WORLD ASSOCIATION OF SOIL AND WATER CONSERVATION

HOT NEWS

Issue 10, 2017

WASWAC HOT NEWS No. 10, October, 2017

Contents

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For ISWCR paper submission:

http://www.journals.elsevier.com/international-soil-and-water-conservation-research/

WASWAC Website: www.waswac.org

WASWAC World Conference IV will be held in 2019

Managing Soil and Water Resources for Climate-Smart Agriculture Toward Global Food and Livelihood Security

-- WASWAC 4th WC, ISCO-20 and SCSI 4th IC

At New Delhi, India, November 5th-9th, 2019

Hosted by

Soil Conservation Society of India, New Delhi

In cooperation with

Indian Society of Soil Survey of Land Use Planning (ISSSLUP)

Indian Society of Water Management (ISWM)

Indian Society of Agricultural Engineering (ISAE)

Indian Society of Soil Science (ISSS)

Supported by

International Union of Soil Science (IUSS)

Indian Council of Agricultural Research (ICAR)

European Society of Soil Conservation (ESSC)

International Research and Training Center on Erosion and Sedimentation (IRTCES)

Chinese Society of Soil and Water Conservation (CSSWC)

INTRODUCTION

The World Association of Soil and Water Conservation (WASWAC)，International Soil Conservation Organization (ISCO), and Soil Conservation Society of India (SCSI)) will hold a joint international conference in 2019. This will be WASWAC's 4th World Conference, ISCO's 20th International Congress, and SCSI 4th International Conference. SCSI will host the joint conference and other prominent international scientific and professional organizations have been invited to be co-sponsors.

Natural resources are critically important components of the earth's life support system. SCSI has selected the Theme as **Managing Soil and Water Resources for Climate-Smart Agriculture Toward Global Food and Livelihood Security**. This theme will build on WASWAC's and ISCO's earlier accomplishments which encompassed the necessity and contributions of soil and water conservation and land husbandry toward sustained economic, especially agricultural growth which is paramount for food security. The unabated degradation of global natural resources exacerbates the scarcity of productive soils and the increasing prevalence of droughts adds unprecedented pressures on water resources. With the topical theme of **Managing Soil and Water Resources for Climate Smart Agriculture Toward Global Food and Livelihood Security**, this International Conference will be organized from 5th-9th November, 2019 at New Delhi, India. The conference will focus on the protection and conservation of land and natural resources for sustainable use and development. The target groups include scientists, researchers and academicians with multidisciplinary expertise, outreach and extension professionals, engineers, land users including farmers, planners and policy makers, students, NGO's, and other stakeholders who are active or interested in the states of art and science of natural resources management. We feel proud in inviting your active participation and valued deliberations to make this international conference a successful event.

PRIMARY CONFERENCE TOPICS

I: Advances in natural resources inventory for food, energy and livelihood security.

II: Soil quality and challenges in resilient agriculture, afforestation, bio-diversity losses and forest management.

III: Rainwater harvesting, efficient use of water, integrated watershed management and community participation.

IV: Biodiversity conservation, coastal ecosystem management, for sustaining soil health and productivity.

V: Prospects for intensification of cropping systems, sustainable production systems, integrated farming systems.

VI: Innovations in irrigation and drainage management.

VII: Land management in mountainous areas, sloping lands, plateaus, plains, deserts, community grasslands, rangelands and alpine and sub-alpine pastures.

VIII: Water and wind erosion and their effects on soil, soil carbon sequestration under different land uses and energy management.

IX: Soil salinization, acidification, contaminated soils, mined soils, wastelands and degraded land management.

X: Remote sensing and GIS, Empirical approaches and modeling soil and water degradation processes, decision support system.

XI: Treatment and management of low quality residual waters, Environmental issues and protection strategies of water bodies.

XII: Socioeconomics of profitable farming for enhancing rural livelihoods.

XIII. Research and Education in soil and water conservation issues for sustaining land and water productivity.

XIV. Constraints, challenges and future strategies for implementing soil and water conservation practices.

XV. Policy interventions, socio-economic constraints and challenges in global food security.

XVI. Climate change mitigation and adaptation strategies, land use and land use planning for smart agriculture and rural livelihood.

