

World Association of Soil and Water Conservation

BULLETIN

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Machu Picchu



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The WASWAC Bulletin seeks to keep conservationists worldwide informed of new developments in the field of Soil and Water Conservation and Land Management issues. Please send editorial contributions to the Editor at sskukul@rediffmail.com

Conserving Soil and Water Worldwide

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WASWAC Mission:

To promote worldwide the application of wise soil and water management practices that will improve and safeguard the quality of land and water resources so that they continue to meet the needs of agriculture, society and nature.

WASWAC Vision:

A world in which all soil and water resources are used in a productive, sustainable and ecologically sound manner.

Publishers

World Association of Soil and Water Conservation

Title photograph is **Machu Picchu**, by *Tanawat Likitkererat*, Experts believe that Machu Picchu was one in a series of royal Inca estates built in the Urubamba Valley. To researchers, the site's multiple observation points suggest that the Inca worshipped the sun, and its location, surrounded by rivers and mountains, indicates a reverence for nature.

President's message



Dear colleagues, friends and members of WASWAC,

Starting this first President's Message I wish you healthy, prosperous and Happy New Year for 2011. It is a great opportunity and a big challenge for me to take presidency of the World Association of Soil and Water Conservation in the period 2011-13. In this respect I wish to thank Prof. Dr. Miodrag Zlatic and all members in the council term 2008-10 for voluntarily handling this tremendous but very important work for our Association.

At this moment, I cherish the memory of great contributions from all predecessors. In Chinese it has a saying "Don't forget the well-diggers when you drink water from the well." Generally speaking, WASWAC has already passed two stages, i.e. **forming stage** and **growing & stabilizing stage**, and has started the third one, **development stage**.

In 1983, Dr. Bill Moldenhauer and other scientists proposed to establish an association called World Association of Soil and Water Conservation—then the WASWAC was born! After that Drs Norman Hudson (UK), Rattan Lal (USA), Hans Hurni (Switzerland) and David Sanders (UK) led WASWAC through their terms that form the first stage. From the turning point of the century, WASWAC started its second stage when President David Sanders and Samran Sombatpanit, his deputy, worked closely with each other. Then Drs Samran Sombatpanit, Miodrag Zlatic, Michael Zoebisch made great contributions to WASWAC in the growing and stabilizing stage, which ended last year when the WASWAC Secretariat was eventually established in Beijing, China.

Now we are meeting a nice opportunity for WASWAC development, which is the third stage. With broad attention and interest from all over the world, with research results from many successful experiments available, with great support from all members of WASWAC, and with nice and useful foundation built by my predecessors, I feel quite encouraged to carry this work forward.

The main task in the next period is to continue the good work of past presidents and WASWAC Council and to implement the tasks that we have discussed at the WASWAC Council Meeting in Xi'an, China in October 2010 as well as at the Secretariat Meeting in Beijing in December 2010. A general framework for WASWAC development has been proposed. The plan is mainly focused on four key points: (i) Membership - Internationalization, to establish a global network of SWC is our aim; (ii) Professional services - Diversification, such as cooperation research, training, publications, conferences and others to develop an integrated service system; (iii) Operation - Socialization, to join related organizations, such as institutions, universities, companies and others to form a united network; and (iv) Management - Standardization and Institutionalization, to establish a series of rules and regulations. More details will be provided in my subsequent messages.

Certainly I will do my best for WASWAC in the coming years. The WASWAC belongs to the world and thus belongs to all of us. Therefore, I am looking forward to having substantial and continual support from all of you. I wish you all the best and look forward to produce good work in WASWAC together with you, thus making the management and care of natural resources, especially soil and water, proceed faster worldwide.

LI RUI

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From Editor's Desk



Dear Colleagues and Fellow Members,

We are now to start a fresh Chapter in the history of WASWAC with our new President in the personality of Professor Li Rui who has taken over the reins of WASWAC. Professor Li is a dynamic personality whom I found to be honest, hardworking, approachable and visionary personality, when I met him in Xian, China. I am very much sure that we shall progress with leaps and bounds under his able guidance. Moreover, the Secretariat of WASWAC has now moved to China and we now have a strong base with our headquarters in China and a beautiful website encasing a lot of wealth in the form of academic knowledge.

I am also happy that Dr Samran Sombatpanit is still a guiding force to all of us working on different aspects of WASWAC and we wish him a long and healthy life for many more years to come so that he may remain a guiding force behind us to successfully achieve our goals. I wish all the support from the members of WASWAC in carrying out the work of WASWAC at a greater pace as I believe that it is the support of the members that drives us to work with much zeal and enthusiasm.



Friends, as usual I once again request all the members to come forward and use this WASWAC Bulletin a good platform for panel discussions, framing policies for the planners to implement soil and water conservation plans all over the world. I feel that this publication is not being properly utilized by the members to take part in the activities. I request all the members to come forward to send us short articles of general interest in the field of soil and water conservation, your views about the present policies to conserve soil and water, share your scientific works in our research section. This will

not only boost our morale but will also lead us to know each other well.

I am sure that next time I will get good response from the readers of this issue of WASWAC bulletin. HAVE A NICE READING!

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Feature

Biochar - An Organic House for Soil Microbes (*Bryan Hugill, Co-founder and Environmental Manager Raitong Organics Farm, Sisaket Province, Thailand*)

Rick Burnette wrote an article for Issue 6 (July 2010) of ECHO Asia Notes, titled "Charcoal Production in 200-Liter Horizontal Drum Kilns." My article takes the charring process a step further by exploring the rapidly re-emerging world of biochar. Biochar is a form of charcoal, produced through the process of pyrolysis from a wide range of feedstocks. Basically any organic matter can be charred, but agriculture and forestry wastes are most commonly used due to the available volume. Biochar differs most significantly from charcoal in its primary use; rather than fuel, it is primarily used for the amendment of soils (enhancing their fertility) and sequestration of carbon (reducing the amount of CO₂ released into the atmosphere).



Biochar has received a lot of interest internationally over the last few years, especially in light of the rising demand for food and fuel crops, and of raging debates on how to radically slow down runaway climate change. With strong voices on both sides of the debate—that is, both in favor of and against the widespread production and application of biochar—I would like to step back to the beginning of the story, hopefully putting things into perspective again.

Terra preta ("black earth" in Portuguese), first noted by the explorer Charles Orton in 1870, is a type of very dark and fertile soil with a very high charcoal content found in the Amazon Basin. The soils were amended by local people between (roughly) 450 BC and 950 AD. *Terra preta* soils were re-discovered by Dutch soil scientist, Wim Sombroek, in 1966. This sparked intense research into the addition of

Charred rice husk (photo by Bryan Hugill)

charcoal to relatively infertile tropical soils with the express purpose of improving them for agriculture. Such charcoal can be made from a variety of organic matter (e.g. plant residues, animal manure, fish and animal bones). The practice of using charcoal to amend soil is not unique to the Amazon; it can safely be said that anywhere people have made fires to cook food or provide heat, or burned the land before planting (including natural fires), some amount of biochar has been produced. However, the aim of biochar is to produce the maximum amount of carbon and minimum amount of ash.

