Eco-Innovation

INAPRO

At a glance

Title:

Innovative model & demonstration based water management for resource efficiency in integrated multitrophic aquaculture and horti-culture systems

Instrument:

ENV.2013.WATER INNO&DEMO-1 Water innovation demonstration projects

Total Cost:	9,227,862.74 €
EC Contribution:	5,981,587.00 €
Duration:	48 Months
Start Date:	01.01.2014
Consortium:	18 Partners

Project Coordinator:

FORSCHUNGSVERBUND BERLIN e.V.
Leibniz-Institute of Freshwater Ecology and Inland Fisheries

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Project Web Site:

Key Words:

water management, water resources, aquaponics, aquaculture, horticulture, modelling, system optimisation, rural and urban water and carbon footprint, demonstration, value chains, market opportunities

The challenge

The collaborative project INAPRO challenges the concept of recent water, energy and nutrient management solutions in rural areas (with aquacultural and horticultural production) and urban areas (urban farming) to cope with global demands and to exploit all available opportunities of resource efficiency.

The ambitions of our project INAPRO meet perfectly well with the recent EU strategies under the new Horizon 2020 framework to face the challenges of the dramatic development of the water resource situation in Europe and worldwide. The project particularly aims at supporting the Innovation Union with the EIP on Water as one of its key initiatives and will consequently be linked to the EIP Action group 'Industrial Water Re-use and Recycling'. Furthermore the Smart Cities and Communities EIP of the EU will be supported. Consequently INAPRO will also demonstrate links and synergies with related major water investment/implementation projects at local, regional or national level to help leverage the demand side.

Project Objectives

The objective of INAPRO is to mobilise industry, member states and stakeholders to promote a new and innovative technical and technological approach right up to an INAPRO-Aquaponic system which allows a nearly emission free sustainable food production and contributes remarkably to global food security for the 21st century. Coupling the production of aquatic animals (e.g. fish) and plants (e.g. vegetables) in greenhouses forms the basis for all aquaponic systems where the wastewater from the aquaculture section is used for the nutrition of the plants and this way saves water compared to single greenhouse or single fish production systems.

The project aims to achieve a real breakthrough towards commercialization by developing an innovative aquaponic production system (INAPRO), which reduces the water and carbon footprint significantly compared to current systems. The new innovative INAPRO system will allow a highly efficient use and reuse of water resources, a minimisation of waste effluents and recovery of material and nutrients from waste water together with a minimisation of energy demands and operating costs. Developing modular solutions of the system scalable and adaptable to local conditions will strengthen the standardization in this field.

By working together within a well-developed network with the stakeholders from science and industry, especially SMEs, we aim to cover the whole value chain from research to markets from modelling and experimental research through demonstration objects at pilot scale to communication and knowledge transfer to policy, business and public. INAPRO will open new market opportunities and improve the market access for these innovations both inside and outside of Europe for producers and technology suppliers from the manufacturing industries as well as for the end-users.

Methodology

The technical and technological improvements will initially be achieved by a model based optimisation of the concept for water, energy and nutrient management in an economic viable integrated aquaponic system. This modelling approach will facilitate a consequent optimisation of all details in construction, design and processes of the elaborated solutions for the whole water supply and usage. Based on the model outcomes the subsequent development of the new system solution will integrate the appropriate new technologies containing cutting edge approaches.

The project will from the start on disseminate deliverables to manufacturing SMEs and different end-users and to all stakeholders.

Expected Results

The results provided by the INAPRO project are the following:

- Aquaponic demonstration objects installed, evaluated and viability proved
- Nearly emission free food production in respect to carbon and water footprint
- Model based optimisation of existing technologies and integration of cutting edge technologies
- One-way water supply for horticulture
- Water retrieval by condensation
- Enhanced nutrients and energy retrieval from waste
- Integration of alternative water and energy resources
- RAS and hydroponic system are optimised in production parameters independently
- Optimised filter systems and wastewater treatment
- Intelligent sensor, control and manufacturing execution system integrated
- INAPRO product, process and management system standards developed
- Successful dissemination and exploitation activities carried out and documented
- Market analyses proving the visibility and acceptance of INAPRO
- New market opportunities for European SMEs created
- International outreach of the project in terms of research, market and policy impact

Project Partners	
Forschungsverbund Berlin e.V. - Leibniz-Institute of Freshwater Ecology and Inland Fisheries – DE	Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V.- Application Center System Technology – DE
PAL-Anlagenbau GmbH Abtshagen (SME) – DE	AliénorEU SPRL (SME) – BE
automation & software Günther Tausch (SME) – DE	Corinne Studer – AT
Beijing CAUIOT Co. Ltd. (SME) – CN	Wageningen University – NL
JARDINERIA Y VIVEROS LA NORIA S.L. (SME) - ES	China Agricultural University – CN
Fischerei Müritz-Plau GmbH (SME) – DE	Yellow Sea Fisheries Research Institute – CN
EUROVIX SPA (SME) – IT	Havforskningsinstituttet – NO
INAGRO VZW – BE	Stichting Landbouwkundig Onderzoek – NL
Fytagoras B.V. (SME) – NL	IFQ GmbH Wismar (SME) – DE