

Future Potentials for Food Production & Wastewater Treatment in Havana's Urban Vegetable Gardens

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INTRODUCTION

The aim of this study was to test the potential for combining urban agriculture and wastewater treatment in Havana, Cuba, for the benefit of both by using the holistic approach of ecological sanitation (EcoSan).

The research objectives were to describe the agroecosystem of Havana's urban vegetable gardens, to analyse production constraints of water, nutrients, and organic matter, and to suggest improvements exploring the potential of EcoSan techniques (preliminary greywater wetlands).

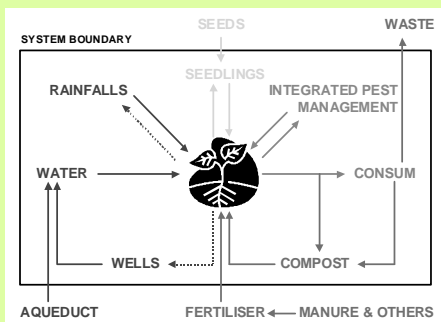
MATERIAL & METHODS

Eleven gardens were selected to represent a variety of sizes (144 - 8800m²), purposes (production, research, demonstration), ownership (private, public), and management practices.



The data were collected by onsite interviews and measurements of water, nutrient, and organic matter supply.

RESULTS & DISCUSSION



- Water supply of 4 - 6 l/m²*d was reached in most cases and thus adequate. Although the aqueduct as water source was not guaranteed.
- Plant nutrient supply was highly insufficient for N and also sub-optimal for P and K.
- Organic matter supply reached officially recommended rates only in large gardens, and the amount really required for the gardens (2000 - 3000 m³/ha*y) was not reached in any case.
- Greywater wetlands do not meet the needs for organic matter and nutrient supply. As water shortage is presently not an urgent problem in vegetable production in Havana, other solutions must be sought.

CONCLUSION

- Today's main problems are not water but nutrient and organic matter supply, which are strongly linked.
- Utilisation of blackwater is potentially a more effective solution than greywater wetlands to the observed nutrient and organic matter deficiencies. Safe blackwater treatment opportunities should be observed.
- The return on investments in recycling solutions has to be secured by integrating them in the long-term city planning.

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