

**FSN FORUM DISCUSSION
RESPONDING TO THE CHALLENGES OF CLIMATE CHANGE
AND ITS LINKAGES TO FOOD SECURITY AND NUTRITION**

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I. GENERAL INFORMATION

Duration: 17.10 to 07.11.2008

Facilitator: Stéphane Jost

Number of participants: 9

Number of Contributions: 19

II. INTRODUCTION OF THE TOPIC

Dear Members of the FSN Forum,

My name is Stéphane Jost and I work as a Liaison officer for the Environment, Climate Change and Bioenergy Division of FAO. I was also part of the secretariat for the preparation of the High Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy organised by FAO in Rome in June 2008. On the occasion of this year's World Food Day under the same theme: "**World Food Security: the Challenges of Climate Change and Bioenergy**", and in collaboration with the Climate Change Group within our Division, I am happy to launch on the FSN Forum a discussion on "**Responding to the challenges of climate change and its linkages to food security and nutrition**" in parallel to the launch of a new Electronic Newsletter called FoodClimate.

Climate change affects everyone, especially many vulnerable and food insecure people like small-scale farmers, fishers and forest-dependent people. They will be the most affected by climate change impacts. By affecting the availability of land, water and biodiversity, and the price of food, the rising demand for biofuels produced from food crops also has an impact on the poor.

During the High-level conference hosted by FAO in June 2008, the food crisis was on the spotlight of the global development agenda. Countries reaffirmed the need to invest more in agriculture and to carry out concrete action for adaptation to climate change in the agriculture sector. This year's World Food Day celebrations will give resonance to this topic once again and provide a good opportunity to continue dialogue among stakeholders and help find ways to make these promises a reality in a short period of time. This discussion launched on World Food Day invites you to share your ideas and concrete experiences related to this topic, especially on the following questions:

- 1) Climate change is expected to affect the incidence of malnutrition caused by, among other factors, more severe drought and erratic rainfall that may also change food consumption patterns. **What experience can you share regarding the impact of climate change and variability on food security, nutrition and dietary quality?**
- 2) Raising awareness of the possible impacts of climate change on food security in each community is essential in order to take action. **What successful strategies for communication and awareness-raising on the effects of climate change can you share?**
- 3) Producers, rural communities but also individuals and consumers have a role to play in adapting their practices and their consumption to limit the impact of climate change. **Do you have concrete examples of successful initiatives for adaptation to climate change and variability? Could you also share with us examples of climate change mitigation measures at the level of small-scale farmers?**

Your contributions in this forum will indeed generate a valuable source of information that can contribute to the generation of new ideas and the collection of concrete experiences on how to face climate change and its linkages to food security. This will help to prepare FAO's participation in the upcoming 14th session of the Conference of the Parties to the Kyoto Protocol (COP) to be held in Poznan next December 2008. Concrete examples may also be very useful for the preparation of documents to be developed by FAO in 2009.

Thanking you in advance we look forward to reading your experiences on this subject.

Best regards,

Stéphane Jost

Liaison Officer

FAO, Natural Resources Management and Environment Department

For more information on the work of **FAO on Climate Change** visit

http://km.fao.org/fsn/resources/fsn_viewresdet.html?no_cache=1&r=578&nocache=1

Subscribe to **FoodClimate** FAO's newsletter on climate change and food security at

<http://www.fao.org/climatechange/home/newsletter/en>

Download the leaflet of the **World Food Day 2008** at

http://km.fao.org/fsn/resources/fsn_viewresdet.html?no_cache=1&r=579&nocache=1

Visit and consult background technical documents on the website of the "**High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy**"

http://km.fao.org/fsn/resources/fsn_viewresdet.html?no_cache=1&r=580&nocache=1

III. LIST OF CONTRIBUTIONS;

Contribution by Ignatius Onimawo, from Ambrose Alli University, Ekpoma, Nigeria

Dear FSN Forum members

I agree that there is a link between climate change and food security. As a result, different countries respond to this issue in different ways. In order to reduce the adverse effects of continuous burning fossil fuels and its implication for CO₂ emission to the atmosphere, **some countries have resulted to the development of biofuels.**

One of the advantages by canvassed for use of biofuels is its environmental friendliness and thus helping to slow down the rate of climate change. This is of course a great argument. What worry me about this approach is the drastic effects on food availability. Already United States of America is currently committing a great deal of maize into the production of biofuels. The implication is grave for developing countries.

