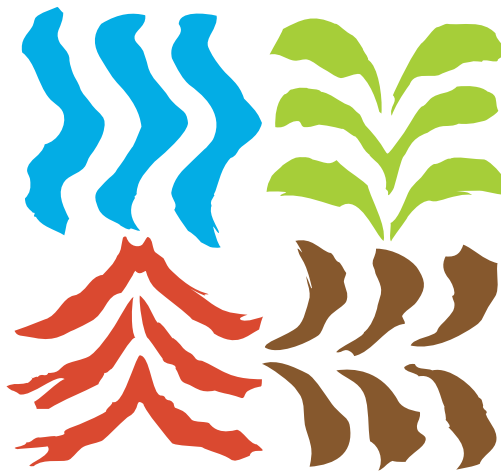




20th WORLD CONGRESS OF SOIL SCIENCE

In Commemoration of the
90th Anniversary of the IUSS



Soils Embrace Life and Universe

June 8-13, 2014 Jeju, Korea
www.20wcsc.org

Host



International Union of
Soil Sciences



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20th WORLD CONGRESS OF SOIL SCIENCE

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O R A L S E S S I O N

- Congress Symposium
 - June 9 (Mon)
 - June 10 (Tue)
 - June 12 (Thu)
 - June 13 (Fri)

- For your reference, abstracts of oral sessions are shown as group per symposium, but those of poster presentations are listed individually.

- Those who wish to cite abstracts in the proceedings of 20WCSS may refer as below since the abstract online access system does not specify the page.

* Author's Name. 2014. Title of Abstract. Symposium Name. Proceedings of the 20th WCSS (www.20wcscs.org), Abstract Online Access System, June 8 to 13, Jeju, Korea.
(Example) Kim, S.Y. and V.K. Choi. 2014. Soil security and awareness. Congress Symposium 1: Soils for Peace. Proceedings of the 20th WCSS (www.20wcscs.org), Abstract Online Access System, June 8 to 13, Jeju, Korea.

- 044-2** **Release Behaviour of Fullerene Nanoparticles from Soils Amended with Sewage Sludge**
10:40
Divina Navarrol, Rai S. Kookana, Mike McLaughlin and Jason Kirby
CSIRO Land and Water, PMB 2, Australia
- 044-3** **Al and Fe Nanominerals Dominate Organic Carbon Preservation in Soil**
11:00
Jian Xiao
Nanjing Agriculture University, China
- 044-4** **Nanoscale Chemical Analyses of Biochar from Ancient Amazonian Anthrosoils**
11:20
B. S. Archanjo^{1*}, J. R. Araujo¹, A. M. Silva¹, R. B. Capaz², E. h. Martins-Ferreira¹, D. L. Baptista³, N. P. S. Falcao⁴, J. Ribeiro-Soares⁵, L. G. Cancado⁵, A. Jorio⁶ and C. A. Achete⁷
¹National Institute of Metrology, Quality and Technology (Inmetro), Brazil; ²Universidade Federal do Rio de Janeiro, Brazil; ³Universidade Federal do Rio Grande do Sul, Brazil; ⁴National Institute for Research in Amazonia (INPA), Brazil; ⁵Universidade Federal de Minas Gerais, Brazil; ⁶ETH Zurich, Switzerland; ⁷Universidade Federal do Rio de Janeiro, Brazil
- 044-5** **New Biofilter Media Modified with Nano-engineered Metal-organosilica Hybrid Composites: an Innovative Solution for Remediation of Stormwater Runoff and Prevention of Soil Pollution**
11:40
Hanbae Yang^{1*} and Paul Edmiston²
¹ABSMaterials, Inc, USA; ²The College of Wooster, USA
- 044-6** **Bacterial Biofilms (Extracellular Polymeric Substances): Role in Geosorbents Mobility and Reactivity**
12:00
Sneha Pradip Narvekar^{*} and Kai Uwe Totsche
Institute of Geosciences, Germany
- 044-7** **Evaluation of Phytotoxicity Effects of Nano Zero-valent Iron (nZVI) on Plants Growth in Soil Culture; Seed Germination, Chlorophyll, Carbohydrates**
12:20
Jae-Hwan Kim, Hak-Won Yoon, Chung-Seop Lee, Da-Som Oh and Yoon-Seok Chang^{*}
POSTECH, Korea

Oral Session No. 45

Halla A+B (3F)

[IDS8] Soils, Land Use and Heat

June 12 (Thu), 10:10 - 12:40

Convenor: *Wolfgang Burghardt (University of South Australia, Germany)/ Ralph Meissner (Helmholtz Centre for Environmental Research, Germany)*

