

## **New resource management in the Botanical Garden of Berlin**

TerraBoGa was a project, where several partners were involved, the Freie University of Berlin, the Botanical Garden as well as two companies HATI from Berlin and Palaterra from Rhineland – Palatinate. It was funded by the Berlin Senate as well as the [European Commission](#) (it is part of the European regional development fund).

The Berlin Botanical Garden produces around 2100 m<sup>3</sup> of waste, like green waste, pruning waste, grass cuttings and wood, as well as the sewage from employees and the annual 260.000 visitors. In contrast, around 250 m<sup>3</sup> of compost and fertilizer has had to be bought in each year. Much of this was unused and is disposed of in a way that is both energy and cost intensive.

If we could at least replace part of the demand, we could not only save money, but also minimize the emission of atmospheric greenhouse gases. Terra Preta might even have the potential of replacing the widely used peat and help saving valuable ecosystems.

With the TerraBoGa- project my Colleagues from Workinggroup Geoökologie wanted to achieve an efficient use of the organic waste that is produced in the Botanical Garden. They do not only regard organic materials such as green and pruning waste, but also human

excrement as well as the urine of the visitors to be valuable resources for the Terra Preta-Production.

## **Terra Preta**

Terra Preta is the local name used for certain dark soil in the Amazon region of Brazil and was created by pre-columbian indians.

This dark soil has high contents of (black) carbon in comparison to the surrounding soils of the Amazonia (which is very poor in nutrients/ carbon). A special characteristic of the organic carbon is its high persistence over a long period of time.

The reason for this stability is seen in the high amounts of biochar, more precisely the so called black carbon that was found in the Terra Preta. In addition Terra Preta is characterized by high nutrient contents and a high cation exchange capacity.

The examination about biochar as a soil amendment also shows, that biochar affects the decrease of nutrient leaching and as a result increases the growth of crops and other fruits.

The soil fertility benefits from biochar because of two important properties: First, because of the high affinity of nutrients to the biochar and secondly, because of its high persistence.

## **New Resource Management**

Two ways of biochar-technology are applied – conventional composting with biochar and fermentation of organic wastes with biochar. On an

internal, small scale we close the material cycles of use. We avoid carbon emissions and nutrient losses.

From wood we produce woodchips and then the woodchips goes in to the pyrolyse-facility and ends up as biochar. The rest of the green waste goes directly in to the compost added with the biochar and after some weeks we have a biochar substrate, what we can use in to the garden.

The addition of biochar to the composting process helps to improve the hygienisation of green waste, reduce bad odours and GHG emissions from composting, and reduce nutrient losses. Biochar-compost optimises the soil structure for plant substrates and can help reduce the amount of peat and other additives used. The use of biochar-compost did not show any negative effects on plant growth. Therefore, biochar-compost is a promising substrate.

Before we had 160 Tons CO<sub>2-eq</sub>/ year, with the implementation of the TPT we got -40 Tons CO<sub>2-eq</sub>/ year.

## **BodenBildungBerlin**

### **Sustainable Use of Resources with Biochar**

The new project “BodenBildungBerlin”, funded by the DBU, aims to implement the concept and the results of TerraBoga into vocational training. Then there is great potential in the regional utilization of biomasses to produce biochar and biochar soil, that can minimize climate and soil pollution and improve economic viability. This topic would require new innovative learning materials and workshops, which can be applied in existing vocational training.

We started pilot projects and currently work with 4 different partners who provide vocational training for gardeners, cooks, assistants for environmental engineering, professional housekeeping. The Trainings are for professionals, apprentice and their teachers.

The project BodenBerufsBildung is working on two new compost facilities, in the UBB and Gutsgarten Hellersdorf, and currently also uses the pyrolyse and compost facilities in BG.

BBB aims to use the compost facilities as outdoor classrooms for various vocational trainings for the students and teachers as well as the professionals.

One of our partners, PrinzessinnenGartenBau founded a company that produces biochar soil in Gutsgarten Hellersdorf from biomass reclaimed from gardening work and soup kitchens. The biochar soil is then sold.

The pilot projects will be carefully monitored and researched parallel to their use. We will research nutrient matter levels, carbon footprint, environmental performance evaluation, quality of soil, and the economic potential of the end product.

BBB aims to create a new model for local resource cycles including reducing waste removal cost, more efficient use of resources, reducing CO<sub>2</sub> emissions, improving soil quality, selling biochar soil and at the same time BBB aims to implement this topics in the vocational training.

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Further Information:

[http://www.geo.fu-](http://www.geo.fu-berlin.de/geog/fachrichtungen/physgeog/geoekologie/forschung/TerraBoGa/index.html)

[berlin.de/geog/fachrichtungen/physgeog/geoekologie/forschung/TerraBoGa/index.html](http://www.geo.fu-berlin.de/geog/fachrichtungen/physgeog/geoekologie/forschung/TerraBoGa/index.html)

<https://www.bgbm.org/en/environmental-sustainability/terraboga>

<https://bodenberufsbildung.wordpress.com/>