This means that deliberate open burning of fields and forests is not the way to proceed, especially when the intended outcome is for agriculture. Slash-and-burn only leaves about 3% of the carbon from the burnt organic matter in the soil, with the rest literally going up in smoke. Unlike the very hard charcoal used for cooking and heating, biochar is highly porous at the microscopic level due to its being made at relatively lower temperatures and has the unique ability to readily absorb moisture and certain nutrients. Herein lies one of its key strengths in the amendment of soils, and the basis for this article's title. From a soil perspective, biochar can be thought of as a microbial condominium. After it is initially made, biochar undergoes a maturation period during which it absorbs nitrogen (until saturation point) from the environment, usually from urine, composting, IMO teas, etc. After this period, the biochar becomes a stable environment for bacteria and fungi to take up residence. In poor and leached soils, microbial activity is often very low, especially during the dry season; the addition of biochar to these soils means that the soil microbes now have a stable and moist place to reside and prosper, even during the dry season. As a result, the need for additional fertilizer should decrease over time, as these now-resident microbes are able to break down organic matter in the soil, and even become food themselves for larger soil organisms, such as earthworms. Furthermore, nutrients stored in the pores are slow-released throughout the year as more and more microorganisms take up residence.

Climate change and carbon sequestration are currently big topics internationally. Biochar is one of the leading means for taking CO₂ out of the atmosphere and binding it up into soils as a stable form of carbon. Unless fires sweep through the area, biochar will remain in the soil for thousands of years. It has been estimated that some 15 to 35% of the carbon in plant biomass can be permanently captured as biochar during the pyrolysis process, putting it way ahead of many other leading technologies that are aimed solely at carbon capture. The ability to "capture" carbon makes biochar a subject of much debate and speculation in international discussions on carbon credits.

Biochar has many other fascinating properties:

- Field trials involving biochar have shown crop yields to increase significantly, especially when used in conjunction with other good agricultural regimes. Increased yields have been obtained with rice, maize, wheat, corn, tea, coffee, legumes, tomatoes, flowers, etc.
- The pH of acidic soil can be increased / optimized through the application of biochar.
- The micro-porous structure of biochar is highly variable, depending on the way in which it is produced (for example, highly porous activated charcoal is made by injecting steam into the

- oven after the carbonization stage) and the type of feedstock used.
- The micro-porous structure provides a habitat for the proliferation of beneficial soil biota.
- The micro-porous structure of biochar benefits water retention in the soil.
- The surface area of biochar has been demonstrated to be anywhere from 10 to 300 m²/g (activated charcoal has a surface area of up to 2,000 m²/g!), most of which is found internally and provides ample area for microbial habitat.
- The large surface area of biochar can attract and hold all mineral ions - not only cations (+) such as ammonium, calcium, magnesium and potassium, but also anions (-) such as nitrogen, phosphorus, sulfur, and boron. By attracting and holding both positive and negative nutrient ions in the soil, biochar can reduce both leaching (into groundwater) and out-gassing (into the atmosphere). These loosely-held nutrients are bio-available to microbes and plant roots in the complex root zone.
- Biochar can improve soil texture and workability, particularly heavy clay soils, although it has shown great promise in all soil types.
- Recent studies have shown that plants grown in biochar as a growth medium (at concentrations as low as 1 to 5% of the total soil mixture) tend to have a higher resistance to pests and diseases (i.e., systemic resistance) (Elad et al., 2010).
- Biochar's natural affinity for nitrogen allows it to arrest the flow of the nitrogen cycle. It tends to only release as much nitrogen into the surrounding soil as is needed by microbes and plants to maintain healthy growth (*ScienceDaily*, 2010).

The policy debate - Should we promote biochar or not?

We must reduce the levels of CO₂ in the atmosphere through substantial changes in our "use as much as we can" lifestyles if we hope to have any chance of bringing global temperatures back down to what we consider as "normal." At an international level, several organizations are actively promoting the production and use of biochar in a responsible manner, particularly in terms of its ability to function as a soil amendment and as one of the most valuable tools in the climate change mitigation "toolbox."

Spearheading this charge is the International Biochar Initiative (<http://www.biochar-international.org>), with a rapidly growing member organization base and 30 regional biochar groups around the world.

Biochar has even been adopted at the UN level as a tool demanding serious consideration in the global "runaway climate change" debate. While finding a "new" way to process organic "wastes" that results in significant crop yield increases and sequesters carbon at the same time may seem fantastical, therein also lies the curse... On the other side of the political fence are organizations that are calling for extreme caution in the widespread development of a formal biochar sector for fear that it will lead to increased land-grabbing and deforestation.

Often, though, we find that real people living in real conditions do things that run counter to or far ahead of the prevailing policy debate, both as a matter of survival and "because this is the way we have always done it". Thailand is a classic example: *glab pao* (แกลบเผา) or burned rice husk is a common by-product of village-level charcoal production and is for all intents and purposes, the precursor to biochar. This char is bought in large volumes, left to sit in piles in the corner of the land (i.e., undergoing a "maturation" period, to be explained in more detail below), and eventually used as a growing medium for such plants as coconuts and bananas. In other words, it's the same product as raw biochar (i.e., biochar that has not undergone the maturation period), has the same use, but a different name so it's not on the biochar radar screen. I don't doubt that similar activities are happening all around the world as I write this and I feel should be supported, when used in conjunction with other forms of environmentally-friendly soil amendments.

Making your own biochar

One of the easiest ways to begin making biochar in Thailand, considering the available feedstocks, is using rice husks resulting in *glab pao* (แกลบเผา). Short of making charcoal and using rice hulls as a filler material in the ovens, the PhilRice Open Type Carbonizer is the simplest option, as outlined in an excellent booklet available online. Other options for such feedstocks as maize cobs and stover,

coconut shells, sugar cane bagasse, etc. could include the top-lit updraft (TLUD) kilns and stoves, drum retorts, brick and Magh biochar retorts, earth pit kilns, inverted downdraft gasifiers, and so on.



It is also recommended that you make biochar from materials that are locally available for environmental and economic reasons. The "200-Liter Horizontal Drum Kilns" in Rick Burnette's article also function as fantastic ovens for making biochar from tree branches, bamboo, etc., with the simple addition of a grating to allow the even distribution of heat from the external fire through the biomass inside. Such technologies are simple to operate and maintain, effective, cost-effective, and readily adaptable to a variety of local needs.

IMPORTANT: Before you begin using your biochar, remember that you need to "mature" it first. The addition of "fresh" biochar to soils often results in what is termed "nitrogen shock" whereby the biochar rapidly absorbs all the available nitrogen in the surrounding soils, thereby limiting its availability to plants (the nitrogen is eventually released, but very slowly). To prevent this from happening, biochar is commonly first treated with urine or mixed with compost and/or drenched with compost teas and IMO mixes and combined together with soil from the field to which the biochar will eventually be applied after having been left to sit quietly in the corner of the field or yard for a few months.

Making biochar in a modified PhilRice Open Type Carbonizer (photo by Bryan Hugill)

During this period, the biochar absorbs all of the available nitrogen to saturation point, as well as begins the process of microbial colonization. As a result, the biochar that you add to the soil will be able to begin working immediately.

Application rates for matured biochar typically vary from between 13 kg per m², depending on the condition of the soil. The biochar can be applied in a variety of ways, including: (a) simple broadcasting across a field, which is most useful in moist/wet soils, or where the soil will soon be plowed, although this runs the risk of being blown away by the wind if the biochar is too dry; (b) targeted application such as in a hole when you plant a tree; (c) mulching, both around a tree and along its lateral root system; (d) mulching on raised beds, preferably thereafter covered in straw, etc.; (e) mixed into composting systems; and (f) mixed into animal bedding, which is then applied to the field periodically.