- 045-1** **Soils, Land Use and Heat**
10:10
Gerd Wessolek, Bjorn Kluge, Thomas Nehls, Andre Peters and Steffen Trinks
Berlin University of Technology, Germany
- 045-2** **On the Relation between Soils and Climate**
10:40
Alfred Hartemink
University of Wisconsin - Madison, USA
- 045-3** **Numerical Modeling of Vadose Zone Processes using Hydrus and its Specialized Modules**
11:00
Jirka Simunek^{1*}, Miroslav Sejna², Diederik Jacques³, Guenter Langergraber⁴, Scott A. Bradford⁵ and M. Th. Van Genuchten⁶

¹University of California Riverside, USA; ²PC Progress, Czech Republic; ³Belgian Nuclear Research Institute, Belgium; ⁴University of Natural Resources and Life Sciences, Vienna (BOKU University), Austria; ⁵US Salinity Laboratory, USDA, ARS, USA; ⁶Federal University of Rio de Janeiro, Brazil

- 045-4** **Monitoring and Mathematical Modeling of Water and Thermal Regime of Urban Soil Influenced by Various Surface Covers**
11:20
Radka Kodesova^{1*}, Miroslav Fer¹, Antonin Nikodem¹, Ales Klement¹, Pavel Neuberger¹ and Petr Bures²
¹Czech University of Life Sciences Prague, Czech Republic; ²VESKOM, Ltd, Czech Republic
- 045-5** **A New Technology to Secure a Congruent Temperature Regime inside the Lysimeter Vessel and the Surrounding Soil**
11:40
Sascha Reth^{1*}, Katja Richter^{1*}, Ralph Meißner², Jozef Gubis³ and Ivan Matusek⁴
¹Umwelt-Geräte-Technik GmbH, Germany; ²HELMHOLTZ Centre for Environmental Research, Germany; ³Agrosystems PS Piestany, PPRI, Slovakia; ⁴EKOSUR, Slovakia
- 045-6** **Long Term Trends in Some Australian Soil Temperature Records**
12:00
John Knight^{1*}, Budiman Minasny¹, Alex Mcbratney¹, Terry Koen² and Brian Murphy²
¹The University of Sydney, Australia; ²Office of Environment and Heritage, Australia
- 045-7** **Quantifying Small-scale Variability in Water Storage and Root Water Uptake on the Edwards Plateau, Texas**
12:20
Ieyasu Tokumoto
Saga University, Japan

Oral Session No. 46

Samda (3F)

[IDS3] Soil Information and Food Security

June 12 (Thu), 10:10 - 12:40

Convenor: *Pavel Krasilnikov (Moscow State University, Russia)/ Suk Young Hong (Rural Development Administration-RDA, Korea)*

- 046-1** **Healthy Soils and Soil Information: A Prerequisite for Sustainable Food Production**
10:10
Moujahed Achouri
Food and Agriculture Organization of the United Nations, Tunisia
- 046-2** **Global Soil Carbon Assessment**
10:40
Jose Padarian, Uta Stockmann, Budiman Minasny and Alex Mcbratney^{*}
The University of Sydney, Australia
- 046-3** **The Good, the Bad and the Ugly - Experiences from Trying to Establish Soil Monitoring Networks within the UK**
11:00
Helaina Black^{*}
The James Hutton Institute, United Kingdom
- 046-4** **Soil Health in Southern Africa and Implication on Sustainable Intensification: How much is the Gap?**
11:20
Lulseged Tamene^{1*}, Andrew Sila², Job Kihara¹, Gift Ndengu¹, Powell Mponela¹, Keith Shepherd², Markus Walsh³ and Deborah Bossio¹
¹International Center for Tropical Agriculture (CIAT), Malawi; ²Agroforestry Center (ICRAF), Kenya; ³Africa Soil Information Service (AFSIS), Tanzania

046-5
11:40 **Variability of Top Soil Saturated Hydraulic Conductivity (kfs) Affected by Mixed Land Use on Two Volcanic Environments in Central Mexico**

Mario Guevara^{1*}, Alberto Gomez-Tagle Chavez², Alberto Gomez-Tagle Rojas², Miguel Equhua³, Julian Equhua⁴ and Carlos Arroyo¹

¹CONABIO, Mexico; ²Michoacan State University San Nicolas de Hidalgo, Mexico; ³Institute of Ecology A. C., Mexico; ⁴Research Center for Geography and Geomatics Ing. Jorge L. Tamayo, Mexico

046-6
12:00 **Spatial Landuse Planning of Soybean Plantation as Analyzed by Land Evaluation and Dynamic System: a Case Study of Karawang Regency, West Java, Indonesia**

