SustainFARM

INNOVATIVE AND SUSTAINABLE INTENSIFICATION OF INTEGRATED FOOD AND NON-FOOD SYSTEMS TO DEVELOP CLIMATE-RESILIENT AGRO-ECOSYSTEMS IN EUROPE AND BEYOND

1° Call:	2015
Project period:	03/2016 - 02/2019
Topic:	Sustainable intensification of integrated food and non-food systems
Keywords:	Productivity optimization, crop-tree interactions, public goods tool, life cycle assessment, co-products and by-product valorization
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Total funding:	1.751.000 €
Website:	faccesurplus.org/research-projects/sustainfarm; www.sustainfarm.eu/it

FACCE SURPLUS
SUSTAINABLE AND RESILIENT AGRICULTURE FOR FOOD AND NON-FOOD SYSTEMS

SUSTAINFARM

BACKGROUND

- Evaluate and develop innovative integrated agro-ecosystems that contribute to multi-functional landscapes
- Better use of biomass and waste from production systems
- Economic and environmental assessment of new systems under different agro-ecological conditions
- Creating resilient agricultural systems

OBJECTIVE

The main objective of SustainFARM is to enhance agronomic, environmental and economic performance of integrated food and non-food production systems (IFNS) by optimizing productivity and valorizing woody components, residual wastes and co-products. IFNS are systems in which trees, crops and livestock components are integrated in different ways at different scales(plot-field-farm). The specific objectives are to:

a) assess resource use efficiency and design innovative and cost-effective IFNS for optimum productivity;

b) develop sustainability metrics to assess agronomic productivity and environmental performance;

c) valorization of the woody components, residual waste and co-products into high value bio-energy carriers and bio-products.

METHODOLOGY

To achieve this, SustainFARM has adopted an innovative case-study approach and will investigate the economic and environmental performance of the range of locally relevant IFNS across several agri-climatic zones of Europe and design innovative IFNS systems, which are resilient and climate-smart. To improve the cost-effectiveness, different means of valorising the residual and co-products (woody components and residual wet olive cake etc.) and for multiple uses (bedding material, compost, bioenergy etc.), have been demonstrated at two SME facilities in the UK and Italy. The best practices and innovative methods have been synthesized into a decision support tool (DST) to enable informed decision making by farmers, advisory services and policy makers.

RESULTS AND KEY FINDINGS

- Descriptions of a network of integrated food and non-food systems (IFNS) and identification of stakeholders in six partner countries (WP1)
- On-farm assessments of productivity measures in locally relevant innovative IFNS (WP1 and WP2)
- Innovative valorization pathways for value addition of woody components/residual waste/co-products (WP3 and WP4)
- Development of Public Goods tool (DST) for agronomic, environmental and social performance of IFNS for informed decision making (farmers and advisory services) (WP3)
- Design and identify innovative agro-ecosystems that contribute to the multiple objectives of sustainable food, fodder, fibre and energy production (WP2 and WP3)
- Prepared country-specific Knowledge sharing, Communication and Impact Maximization (KCIM) plan to reach the identified stakeholders within and beyond Europe (WP5)
- Life cycle assessment of the woody component, residual waste and co-products of IFNS (WP4)

KEY PUBLICATIONS

- Ghaley, B. B., Wösten, H., Olesen, J. E., Schelde, K., Baby, S., Karki, Y. K., et al. (2018). Simulation of Soil Organic Carbon Effects on Long-Term Winter Wheat (Triticum aestivum) Production Under Varying Fertilizer Inputs. Frontiers in Plant Science 9, 1–9. doi:10.3389/fpls.2018.01158.
- Hamidov, A., Helming, K., Bellocchi, G., Bojar, W., Dalgaard, T., Ghaley, B. B., et al. (2018). Impacts of climate change adaptation options on soil functions: A review of European case-studies. Land Degradation and Development. doi:10.1002/ldr.3006.
- Ghaley, B. B., Teodor. R., Sanden, T., Spiegel, H., Menta, C., et al. (2018). Assessment of Benefits of Conservation Agriculture on Soil Functions in Arable Production Systems in Europe. doi:10.3390/su10030794.
- Ghaley, B. B., Kehli, N., and Mentler, A. (2018). Emergy synthesis of conventional fodder maize (Zea mays L.) production in Denmark. Ecological Indicators 87. doi:10.1016/j.ecolind.2017.12.027
- Agroforestry systems in Europe – Roles and functions in diverse socio-economic contexts
- (poster presentation at 26th European Biomass Conference and Exhibition, 14-17thMay, Denmark)
- SustainFARM project presented at at 26th European Biomass Conference and Exhibition, 14-17May, Denmark)
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