

Exploring water and food security: the water footprint of domestic food production in the Gaza Strip

Francesca Recanati (1), Andrea Castelletti (1), Giovanni Dotelli (2), and Paco Melià (1)

(1) Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milano, Italy, (2) Dipartimento di Chimica, Materiali e Ingegneria Chimica "G. Natta", Politecnico di Milano, Milano, Italy

Water scarcity and food security are major issues in the Gaza Strip. This area is characterized by one of the highest densities in the world and it is affected by both severe scarcity of water resources and limited trading possibilities. Given this context, the enhancement of domestic food production is considered a fundamental strategy in achieving food security in the area. For this reason, rural people play a crucial role in implementing sustainable strategies for enhancing the domestic food production while preserving water resources.

In order to investigate the effectiveness of existing agricultural scenarios in achieving food security in a sustainable manner, we propose a framework to assess food production systems in terms of their contribution to the nutritional and economic conditions of rural households and their impact on water resources. In particular, the latter has been carried out through the water footprint indicator proposed by the Water Footprint Network.

The case study analyzed is a sample farm located in the Gaza Strip, whose food production is based on horticulture, animal husbandry and aquaculture. The study is articulated into two main parts: first, we compare alternative scenarios of vegetal and animal food production in terms of food supply, water consumption and economic income at the household scale; then, we extend the analysis to evaluate the potential contribution of domestic food production to the food security in the whole Gaza Strip, focusing on the nutritional dimension, and providing a preliminary assessment of the environmental and economic sustainability. In particular, we evaluate water appropriation for domestic food production and compare it with the availability of water resources in the region.

The outcomes highlight that the domestic food production can potentially satisfy both a basic diet and economic income for rural household, but the related appropriation of freshwater results unsustainable with respect to the fresh water availability in the Gaza Strip.