It is best to start small and build up the concentration of biochar until the crop yield increases reach a plateau, and then stop adding biochar. After that point, short of a fire raging through your field and vaporizing everything or a flood washing your field away, the biochar should remain stable in your soil for thousands of years, quietly working its magic.

Making IMO for maturing the biochar (photo by Khongchi Yiayang, GIZ CliPAD)

Final thoughts

Biochar, while appearing on the surface to be a climate change and agricultural panacea, is not without very real dangers if the production and sourcing of feedstocks are unregulated, particularly at an industrial scale. To be cost-effective, centralized industrial production requires enormous volumes of feed stocks. There are worries that such large-scale biochar production will be sourced primarily through land-grabbing, followed by tree plantations (such as *Eucalyptus*), resulting in an escalation of social

and environmental conflicts. However, such concerns remain hindered for two key reasons. First of all, the biochar industry and market are still very young and at the experimental stage with regard to technology (much of which is extremely expensive at an industrial scale) as well as efficient production processes, biochar characterization and applications and market readiness. Second, many proponents of biochar production and use are acutely aware of the dangers and are actively campaigning to prevent the negative effects from industrial production from happening.



Biochar is also not an easy carbon-in-the-ground substitute for changing our oil-addicted "business as usual" behavior and, as noted above, should never be used as an argument for large-scale land-grabbing and the promotion of plantations for charring. Neither should the making of biochar mean abandoning other good agricultural practices. Rather, biochar should be used as yet another tool that every farmer has at his or her disposal for using agricultural wastes in innovative ways to improve soil fertility and productivity.

Finally, to quote Albert Bates, "... if it [biochar] fulfills its promise of taking us back from the brink of irreversible climate change, it may well be the most important discovery in human history."

Further information

Below are a few websites that provide solid evidence for the value of using biochar in various soil types and climatic conditions. The sites also include discussions on matters such as policy, remediation, production, field trials, and external funding sources:

- The Thai Biochar Initiative: <http://www.biochar-international.org/regional/thailand>
- Japan Biochar Association (been studying biochar for almost 30 years): <http://www.geocities.jp/yasizato/JBA.htm>
- Bioenergy Terra Preta Discussion List (the most up-to-date discussion list covering a wide range of biochar-related topics, including production and field trials): <http://terrapreta.bioenergylists.org/>
- Yahoo Group mailing lists:
 - Biochar (<http://tech.groups.yahoo.com/group/biochar/>)
 - Biochar in Soils (<http://tech.groups.yahoo.com/group/biochar-soils/>)
 - Biochar Production (<http://tech.groups.yahoo.com/group/biochar-production/>)
 - Biochar Policy (<http://tech.groups.yahoo.com/group/biochar-policy/>)
 - Biochar Funding (<http://tech.groups.yahoo.com/group/biochar-funding/>)
 - Biochar Remediation (<http://ca.groups.yahoo.com/group/Biochar-Remediation/>)
- South East Asian Biochar Interest Group: <http://sea-biochar.blogspot.com/>
- GEK Gasification (an open-source resource for engineers and DIY-ers): <http://www.gekgasifier.com/>
- Understanding micro-gasification in stoves and why it works: <http://www.hedon.info/Micro-gasificationWhatItsAndWhyItWorks>
- PhilRice Open Type Carbonizer: <http://terrapreta.bioenergylists.org/philricecarbnull> . The main challenge with producing rice husk char is the potential for the high levels of silica in the husk to vitrify due to excess heating. The PhilRice Open Type Carbonizer limits this effect, but may result in excessive amounts of ash if allowed to burn too long.
- Top-lit updraft (TLUD) kilns and stoves: http://terrapreta.bioenergylists.org/files/1G%20Toucan%20TLUD%20for%20Biochar%20Jan%202010%20-%20final_0.pdf and <http://www.arti-india.org/content/view/full/80/52/>
- Magh biochar retorts: <http://maghbiocharretort.blogspot.com/>
- Earth pit kilns: <http://www.pacificviews.org/weblog/archives/002103.html>
- Inverted downdraft gasifiers: <http://transectpoints.blogspot.com/2007/02/pyrolysis.html>

Here are a few books worth finding and reading:

- Bates, Albert (2010) *The Biochar Solution: Carbon Farming and Climate Change*. New Society Publishers. ISBN: 9780865716773.
- Bruges, James (2010) *The Biochar Debate: Charcoal's Potential to Reverse Climate Change and Build Soil Fertility (The Schumacher Briefings)*. Chelsea Green Publishing. ISBN-10: 160358255X, ISBN-13: 978-1603582551.
- Lehmann, Johannes and Stephen Joseph (eds.) (2009) *Biochar for Environmental Management: Science and Technology*. Earthscan Publications Ltd. ISBN-10: 184407658X, ISBN-13: 978-1844076581.
- Steiner, Christoph (2007) *Slash and Char: An Alternative to Slash and Burn*. Cuvillier Verlag Göttingen. ISBN-10: 3867274444, ISBN-13: 9783867274449

Ideas and Innovations

China Revises Law on Water and Soil Conservation

In an effort to reverse the water and soil losses that China sees as its top environmental problem, the Standing Committee of the NPC revised the 1991 Law on Water and Soil Conservation on December 25, with the revised law set to go into effect on March 1, 2011. Roughly 37 percent of Chinese land suffers from erosion and at current rates the country loses an average of 666 square kilometers of farmland yearly in the northeast region alone.

According to statistics from China's National Bureau of Statistics, the country spent about US\$450 million to prevent soil erosion in 2009 and research from the Asian Development Bank has shown economic losses caused by water and soil loss in China to equal about 3.5 percent of the nation's GDP. The newly amended law shows a strong government commitment to addressing a host of factors aggravating China's soil and water preservation problems, including inadequate coordination and monitoring, lack of measures to prevent and control water and soil loss, and increased production and construction activities.

The law, with a new chapter on planning, aims to strengthen control mechanisms by specifying that water administration departments at or above county level should draw up plans for land and water conservation and oversee their implementation. China's water authorities as well as other government agencies including the forestry, agriculture, land and resources departments will be responsible to work together on the country's water and soil conservation project.

Penalties for the loss of soil and water must be included in land-use contracts reached with local governments, according to the law, which provides for more severe punishments to violators. If individuals or companies fail to work on controlling water and soil losses within a prescribed time frame, they should pay the full expense of the government's water and soil conservation work on the project.

The revised law requires water authorities to confiscate the illegal income of individuals or companies that borrow soil, dig sand or collect stones in dangerous areas known for land collapsing or landslides. A fine in the range of RMB1,000 to RMB10,000 will be imposed on individual violators. The fine for companies will be in the range of RMB20,000 to RMB200,000. The law also requires local authorities to seek public and expert opinions before drawing up soil and water conservation plans.

Climate change to create a dustier Southwest (BY JUDY FAHYS)

A warmer Southwest might very well mean a dustier Southwest.

That's the conclusion of a new study by researchers at the U.S. Geological Survey and the University of California-Los Angeles that has far-reaching implications for all of Utah, where healthy range is vital to livestock, wildlife and recreation, as well as air quality and water supplies. Seth Munson, a USGS ecologist and the study's lead author, noted that looking at how climate change might affect wind

erosion in arid landscapes is an important new area of research.

With climate change, temperatures are expected to increase. That, in turn, means more evaporation, less soil moisture and fewer grasses and some shrubs, which help protect the soil from blowing away in the stiff winds that rip through Utah from the south and west.