Widiatmaka Widiatmaka¹, Wiwin Ambarwulan², Irman Firmansyah¹ and Khursatul Munibah¹

¹Bogor Agricultural University, Indonesia; ²Geospatial Information Agency, Indonesia

046-7
12:20 **Werise: a Farmer-friendly Decision Support Tool for Climate Change Adaptation in Rainfed Rice Areas**

Keiichi Hayashi^{1*}, Anita Boling¹, Tsutomu Ishimaru¹, Benjamin Samson², Zulkifli Zaini³ and David E. Johnson¹

¹International Rice Research Institute, Philippines; ²International Rice Research Institute, Laos; ³International Rice Research Institute, Indonesia

12:40-13:40 **Lunch (Tamna B)**

Oral Session No. 47

Baekrok A (1F)

[WG9] Steps made toward a Universal Soil Classification

June 12 (Thu), 13:40 - 15:30

Convenor: Jonathan Hempel (Universal Soil Classification System Working Group, Hungary)/ Erika Michéli (Szent Istvan University, Hungary)

047-1
13:40 **Towards a Universal Soil Classification System**
Jonathan Hempel^{1*}, Erika Micheli², Phillip Owens³ and Alex Mcbratney⁴

¹Natural Resources Conservation Service, USA; ²Szent Istvan University, Hungary; ³Purdue University, USA; ⁴University of Sydney, Australia

047-2
14:10 **Approches to Define the Elements of a Universal Soil Classification System**

Erika Micheli^{1*}, Vince Lang¹, Phillip Owens², Jon Hempel³ and Alex Mcbratney⁴

¹Szent Istvan University, Hungary; ²Purdue University, USA; ³USDA NRCS, USA; ⁴University of Sydney, Australia

047-3
14:30 **Toward a Global System of Soil Horizon Nomenclature**

Curtis Monger^{1*}, Lucia Helena C. Anjos², Ganlin Zhang³, Sergey Goryachkin⁴, Ben Harms⁵, Peter Schad⁶, Catherine Fox⁷ and Sonn Yeon-Kyu⁸

¹New Mexico State University, USA; ²UFRRJ, Brazil; ³Chinese Academy of Sciences, China; ⁴Russian Academy of Sciences, Russia; ⁵IT, Innovation and the Arts, Australia; ⁶Technische Universität, Germany; ⁷Agriculture and Agri-Food Canada, Canada; ⁸NAAS, Korea

047-4
14:50 **Cold Soils in Universal Soil Classification**

Sergey Goryachkin^{*}
Russian Academy of Sciences, Russia

047-5
15:10 **Creating Numerical Horizon Classes For The USA**
Philip Hughes^{1*}, Alex Mcbratney¹, Budiman Minasny¹ and Jon Hempel²

¹University of Sydney, Australia; ²USDA Lincoln, USA

Oral Session No. 48

Baekrok B (1F)

[C2.3-2] A: Life in Soils - Distribution and Function of Soil Microorganisms in a Changing Environment

June 12 (Thu), 13:40 - 15:30

Convenor: Ellen Kandeler (University of Hohenheim, Germany)

048-1
13:40 **The Moisture Response of Soil Microorganisms: Old Topic, Present Challenges and New Approaches**

Claire Chenu^{1*}, Fernando Moyano², Naoise Nunan², Ruth Falconer³, Patricia Garnier⁴, Olivier Monga⁵, Wilfred Otten³, Valerie Pot⁴ and Xavier Raynaud⁶

¹AgroParisTech, France; ²CNRS, France; ³University of Abertay, United Kingdom; ⁴INRA, France; ⁵IRD, Cameroon; ⁶UPMC, France

048-2
14:10 **X-Ray Tomography and in Situ Detection Technique used to Quantify Spatial Distribution of Bacteria in Soil**

Archana Juyal¹, Thilo Eickhorst², Philippe Baveye^{3*}, Ruth Falconer¹ and Wilfred Otten¹

¹University of Abertay Dundee, United Kingdom; ²University of Bremen, Germany; ³Rensselaer Polytechnic Institute, USA

048-3
14:30 **The Microbial Landscape in Soils - Biogeography of Soil Microorganisms at Different Scales**

Ellen Kandeler^{1*}, Runa Boeddinghaus¹, Kathleen Regan¹, Franziska Ditterich¹, Sven Marhan¹, Christian Poll¹ and Naoise Nunan²

¹University of Hohenheim, Germany; ²CNRS, France

048-4
14:50 **Soil Habitat Structure and Crop Management Influence Functional Diversity and Activity of Soil Microbiota**

