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Progressing from Terra Preta de Índios to the Whole World

Biochar Super Gardens

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Introduction

Micro-scale agriculture, i.e. gardening, is a central activity of billions rural households in developing countries whose daily food supply depends for the most part on their own production. The rampant poverty and malnutrition experienced by these communities is dramatic evidence that despite their effort and hard work, most of them fall short of covering the needs of their whole family. National and international organizations and authorities usually address these issues on a large scale by following a top-down approach and conducting large and ambitious development programs with little if no impact on the individual farmers.

It seems however obvious that a bottom-up approach is unavoidable in order to reduce in the long run the poverty of rural households and communities and to increase their self-sustainability while protecting their environment and natural resources. In this paper, we present Biochar Super-Gardens (BSGs), a new concept developed by Pro-Natura International and JTS Seeds and already successfully implemented in several developing countries all over the world.

Biochar Super Gardens

JTS Seeds, a social business focused on GMO-free agronomical research since the mid-nineties, has developed the innovative, ecological and highly productive Improved Tropical Garden (ITG). Initially conceived for African drylands, this enriched garden combines the most efficient agricultural strategies from seed selection to irrigation and pest control in order to reach the highest productivity while selecting exclusively green practices harmless to the environment and ensuring the long-term sustainability of the garden.

Pro-Natura, on the other hand, is an NGO which has developed an innovative pyrolyzer using renewable biomass for the production of *green charcoal*, which can be used as domestic fuel in place of charcoal or as biochar. The efficiency of Pro-Natura's biochar has already been confirmed by several field trials in Africa showing a significant increase of the yields of crops grown on soil amended with biochar in combination with organic fertiliser, compared to crops grown on a normal soil.

The BSG project results from a partnership between JTS Seeds and Pro-Natura, aiming at combining their experience and expertise to develop ITGs on soils amended with Pro-Natura's biochar. With its remarkable capacity to retain water and nutrients and improve the overall soil quality, biochar fits indeed perfectly with the other agricultural practices developed in ITGs. Adding biochar fosters the action of fertilizers as well as the water retention capacity of the soil, which leads to a yield increase as well as a reduction of the costs of water and other inputs, since their required quantity is significantly reduced compared to traditional gardens.

The resulting garden, called BSG, has the potential to yield vegetables sufficient for 10 people all year long on a surface area of 60 m^2 in a developing country, with minimum cost, work and training. Indeed, BSGs only require low-tech material affordable by the target communities, and maintaining them only requires about two hours work per day. This leaves plenty of time for other activities such as education of the children or generation of additional income, which are usually sacrificed on the behalf of food production. The initial setup of BSGs is also facilitated by its distribution in form of a kit that includes all the required material for its setup. This kit, sold at low price, is complemented by training and support provided directly to rural communities by experienced trainers.

BSGs have already been successfully implemented in Senegal, Niger, Algeria and Egypt, and similar projects are planned in Morocco, Mali, Brazil and Haiti in the near future. The demand and potential for development are tremendous, since the cost and work for the setup and maintenance of these gardens are completely and very quickly compensated by the benefits obtained by the farmers, who become self-sustaining after only a few months. The first results confirm the

expectations and show a remarkable yield increase compared to a traditional gardens.

Besides facilitating the development and dissemination of BSGs, Pro-Natura is also concerned with the evaluation of the amount of carbon stored in the soil in the form of biochar, whose accuracy and reliability are key prerequisites to any official acceptance of biochar as valid methodology for GHG emission reduction (as carbon sink). A global monitoring strategy of BSGs is therefore being developed by Pro-Natura, which consists in maintaining an up-to-date database of all operational BSGs with static information (location, target community, etc.) as well as dynamic data (crops currently in cultivation, yield results, etc.) regularly updated by the owner of the BSG or an intermediary entity (NGO, co-operative etc.) in close relation with the farmers maintaining the BSG. Part of the collected data is made available in the public domain on a website showing a dynamic map of the implemented BSGs all over the world and their related information and pictures.

Conclusion

In the future, Pro-Natura aims at developing further this dual approach: promoting the implementation of new BSGs in developing countries on the one hand, and monitoring the network of existing BSGs on the other hand, in order to keep track in a transparent way of the global impact of biochar in the world and see its evolution. We believe that partnerships with other key actors in the biochar community supporting this approach could eventually lead to a new consideration of the biochar strategy by the decision makers in the climate change authorities, and thus eventually open new opportunities for the development of projects in developing countries.

Figure 1. Installation of a Biochar Super Garden (1).

Figure 2. Installation of a Biochar Super Garden (2).

Figure 3. Biochar Super Garden in Niger.