**Research project: Development of technologies for the cultivation of horticultural species through simplified hydroponic systems**

The research grant falls within the European project H2020 FoodLand 862802 aimed at evaluating different sustainable horticulture applications adapted to the African continent. The analyses will include evaluation of yield and quality (nutritional and organoleptic) of the productions, but also the physiological response of crops to environmental stresses present in the local environment (e.g. contaminants, quality of irrigation water, etc.) through characterization of the main plant functions (gas exchanges, water relations, enzymatic processes). During the activities, research visits will be carried out in the African countries in which the partners of the FoodLand project operate, aimed at defining experimental protocols and management of cultivation tests of horticultural species. Experiments will be carried out relating to the optimal use of natural resources, in particular water and nutrients. The main research topics may include:

- Technologies with high efficiency in the use of nutrients;

- Use of cover crops;

- Highly efficient water use technologies;

- Simplified hydroponic systems;

- Simplified precision farming techniques.

- Identification of genotypes suitable for the local context

- Agroecology and intercropping;

- Use of biodegradable mulching;

- Aquaponics (mixed fish and crop production);

- Simplified smart farming technologies.

As part of the tests, data for sustainability analysis will also be collected. Environmental sustainability will be assessed using the Life Cycle Assessment (LCA) method; the impact assessment will be measured with the ReCiPe method (18 midpoint indicators from global warming to water depletion). Economic sustainability will be assessed through cost-benefit analyses. The total cost (€) and the total profit (€) will be used as indicators. The data will be collected from trials and market analysis, and compared with data collected from existing local farms. Finally, social sustainability will be associated with the multi-functionality of horticulture.

**Riferimenti Bibliografici**

Michelon, N., Pennisi, G., Myint, N. O., Orsini, F.\*, Gianquinto, G. (2020). Strategies for Improved Water Use Efficiency (WUE) of Field-Grown Lettuce (Lactuca sativa L.) under a Semi-Arid Climate. Agronomy, 10(5), 668. https://doi.org/10.3390/agronomy10050668

Orsini F., Kahane R., Nono-Womdim R., Gianquinto G. (2013). Urban agriculture in the developing world. A review. Agronomy for Sustainable Development, 33, 695-720.

Fecondini M., Damasio De Faria A.C., Michelon N., Mezzetti M., Orsini F., Gianquinto G. (2010). Learning the value of gardening: results from an experience of community based simplified hydroponics in north-east Brazil. Acta Hort., 881: 111-116

Mezzetti M., Orsini F., Fecondini M., Gianquinto G. (2010). Women and simplified hydroponics: community gardening as a way of emancipation in Trujillo, Peru. Acta Hort., 881: 169-172

Orsini F., Fecondini M., Mezzetti M., Gianquinto G. (2010). Simplified hydroponic floating systems for vegetable production in Trujillo, Peru. Acta Hort., 881: 157-162

Orsini F., Mezzetti M., Fecondini M., Gianquinto G. (2010). Simplified substrate soilless culture for vegetable production in Trujillo, Peru. Acta Hort. 881: 163-168

Orsini F., Morbello M., Fecondini M, Gianquinto G. (2010). Hydroponic gardens: undertaking malnutrition and poverty through vegetable production in the suburbs of Lima, Peru. Acta Hort. 881: 173-178

Fecondini M, Casati M, Dimech M, Michelon N, Orsini F., Gianquinto G. (2009). Improved cultivation of lettuce with a low cost soilless system in indigent areas of northeast brazil. Acta Hort., 807:501 – 507.

Orsini F., Michelon N, Scocozza F, Gianquinto G. (2009). Farmers-To-Consumers Pipeline: An Associative Example Of Sustainable Soil-Less Horticulture In Urban And Peri-Urban Areas. Acta Hort., 809: 209–220.

Gianquinto G, Orsini F., Michelon N, Ferreira Da Silva D, Damasio De Faria F. (2006). Improving yield of vegetables by using soilless micro-garden technologies in peri-urban area of north-east Brazil. Acta Hort., 747: 57-65.