XVII. Women empowerment, rehabilitation, environment protection, employment generation, energy utilization, soil solarization, hill cultivation, micro flora and fauna.

Conference updates

Detailed information and updates about the Conference

will be available soon at the websites of

WASWAC(www.waswac.org)

ISCO(www.tucson.ars.ag.gov/isco/)

SCSI (www.scsi.org.in)

Organizational Contacts

Chairman: Dr. Suraj Bhan, President, SCSI

Prof. Li Rui (WASWAC), China

Prof. Samir A. El Swaify (ISCO), USA

Dr. Miodrag Zlatic (WASWAC), Serbia

Convener: Dr. Sanjay Arora (India)

Welcome to be New Delhi to attend The WASWAC World Conference IV in November 2019

The Second International Youth Forum on Soil and Water Conservation (2nd IYFSWC)

The Second International Youth Forum on Soil and Water Conservation (2nd IYFSWC)

Moscow, Russia, 27-31, August, 2018

2nd IYFSWC will address:

- Challenges/actions of soil and water management in the changing world
- Mechanism/processes and modelling of soil degradation
- Innovation of technology of soil and water conservation
- Ecological restoration and regional sustainable development
- How to play the roles of youth in soil and water conservation

Conference program will include:

- ✧ Plenary lectures by keynote speakers – internationally recognized scientists
- ✧ Oral and poster thematic sessions
- ✧ Field excursion to the World largest hydro-technical projects – water transfer from Volga River to Moscow city
- ✧ Cultural program in Moscow

- ✧ Post-conference tours to the cities of Saint-Petersburg and Kazan
- ✧ Extra-program – special thematic part-time courses for young scientists . The participants of the workshops will get official certificate of Moscow State University

Outstanding Youth Paper Award:

To encourage early-career scientists to contribute to soil and water conservation in the world, the WASWAC has launched the WASWAC Youth Outstanding Paper Award (DATUM) 2018. The award will be presented at the second International Youth Forum on Soil and Water Conservation (IYFSWC). The application for the award is open from now.

Key dates of the Forum:

Registration opens - December 2017

Abstract submission deadline - 15 March 2018

Registration & fee payment

deadline (early bird) - 01 May 2018

Notice of abstract acceptance - 15 April 2018

More details please go to the official website

http://www.eng.geogr.msu.ru/IYFSWC

or our association's website www.waswac.org

Integrated Soil and Water Conservation Indispensable to Step up and Sustain Food and Agricultural Production

Prepared for WASWAC Hot News *By* *Prafulla Kumar Mandal*

(Ex-Additional Director of Agriculture, West Bengal, India)

As UN forecast, the current world human population of 7.6 billion will expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100. The number of hungry people in the world is around 795 million. To feed this larger population, food production must increase by 70 percent. Annual cereal production will need to rise to about 3 billion tonnes from 2.1 billion today and annual meat production from 200 million tonnes to reach 470 million tonnes. Thus along with the increase of population the demand of the cereals, oil seeds, pulses, vegetables, sugar and jaggery, tubers, commercial crops, fodder & forage, fruits, medicinal plants, aromatic plants ,flowers, raw materials of agri-based industries, structural materials, spices and condiments etc. many others are in the rise day by day to ensure food security.

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". (World Food Summit, 1996). All these should be produced on the arable productive land with optimum fresh water. But, the arable land has been subjected to various degradation out of accelerated soil erosion and the area is decreasing for use in various non-agricultural sectors and urbanization. Let us have an exercise of the present state and the efforts needs to combat the situation.

The land resource – The total surface area of the Earth is 510.072 billion hectare, out of this, total water area is 361.132 billion hectare, which is 71% of the Earth surface. The total land surface area of Earth is about 14.894 billion hectare which is 29% of the Earth surface. Of this surface area about 33% is desert and about 24% is mountainous. Subtracting this uninhabitable 57% (8.5 billion hectare) from the total land area leaves 6.4 billion hectare of habitable land." (Feb 12, 2016).

Agricultural land. Total agricultural land area is 4.9 billion hectares out of this 1.54 billion hectare is arable land. Status of the agricultural land.- As per GLASOD 1.216 billion hectare is degraded land.