Some developing countries have already joined the race. In a situation where there is already food crisis I think use of food crops like maize, millet, sorghum and cassava for biofuels will aggravate the food crisis situation. I am only thinking aloud.

Prof. Ignatius Onimawo
Ambrose Alli University, Ekpoma, Nigeria.

Contribution by Marc J. Cohen, IFPRI, Washington, USA

Dear members,

I would like to draw on your attention the following paper, "Impact of Climate Change and Bioenergy on Nutrition," written by myself and colleagues at the International Food Policy Research Institute, the School of Public Health at the University of California-Los Angeles, and the Nutrition and Consumer Protection Division of FAO. It is posted at http://km.fao.org/fsn/resources/fsn_viewresdet.html?no_cache=1&r=581&nocache=1.

Thank you very much.

Marc J. Cohen,
Research Fellow
Food Consumption and Nutrition Division
International Food Policy Research Institute

Washington, USA

Contribution by Shaikh Tanveer Hossain, from Padakhep Manabik Unnayan Kendra, NGO, Bangladesh

Bangladesh's economy is heavily dependent on agriculture. It is beyond question that the rice industry has an overwhelming influence on the national economy. There has also been a sharp increase in the use of inorganic nutrients, i.e., chemical fertilizers, to get a higher yield from modern varieties of rice. During the green revolution, for example, 1 kg of added nitrogen fertilizer would produce 20 kg of grain, but now it only produces 8 to 10 kg (FAO, 2004). **Declining productivity due to soil degradation is now a major constraint.** It is said that a good soil should have an organic matter content of more than 3.5%, but in Bangladesh most soils have less than 1.7%, and some soils have even less than 1% organic matter. Moreover, the continuous and unbalanced use of inorganic nutrients in an intensive cropping system has been considered to be the main cause for stagnating or declining crop productivity. Unless the use of balanced fertilizers and organic matter in soils is seriously considered, sustenance or an increase in productivity can hardly be achieved.

Agriculture is a major contributor to emissions of carbon dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O). On a global scale, agricultural land use in the 1990s has been responsible for approx. 15% of all green house gas (CH₄) emissions. One third of all carbon dioxide emissions come from change in land use (forest cleaning, shifting cultivation and intensification of agriculture). Approx. two third of methane and most of nitrous oxide emissions originate from agriculture.

At the same time, agriculture offers options to reduce green house gas (GHG) significantly. One is to reduce emissions and thereby to the production of atmospheric CO₂, CH₄ and N₂O. To evidence emission reduction potential, **organic agriculture can play significant role in reducing carbon dioxide emissions.** This is because in these types of practices, it uses significantly less fossil fuel in comparison to conventional/chemical agriculture.

On the other hand, agriculture is responsible for about 30 percent of human related methane emissions and 70 percent of nitrous oxide emissions. Agriculture ranks third after energy generation and chlorofluorocarbon production, contributing to **greenhouse effect, the cause of climate change.** Agro-ecological and organic farming systems can be promising opportunity in both industrialized and developing countries to reduce GHG emissions. The allocation of carbon

credits for converting to ecological or organic production systems may also enhance the financial viability of this option for a large number of farmers.

Organic agriculture is not only a philosophy but **it's also a means of achieving sustainability in agriculture**. Sustainability is not only addressing economic issues but will also provide equal importance to social and environmental concerns. By adopting organic, one could potentially get rid of toxic chemicals pesticides and synthetic fertilizers, which over time have proved to adversely affect soil health.

Sustainable agriculture depends on many factors although soil is the most important media responsible for sustainable agriculture, when the organic matter from plants and animal is mixed with the powder of rocks (mineral), biological (micro-organism) activities and chemical action. The most common but limited organic materials which are currently used though out the world are bio fertilizer, humane fertilizers, manure spreaders, crop residues, green manure, bone meals, compost, farmyard manure, fish meal, fish wastes, liquid manure, sewage sludge etc.

To ensure that the soil remains biological active, **new sources of organic matter must be added at regular intervals**.

The Millennium Development Goals have eight targets through which balanced development and poverty alleviation are planned to be achieved. In Bangladesh, poverty is found to be more pronounced in rural area almost all the regions.

Organic agriculture offers an opportunity to contribute towards achievement in six of the eight targets:

1. Eradication of extreme poverty and hunger
2. Promote gender quality and empower women
3. Reduce child mortality
4. Improve maternal health
5. Ensure environmental sustainability
6. Develop a global partnership for development

Hossain et.al., (2007) remarked that **the research institutes should pay attention to finding new technology** such as an alternate organic fertilizer source (as cow dung needs a large volume), post-harvest and storage methods of an organic way.

