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Economic and Environmental Performances of Organic Farming System Compared to Conventional Farming System: A case study of the Horticulture sector in the Niayes region of Senegal.

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Abstract

Horticulture production in Senegal is an important agricultural activity that is mainly located in the Niayes zone. However, the increasing use of fertilizers and pesticides to boost production in order to meet a growing demand has many implications for the environment. The recognition of the negative impact this system of production has on the health of the soil and farmers, but also on the atmosphere with the emission of GHGs, has increased in recent years and some leading NGOs have started promoting organic farming systems. Therefore, the rising level of environmental hazards from conventional farming system made it attractive to farmers in the Niayes to adopt sustainable agriculture practices based on organic farming.

A whole farm model is used to study the economic and environmental performances of the organic farming system compared to the conventional farming system in the horticulture production in the Niayes region in Senegal. The gross margin is regarded as the economic indicator, while carbon emissions are regarded as environmental indicators. The results indicate that the organic farming system will be economically more attractive to farmers in the Niayes compared with the conventional farming system only when a premium price is applied to organic crops. Simulation results also reveal that there exist a "win-win" situation for conventional farmers when they go for organic farming for certain types of crops. However, environmental results based on carbon emissions reduction show that organic system is found to be more effective in mitigating climate change.

Our study suggests that, through appropriate investment in agro-ecological research to improve organic management and the establishment of a local organic market for organic crops, organic farming can be a very competitive alternative to conventional farming, when it comes to healthy food production with less environmental impact in the horticultural sector. However, further studies are needed on components of sustainable intensification to see which system of production is more profitable for farmers of the Niayes region, but also beneficial for the environment, and at regional and even national levels.

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Keywords: Organic farming; conventional farming; mathematical programming; whole farm model; greenhouse gas emissions; Niayes.

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