General aggravation and concerns due to degradation of land.- Not withstanding and without derogating the progress, development and steps being taken, but making a simple exercise, the present days' negates and deep concerns expressed are:

(1)accelerated soil erosion in various forms like Splash, Sheet, Rill, Gully, Ravine, stream bank, slip, slide and sand ladening on table land, high sediment yield and thereby rendering these lands out of farming because of their decreased fertility and productivity as well as decrease in area;

(2)deposition of eroded and displaced soil and spoils in the surface water bodies decreasing water storage capacity, depositing in to the river bed reducing depth but increasing width by eating the table land, causing spate of flush water on the adjoining land;

(3) intensity, recurrence and spatial expanse of Drought and Floods are in the rise, which destroy the standing crops and production;

(4) due to increasing overland flow of rain water in to the rivers the groundwater recharge is decreasing;

(5) decreased quantum of surface storage of fresh water due to decreased storage capacity of the surface water bodies, reducing the surface irrigation water for agriculture;

(6) over-exploitation of ground water resulting in fast depletion of this important resource which, in fact is reservoir for drinking purposes;

(7) decreasing arable land area due to diversion to non-farming purposes, resulting less production;

(8) the main source of fresh water is the rain water which is retained in-land in surface water bodies and underground aquifer by recharge. The demand by volume of useable in-land water is increasing day by day for both agricultural and non-agricultural purposes. The need of industrial water, drinking water and other urban

uses are mainly met from the underground aquifer. This causing over draft, alarming the situation;

(9) urbanization and industrialization are encroaching the arable land and also over drafting the ground water;

(10) brick making with the top soil of the arable land, is negating the productivity of the crops;

(10) physiography of many lands are changing, degrading these unfit for every kind of use less to speak of farming;

(11) environmental degradation by ignition of smoke, release of effluents from urban areas and heavy industries, increase of air temperature by burning of fossil solid, liquid fuel;

(12) frustrating the obligation and responsibility in the projects meant for Soil and Water Conservation;

(13) some where paddy lands are being converted exclusively for aquaculture large size fishery converting to vast water body filed with ground water in summer months round the years , which were under fish-cum-paddy culture in rainy season, which is one of the reasons for decrease of crop area and production of agricultural commodities and depletion of ground water with threat to environment;

(14) land degradation reduce productivity and food security, disrupts vital ecosystem functions, negatively affects biodiversity and water resources; and increases carbon emissions and vulnerability to climate change. Land degradation directly affects 1.5 billion people worldwide, with a disproportionate impact on women, children and poor and it reduces the productivity of world's terrestrial surface by about 25%;

(15) As per FAO about 52% of land used for agriculture is degraded and nearly 2 billion hectares is seriously degraded, sometimes irreversibly;

(16) Land Degradation over the next 25 years may reduce global food production by up to 12% resulting in an increase of, as much as, 30% of world food prices.

World Soil erosion information- Soil erosion is the accelerated removal of top soil from the land surface by rain and run-off water, wind, etc. During last decade, the

figures published for water erosion ranges to the magnitude of 20 gigaton to 50 gigaton per year. Considering only those estimates that are not manifestly affected by such problems, the most likely range of global soil erosion by water is 20–30 gigaton per year, while tillage erosion may amount to 5 gigaton per year. Estimates of the total amount of dust that is yearly mobilized on land place an upper limit on dust mobilization by wind erosion on arable land at 2 gigaton per year. However, wind not only mobilizes dust but also coarser soil particles (sand), implying much higher total wind erosion rates. Approximately 430 million ha of dry lands, which comprise 40 percent of the Earth's surface (Ravi et al., 2011), are susceptible to wind erosion (Middleton and Thomas, 1997). In a survey of global estimates of present-climate dust emissions, (Shao et al 2011) described 13 studies that estimated global dust emissions in a range from 500 to 3320 teragram (Tg) per year (Ginoux et al 2012). Natural dust sources do account for about 75 percent of dust emissions and the remaining 25 percent of emissions were attributed to anthropogenic sources. Hilly croplands under conventional agriculture and orchards without additional soil cover in temperate climate zones are subject to erosion rates up to 10-20 tonnes per hectare per year , while average rates are often <10 tonnes per ha per year . Values during high-intensity rainfall events may reach 100 tonnes per ha per year lead to muddy flooding in downstream areas. Erosion rates on hilly croplands in tropical and subtropical areas may reach values up to 50-100 tonnes per ha per year. These high rates are due to the combination of an erosive climate (high intensity rainfall) and slope gradients which are generally steeper than those on cultivated land. Soil erosion has direct, negative effects for global agriculture. Soil erosion by water induces annual fluxes of 23-42 Megatons (megaton) N and 14.6 - 26.4 Megatons P off agricultural land. This is annual fertilizer application rates, which is equivalent to 112 Tg for N and 18 Tg of P. These nutrient losses need to be replaced through fertilization at a significant economic cost. Annual economic cost of US$ 33-60 billion for N and US$ 77-140 billion for P. It is therefore clear that compensation for erosion-induced nutrient losses requires a massive investment in fertilizer use.