Considering all these things, different waste materials such as kitchen, municipal etc. are needed to more studies for better utilization to use in organic ways and energy production.

References:

1. Food and Agricultural Organization (FAO) 2004, 'Bangladesh: land-related constraints', http://km.fao.org/fsn/resources/fsn_viewresdet.html?no_cache=1&r=582&nocache=1
2. Hossain, S. T., Sugimoto, H., Ueno, H.. and Haque, S.M.R. Adoption of organic rice for sustainable development in Bangladesh. Journal of Organic Systems (New Zealand). 2 (2) : 27-37, 2007 at http://km.fao.org/fsn/resources/fsn_viewresdet.html?r=583

With best regards,

Dr. Shaikh Tanveer Hossain
Agriculture and Environment Division
Padakhep Manabik Unnayan Kendra
A National Non-Governmental Organization

BANGLADESH

Contribution by Taiwo Adewole, Environmental Consultancy Services, Lagos State, Nigeria

"Some developing countries have already joined the race. In a situation where there is already food crisis I think use of food crops like maize, millet, sorghum and cassava for biofuels will aggravate the food crisis situation. I am only thinking aloud."

Dear All,

based on the above quote, I believe there are more better feedstocks that can be used rather than cash crops. In the some developed countries they have started using some plants and in some developing countries, Jathropha seed is taking over the use of Maize, millet, sorghum and cassava. But the question is for how long are we going to be feeding vehicles instead of human looking at the rate of malnutrition in the countries where there is mad rush for Biofuels feeds?

Thank you.

Taiwo Adewole
Taiwo Adewole and Associates
Environmental Consultancy Services
Lagos State, Nigeria.

Contribution by Ruy Korscha Anaya de la Rosa, GoodPlanet/Action Carbone NGO, France

Dear Stéphane Jost,

I am Ruy Korscha Anaya de la Rosa, carbon offset project manager for GoodPlanet / Action Carbone, the non-profit organization founded by the French flying photographer Yann Arthus-Bertrand.

I would like to share with you and the members of the FSN Forum the **innovative concept of Biochar in soils** in order to increase earth's fertility and crop yields and sequester carbon indefinitely as a powerful means to withdraw effectively CO₂ emissions from the atmosphere and therefore, counteract Global Change.

Ongoing research shows that carbonized materials (biochar) obtained from the chemical decomposition of organic matter by heating in the absence of oxygen (pyrolysis) are responsible for maintaining high levels of Soil Organic Matter and available nutrients in anthropogenic soils (Terra Preta or Dark Soils, in Portuguese) of the Brazilian Amazon basin (Glaser et al., 2002).

Pyrolysis can convert sewage wastes, trees, grasses, straw, corn stover, peanut, coconut and chestnut shells, olive pits, bark, sorghum, rice husk and other crop residues into biochar. In addition, the off-gases produced during the pyrolysis processes can be used to produce heat and electricity. Biochar improves the structure and fertility of soils resulting in a higher crop yield. Biochar, a porous material, increases water retention, stimulates symbiotic nitrogen fixation in legumes and creates a "cozy home" for the bacteria, microorganisms, fungi and nutrients required by plants. It can reduce nitrous oxide emissions and leaching of nitrates into water. It lowers soil acidity and aluminium toxicity.

Terra Preta soils are thousands of years old and charcoal, as a relative stable form of carbon, is still found in these soils. This suggests that the duration of charcoal or biochar's storage time ranges from millennial to centennial timescales. Whether biochar remains in soils for hundreds or thousands of years, it could be considered as a long-term sink for the purposes of reducing carbon dioxide emissions (Lehmann, 2007). Therefore, biochar has been recently brought to wide attention due to its high potential to counteract global warming by sequestering carbon in soils, becoming a carbon-negative strategy, while enhancing agricultural practices and delivering other

socio-economical and environmental benefits. These characteristics, coupled with the benefits mentioned above, opens a window of opportunity to improve the energy, forestry, agriculture, pasture and biomass waste management sectors.

While governments, industry and individuals tend to focus on carbon-neutral technologies, Terra Preta (biochar sequestration) projects offer them a unique possibility of becoming carbon negative. Having written this, Action Carbone finances a Biochar project aimed at small-scale farmers in India. At the moment, we are not claiming any carbon credit resulting from the sequestration of carbon in soils. We are trying to exist elsewhere. I actually think that a **holistic Biochar/ Terra Preta project should include improved biochar-making stoves**, improved biochar-making kilns and the application of the biochar produced in soils. And we are shooting for that scenario!

