

# **Terra Preta Sanitation (TPS) Workshop**

**April 5-8, 2010**

**Cagayan de Oro City, Philippines**

**Host: Sustainable Sanitation Center, Xavier University**

The Sustainable Sanitation Center (SuSan Center) in collaboration with the Research and Social Outreach Cluster of Xavier University (XU-RSO) wholeheartedly welcomed Prof. Dr.-Ing. Ralf Otterpohl, director of the Institute of Wastewater Management of Hamburg University of Technology (TUHH) and Dr. Jürgen Reckin, a plant variety and Terra Preta expert, from Germany for an intensive Terra Preta Sanitation Workshop on April 6-8, 2010 in Cagayan de Oro, Philippines.

Aim of the workshop was to get a common understanding on Terra Preta Sanitation, the current state of knowledge and research and how this concept can be practically implemented and tested in the Philippine setting.

Terra Preta Sanitation (TPS) is a low-cost dry sanitation system based on urine diversion and the addition of charcoal to the system that produces lasting and highly fertile soils with properties similar to the recently discovered manmade Terra Preta (black soil) in the Amazon region. Through natural processes of lacto-fermentation (silage) and vermicomposting fecal material is converted into Terra Preta like soils that can be utilized in (urban) agriculture and also act as a carbon sink. In the TPS system urine and feces are collected in 2 separate compartments. Urine is collected in a jerrican that contains a microbial mix and the feces fall by gravity into a bucket that is placed airtight underneath the toilet bowl to allow for anaerobic conditions in the bucket. After each defecation a mix of charcoal powder together with a finely cut wood source and some limestone or volcanic soil needs to be added to cover the feces. In addition a few dashes of the lacto-bacilli containing microbial mix should be added. Left under anaerobic conditions a lacto-fermentation process will be initiated inside the bucket. Unlike in anaerobic digestion no methane is produced and no odor will occur in the bucket, which makes it particularly interesting for larger scale indoor application in urban areas. The toilet lid needs to be closed after each use to provide as anaerobic conditions as possible. The occasional opening of the lid during the use will not significantly affect the process. As soon as the bucket is full it will be put aside, closed and stored for around 1 month to let the lacto-fermentation fully take place. It will then be subjected to a vermicomposting process. The final product is a Terra Preta soil with a high organic carbon content that allow for a long lasting fixation of essential nutrients, water retention and reduced leaching of nutrients from the rhizosphere.

## Day 1 (Monday, April 5, 2010)

The visit of the 2 German experts started with a one-day field trip to different sustainable sanitation implementations in Cagayan de Oro and Libertad (at WAND Foundation area around 30 km from Cagayan de Oro) on April 5, 2010. Several project sites including the famous Cagayan de Oro allotment gardens with UDDT, Arboloo toilets, Ecopees, double-vault UDDTs, Low-cost single-vault UDDTs, vermicomposting sites and coastal hanging UDDTs have been visited.



## Day 2 (Tuesday, April 6, 2010)

On April 6, 2010 the workshop started with a general expectation setting and a leveling of on the current state of knowledge and existing activities on TPS so far as well as the existing sustainable sanitation related activities in Cagayan de Oro and neighboring communities where TPS will soon be introduced and pilot tested.

After the introduction of participants, that mainly consist of the 2 German experts and the members of the XU SuSan Center the newly assigned director of the XU SuSan Center, Mr. Robert Gensch briefly presented the center's activities, where the visiting experts obtained an overall background about the center and the sustainable sanitation related activities of XU in Northern Mindanao and the Philippines.

After that Dr. Gina Itchon, Chair of the Department of Preventive and Community Medicine at XU School of Medicine presented a proposal for a TPS study that will soon be conducted at XU and further improvements of the proposal were discussed among the group.



The 2 German experts gave a lot of valuable input on the current state of Terra Preta research and existing practical experiences in developing Terra Preta soils. Terra Preta is now one of the focus areas of the Wastewater Management Institute of Hamburg University of Technology (TUHH) and Dr. Reckin is already practicing TPS for several years in his own garden in Berlin, Germany.

