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"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Biochar and bioslurry production using water hyacinth from Lake Tana / Ethiopia – methodological issues and impact on crop yields

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Abstract

Water hyacinth (*Eichhornia crassipes*) (WH) is an invasive species in Lake Tana, Ethiopia, which infestation increases over the last decade and became a serious issue for fishery and biodiversity of flora and fauna. Furthermore, the WH mats are hosting mosquitos as well as bilharziasis.

Several strategies are discussed to reduce WH infestation: (a) reduction of nutrient flow int the Lake via household and agricultural nutrient input that are the drivers of WH growth; and end of pipe solutions including (b) chemical reduction of the plant population, and (c) technical reduction via harvest strategies combined with the transformation of WH biomass towards products for agricultural purposes. This project focus is on strategy (c). The overall aim of this research is to analyse the whole chain of harvesting, drying, storing, transporting, and preparing the biomass for transforming towards biochar and bioslurry and related residues for composting and biogas production, up to the impact of these fertilisers on crops, using tef (*Eragrostis tef*) as a reference crop.

Findings inform about nutrient content of the diverse parts of WH, the processing characteristics, preparation of the material and logistics and methodological aspects. Furthermore, we inform about the impact on crop yield via different amounts of applications of biochar and bioslurry applications, their combination, additional mineral fertilisers, compared with a non-fertiliser control and farmer's practice.

A first rough calculation clarifies the relation between WH productivity in the Lake in comparison to the need of nutrients for agricultural production in smallholder communities along the Lake shore, technical challenges logistics, labour, economy and acceptance by the local farmers.

Against the backdrop of the mineral fertiliser crisis - shortages, unavailability, delivery not in time, quality deficiencies, and high prices - alternative organic nutrient fertilisers are of great importance.

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