What World Health Organisation warns as to the consequence of Land degradation. What does land degradation mean for health?

These social and environmental processes are stressing the world's arable lands and pastures essential for the provision of food and water and quality air. Land degradation and desertification can affect human health through complex pathways. As land is degraded and in some places deserts expand, food production is reduced, water sources dry up and populations are pressured to move to more hospitable areas. The potential impacts of desertification on health include:

(1)higher threats of malnutrition from reduced food and water supplies;

(2)more water- and food-borne diseases that result from poor hygiene and a lack of clean water;

(3) respiratory diseases caused by atmospheric dust from wind erosion and other air pollutants;

(4)the spread of infectious diseases as populations migrate.

Basic need for advancing agriculture. -It is very general for all the purposes, particularly for advancing the agriculture and allied sectors that

(1)If land is available, then every kind of utilization (Agriculture &Non-Agriculture) is possible and can be accommodated.

(2)If Arable land with productive soil exists, then sustained output from farming is possible and can be expected. If this is available, then only farming can be remunerative.

(3)If there is stock of water in the earth surface and under-ground aquifer, then water for irrigation as well as for all other purposes can be possible and will be available.

(4)The main source of useable fresh water is the rainfall. If that water after its touch to the ground/earth surface is retained for prolonged period in all the Altitudes and is released gradually through out the year, particularly when no rainfall as per demand, can be available and its flow in the river-net works uniformly will be possible. This will also reduce flood devastation-vis-a-vis drought incidence may be

combated.But, unfortunately, all these indispensable basic needs for actuation are often missing in official instruction/recommendation/plan. Inspite of such alarm, the Central and State/Provincial Govts. are only attentive to discriminately use the land and harvesting crops from there without adequate conservation and management measures. The consequences are very much spectacular.

Soil and water Conservation.- If soil conservation measures are done effectively, then automatically, there is water conservation or storage in inland, that reduces flood and drought intensity.

The measures need. There is nothing alternative of food and other essential agricultural commodities which are produced on the land and fertile soil with optimum water for the survival of the mankind and animals . Along with the increase of population the demand of the cereals, oil seeds, pulses, vegetables, sugar, commercial crops, fodder& forage , fruits, medicinal plants, flowers ,raw materials of agri-based industries, structural materials, spices and condiments etc. many others are in the rise day by day. Food (Cereals and Pulses) is the prime importance, which are produced on prime farm land having good soil. Only An INCH (2.5 cm) thick layer of soil is formed from the parent rock by natural processes in a long span of 800- 1000 years. Arable soil on the land is the foundation and entire agriculture is the superstructure on it. If the foundation becomes week and inadequate, the entire superstructure becomes threatened and collapses at any time. The land area is confined, non-expandable. Lands should be protected from accelerated degradation, degraded lands and soil on it should be upgraded by reclamation, rain water should be retained in all the elevations, i.e. altitudes so that it can not rush down by devastating the lower reaches but is compelled to retain in situ as well as recharge to the ground water aquifer. As such , soil and rain water conservation is the crux of the day to combat the situation and the only solution n tony fr the present but for the future.