Vadakattu Gupta¹, Lara Vallejo Roosdorp², Ross Chapman³, Alan Mckay⁴ and Rick Llewellyn¹

¹CSIRO, Australia; ²Wageningen University, Netherlands; ³Ecogonomix, Australia; ⁴SARDI, Australia

048-5
15:10 **Processes and Filters Shaping Soil Microbial Diversity Assessed by High throughput Sequencing**

Sebastien Terrat¹, Samuel Dequiedt¹, Melanie Lelievre¹, Virginie Nowak¹, Patrick Wincker², Corinne Cruaud², Nicolas Saby³, Claudy Jolivet³, Dominique Arrouays³, Pierre-Alain Maron⁴, Lionel Ranjard⁴ and Nicolas Chemidlin Prevost-Boure^{4*}

¹INRA-Universite Bourgogne, France; ²Commissariat a l'Energie Atomique (CEA), Institut de Genomique (IG), Genoscope, France; ³INRA, France; ⁴INRA-Universite Bourgogne, AgroSup Dijon, France

Oral Session No. 49

Yeongju A (1F)

[C2.2-2] A: Soil Organic Carbon: Dynamics, Stabilization, and Environmental Implications

June 12 (Thu), 13:40 - 15:30

O46-6

[IDS3] Soil Information and Food Security

Spatial Landuse Planning of Soybean Plantation as Analyzed by Land Evaluation and Dynamic System: a Case Study of Karawang Regency, West Java, Indonesia

Widiatmaka Widiatmaka¹, Wiwin Ambarwulan², Irman Firmansyah³ and Khursatul Munibah⁴

¹ *Soil Science and Land Resources, Bogor Agricultural University, Indonesia*

² *Geospatial Information Agency, Indonesia*

³ *Study Program of Natural Resources and Environmental Management, Bogor Agric. University, Indonesia*

⁴ *Bogor Agric. University, Indonesia*

Indonesia is actually faced with serious problems in terms of food supply due to its high population. One of the public commodity which was still can not be fulfilled from domestic agricultural production is soybean. The data of Indonesian Bureau of Statistics showed that soybean plantation has declined in the last decade. As an illustration, if in 1996 and 1997 Indonesian soybean planting area is 1,277,736 Ha and 1,118,140 Ha, the planting area of 2011 was only 622,254 Ha, and even decrease again in 2012 to become 567,624 Ha. Although the average productivity has successfully been improved significantly, from 1,186 kg.Ha-1 in 1996 to 1,485 kg.Ha-1 in 2012, however the production decline can not be avoided, from 1,515,937 tonnes by half, to become 843,153 tonnes in 2012, due to continued decline in planting area. As an illustration, the Indonesian local soybean production in 2011 was only 851,286 tonnes, it was able to meet 29% only of the total national need of soybean. With that situation and background, this research was done in Karawang Regency, West Java, Indonesia, a regency of agricultural center. The main food crops in this region was rice, hence, the research was done in the context of developing soybean as a crop rotation of rice. The objective of the research were: (i) to identify the suitable area for soybean plantations in the rice field, (ii) to place the development of soybeans in the context of land use and socio-economic factors of the regency, and (iii) to plan the spatially soybean plantation. Several methodology were used in order to get an integrated manner of soybean plantation landuse planning. A soil survey and land evaluation for soybean plantations of the research area was done. Soil samples were taken for laboratory analysis. Land evaluation was done using Automated Land Evaluation System (Rossiter, 1997). The delineation of rice field area was done using IKONOS imagery. A dynamic system of soybean production and consumption was developed using Powersim 2.5 software. The factors which were taken into account in the dynamic system of soybean production and consumption include the result of soil survey, as well as the socio-economic factors of soybean production and consumption. A spatial landuse planning was then developed, taking into account the soil information and socio-economic aspects. Results of the research indicate that in Karawang Regency, there were still a waste area in paddy field plantation which are suitable for soybean plantation. The land suitability class vary from S1 (very suitable) to N1 (currently not suitable). More than 50% of the rice field cultivated area has a land suitability order for soybean, suitable. The limiting factors of this land were generally nutrient retention and nutrient availability. According to the analysis of dynamic system of soybean, there are many factors that cause a decrease in soybean planting area in the region and in turn to lower production. The main cause is a lack of interest of farmers in planting soybean because of less supportive economic benefits. Based on such result, a spatial land use planning was then developed to delineate the priority area of soybean plantation in crop rotation with paddy. A suggestion in term of increasing the farmer's interest in soybean plantation was also done.

Keywords : soil survey, land suitability, land characteristics, soybean production, soybean consumption