Furthermore, here it is a good summary article on Biochar:

http://km.fao.org/fsn/resources/fsn_viewresdet.html?no_cache=1&r=586&nocache=1

I know that the International Biochar Initiative is in good contact with the United Nations Convention to Combat Desertification to promote Biochar in Climate Change negotiations in Poznan. However, I am not aware of FAO's involvement to push forward this innovative strategy.

My positive vibrations to all of you,

Ruy

Contribution by Stephane Jost

Following previous contributions on this Forum, I would like to share with you the following comments or information:

- Dr. Shaikh Tanveer Hossain gave us useful insights on the situation in **Bangladesh** and the interest of organic agriculture. Thank you. This Forum precisely aims to share interesting field experiences. In Bangladesh, FAO is supporting a **Livelihood Adaptation to Climate Change (LACC)** Project aiming to improve adaptive capacity to climate variability and disaster risk reduction processes and capacities for sustainable food and livelihood security in drought prone and coastal regions of Bangladesh. This project promotes notably "Climate field schools" where farmers learn about how to adapt to climate change, as well as energy efficient stoves which save fuel consumption by 30 to 40 %. More information on this project is available at: <http://www.fao.org/climatechange/laccproject/en/>. You can also see the 2008 World Food Day Video which focuses on Bangladesh and partially on this LACC project (5.30 minutes video available at: <http://www.fao.org/climatechange/47742/en/>).

- On **organic agriculture**, two practical tools have been launched in early October to ease trade in organic agricultural products in developing countries. Outcome of six years of collaborative work by FAO, the UN Conference on Trade and Development (UNCTAD), and the International Federation of Organic Agriculture Movements (IFOAM), the umbrella organization for the organic sector worldwide, these tools will help streamline acceptance of products that are traded internationally:

- **Equitool** is a guide to help decision-makers assess whether an organic production and processing standard applicable in one region of the world is equivalent – that is, not identical but equally valid – to another organic standard. This tool facilitates trade while also safeguarding organic production according to local socio-economic and agro-ecological conditions.
- The second tool, **IROCB** (International Requirements for Organic Certification Bodies) is a minimum set of performance requirements for organic certification bodies that will

enable import of products certified under foreign control systems.

These tools and other documents on organic guarantee systems can be downloaded from:

http://www.unctad.org/trade_env/itf-organic/welcome1.asp

For more information on FAO's activities in organic agriculture, please consult:

<http://www.fao.org/organicag/>

- Several contributions referred to the development of **bioenergy**. Mr Ruy Korscha Anaya de la Rosa from GoodPlanet/Action Carbone presented the innovative concept of Biochar in soils. This technology appears quite promising as it connects well agricultural and rural development, soil improving practices, energy provision and climate change mitigation. It has applications for households, farms or villages that could produce biochar for their own use (some are already doing it). Larger scale plants, connected to paper mills for example, could produce char for utilisation in neighbouring regions or export. Slash-and-burn farmers could switch to a slash-and-char system. Many more cases exist. Calculations and estimates on GHG savings and energy production look favourable. Pyrolysis, the process where biochar is produced, also produces biogas, thus impacting all rural energy expansion. In some countries, like China, pyrolysis is used for producing gas for cooking, and the biochar does not seem to be valorised. All information you may have on concrete experiences related to this technique would be very useful.

- On Bioenergy topics, please note the recent launch on 8 October of the FAO flagship publication **State of Food and Agriculture (SOFA) 2008 Report on "BIOFUELS: prospects, risks and opportunities"** (report available at: http://www.fao.org/sof/sofa/index_en.html). The report analyses the evolution of the demand for agricultural feedstocks (sugar, maize, oilseeds) for liquid biofuels. Growing demand for biofuels and the resulting higher agricultural commodity prices offer opportunities for some developing countries in terms of income and employment. However, they increase concerns for food security of developing countries that are highly dependent on imports to meet their food requirements and of poor urban consumers or poor net food buyers in rural areas. The questions of the availability of land and water and the environmental impacts of biofuels are also crucial.

Thank you for your contributions. We look forward to hearing from your experiences and projects!

Stéphane Jost

FAO- Environment, Climate Change and Bioenergy Division

Contribution by Clover LaGuerre, from Rural Agricultural Development Authority (RADA), Jamaica

Hi Stéphane,

Since 2002 we have been working on climate variability and change in Jamaica through our Meteorological Office (MET). A second National Communication of Jamaica to the United Nations Framework Convention on Climate Change (UNFCCC) was completed and a workshop held to apprise all relevant agencies of the progress.

