russia and Eurasian region. Accordingly, the department from time to time provides analysis and monitoring of food policy in Russia and the countries of Eurasian region, provides an assessment of influence of climate change on food security, assessment of constraints and prospects in development of the main agro-food markets and the development of food security assessment methodologies in the region.

Within the Center is an operational Eurasian Soil Partnership; this is a sub-regional part of the Global soil partnership (<http://www.fao.org/global-soil-partnership/regional-partnerships/europe/eurasia/en/>). This Eurasian soil partnership unifies the experts in soil science and agronomy from the Eurasian countries (Russia and adjacent countries). Through the partnership, five key aspects are addressed namely: soil management, awareness raising, research, information and data, and harmonization of various programmes and activities; these five key areas are part of the five pillars of the Global Soil Partnership (see Figure). The Center now seeks for collaboration beyond the Eurasian region with a keen focus to develop collaboration arrangements and programs with Africa as part of growing its global operations as well as providing strategic support to other regional networks with similar mandates and effort.



Lomonosov Moscow State University: Soil Science Faculty

The Lomonosov Moscow State University is a prestigious university and the oldest (established in 1755) in Russia. It has over 40,000 students at both graduate and undergraduate level. Its undergraduate population is about 7,000 students indicating its research focus as the graduate student population is higher. The university has about 5000 researchers working at various levels including in the faculties and research institutes. The university's average annual enrollment rate for international students is about 4000 students. The university has several faculties, schools and institutes that run a number of academic programmes (see list).

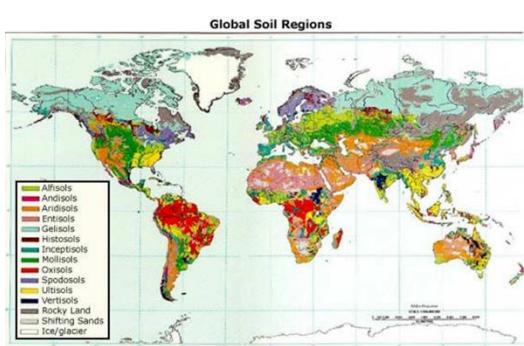
Soil Science is a highly developed discipline at the University. It owes its outstanding development to the leading Russian scientists-V.V.Dokuchaev, V.I.Vernadskiy, and other experts, who interpreted soil as a part of biosphere and noosphere. Accordingly, Moscow State University has a fully-fledged Faculty

FACULTIES

- Faculty of Mechanics and Mathematics
- Faculty of Computational Mathematics and Cybernetics
- Faculty of Physics
- Faculty of Chemistry
- Faculty of Materials Science
- Faculty of Biology
- Faculty of Bioengineering and Bioinformatics
- Faculty of Soil Science
- Faculty of Geology
- Faculty of Geography
- Faculty of Fundamental Medicine
- Faculty of fundamental physical and chemical engineering
- Faculty of History
- Faculty of Philology
- Faculty of Philosophy
- Faculty of Economics
- Faculty of Law
- Faculty of Journalism
- Faculty of Psychology
- The Institute of Asian and African Studies
- Faculty of Sociology
- Faculty of Foreign Languages and Area Studies
- Faculty of Public Administration
- Faculty of World Politics
- Faculty of Fine and Performing Arts
- Faculty of Global Processes
- Faculty of Educational Studies
- Faculty of Political Science
- School of Business Administration
- Moscow School of Economics
- School of Translation and Interpretation
- Graduate School of Public Administration
- School of State Audit
- Graduate School of Management and Innovation
- Graduate School of Innovative Business
- School of Contemporary Social Sciences
- School of Television
- Higher School of Policy in Culture and Management in the Sphere of Humanities
- Faculty of Urban Studies

of Soil Science with about 450 undergraduate students, 15 MSc and 30 PhD students. There are 267 Faculty and technician stuff, 40 of whom are Professors and 115 Researchers with PhD level qualification.

The Faculty and MSU at large has had varied contribution to the International Soil Research as well as to Africa. For example, Russian Scientists from MSU (*V.Kovda, G.Dobrovolskiy, B.Rozanov, M.Stroganova, and N.Rozov*) contributed to the Global soil maps and the global soil map that until recently was the only global overview of the soil resources (see Figure to the right).



Further, Lomonosov Moscow State University (MSU) is the Russian intellectual center for desertification studies and mapping with reknown works Victor Kovda and Boris Rozanov; the classical scientists. These works have provided global to regional specific relevance and have guided scientific discourse

of several decades.

The Faculty of soil science is constituted by 11 departments (see list to the right). Each of these departments provides unique services and programmes at Faculty level. The summer schools are however diverse including those in soil science, wildlife and landscape management, and soil science and ecology among others. These summer schools help with the experiential learning development as well as cultural integration. The Faculty has advanced the development of Humic products in agriculture and environmental technologies and Plant nutrition and plant biochemistry among others.

In looking forward, the Faculty of Soil Science aspires for collaboration in Education including: in BSc, MSc and PhD, selected courses, student exchange and developing agreements of cooperation. Further cooperation needs to be developed around Joint Research in Humic products in agriculture, and combating desertification among other areas.