"You're going to have less vegetation," said Munson, "and more dust."

Ultimately, it could also mean poor air quality in northern Utah's cities and a faster-melting snowpack in the mountains, which normally serve as a kind of freezer storage for the basin and desert water supply.

"Dust coming from the drier regions in Utah," Munson added, "causes exceedances of air-quality standards in Salt Lake and the rest of the Wasatch Front."

Since the 2007 Milford Flat Fire, the largest fire in Utah history, the loss of soil crust and vegetation has led to some significant dust storms in northern Utah, the scientist noted. "We've learned a lot from that."

HUL boost for water conservation

MUMBAI: Depleting water tables in the country have got corporates like Hindustan Unilever (HUL) worried. After all, products like soaps and detergents require this critical commodity to spur consumption. The maker of Lifebuoy soap and Surf Excel detergent said it will invest Rs 5 crore this year in water conservation projects.

This is part of a commitment to invest Rs 20 crore in this direction. However, this investment will go up substantially with HUL's move to launch IndiaWater Body, an initiative to address the challenge of water scarcity in India in a more holistic manner. The CEO and managing director of India's largest fast-moving consumer goods (FMCG) firm, Nitin Paranjpe, told reporters at the launch of India Water Body that although a corpus has not yet been set aside for the foundation, the objective is to drive water security in the country by 2030 through the public private partnership route.

"It is estimated that by 2030, the supply of water in India would be half of the demand for it. This is a crisis that has the potential to derail the economic and social development of the country and impact the health and livelihoods of millions of people across the country. We believe that what concerns the nation must concern us too," said Paranjpe. Consider the statistics which appear to be alarming. The current demand for water is a little over 700 trillion litre, according to data collated by the Water Resources Group.

This is expected to treble to 1,500 trillion litre by 2030. The gap in demand-supply will be 755 trillion litre by 2030. Demand is clearly outstripping supply. Surely for HUL, which draws 44% of its Rs 20,000 crore revenues from soaps and detergents, there are reasons to be concerned. Take the example of Punjab, the food bowl of India. With growing consumption, water levels in Punjab have declined to 600 feet from 250 feet in five years. These facts have led experts to believe that in the next two decades, there could be a serious crisis on water.

The HUL has initiated projects in several states in India to create capacity towards conserving more than 50 billion litre of water by 2015. "Water is the life blood of our business. What we've seen in Punjab is an exponential drop in water levels," said Gopal Vittal, executive director (home and personal care business), HUL, while adding how growing prosperity is leading to a rise in consumption of eggs, meats and cereals, which requires more water when compared to other grains and vegetables down the value chain.

The HUL is also working on how innovation can be brought about in the product pipeline. HUL has consistently reduced water consumption in its operations and developed product innovations such as Surf Excel quick-wash that helps consumers use less water while washing clothes. In many global markets, parent Unilever has Comfort one-rinse fabric conditioner which saves water when compared to other ordinary fabric conditioners. The India Water Body initiative builds on the sustainable living plan launched by Unilever in November last year, wherein water has been identified as one of the focus areas.

The India Water Body will be conducting a nation-wide study to assess the demand-supply gap for water in India. The study will build on the available body of knowledge and engage multiple stakeholders to evolve an India water roadmap enumerating clear priorities and solutions for implementation.

What the Members Say?

Dear Prof. Li Rui,

I learnt in the Bulletin of News letter Vol-26 (2) and message of Prof. Dr. Miodrag Zlatic, President of WASWAC therein that you are being inducted as the New President of the WASWAC for the term 2011-13 and succeeding him from January 2011. Perhaps, full Council will soon be constituted. I sincerely and heartily congratulate you. I hope that, you will orient the activities of the prestigious Association to pivotise Soil and Water Conservation in every corner of the world.

Perhaps, you may know of Dr. M.S. Swaminathan of India, one of the pioneering doyens of the world in the field of agricultural advancement. His voice, citing the Lester Brown's article STATE OF WORLD 2000 that ***"It would be a mistake to confuse the vibrancy of the virtual world with the increasingly troubled state of the real world"***. In this concern his comments that ***" Among the troubles of the real world, land degradation and increasing diversion of prime farm land for non-farm purposes, are among the more serious ones, since they affect the future of food and water security. There is currently well justified concern for oil price, but it is not commonly understood that coal or various forms of renewable energy can stand for oil, there is no substitute for top soil. Land and water care and conservation hold the key to the future of both food and livelihood security"***, is worth mentioning.

We born, brought, perform on land and after our demise, our body is cremated in to the land in one or other way. The other name of the water is the life, sine every living cell contains sap/water. Similar is the state of plants within which crops include. Such are our relation with the soil and water. The Agriculture is the super culture of all the cultures in the world that generates goods for nourishing and subsistence of both the Plant and Animal Kingdoms of the inland. Agriculture in broad is the prime way for the furtherance and survival of the Civilization.

Main and great concern of the day is that Lands are eroding, degrading, going in to Rivers and Sea and Bay as well as for various non-farming uses. Arable lands are being degraded in to non-arable state, going out of cultivation. Maximum rain water is returning to Sea/Bay and air by run-off and evaporation; minimum of it is being stored in the surface water bodies, in to the soil and in to the aquifer by recharge. On the other hand, due to population explosion, demand of agricultural commodities is increasing day by day. Similar is the state of fresh water. The only way in front is the stopping further degradation and erosion but up-gradation of degraded land and restoration of the eroded land. Another associated task is the storage of rain water on the surface on surface water bodies, in to the soil layers and in the aquifer /ground water by recharge. Unfortunately, the Governmental policy makers have not realized or little realized, the importance of the Soil & Water Conservation. Instead, by investing on crop husbandry, desired results are not coming out. Also not astonishing for this failure, simply because, if foundation is weak, then superstructure cannot be strong.

It is true that, there is enough stock of know-how / technologies of Soil & Water Conservation in the National and International pool. The soil & water conservation education and research have advanced. But it can not be denied that those are confined in Publications, Selves and Books. Very fraction of those has been materialized in the field. The main limitation is the inadequate and or week Official functionary to transmit and materialize those. Time has come to disseminate the know-how and the importance of integrated soil and water conservation among Governmental peoples' representatives, mainly on whom the real implementation rests and also among the land users, I and owners.

It is the right time that the countries should give real importance on integrated soil and water conservation through taken up policy and fund allocation for implementation extensively on the field.

The States/Provinces of the countries should take up similar policy and invest fund. The National /Central and State/Provincial Governments should establish separate Governmental functionary with the specialized personnel in Soil & Water conservation. Each Country/National Government and State /Provincial Government should establish strong Training Institute for imparting training to the official functionary as well as to the land owners/users in integrated soil and water conservation. Soil & Water conservation schemes and works should be implemented on the field fully backed by technology. If these are done, then the only real soil and water conservation can be expected and then only successful agriculture will be possible.

In perspective to above what have been clarified, it is my suggestion that the WAS&WC may impress upon the FAO/UNO/National/State/Provincial governments to emphasize on the integrated soil and water conservation to combat the present situation and forthcoming situation. It should impressed upon to such confidence that, unless integrated Soil and Soil Water Conservation measures are intensively taken, all efforts of stepping up agricultural production as well as storage of rain water on inland will be futile.

