The Welfare Impact of Agricultural Productivity Enhancements – An Economic Evaluation of Bio-Char as a Soil Amendment for Urban Vegetable Markets in West Africa

Marc Hansen

Abstract:

Due to the restricted logistical infrastructure and absence of refrigerated transportation, West-African cities rely on urban agriculture to meet the vegetable demand of their persistently growing populations. Aside from the issues arising from the prevalent use of wastewater for irrigation, land is fast becoming a constraining factor of production. As such the introduction of productivity enhancing technology may have a significant impact on market prices, through yield increases, and consequently on both consumer and producer welfare; not to mention improvements in food security for the urban populations. It is the purpose of this dissertation to establish a theoretical framework for the ex-ante evaluation of the impact of productivity enhancing technology, specifically for closed agricultural markets, on both prices and by extension consumer and producer welfare. The assumption of closed vegetable markets, i.e. no trade, is given credence due to the lacking logistical infrastructure. The framework will be constructed by adapting previous market based approaches of Cost Benefit Analysis to various market structures frequently present in agricultural markets in developing countries. The classic assumption is that of a competitive market structure, applicable in but a number of scenarios. The presence of a plethora of distortions, such as Market Queens who dictate the prices of certain food products, for example Tomatoes in Ghana, means that other market structures need to be considered explicitly in any impact evaluation. For the case of Tomatoes in Ghana this would, in all likelihood, be Cartel behaviour. The theoretical framework will be implemented, and so tested, within the BMBF funded Urban Food Plus project. The Urban Food Plus project aims to enhance resource use efficiency in urban and peri-urban agriculture for improved food security in West African cities. The specific technology being developed aims to exploit the soil amendment properties of Bio-Charcoal, a cost effective potential resource, and will be implemented on central field experiments in Ouagadougou, Burkina Faso and Tamale, Ghana.