At the workshop the consultants all presented their studies and relevant recommendations for the National consultations on '**Vulnerability and Adaptation Assessments and a Draft Regional Strategic Plan for Building Resilience to Climate Change.**' The MET office also distributed bound copies of the assessments and strategies; however their plans to have it on their website have not materialized as yet. However you could contact Messrs. Spooner or Mahlun 876-929-3694 or www.metservice.gov.jm and request more info or a copy of the book.

The consultancies were on the following topics:

1. The regional STRATEGY to build resilience
2. The effect on TOURISM & SOCIO-ECONOMIC components

3. AGRICULTURE & FOOD SECURITY
4. HEALTH AND NUTRITION
5. HUMAN SETTLEMENT

Do hope this is of some help. I will also forward this email to the MET office – Jamaica - and probably they will get in touch with you.

Miss. Clover LaGuerre
Manager, Water Management Unit
RADA, Jamaica

Contribution Shaikh Tanveer Hossain

Dear Stéphane Jost,

Thank you very much for your comments and supporting links. It will be helping us a lot. Regarding organic agriculture, last couple of years we are trying to do practice organic farming with our limited resources in Bangladesh. I introduced **Integrated Rice-Duck Farming** for the first time in Bangladesh in the year 2001. We are also trying to use new **FEROMON TRAPS technology** against insect pests of vegetable crops and producing organic fruits in our homestead projects. Short duration high temperature tolerant rice varieties for kharif II and System of Rice Intensification (SRI) for boro season are now practicing in wide areas under the disaster risk management program.

The **major constrains of organic agriculture in Bangladesh** are low awareness level (both producer and consumer), low quantity required organic fertilizer sauce, none of any organic certification agency and effective policy.

It will be highly appreciable if you kindly give me your personal e-mail/phone number, so that I can contact with you personally about our future direction of works on climate change and organic agriculture, which is now the major issue in agriculture.

Sincerely Yours,
Dr. Shaikh Tanveer Hossain
Manager
Agriculture and Environment Division
Padakhep Manabik Unnayan Kendra
Dhaka, Bangladesh

Contribution by Joseph Opio-Odongo, formerly UNDP, Kampala, Uganda

Dear Colleagues,

The kinds of documents that Clover refers to do exists in many countries that have ratified the UNFCCC. Although the quality of the assessments and planning (NAPA) vary considerably, they do provide a good basis for programme actions at the national and sub-national levels.

A main challenge, especially in Sub-Saharan Africa that I am more familiar with, has been the **integration of the good scientific analysis and proposed actions into national and sub-national strategies and plans and budgets**. This includes using the results of the assessments of the impacts of climate change in the very sensitive sectors for climate proofing the investments in those sectors.

Those with concrete examples where this is happening could share them with members of the forum.

Joseph Opio-Odongo
Kampala, Uganda

Contribution by Syed A.B. Siddiqui, from Bangladesh Rice Foundation, Bangladesh

You have really opened an interesting discussion. But is there any way out for the countries like Bangladesh which is supposed to be disappeared completely by 2100 by the estimate of new paper by James Hansen, a leading climate change scientist and the head of NASA's Goddard Institute for Space Studies, which examined the relationship between rising carbon dioxide (CO₂) levels, melting ice and rising sea levels. Can we initiate a dialogue **how technology and investment** from the world community **can rescue these countries at the risk of drowning under the sea?**

Thanks to Ruy Korscha Anaya de la Rosa, from the GoodPlanet/Action Carbone NGO, France for her informative note with a futuristic idea of using **Biochar in soils** for reducing global carbon emission. But the question is **how to trap it and deposit safely or reuse?**

Regards.
Syed A.B. Siddiqui

Contribution by Ruy Korscha Anaya de la Rosa

Dear Syed A.B. Siddiqui and all,

I would like to elaborate a little bit on the **concept of Biochar in soils**.

GoodPlanet/ Action Carbone, together with GEO, an Indian NGO, are building knowledge on this innovative measure called Biochar to not only fight global warming but ALSO (and this is my main interest for this Forum) to improve soils' fertility and therefore increase crop yields. Ongoing research aims at characterizing the use of biochar. Several variables have been identified (type of pyrolysis technology and its various factors, type of soils, depth at which this biochar is dug into the soils, amount of biochar per hectare, type of biomass to produce the biochar, etc. , etc.).