- (i) They should really emphasize on integrated soil and water conservation.
- (ii) They should establish official functionary of enough manpower with the knowledgeable personnel in soil and water conservation at National /State/Provincial level of the National/central/State/Provincial Governments .Such establishments should have direct hierarchy up to field level.
- (iii) They should invest enough funds for the integrated soil and water conservation.
- (iv) They should establish training institutions for imparting training to the Official functionary, land owners, land users and to the policy framers.
- (v) Any other that may be deemed necessary.

Because of my back ground from an agricultural rural family and experiencing the need of the day, I have great concern as a "Wearer best knows where the shoe pinches" and placing my above suggestions for your perusal and taking appropriate steps.

Thanking you.
Yours sincerely,

P.K.Mandal

Member, World Association of Soil & Water Conservation from India

Dear Professor Kukal,

I had a detailed look at the 26 (3) issue of WASWAC Bulletin and was happy to know that Professor Li Rui has taken over the reins of WASWAC and the Secretariat shifted to China. It is indeed great news for me. I am sure that Professor Li will work with a great enthusiasm for the welfare of WASWAC and take it to new heights. I congratulate you and your team to bring out very informative bulletin with much hard work.

Keep it up!

Sincerely yours
(**Dr S S Bawa**, Sydney, Australia)

Dear Dr Kukal,

I am indeed thankful to you and WASWAC for admitting me as a life member of WASWAC. I, being a young scientist believe that this Association will be of immense importance for me and I hope to be in contact with great scientists in the field of soil and water conservation through WASWAC. I congratulate you and your editorial team for the hard work you have put in bringing out the WASWAC Bulletin.

Thanks and regards,

Sincerely
Deepak Jhajharia
Itanagar, Arunachal Pradesh, India

Members' Forum

Dear WASWAC Members,



I feel happy that WASWAC has democratically chosen its President for the next two years. Professor Miodrag Zlatic has done a commendable job in doing so. I got an opportunity to click a snap of President (Prof Li Rui), Immediate Past President (Prof Miodrag Zlatic and Immediate-2 Past President (Dr Samran Sombatpanit). This snap of three Presidents who are still active in WASWAC is picture of pride for all the members of WASWAC. A group of three is considered to be very productive group for any type of work and I feel that this will be true as far as the WASWAC is concerned. I must suggest that the Past Presidents should share with the present President their own experiences in carrying out the day-to-day activities of the WASWAC, so that our new President is much more efficient in performing his duties of WASWAC. I must suggest here some of own points which need to be taken care of by new President.

- We need to prepare a folder showing a brief history of WASWAC along with our achievements in past. This may also include the names of the present Executive Council of WASWAC and should highlight different organs of WASWAC. This should prove to be handy for us to showcase our association.
- The Executive Council should chat through SKYPE or similar system at least once in two months time and make some policy decisions instead of waiting for some event like Conferences/Symposia for that purpose.
- The people who do not give any input or do not take part in such meetings should be asked to do so and even if they do not do so, they may be politely asked to relax for some time till they feel active again or have time to work for WASWAC.
- Dr Samran has done wonderful job in sponsoring LANDCON conferences with certain pre-conditions. This has given a new look to WASWAC. However, we not being recognized as much as we could have been and thus much remains to be still done.
- The most important thing that a scientific association should have is a scientific journal with an impact factor and hard print copies for circulation at least in Asian countries. We till date have not been able to come out with such a journal. I feel that this should be the first priority of our President and I am sure that he will be able to do so soon.
- Our WASWAC Bulletin needs to be built stronger but that can be possible only with the support of the members in general and executive council in particular. We have a research section in this Bulletin and this section needs important articles from renowned scientists.

I hope that these points will be noted by the President and shall be taken care of very soon.

Dr Manmohanjit Singh, Editor WASWAC
Punjab, India

Issues

New maps to help Indonesia keep its CO₂ emissions on target

Indonesia lost 29 million hectares of forest between 1990 and 2005, contributing significant greenhouse gas emissions. The nation has now declared its commitment to reduce emissions by as much as 41% by 2020, supported by external funding. More than 50% of the reduction is intended to come from the land-use, land-use-change and forestry sectors.

The World Agroforestry Centre's Southeast Asia Regional team has been helping to develop time-series, land-cover maps that will enable the government to determine if its actions to reduce emissions are on target.



“This is the first time Indonesia’s historical land-use changes and trajectories have been mapped with this level of detail,” explains Dr Meine van Noordwijk, Chief Science Adviser with the Centre. “The maps show where deforestation has occurred across Indonesia and how agroforests and plantations replaced natural forests inside and outside the official forest zones. They also make it possible to calculate the amount of carbon stored in different land uses and the level of greenhouse gasses emitted from each type of transition.”

1990 to 2000, most districts in Indonesia, except some in Sumatra and Kalimantan, lost more forest than they gained in planted tree cover. Unsustainable logging and forest fires were the main causes.

During 2000–2005, half of the areas gained more tree cover than they lost in forest through the establishment of estates, timber plantations and agroforests. In the areas where deforestation occurred during this period, the primary cause was the demand for agricultural products and export commodities. Of course, there are exceptions to the trend. For example, in Papua and in Maluku, the most easterly part of Indonesia, forest loss is still higher than planted tree-cover gain.

Using data from the National Forest Inventory (compiled by the Government of Indonesia and FAO), the team was able to calculate carbon-stock densities for different forest types and locations and therefore estimate CO₂ emissions over time resulting from deforestation and forest degradation.

“Emission rates are slowing,” says Dr Sonya Dewi, landscape ecologist and climate-change scientist at the Centre, who worked on the maps. “During the 1990 to 2000 period, Indonesia’s rate of emission was 0.79 gigatonne of CO₂ equivalent per year. During 2000 to 2005, the rate was lower, with annual emissions at 0.47 gigatonne per year. The annual sequestration rate in the later period is more than double that of the earlier period.”

Emissions can be viewed by province, district, watershed or other categories, and this will be extremely useful to the government as they set baselines and develop national and sub-national strategies for emission reduction.

“We found that more than 79% of Indonesia’s emissions from land-use changes were produced by less than a third of the provinces of Indonesia. The largest share of emissions came from Central Kalimantan (16%), Riau (14%), East Kalimantan (12%) and West Kalimantan (8%),” says Dr Dewi.

The maps were produced as part of the [‘Accountability and Local Level Initiative to Reduce Emissions from Deforestation and Degradation’](#) (ALLREDDI) project, a European Commission-funded project implemented jointly by the World Agroforestry Centre and the Indonesian Government’s Forest Planning Agency in partnership with Brawijaya University and the Indonesia Centre for Agricultural Land Resources Research and Development.

A Genuine Green Economy must bring appropriate technology to the world's poor (Ashwani Vasishth; <http://earthsummit2012.org/index.php/blog/item/255-blog3>)

UNCSD 2012 is focused on “the transition to a green economy.” At its heart, talk of the “Green Economy” is talk about green technology. But what counts as a “green” technology? How would we know a green technology from a brown one, or a grey one?

Back in the 1970s, we knew green technologies. We called them Appropriate Technology; Biogas plants, solar cookers, treadle pumps, low-cost technologies that focused on bringing the benefits of progress to the masses, as they are quaintly called. By some accounts, Mahatma Gandhi first focused attention on simple technological innovations that could help develop cottage industries across the colonized Indian landscape. The ideas of *swadesh*, or autonomy, of self-sufficiency, lay, in many ways, at the heart of his vision of a better life for all.

A better life for all. Surely that is the nub of it. If this new vaunted “green economy” does not reach the poor, is it truly a green economy? Uchita de Zoysa had organized a panel titled “Whose Green Economy,” at the previous [CSD-18](#). I seek to continue that thread here, by asking, whose green technologies?