After the lunch break of the first day, a guest lecture for a wider group of interested people with the theme “Water Reuse Systems for buildings based on existing projects and experiences” in one of the bigger hotels in Cagayan de Oro (Grand Caprice) took place and gained interest of a good number of participants from LGUs, government agencies, local NGOs and academic institutions.

The lecture of Prof. Otterpohl entitled “**Terra Preta Sanitation: Solids and Biowaste Management Towards Highly Fertile Soils**” gave a good overview of existing high- and low-tech sanitation, wastewater management and reuse systems that finally led to the introduction of terra preta sanitation as one of the promising future approaches in dealing with human waste products. The enthusiasm of Prof. Otterpohl on this new technology swayed the crowd's views and perceptions on handling human excreta as vividly observed through their comments and suggestions during the open-forum after the presentation.

Dr. Jürgen Reckin's lecture on “**New Insights in Matters of Plant Nutrition, Soil Microbes and their Role in Recycling of Human Excreta and Regenerating Soil Fertility**” focussed more on the agricultural link, recent findings with regard to plant nutrition, the role of microorganisms in the soil and its practical impacts on how plants should be 'fed'. The in-depth lecture of Dr. Reckin contributed to the interest and motivation of the crowd to value more organic methods in agriculture and that human waste is a potent

alternative resource that can help to gain healthy, lasting and nutritious soils for food production.



The first day concluded with a welcome dinner of the German guest lecturers together with the University president Fr. Jose Ramon Villarin, the Vice President for Research and Social Outreach Atty. Antoinette Royo-Fay, the deans of the XU School of Medicine, XU College of Engineering and the XU College of Agriculture as well as other invited guests and RSO units.

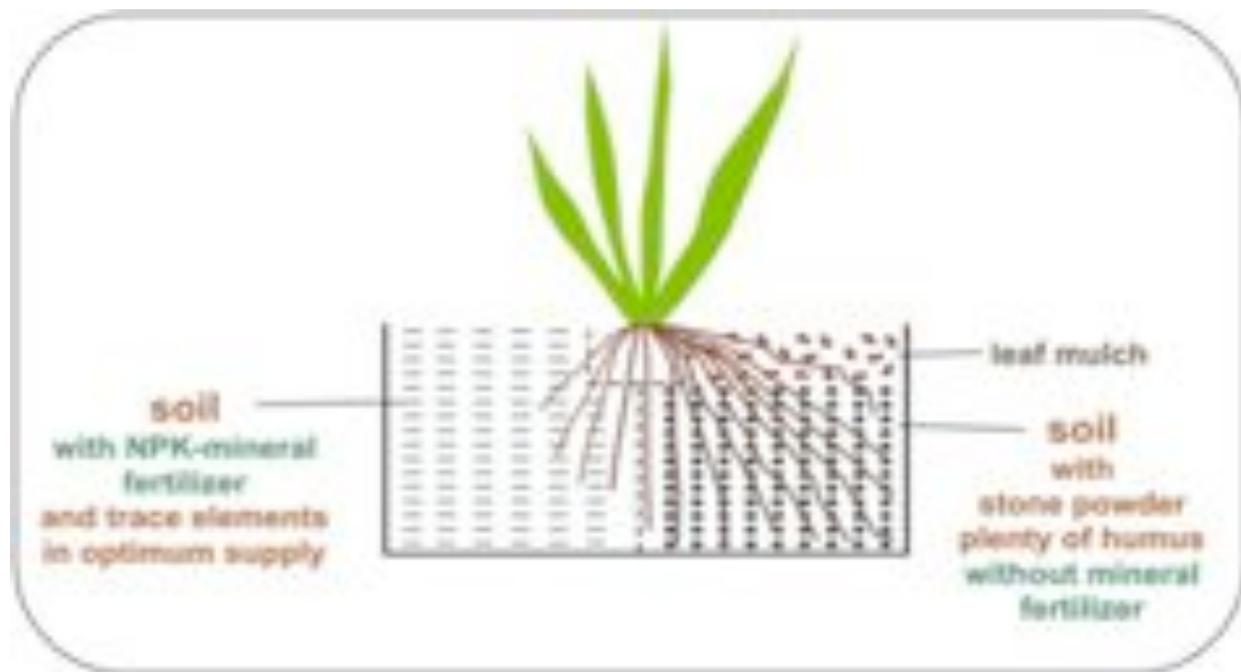
### **Day 3 (Wednesday, April 7, 2010)**