I have been doing research on Biochar for the carbon market for almost two years now and my interest skyrocketed when visiting a Biochar amended field in India 7 months ago. The Biochar was put into a rice paddy field and the difference between the treated and untreated fields was HUGE. I could not believe my eyes, the rice plants from the treated field had much more branches, the roots were bigger and kept their moisture for a longer time than the untreated plants when taking them out of the water. Therefore we decided to finance a Biochar holistic scheme (I explain below) as a pilot project, which I hope would serve as a solid basis to create the platform for Biochar projects to become eligible for carbon finance and claim Emission Reductions in the future.

I explain you briefly **our Biochar project in India**.

In rural areas in India and in most developing countries women cook their food with biomass (mostly wood and charcoal) in highly polluting stoves, which represent a number of problems (Deforestation, lots of time spent on wood collection and on cooking, back pains and other life-threatening risks from wood collection, respiratory and eye diseases from Indoor Air Pollution, high fuel prices if the wood is bought, etc.).

Furthermore, charcoal is inefficiently produced in the earth-mound kiln, which is a pile of earth, leaves, hay, grass, etc. acting as an oven to heat in the absence of oxygen the wood cut (sometimes illegally) from forests and releasing considerable methane emissions. This process is called pyrolysis and, nowadays (because of Biochar's long-term potential to take carbon out of the atmosphere) a strong emphasis is put on technologies to improve this process. There are different technologies available. From just some drums to the big expensive industrial machines.

And finally, soils are pretty much degraded and farmers still believe that adding extra chemicals is

good for the Earth.

Having written this, GoodPlanet/ Action Carbone is mainly looking at financing the diffusion of what is called **the 3rd generation stoves** and these are merely the so-called **Charcoal-Making stoves**. So, while cooking normally with wood, this technology converts part of the wood into charcoal which is then recuperated after cooking. There are different designs and our partner GEO has developed different models ranging from 2 USD to 20 USD. Moreover, GoodPlanet/ Action Carbone will finance approximately 10 small-scale efficient kilns (around 500 euros per kiln) to pyrolyse or carbonize the cotton stumps which are left and otherwise burnt openly on the fields of cotton farmers.

The Biochar (in this case charcoal) will then be produced as a by-product while cooking more efficiently and from agricultural waste (the cotton stumps). Then, the biochar will be added into degraded soils to enhance their productivity. GEO has been experimenting with approximately 5 tons of biochar produced from Prosopis Juliflora/ hectare at a depth of about 20 cm. The results are very positive, nonetheless, we are still testing.

Chido,

Ruy

Contribution by Joseph Opio-Odongo

I find the practical example provided by Ruy rather interesting. It provides some insights on how the project contributes to emission reduction and crop productivity by use of the bio-char technology to improve the productivity of degraded lands. It would, however, be useful if Ruy could give us additional perspectives on the following:

- The linkages between bio-char application and enhanced food security and nutrition of the poor and underprivileged in India
- The costs and benefits of the alternative of incorporating cotton stumps into the soil for fertility replenishment or improvement of the soil structure (rather than burning them) as opposed bio-char production
- The extent of the uptake of the bio-char technology by the poor and undernourished farmers in India.

Regards.

Joseph Opio-Odongo
Kampala, Uganda.

Contribution by Ruy Korscha Anaya de la Rosa

Dear Joseph,

I would like to start by quoting Leonardo da Vinci: "We know more about the movement of celestial bodies than about the soil underfoot." Biochar in soils is no exception. We are far from mastering this innovative soil-amendment technique, nonetheless, we are moving forward and in fact, all of you working with agriculture, food security and nutrition could help to **construct the necessary Biochar knowledge and respective lobbying** to understand better the relation between Biochar and soil organic matter.

Biochar application in soils decreases the use of chemical fertilizers and water irrigation needs since the biochar retains water, beneficial bacteria, nitrogen, micro-organisms and nutrients in general in its pores. Thus, Biochar avoids water's and nutrients' leakage to undergrounds. This is critical for the soil's biological activity, productivity and profitability.

For already some time, it has been recognized that organically produced food is safer and more nutritious. Biochar, by increasing land's productivity and food production and by reducing the need of chemical fertilizers, points at a positive direction towards an enhanced food security and nutrition of not only the poor and unprivileged in India but of everyone in this planet.