Or was it?

As it turns out, and at that time, both the developing and the developed worlds were less than enthusiastic about the idea of Appropriate Technology. Either because small-scale, locally grounded projects are much more tedious to fund than large-scale, centrally-run projects, or because, low-tech was seen as being less “modern” than high-tech. But, in any case, a magnificent opportunity to redirect development toward true sustainability was lost.

After all, and understandably, our ideas of modernity are shaped to a significant extent by notions we carry in our minds about state-of-the-art solutions. To be modern is to deploy the most sophisticated technologies we have thought to develop. In many cases, this deployment serves us well. In health care, for instance, or in science research. But, in some cases, what is needed for “proper action” is something else, something less, something more--hence the notion of “appropriate technology.”

The US Office of Technology Assessment defines Appropriate Technology as being “small-scale, energy-efficient, environmentally sound, labor-intensive, and controlled by the local community.” In addition, it is taken that such technologies are simple enough to be maintained by the people using them.

For instance, it may be inappropriate to deploy some modern construction technologies in a rural context, in circumstances where local builders may not be familiar with, say, pre-stressed concrete construction or extrusion. Similarly, methane digesters may be a more appropriate way to deal with sewage than modern sewage treatment plants, when socio-cultural context is taken into account. Differently, composting may be a more appropriate way of dealing with organic waste than disposal in landfills. Fertilizers and pesticides and genetic engineering may be the most modern ways to deal with agricultural yields, but, in many ways, may be more harmful to the ecosystem level environment than less conventional techniques such as no-till farming, or composting or integrated pest management.

According to Schumacher, and in any particular context, an appropriate technology is “intermediate” between established local technologies and state-of-the-art modern technologies. But, in every case, an appropriate technology is small-scale, low-cost, and easily maintained by local communities.

Water supply and purification, energy production, sewage treatment, waste management, and agriculture are some of the sectors that currently cry out for innovation, when it comes to poverty alleviation. If we are to focus on the “green economy,” let us bend our attention as well to these fields.

The important point here is to broaden the discussion about the new “green economy” in a way that takes the discourse away from high-cost green technologies and toward low cost ones. And to bring the notion of poverty alleviation back into the conversation. A green economy that does not reach the poor is worth little to the sustainability movement.

Miscellaneous

Certified Crop Adviser Program (<http://www.certifiedcropadviser.org>)

Who is a CCA?

A Certified Crop Adviser is a person educated to provide crop management recommendations to farmers, thereby ensuring better economic return to the farmers, employer, and himself, with emphasis on protecting the environment.

Aim of CCA certification

CCA certification ensures that the quality of service provided at the farm level is of uniform and high standard. Certification brings information on latest technologies, improves knowledge and encourages more meaningful interaction with the farmers and better productivity at the farm level. Earning the certification will bring:

- Better job opportunities in multinational organizations
- Job Opportunity in new technology areas
- Increased entrepreneurial opportunities
- Recognition from employers and clients as a credible and competent adviser
- Respect from other professionals, as a better adviser, consultant, and a credible teacher of agronomic practices
- Ensures continuous upgradation of your knowledge and skills, thus bringing pride, satisfaction and increased respect amongst peers
- Ensures advisory of global standards to the farmers. The fact that these standards are followed globally adds to the credibility of certified adviser

Who can get the CCA certificate?

Given below is the partial list of the program who will benefit from the CCA program

- Market development officers, Agronomists, Agri input sales personnel, Agriculture Development Officers, field assistants, Farm extension workers both in public and private sectors
- Consultants and Farm Managers
- Natural resource conservation personnel
- Educators and Extension specialists
- Technical support personnel
- Academic Scientists and Agronomy Researcher
- Agri graduates and post graduates

About CCA Program

The certified crop adviser program was started by American Society of Agronomy (ASA) in 1991 in United States of America (USA) and was later extended to Canada. Presently there are more than 13,000 certified crop advisers in USA and Canada. India is the first country outside the North American continent to provide the program with its continuous education as the major criterion for renewing the certification.

Initial support for the establishment of Certified Crop Adviser (CCA) program in India came from the Bill & Melinda Gates Foundation, United States Agency for International Development (USAID) and World Bank to International Rice Research Institute (IRRI) through a project on Cereal System Initiative for South Asia (CSISA).

Salient Features

- Certificate is issued by American Society of Agronomy (ASA), Madison, WI, United States
- This Certificate is valid in USA & Canada in addition to India
- Upgradation of knowledge will help the CCA in improving their job prospects

Pre-requisites to earn the Certification

The individuals who desire certification must register before appearing for the exam. The individuals must have the following technical requirements to become certified as crop advisers.

EDUCATION & EXPERIENCE

* B.Sc. Agriculture or above

* 10+2 or higher secondary with 4 years experience working at farm level

EXAMS

The individual must pass the India CCA exam based on the performance objective (syllabus) covering:

1. Nutrient management
2. Soil and water management
3. Integrated pest management
4. Crop management

The performance objective (syllabus) details are available on the website:
www.certifiedcropadviser.org/india

ETHICS

The individuals must sign and agree to uphold the India CCA code of ethics.

CONTINUOUS EDUCATION

40 hours of Education updation every two years is mandatory for renewing the CCA status

Summary Reports

DFHM5 conference at Padova – Some issues related to organization of conferences

A panel discussion was convened on the final day of the conference, but the overall turnout was limited, so I wanted to provide a summary of the discussion that took place for all because some important issues were discussed. Members of the International Organizing Committee (Jon Major, Tim Davies, Takahisa Mizuyama) along with Marcel Hürlimann and Peng Cui convened a panel discussion with about 30 of the conference attendees. The discussion centered on a number of issues related to the state of the conference series, the structure of the conferences, the proceedings publications, future research directions, and a database of debris flow events. The principal messages that resonated from the discussion focused on the following issues:

- There is a great need to structure the conferences so as to attract more students, young researchers, and practitioners. The current conference structure is mostly a top-down set of themes that have not changed much since the conference series began in 1997, is focused mostly around 'debris flow science and research' and does little to attract or engage practitioners and other end-users who must deal debris flow hazards at the community level despite the name of the conference (i.e., DF Hazards Mitigation), and offers little incentive to attract students and the younger generation of researchers and practitioners.
- There was very strong sentiment that this is an important conference series and that it should continue. This conference series offers a unique venue focused on a thematic topic that is generally diffuse at other major conferences. However, it is often the same people that attend this conference repeatedly and there is a need to attract new participants.



- The conference structure should be modified to include workshops and short courses, to invite theme sessions from the participant community (i.e., bottom up session proposals), include informal social sessions for students and younger researchers to meet and engage with the more senior scientists of the community, to include sessions aimed more at practitioners (such as sessions focused on 'success studies' to identify and discuss methods that worked and that failed), and perhaps to involve social scientists, the local populace, local politicians, and local public institutions in some manner. There were also suggestions to consider breaking up the conference to have an optional mid-week field trip, and to have a few more social sessions during the week.