The Integrated Soil and Water Conservation measures-

3 groups of measures need for integrated soil and water conservation in a view to

disintegrate raindrop energy, decrease sediment yield, halt rain water in each elevation and rest safe disposal, intercept the direct flow of run-off water, arresting the eroded soil in situ, enforce recharge of surface water, storage of surface water in surface water bodies, transparent surplus water, increase the time of concentration of run-off water in the drainage net work, prolongation of stream flow in the natural drainage system, restoration of degraded land and micro climate suitable for habitation.

(1)Mechanical – By erection of barriers on the field to intercept the run-off and safe disposal of surplus. New works and maintenance of Contour bunding, Field bunding, Compartmental bunding,Levelled bunding, Graded bunding, Bench Terracing ,Gully plunging, Graded terracing (inward and out ward), Conservation Bench Terrace, Stager Contour Trench -cum -Ridge, Small Dam, De-siltation basin, Silt detention dam, Waste wire, Inlet drops, Chute, Diversion channel, Land shaping,Land levelling, Plot to plot drainage, Sluice gate, Percolation tank, iImpoundment ditch, Dug out, Farm pond, Cause way, Vented cause way, Course training (spur) , Surface reservoirs, Torrent control structures, Land slip and land slide resisting structures, Risers in hill slope, etc.

(2) Vegetative- Agrostological cover by grasses and legumes (non-weed) on the non-arable lands, Contour Vegetative Hedge (Vetivar, Lemon grass & Vitex), Grassed water ways, Agro-forestry, Farm forestry, Shelter belt (two storied), Eyebrow vegetation in hill terrace risers, etc.

(3) Cultural practices (agronomic)- Contour ploughing, Contour cropping (rowing), Strip cropping with Erosion Resisting and Erosion Permitting Crops at appropriate ratio of the length of the strip along the contour, Intercropping at appropriate ratio of row of Erosion Erosion Resisting and Erosion Permitting Crops , Green manure crops, Organic matter amendment with the soil.

Watershed Management- Now almost each country of the Globe has taken up watershed management programmes. It is a strategy, the subjects are Land, Soil & Water conservation. Watershed is a geo-hydrological unit of land, that drains to a

single outlet of the drainage system. The outlet may be a surface water body or a natural drainage system. It may be compared with a leaf that all its venation networks join to its peteol. Thus Watershed is a natural hydrologic entity governed by the terrain topography from where runoff is drained to a point. The term watershed is a general phenomenon, its size and area depends on the areal expanse of the Unit .

Clarion call.-Our clarion call is let the forthcoming year be the year of Integrated Soil and Water Conservation. May it be voiced clarion call “Agriculture is the super culture of all the cultures in the World. Conserve Land, Soil, fresh water for nourishing People, Plants and Animals and for survival of the Civilization”. Unless enough and productive land,soils and fresh water are available, the full success for food security can hardly be achieved. Therefore, the Governments may consider afresh to launch a development programme exclusively for “Natural Resources Conservation (Soil and Water Conservation) Mission” . It is very much relevant that the entire Soil & Water Conservation operation is densely labour Need of a clarion call for integrated soil and water conservation. There should be a clarion call to generate awareness to give real emphasis on the integrated soil and water conservation ,rather plot to plot soil and water conservation in order to upgrade the degraded lands and soils to resist degradation of land and soil, conserve rain water in inland both in surface and in ground to build and maintain a strong and firm foundation of Agriculture as well as non-agriculture for the present and for the future. This should be given the top agenda now in all programs and schemes intensive and environment friendly, rather environment refreshing.

(NOTE: Data and information cited mostly from UN,FAO,WHO, S.L.U.S. of India and proceedings of conferences, seminar etc.)

European Achievements in Soil Remediation and Brownfield Redevelopment

This monograph presents examples of success stories of remediation of contaminated soils in vari-ous contexts and different European countries, aiming at sharing best practices of soil restoration and management of contaminated sites among European countries. Eight countries present a total of 17 cases which illustrate how soil and brownfields remediation along with sustainable land man-agement have become essential for reversing the trend of soil degradation and ensuring the provi-sion of ecosystem services by soil. The cases show progress in research and innovative technologies of soil remediation, new outstanding approaches to soil remediation management, beneficial inte-gration of stakeholders in decision-making and fruitful progress in raising public awareness and citi-zen science.