In India, we have not studied the benefits or costs of incorporating the cotton stumps directly (as wood) into the soils. We first pyrolyse the cotton stumps and produce biochar and then we dig it into the soils. Since, besides improving agricultural practices, we are also looking at means to remove carbon from the atmosphere we discard the option of applying wood into soils. The carbon contained in the cotton stumps would eventually be released back into the atmosphere if it is not pyrolysed. Biochar in soils is a stable form of carbon which takes hundreds or even thousands of years to decompose.

The pilot project I've explained aims at involving approximately 5000 households and several farmers in rural India. Action Carbone will finance the respective activities through the carbon market. Carbon credits will result from the savings of non-renewable biomass thanks to the diffusion of the charcoal-making stoves. Unfortunately, biochar is not eligible for carbon finance but we would like to push it forward in climate change negotiations and this is one of the purposes of this project as well.

Chido,

Ruy

Contribution by Syed A.B. Siddiqui

Dear Ruy Korscha Anaya de la Rosa,

Thank you so much for taking time to write a brief note. But you have aroused more interest by replying us.

You have been mentioning about the cotton stump but there are other agricultural wastes in the rural areas. What do you think about those stuffs? Can you share the results of your experimentation and type of stove you are talking of?

In Bangladesh, so far my knowledge goes no one worked with bio char. I am very much interested to work with similar type of action project and wondering how you could play an effective role to give your hand in our initiative. It would be therefore wonderful if you share your experience with some data and indicate your interest to undertake a **small initiative in Bangladesh**, which I believe would be one of first victim of climate change. Together we can make change.

With best regards.

Thanks and regards.

Syed A.B. Siddiqui, Bangladesh Rice Foundation

Contribution by Ruy Korscha Anaya de la Rosa

Dear Syed A.B. Siddiqui,

Thanks to you for your interest. I am glad to share my views on Biochar in soils with you. All together, we can make a change indeed!

As you are involved in the Bangladesh Rice Foundation you will be happy to read that biochar can be produced from rice husk. And actually, GoodPlanet / Action Carbone is financing another

project in Senegal which consists of the replacement of wood charcoal with “**green charcoal**” **briquettes** (there is no international consensus yet but so far I define green charcoal as the char produced from organic matter and burnt to provide energy and biochar as the char produced from organic matter and applied underground for carbon sequestration and soils’ fertility improvement). The green charcoal briquettes in this project are produced from rice husk, which is burnt otherwise, and from typha, an invasive plant in Senegal. Technically, pyrolysis can convert sewage wastes, bones, trees, grasses, straw, corn stover, peanut, coconut and chestnut shells, olive pits, bark, sorghum and other crop residues into biochar.

Concerning the stove, I am attaching hereby the words of Dr. N. Sai Bhaskar Reddy the CEO of GEO, our NGO partner in India, for your information:

MAGH-1 T-LUD WOOD GAS STOVE - Designed by Dr. N. Sai Bhaskar Reddy, CEO, GEO

Magh-1 woodgas stove is a non-traditional highly efficient stove based on the Top lit up draft (T-LUD) principle. It has a small fan for forced primary and secondary air. The secondary air burns the smoke / gases generated during pyrolysis by primary air. A 12v CPU cooling fan is used for forced air generation. The efficiency of the stove is 40% as compared to the traditional three stone and clay stoves with very low efficiencies of 5% to 10%. All types of biomass, with homogeneous size (natural grade / chipped) can be used for fuel. Design of the combustion chambers vary according to the type/s of biomass available. The stove can be made with use of various types of materials, clay, stainless steel, ferro-cement, etc. The cost of each piece of stove varies from Rs. 150 to Rs. 1000 based on the type of material used.

The intention is to make these stoves accessible to all class of people for adoption. Some of these stoves could be made by people themselves with locally available material (except for fan) and easily adoptable by millions of people. The duration of flames last from 25 minutes to 45 minutes depending on the density of biomass. Total functioning time is 45 minutes to 1 hour 30 minutes per batch loading of fuel. This model is convenient for a family of 5 members with two batch loads of fuel total cooking needs are met. Because of the compact size of just 10x6x6 inches dimension, they are easily adoptable. To boil 1/2 litre of milk it took just 4 to 5 minutes, it means it is able to compete with the standard LPG Stoves available in India. These stoves produce charcoal as a byproduct after every batch load of cooking, which can be used for various purposes, like improving the soil fertility, as fuel in charcoal stove, etc. This is the stove which links the micro initiatives on a macro scale. The biomass conservation due to high efficiency, very less smoke released - safe for women and children and a solution to mitigate global warming, time spent on biomass fetching is saved or the costs on fuel prices saved. The burden of subsidies by the government can be saved. As a micro-enterprise activity the stoves could be facilitated in millions all over the world. The remote tribals are happily using them along with solar panels to power the fan in a tiger reserve in Andhra Pradesh state India. If tribals are happy using them why not everyone?