- There was a strong sentiment expressed to continue to publish a proceedings volume. It was felt that this is a very useful document for the scientific community and is one place where case studies (which can be difficult to publish in scientific journals) can be collected and disseminated. The view was expressed that simply printing an abstracts volume would be a little value. However, given that the proceedings are not distributed much beyond the attendees of the conference, there is a need for them to have higher visibility and utility. Thus, a strong sentiment was expressed that the proceedings volumes need to be made available online. If the proceedings can be made available online, a printed hardcopy may no longer be needed. Ideally, all previous volumes would be digitized and made available online since they are now very difficult to access for anyone who did not attend the early conferences. The limited printing of the Padova volume will also make for limited visibility beyond conference attendees - although it may be made available as open access online. Major challenges to getting the past volumes online revolve around copyright issues of multiple publishers and finding a 'host institution' willing to post all of the volumes and maintain their availability in perpetuity. These



issues are certainly challenging, but need to be explored aggressively if the proceedings publications are to have wider impact and utility.

- On the science front, a variety of opinions were expressed as to future research directions. Some of the common research themes expressed concerned better understanding of debris flow initiation and deposition processes, better quantitative connection of debris flow forecasting with real-time rainfall forecasts, better quantitative understanding of the effects of boundary conditions (sediment entrainment and loss), a need to be able to predict how large an event will be (we've made significant advances in when they will occur, how fast they will be, and how far they will go), and perhaps consideration of conducting benchmark exercises to test various numerical models that are being used.
- Lastly, Rinaldo Genevois presented a website hosted by the University of Padova that is intended to serve as a community database for debris flow events. The database will contain such information as date of event, type of event, location of event, volume, inundation area, and several other parameters. If you are interested in learning more about this database, contact Rinaldo at rinaldo.genevois@unipd.it.



The members of the International Organizing Committee (IOC) have heard the concerns of the community and will work with the local organizing committee for the next conference, to be held in **Tokyo in 2015**, to provide a conference structure that addresses the concerns expressed. To help address some of the issues raised, the IOC may organize a couple of working groups. The health of this conference series rests squarely with the participants, and the IOC wants the function and organization of the conferences to be open and the participant community to be involved. I hope the participants had an enjoyable

conference in Padova and that they will attend the 2015 conference in Tokyo.

Jon Major, IOC Chair
(jjmajor@usgs.gov)

Research highlights

PAU-Tensiometer for scheduling irrigation to rice



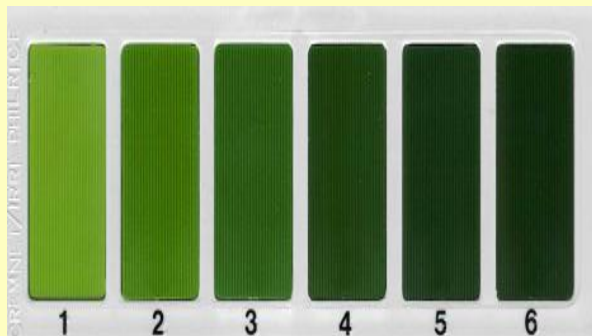
Soil tensiometer costing about just US\$ 7 per piece is a simple and innovative device which indicates the status of water in the soil. The tensiometer has been developed at Punjab Agricultural University (PAU), Ludhiana, India in the Department of Soil Science. This is very simple, cheap, sturdy and can

withstand hot climatic conditions. It has been standardized and tested at different levels of water in the soil which may be sufficient for rice crop without affecting its yield. It has been recommended for use by the farmers for scheduling irrigation to rice. The

water in the inner tube of the tensiometer equilibrates with the surrounding soil through porous cup and the level of the water in the inner tube indicates the water status of the soil. The colour scheme designed on the outer tube of the tensiometer body guides the farmers for scheduling irrigation to crops. The irrigation to rice is recommended when the water level reaches the bottom of the green strip or just enters into the yellow zone. It is applicable under all soil textural and weather conditions

and irrigation methods. The tensiometer is being standardized for scheduling irrigation to other field crops including fruits and vegetables, which need frequent irrigation. Assuming its 100% adoption by the farmers of the state, it could lead to saving of electricity to the extent of 1560 million units (kilowatt-h) worth US\$ 100 million per annum (www.pau.edu).

Leaf colour chart for managing fertilizer nitrogen in rice



Another important technique for site specific application of nitrogen in soil, developed by PAU is the leaf colour chart (LCC) costing about US\$1.1 per piece is a simple innovation enabling farmers to apply nitrogen fertilizer as and when required by the rice crop. It works on the principle that colour of the top most fully opened leaf of the rice plant is a good indicator of leaf nitrogen content and threshold leaf colour must be maintained up to flowering stage of the crop to achieve optimum yields. LCC helps in providing need-based, site-specific nitrogen management in

rice, based on soil nitrogen supply and crop demand. Use of the LCC can increase profit by enhancing yield per unit of applied nitrogen. By using LCC, farmers will be able to obtain optimum yields of rice by applying up to 30 kg/ha less nitrogen because LCC based fertilizer management takes care not only of the indigenous nitrogen supply but also from organic manures or residual effects from the previous crop. Savings in nitrogen fertilizers can be even higher when excessive nitrogen fertilizer applications to rice are considered. Chasing for high yields of rice, farmers in Punjab tend to apply fertilizer nitrogen in excess of the requirements. Assuming 100% adoption in rice by the farmers and a saving of 20 kg N ha⁻¹, it is estimated that a saving of N fertilizer worth US\$ 4.5 million can be made per annum (www.pau.edu).

- We intend to include peer-reviewed research papers from our members on various aspects of natural resource management from the next issue onwards. The Editors invite the original research papers from the members for publication in WASWAC Bulletin.

Few wise words

What Money Can Buy! (A Chinese Proverb)

With Money You can....

Buy a **Bed** but not **Sleep**
Buy a **Clock** but not **Time**
Buy a **House** but not a **Home**
Buy a **Book** but not **Knowledge**
See a **Doctor** but not good **Health**
Buy a **Position** but not **Respect**
Buy a **Blood** but not **Life**
Buy **Sex** but not **Love**

Seven Don't's after a Meal

Immediately after meals.....

Do not **Smoke!**
Do not **Eat Fruits!**
Do not **Take Tea!**
Do not **Loosen your Belt!**
Do not **Bathe!**

Do not **Walk!**
Do not **Sleep!**

WASWAC members are requested to send news about anything concerning SWC, e.g. funds, awards, publications, websites, exhibitions, technical meetings, to publish with us by sending to sskukal@rediffmail.com, aroraspau@yahoo.co.in, and mmjsingh@yahoo.com

Members/Contributors for WASWAC Bulletin

The following members have been our contributors to WASWAC newsletter and we expect them to continue this service for WASWAC Bulletin also. The next issue will list the names of the contributors for WASWAC Bulletin only.

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INFORMATION ABOUT MEMBERSHIP IN WASWAC

1. Individual membership: US\$5/yr for developing countries; US\$10 for developed countries and persons working in international organizations worldwide. Payment of the fee for 4 years at the same time will enable the membership to be valid for 5 years.

2. Life membership: US\$80 for developing countries; US\$160 for developed countries and persons working in international organizations worldwide.

3-1. Organization membership (OM): 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/yr for an organization with up to 150 persons; \$150/ yr for an organization with up to 300 persons; \$200/ yr for an organization with up to 500 persons; and \$10/ yr for an additional 100 persons or part thereof. Local organizations in developing countries can request to pay at a lower rate.

3-2. Organization subscription (OS): is the same as the Organization membership but the organization wants to limit its involvement only as a subscriber.

3-3. Organization cooperation (OC): is the same as the Organization membership but the organization wants to limit its involvement only as a cooperator, without paying a fee. Any organization can be a cooperator for 1-2 years before deciding to join as OM or OS if desired.