- Agro-chemistry and Plant Biochemistry
- Soil Science
- Soil Geography
- Soil Physic and Melioration
- Soil Chemistry
- Soil Biology
- Soil Technology
- Soil Erosion and Conservation
- Agro-informatics
- Land Resources
- Radio-ecology and Ecotoxicology

African soil science landscape

African soils are varied owing to a complex geography and use forms. Nonetheless, the vast majority of African soils have had considerable declined productivity requiring supplementation which is barely undertaken particularly in Sub-Saharan Africa. Africa has had varied trends in the field of soil science; from colonial to post-colonial and to the present period. During the colonial period, enormous effort was put to mapping African soils in a relatively coarse scale (1:50,000). For many African countries, these are the only available soil classification maps that are available. During the post-colonial era, African governments also invested in the higher education institutions and Faculties and Colleges of Agriculture were developed around the broad disciplinary focus. Accordingly Departments of Science existed in the universities and in

the Faculties of agriculture like other Faculties such as Animal Science, Crop Science, and Agricultural Economics etc. However, in the current period, a downward spiral of soil science departments is occurring; several of the researchers and academics that were trained during the colonial and post-colonial period are retired and retiring yet there are very few soil scientists in the departments and faculties.

Further to this crisis, is the fact the student numbers in many departments of soil science are dwindling with some programmes failing to raise the requisite number of students to be undertaken. Accordingly, universities pressed with the need to strategically manage resources both staff and facilities, have either closed the departments of soil science and/or merged them with other departments to create seemingly 'viable' departments. Such initiatives further threaten the existence and development of science as a discipline in Africa and also undermines the actual value and contribution of soil science to food security and economic development. The developments have similarly made it hard to attract resources to stabilize and finance soil science research programs in Africa.

Notwithstanding the above, African universities have continued to train soil scientists. Soil Science programmes exist in several universities either as fully-fledged programmes or modules (see Figure to the right) and researchers in these universities have continued to provide various contributions at various levels including at national and regional level. Increasingly, demand for soil science support at local farm level has gained traction as such requirements and needs for agronomic based maps has become important lately. These are however missing in many African countries. Further, while the interest in soil science has remarkably increased since the 2015 year of soil; student interest in agriculture has declined dramatically. This requires that universities repackage their soil science and agriculture related programmes to make them attractive and marketable among the graduates of the present times. Further, other possible options and opportunities for improving soil science practice in Africa are presented in the Figure below.

Content....



Modules: *Soil Genesis, Soil Mineralogy, Soil Chemistry, Soil and Water Conservation, Soil Physics and/or Soil-Water-Plant Relationships, Soil microbiology/Soil Biology, Soil Fertility and Fertilizers, Plant Nutrition, Land Use Management...*

Supporting modules: *Other Agricultural courses, Biometrics for Agricultural Sciences, Research Methods, Data Management and Communication of Science, Geographic Information Systems (GIS) in Land Resource Management, Gender in Agriculture... etc*

Background: *Chemistry, Biological and Physical Sciences and Mathematics....*

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Opportunities...

- Interesting Youth in Agriculture
- Communication
- Re-evaluating the curricula to include the dynamic changes: climate issues, gender, ICT, policy, etc....make it more attractive
- Inter and Intra-University Collaboration to make use of infrastructure and resources-financial implications to the Universities
- Refresher courses for technicians interactions of postgraduate students and technicians
- Exchange programmes and guest speakers/Professors



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What can be done?

The participants underscored the varied levels of development in the field of soil science in Russia and Africa and underscored a range of similar efforts such as those implemented by the Eurasian Center for Food Security as critical. It was thus observed that a raft of measures need to be undertaken to reinvigorate soil science discipline in Africa and better enhance the collaboration between Russia and Africa. The following need to be undertaken:

1. Institutionalize the collaboration between the Eurasian Center for Food Security, Moscow State University, the World Bank and RUFORUM.
2. Take advantage of the rising interest in soil science in Africa and build on the successes and long experience and expertise from Russia to capitalize on it and use it to further build and strengthen the discipline as well as its products.
3. Explore opportunities and possibilities for further capacity building through refresher courses academic exchange, and students exchange that will support retooling of academics and other professionals including technicians involved in the soil science practice.
4. Build strong and vibrant partnerships and collaboration with universities, researchers and industry both within and outside Africa with a vibrant network of researchers in the field of soil science including with other associations/bodies besides Russia.
5. Undertake soil science programmes curriculum review to make them more inclusive with aspects such as Gender, climate change, entrepreneurship and agribusiness, GIS and remote sensing. A soil and Agribusiness ecosystem interface should highly be explored.
6. Consider strategic dialogue on retention of professionally trained Soil Scientist in the field and practice of soil science. This will scientifically improve the strength and practice of soil science.
7. Collaboration with Moscow State University through students exchange and international students recruitment could be based on the quality programmes they offer. Scouting for sources of funding to support the training of African students in such programmes is very critical. Collaboration can also be further developed through Joint Research programs.
8. African universities and faculties require equipping as well staff capacity building in using the modern equipment that will be procured and installed. Failure to build human capacity will lead to non-use of the sophisticated equipment that would have been acquired as has been the experience in many African universities.

Immediate actions for moving forward

- Develop a concept note for partnerships to address emerging challenges. A team of five including Prof. Majaliwa Mwanjalolo (Makerere University), Dr. John Lynam (Independent Consultant) David Nielson (World Bank), Dr. Anthony Egeru (RUFORUM) and Artavazd Hakobegan (World Bank) will spearhead this process.
- Focus towards attending the 5th-6th December, 2016 conference and dialogue meeting in Moscow. The World Bank and Eurasian Center for Food Security to send invitations; David Nielson to handle this action.

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