And regarding the small biochar initiative in Bangladesh let me write to you that small biochar field trials are taking place all over the world and I can put you in contact with some of the biochar organizations. Although at this point it is difficult for me to draw specific actions, I am interested in helping you to build biochar knowledge in Bangladesh.

Chido,

Ruy

Contribution by Syed A.B. Siddiqui, from the Bangladesh Rice Foundation

Dear Ruy Korscha Anaya de la Rosa,
It's nice to get your response so quickly. It simply shows your interest and devotion to a noble cause. Thanks for your assurance of lending your hand in initiating something on bio char.

I found your note very useful and understand that Rice Husk could be used as bio char but there remains a lot of unanswered question before you start. How can I get in touch with Dr. N. Sai Bhaskar Reddy to get a little more on the technical design of his stove and possibility of making such stuffs here. By the way since I don't know French I failed to read about your organization which has got a website. Do you have anything in English?
Thanks and regards.

Syed A.B. Siddiqui, PhD

Contribution by Poonam Pande, from Sustainable Agriculture Information Network (Sustainet) in India

Dear Ruy Korscha

Nice to know about such an important topic. My name is Dr. Poonam Pande and I am the Indian co-ordinator for the Sustainet (Sustainable Agriculture Information Network) in India. Our network partners are involved at grass root as well as national level working on various aspects of Sustainable Agriculture. I would like to share the technology with the network partners as this could be one of the good practice to conserve soil organic carbon and as an acting reservoir for the carbon sequestration. Is there **any scientific papers or studies** that you would like to recommend **for pilot studies in different agroecological zones**. This will be helpful for us.

Warm Regards

Poonam Pande

Contribution by Stéphane Jost

Dear Members of the FSN Forum,

We are about to close the E-Forum discussion on "*Responding to the challenges of climate change and its linkages to food security and nutrition*" launched on 16 October on the occasion of 2008 World Food Day dedicated this year to the theme: "*World Food Security: the Challenges of Climate Change and Bioenergy*" as a follow-up to the High Level Conference organized on the same topic by FAO in Rome in June 2008.

We thank you for your valuable contributions which permitted to receive inputs and exchange experiences from various countries including Bangladesh, China, India, Nigeria, Senegal, Uganda. A summary of our discussion on these subjects will be circulated in the coming days and it will be also provided in French and Spanish as soon as possible. The purpose of this discussion was to "*get a valuable source of information that can contribute to the generation of new ideas and the collection of concrete experiences on how to face climate change and its linkages to food security*", as stated in my introductory message to the Forum. We managed to do it, notably with a lively discussion on the innovative concept of "Biochar in soils" which allowed sharing concrete examples of biochar projects in India or Senegal and discussing how this technique could be implemented in other countries. These **inputs will help us for coming discussions during the next 14th session of the Conference of the Parties to the Kyoto Protocol (COP)** to be held in Poznan next December 2008 and for activities to be developed by FAO in 2009.

For those who would like to continue exchanging on the bioenergy topic, we inform you that another **E-Forum discussion** is going to start today 10 November on "*The role of agricultural biotechnologies for production of bioenergy in developing countries*". Launched by the FAO Inter-Departmental Working Groups on Bioenergy and on Biotechnology, it will last until 7 December. This e-mail conference provides a good and timely follow-up to our discussion. For more information, please read the background document at <http://www.fao.org/biotech/Conf15.htm> or contact biotech-mod3@fao.org. To join, send an e-mail to mailserv@mailserv.fao.org with the following text on two lines: subscribe BIOTECH-L ; subscribe biotech-room3

Finally, we invite you to subscribe to the new **FoodClimate Electronic Newsletter** launched also on 16 October 2008 to provide an entry point to information, events and publications related to climate change and its impacts on agriculture, forestry, fisheries, food security, and natural resources as well as adaptation and mitigation *strategies*. To subscribe to this newsletter, send a message to mailserv@mailserv.fao.org leaving the subject blank and entering the following one-line message: *subscribe Food-Climate-L xxx.xxx@yyy.zzz (the address to be added)*.

Thanking you for your contributions, do not hesitate to share with us other concrete experiences on these subjects.

Best regards.

Stéphane Jost

Liaison Officer,

FAO, Environment, Climate Change and Bioenergy Division,

Natural Resources Management and Environment Department