4. Gift membership: US\$5/ yr worldwide, to be purchased by anyone to give to colleagues, friends, students, etc.

You may ask sombatpanit@yahoo.com about your membership status, i.e. up to which year you have paid. Then you may send your membership fee to either John Laffen or me or any other address in the following list:

a. Dr. John M. Laffen, Treasurer, 5784 hwy 9, Buffalo Center, IA 50424 U.S.A. Phone: +1-641-561-2324. Fax: +1-641-584-2265 Attn: J.M. Laffen. laffen@wctatel.net. He can receive money from US and Canadian members through Personal Check, Money Order, or Bank Draft (payable to WASWAC), and can receive VISA and MasterCard credit cards and Bank Draft (payable to WASWAC) from all over the world. For sending money through a bank, please give the following information to your bank:

- Foreign wires: United Bankers Bank, 1650 West 82nd Street, Bloomington, MN 55431, U.S.A. Routing number 091 001 322; Swift Code UBBKUS41; for benefit of First National Bank of Volga; account number 091 402 552; further credit World Soil #703-488.

- Domestic wires: United Bankers Bank, 1650 West 82nd Street, Bloomington, MN 55431, Routing number 091 001 322; for benefit of First National Bank of Volga; account number 091 402 552; further credit World Soil #703-488.

b. Dr. Samran Sombatpanit, WASWAC Immediate Past President, 67/141 Amonphant 9, Soi Sena 1, Bangkok 10230, Thailand. Phone/Fax: +66-25703641, sombatpanit@yahoo.com. He accepts Bank Draft from every country. Mark the draft "payable to Dr. Samran Sombatpanit". He receives SWIFT through the Bangkok Bank, Bangkhen Branch, 2124 Phaholyothin Road, Jatujak, Bangkok 10900, Thailand. Phone: +66-25614091/ 25791146-8, Fax: +66-25791149. SWIFT CODE: BKKBTHBK, A/C No. 161-0-210864, which you should also indicate "payable to Dr. Samran Sombatpanit".

IMPORTANT NOTES: 1. DO NOT write the word 'WASWAC' in your remittance document, as it will cause a problem, since this is an alternative account that supplements the official one (a, as above).

2. Do not deduct the bank fee from your side from the amount of money to send.

3. For sending money by wire/bank transfer or check please add US\$8 per transaction to compensate for the charge at the receiving bank in Bangkok. This additional charge is NOT applicable for the payment of membership fee(s) of US\$50 or more.

c. You can also send to Dr. Samran Sombatpanit (use the address as shown in b.) through the **Western Union worldwide money transfer service**. Learn how to send from www.westernunion.com. Their service is quick and the transfer fee has been much reduced from the earlier time. Also as in (b), please do not deduct the money transfer fee from the amount to send but do not have to add US\$8 as shown in (b3) above. Please write to sombatpanit@yahoo.com to show your intention before sending.

OTHER ADDRESSES TO SEND THE MONEY TO WASWAC

Argentina: Eduardo Rienzi, Fac. of Agronomy, Univ. of Buenos Aires, Av. San Martin, Buenos Aires. Banco Nacion, suc 0082 Nro 200388227 CBU 01100204-30002003882279. rienzi@mail.agro.uba.ar

Australia: Kristie Watling, Department of Natural Resources and Water, 203 Tor Street, Toowoomba Q 4350, (P.O. Box 318, Toowoomba Q 4350) Phone: +61-(0)7-4688 1092, Facsimile: +61-(0)7 4688 1487 Kristie.Watling@nrw.qld.gov.au, www.nrw.qld.gov.au

Brazil: Antonio Guerra, Avenida Jose Luiz Ferraz, 250, apartamento 1706, CEP. 22.790-587, Rio de Janeiro – RJ BRAZIL.

SWIFT: BRASBRRJRJO, Banco do Brasil – conta 652291-2; agencia 3652-8.

antoniotguerra@gmail.com

India: *Surinder S. Kukal*, Department of Soils, Punjab Agricultural University, Ludhiana 141004.

sskukal@rediffmail.com

India: Suraj Bhan, Soil Conservation Society of India (SCSI), G-3, Nat. Soc. Block, NASC Complex, Dev Prakash Shastri Marg, New Delhi-110012. bhan_suraj2001@yahoo.com

Indonesia: Syaiful Anwar, WASWAC Indonesia Chapter (Masyarakat Konservasi Tanah dan Air Indonesia, MKTI, c/o Ministry of Forestry, Jakarta) with following account details: Bank Mandiri cabang Jakarta Gedung Pusat Kehutanan; Account holders: Trisnu Danisworo, qq Zulfikar Ali; A/C No: 102-00-0437516-5. sanwar@cbn.net.id

Japan: Machito Mihara, WASWAC Deputy President, c/o Institute of Environment Rehabilitation and Conservation (ERECON), 2987-1 Onoji Machida-shi, Tokyo 195-0064, Japan. Phone/Fax: +81-42-736-8972, hq-erecon@nifty.com. He can receive all forms of payment from within Japan, and can receive Visa and MasterCard credit cards from all over the world (mark in all forms of payment "payable to ERECON Japan"). Payment is in Japanese yen only; see more details in www.waswc.org.

Kenya: James O. Owino, Dept. of Agric Eng., Egerton University, P.O.B. 536 Njoro. SWIFT: BARCKENXANKE, Bank code: 003, Branch code: 027, Acc. No. 1214170, P.O. Box 66, Nakuru 20100. joowin@yahoo.com

Morocco: Mohamed Sabir, National School of Forest Engineers, BP 511 Salé. sabirenfi@wanadoo.net.ma

Netherlands: WRS Critchley, ABN AMRO Bank, Gelderlandplein, POSTBUS 87091, 1080 JB Amsterdam. Account number 549365478, BIC number = ABNANL2A, IBAN = NL28ABNA0470430559. wrs.critchley@dienst.vu.nl

Serbia: Miodrag Zlatic, WASWAC President, Faculty of Forestry, University of Belgrade, Kneza Visoslava 1, Belgrade. Serbia. Phone: +381-11-3553122 (o), +381-11-3583280 (h), +381-63661549 (m). He can receive money from the Balkans Region through the Raiffeisen Banka AD, Beograd, Republic of Serbia, SWIFT code: RZBSRSBG, Customer's name: Zlatic Miodrag, A/C No. RS35265051000004691675. miodrag.zla@sbb.rs,

South Africa: Richard Fowler, fax 086 672 6872 or e-mail rmfowler@iafrica.com

Spain: Artemi Cerdà, Departament de Geografia, Universitat de València, 46010-Valencia. acerda@uv.es

Thailand: Karika Kunta, Land Development Dept., Chatuchak District, Bangkok 10900, Thailand, Savings A/C No. 256-210171-8 Siam Commercial Bank (Tops Central Lat Phrao Branch) care_045@yahoo.com

United Kingdom: Mike A. Fullen, School of Applied Sciences, University of Wolverhampton, Wolverhampton WV1 1SB, U.K. Phone: +44-1902-322410, Fax: +44-1902-322680, M.Fullen@wlv.ac.uk. He can receive money from within the UK in pound sterling equivalent to the rates stated above. Cheques should be made payable to the University of Wolverhampton. You may use the most recent exchange rate for converting US\$ into GBP.

Note: For the convenience of all parties you are advised to sign up as a Life member or to pay for several years (e.g. 4 years and get 5 years) in one time. Contact sombatpanit@yahoo.com if you have any problem.

□ PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS WASWAC BULLETIN