On April 7, the hands-on part of the TPS workshop was conducted at the Manresa Farm complex - the field laboratory area of the XU College of Agriculture. The participants of the hands-on training came from the College of Agriculture Crop Science Unit, the WAND Foundation, the Peri-urban Vegetable Project, XU Sustainable Agriculture Center, XU School of Medicine, and XU Engineering Resource Center, respectively.



The training started with an inspiring film called "Life in Soil" (Japan Nature Farming International Research Foundation, can be ordered from [www.agriton.nl](http://www.agriton.nl) or soft copies

can be obtained from XU SuSan Center). The film showed impressively that plants that were given a choice between an optimal N,P,K (and trace elements) fertilised soil and a soil with stone powder and plenty of humus would always decide with their roots for the humus soil. In conventional agriculture as well as in the conventional ecological sanitation approach where the use of urine as a liquid fertiliser substitute is propagated the focus is far too often on just 'force-feeding' plants with N,P,K instead of restoring and enriching the soil itself.



Taken from the presentation: New Insights in matters of Plant Nutrition, Soil Microbes and their Role in Recycling of Human Excreta and Regenerating Soil Fertility (RECKIN, J. 2010)

Then Dr. Reckin gave his lecture on Plant Nutrition followed by sharing on his practical experiences on TPS. He introduced a microbial mixed that he brought to the Philippines, which is similar to the so-called Effective Microorganisms (EM), containing a mixture of five microbes namely: *Bacillus subtilis*, *Bacillus mesentericus*, *Geobacillus stearothermophilus*, *Azotobacter croococcum* and *Lactobacillus* sp., respectively.



The microbes can be propagated easily though careful management and regular feeding of the microbes. The original source of microbes will be kept at Xavier University and can easily be obtained from the XU SuSan Center (contact: Robert Gensch, Email: robert.gensch@web.de, Tel: 09177110975). For feeding the microbes regular addition of a mix of a sugar source (sweet fruits like banana or sugar cane juice), pasteurized milk, and distilled/boiled (un-chlorinated) water). Feeding should be done between once a week and every 2-3 days, depending on the amount needed.

Apart from urine, faeces and the microbial mix, the materials used for TPS comprise ground charcoal powder, a sliced cut wood source (e.g. sawdust) as well as garden soil.

During the practical hands-on-training that followed Dr. Reckin explained how the urine composting can be done in practise. Urine and a little bit of the microbial mix can be applied to a mix of a finely sliced wood source (80%), ground charcoal power (10%) and existing soil (10%) and should be covered with some dry leaves. Within 1 month (under tropical conditions) and regular watering in order to keep the heap moist the material should convert into a humus-like material with no significant N,P,K losses. As expected during the urine application no urine odor was perceived.

#### **Day 4 (Thursday, April 8, 2010)**

Dr. Reckin shared his wealth of knowledge regarding several medicinal plant varieties in the tropics. This was not directly related to Terra Preta but a welcome and much appreciated input from one of the world's leading experts in this area. In conclusion of the TPS Workshop, Prof. Otterpohl synthesized the whole workshop and hands-on-training and participants were invited for open questions and clarifications.

The enthusiasm of the experts in this new TPS technology they shared, their extraordinary knowledge and skills significantly contributed in boosting the participants' interest in Terra Preta Sanitation and some first pilot implementations will soon be done at the WAND Foundation area as well as in several XU outreach communities. XU is already planning for a first training on TPS and organic farming for some XU outreach communities at the end of May 2010 and will continuously support the implementation process. A first study on the health implications and the effect of lacto-fermentation and vermicomposting on fecal pathogenic bacteria and parasitic ova reduction will soon be conducted as well.

#### **For more information please contact:**

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