Combating desertification implies managing the land to enhance its potential to sequester CO2

The land literally "inhales" excess greenhouse gases

Soil organic carbon

The world's soils hold more organic carbon than that held by the atmosphere as CO2 and vegetation combined, yet the role of the soil in capturing and storing carbon dioxide is often one missing layer of information in taking into consideration the importance of the land in mitigating climate change. Extraordinary demands are being placed on agricultural systems to produce food, fibre and energy in addition to biomass burning and the removal of crop residues that inevitably result in changes in the flow of carbon into or out of soils. These events have a significant effect on soil fertility and the global carbon cycle.

Land: the unconventional carbon sink

The land has an unparalleled capacity to hold carbon and to act as a sink for greenhouse gases making it imperative to focus on activities that enhance rehabilitation, protection and sustainable management of degraded lands. Over the years, most efforts to manage greenhouse gases have involved planting trees, since the amount of carbon that can be sequestered in this way is substantial. But conventional means to increase soil carbon stocks depend on climate, soil type and site specific management.

The drawback of conventional carbon enrichment is that this carbon-sink option is of limited duration. The associated humus enrichment follows a saturation curve, approaching a new equilibrium level after some 50 to 100 years. The new carbon level drops rapidly again as soon as the required careful management is no longer sustained. Opportunities exist to enhance sequestration of carbon in the soils through sustainable land management processes. In particular, the application of biochar into the soils can augment carbon sequestration, both in smaller and larger quantities.

Biochar: an option for sequestering carbon

Biochar production can be easily undertaken at small (e.g. cooking stove) or large scale (e.g. bio-refinery) through pyrolysis of agricultural residues resulting in charcoal and energy production. Biochar carbon sequestration provides a tool to combine sustainable soil management (carbon sequestration) and renewable energy production. About 50% of the carbon can be captured if biomass is converted to biochar. Charcoal enriched soils are among the world's most fertile soils and prove that soil organic carbon enrichment beyond the maximum capacity is possible if done with a very slow degradable form of carbon such as biochar.

It must be considered that soil properties determine the different capacities of the land to act as a store for carbon that has direct implications for capturing greenhouse gases. The fact that many of the drylands soils have been

degraded means that they are currently far from being saturated with carbon. Keeping in mind the large potential of biochar to sequester carbon, a strategy to use it to enhance soils carbon sequestration should be established as soon as possible.

Linking Land Carbon Sequestration with climate change

- The global carbon trade market must be made accessible to land managers, especially in the tropics where sustaining soil organic carbon (SOC) and soil fertility is most challenging and CO_2 emissions due to land use change are highest.

- The approach of biochar soil organic carbon restoration constitutes a significant adaptation tool to climate change, in addition to sequestering carbon. This could be a strong link between the three Rio conventions as it simultaneously addresses climate change, desertification and biodiversity issues.

- There is the need to include into the negotiation agenda of UNFCCC practical approaches such as biochar-related mitigation and adaptation initiatives, focusing on increased land productivity, which simultaneously take into account the issue of climate change, desertification and biodiversity issues.

According to the IPCC biochar management could be a valid carbon sink in the current and post 2012 LULUCF guidelines. Policy action urgently required:

1. Raising awareness on the role of the land on mitigation and adaptation to climate change and in particular the importance of Biochar in enhancing the sequestration of carbon in the soils.
2. Inclusion of biochar in the CDM mechanism along with currently already included afforestation and reforestation.
3. Revision of the additionality rules in order to take into account the fact that biochar is a permanent means of carbon capture that has more value than the potentially reversible afforestation and reforestation.
4. In view of item 3 above, increase the level of CERs that an annex I Party can use towards meeting the Kyoto Protocol targets from the current 1% to a higher percentage. This would result in large financial flows for both mitigation and adaptation to developing countries where use of this technique would result in the highest returns, due to the high losses of SOC.

Conclusion

In the final analysis, during the Climate Change negotiations, the land could be treated from a new perspective, of its capability to sequester and to literally "inhale" excess greenhouse gases, a process that help mitigate climate change.