This book is available here:

http://publications.jrc.ec.europa.eu/repository/bitstream/JRC102681/kj0217891enn.pdf

Awardees of IUSS Awards in 2018

Three awards are presented by the IUSS at each World Congress of Soil Science to recognize outstanding contributions in three areas:

- IUSS Dokuchaev Award for basic research in soil science
- IUSS Liebig Award for applied research in soil science
- The IUSS Jeju Award for a young or mid-career soil scientist

Ryan to receive the Liebig Award of the IUSS

John Ryan, Soil Science Consultant based in Ireland, will receive the Liebig Award of the IUSS at the World Congress of Soil Science in Rio de Janeiro, Brazil, in August 2018. John Ryan's entire career, spanning over 50 years, has been dedicated to the advancement of applied soil science and to implementation of his research findings to increase food production and alleviate rural poverty.

He has worked at the Aridoculture Center in Settat, Morocco; at the American University of Beirut in Lebanon; and, most recently, at the International Center for Agricultural Research in the Dry Areas in Aleppo, Syria, which he had to evacuate due to civil war. He has been instrumental in initiating programs that have been successful in addressing serious production limitations in the Middle East and North Africa. He exemplifies extreme service to soil science, because he has risked his life to carry out his research done in the war-torn Middle East, first in Lebanon during its civil war and then in Aleppo, Syria. He is an Honorary Member of the International Union of Soil Sciences.

This will be the fourth presentation of the Liebig Award, established in 2006. The award recognizes outstanding contributions in applied soil science research, contributing to new discoveries, techniques, inventions or materials that increase food security, improve environmental quality or conservation, land and water development, and other areas covered by the divisional structure of IUSS.

Bouma to receive the Dokuchaev Award of the IUSS

Johan Bouma, Emeritus Professor of Soil Science, Wageningen University, the Netherlands, will receive the Dokuchaev Award of the IUSS at the World Congress of Soil Science in Rio de Janeiro, Brazil, in August 2018.

Bouma is known for the functional characterization of soils, emphasizing use of data from soil surveys to improve soil physical characterization of soils, now referred to as hydropedology. This work includes his development of the widely used term "pedotransfer functions," which relate pedogenic soil data to physical parameters. He has been involved in projects in developing countries, including the Philippines, Costa Rica, Niger, Vietnam, Kenya, Tibet, Ecuador, Peru, Panama, and South Africa. In his work, sustainable development has been a guiding principle. He has applied his soil science expertise in the policy arena. He is Fellow of the Soil Science Society of America and also the recipient of its Presidential Award. In 2017, he received the Alexander von Humboldt Medal of the European Geosciences Union. He is an Honorary Member of the International Union of Soil Sciences. He was the first soil scientist to be elected as a member of the Royal Dutch Academy of Scie nces, Arts, and Letters.

This will be the fourth presentation of the Dokuchaev Award, established in 2006. The award is made for major research accomplishments, resulting from basic researches in any field of soil science.

Bennett to receive the Jeju Award of the IUSS

John McLean Bennett, Senior Research Fellow at the University of Southern Queensland in Australia, will receive the Jeju Award of the IUSS at the World Congress of Soil Science in Rio de Janeiro, Brazil, in August 2018.

Bennett is a soil physico-chemist with globally recognized expertise in soil structure. His research has focused on water quality interactions with soil physical and chemical mechanisms. His results have direct application for irrigated agriculture and in the coal-seam gas industries. He also is an inspirational educator, introducing innovative problem based soil science learning approaches at his university. In 2017,

he became the President of the Australian Soil Science Society.

This will be the first presentation of the Jeju Award. The award has been co-established by the IUSS and the Korean Society of Soil Science and Fertilizer in commemoration of the successful 20th World Congress of Soil Science held in Jeju, Korea, in 2014. The award is given to a young or mid-career soil scientist who has had outstanding accomplishments in education, research, or extension and has made a substantial contribution to the IUSS objectives.

Global Soil Biodiversity Atlas

What is soil biodiversity? How does it vary in space and time? What does it provide to society? What are the main threats to soil biodiversity? What can we do to preserve it? The first ever Global Soil Biodiversity Atlas uses informative texts, stunning photographs and striking maps to answer and explain these and other questions. Going through its nine chapters, every reader will learn what soils are and about the amazing creatures living in them. You will discover the factors influencing the distribution of soil organisms, how soil biodiversity supports food production, the pressures affecting soil life and the possible interventions to preserve it. The Global Soil Biodiversity Atlas is an essential reference to understand and appreciate the incredible world living under our feet. Soil is an extremely complex system resulting from the essential interactions between inert and living components. Soils host a myriad of soil organisms ranging in size from a few micrometres to several centimetres, from the microscopic bacteria and archaea to the “giant” earthworms and moles. All these organisms are distributed over space and time, and each ecosystem and season has its unique soil community. Soil organisms interact to provide essential ecosystem services to human beings and the environment, ranging from supporting plant growth to the regulation of climate. Soils are increasingly under pressure and so are the organisms living in them. Intensive agriculture, loss of aboveground biodiversity, soil erosion and land degradation are among the most

relevant threats to soil life. We can protect soil creatures by taking specific actions. No-tillage, diversification of crops, increasing reforestation and greater use of natural amendments are examples of interventions that may promote life in soils. People need to know about the fascinating world belowground and understand its value. The Global Soil Biodiversity Atlas presents the often neglected protagonists in the environment that surrounds us all.




Chapter 1: Soil Habitat

Chapter 2: Diversity of Soil Organisms

Chapter 3: Geographical & Temporal Distribution

Chapter 4: Ecosystem Functions & Services

Chapter 5: Threats

Chapter 6: Interventions

Chapter 7: Policy, Education, and Outreach

Download free here: https://atlas.globalsoilbiodiversity.org/

WASWAC MEMBERSHIP APPLICATION/RENEWAL FORM (Issued 120501)

(For applicants from all countries)

Name: (Ms./Mrs./Mr./Prof./Dr.)..... Gender: □F □M

Institution:.....

Postal address:.....

State/Province:..... Zip/Postal code:..... Country:.....

Phone:..... Fax:.....

Emails (Please give at least 2 addresses to ensure uninterrupted contact): (1).....

(2)..... (3).....

My specialized field(s):.....

Please sign me up for the WASWAC membership in category*: □1(IM)□2(LM)□3(OM)□4(SM&GM)

Membership for the year(s)..... @US$..... = US$ .....

Donation for developing country membership, etc. US$ .....

Donation to the Moldenhauer Fund US$ .....

Total US$ .....

*__Membership categories & rates__ from July 18, 2005, amended March 3, 2007 and March 4, 2010.

1. IM (Individual membership): US$20 for 5 years for developing countries (In China, members pay 130 yuan RMB); US$40 for 5 years for developed countries and persons working in international organizations worldwide.

2. LM (Life membership): US$80 for developing countries (In China, members pay 520 yuan RMB); US$160 for developed countries and persons working in international organizations worldwide. Persons who have passed their 60th birthday pay only half of these LM rates.

3. OM (Organization membership): For universities, research and implemental institutions, government agencies, NGOs, societies, associations and international organizations, etc. Persons belonging to an Organization member will receive the same online products and services as the other two above categories: $100/year for an organization with up to 150 persons; $150/year for an organization with up to 300 persons: $200/year for an organization with up to 500 persons; and $10/year for an additional 100 persons or part thereof.

4. SM&GM (Student membership & Gift membership): US$5/year worldwide, to be purchased to give to colleagues, friends, students, etc.

For sending money by foreign wires through a bank, please give the following information to your bank:

Name of Receiver (A/C Holder's Name): World Association of Soil and Water Conservation

Bank Name and Address: China Construction Bank, Shoutinanlu Branch, Beijing, China, No. 9 Shoutinanlu Street, Haidian District, Beijing, P R China

A/C NO.: 1100 1042 7000 5301 6996

Message to write on the Bank Sheet: WASWAC Membership due for Ms./Mrs./Mr./Prof./Dr. ....., Country .....

NOTE: 1. Do not deduct the bank fee from the amount of money to send. **2.** For sending money by wire/bank transfer or check please add US$7 per transaction to compensate for the charge at the receiving bank in Beijing. This additional charge does not apply for **WESTERN UNION** or any payment of US$50 or more.