



**ECO-innovation**  
WHEN BUSINESS MEETS THE ENVIRONMENT

**CIP Eco-innovation  
Pilot and market replication projects  
Call 2012**

**Call Identifier: CIP-EIP-Eco-Innovation-2012**

**Strategy advice for governments and  
municipalities for local sustainable food  
production  
D5.5**

**Ecaponics  
Contract ECO/12/332783/SI2.656985**

**Reporting Date  
30/07/2016**

**Project coordinator: Dr. Ragnheidur Thorarinsdottir  
WP5-leader: Fernando Sustaeta  
Project website: <http://aquaponics.is/ecaponics/>**

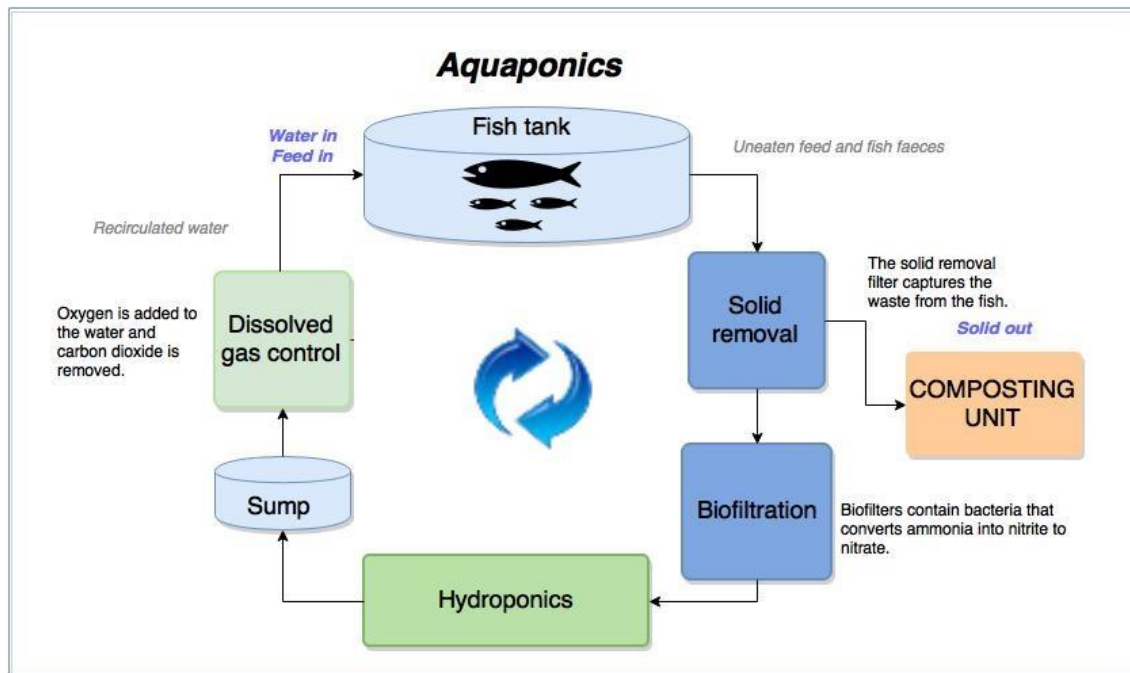


## Introduction

The aim of deliverable 5.5 is to present an EU strategy to governmental entities and local authorities, based on the results of the pilot plant development in Ecoponics and to advise about the aquaponic systems and possibilities of local sustainable food production.

Presently there is a shortage of fish in maritime environment due to overfishing and agricultural soils are under stress due to intensive production practices and climate change. Therefore aquaponics is a good alternative in fish and vegetable production. Aquaponics presents a sustainable, healthy production system that produces high quality products.

Ecoponics presents data and guidance that can be used to promote and disseminate the benefits of aquaponic systems not least in the urban environment, in relation to the production of vegetables and fish.



**Figure 1. Aquaponics system (Thorarinsdottir et al., 2015)**

Fig. 1 gives a schematic overview of an aquaponic system. Such systems can be set up in the urban environment, from personal (a few m<sup>2</sup>) or cooperative neighbourhood hobby systems (a few tenths m<sup>2</sup>) to small businesses (a few hundred m<sup>2</sup>). In periurban areas commercially viable systems can be developed (a few thousand m<sup>2</sup>). Such systems contribute to reduction in CO<sub>2</sub> emissions, energy and water use, give food security and provides local healthy food.

Aquaponics quality products need to be presented to governmental entities, companies and consumers. Little by little, such dissemination will change or evolve the mentality of the consumers. For that, government entities can support and promote aquaponics

education events. By this action, government legislators can facilitate and improve the regulations pertaining to aquaponics, because they are currently mostly lacking.

### **Example from Spain – 6,000 m<sup>2</sup> production unit**

Breen in Spain has in the Ecoponics project developed a 6,000 m<sup>2</sup> aquaponics system. Municipalities can learn from interaction of Breen in Spain with the Hondarribia municipality. The municipality requested the integration of Breen with social activities, presentations and actions about environmental awareness that the city hall planned by promoting visits to the Breen's facilities and obtaining information about aquaponic food production, renewable energy and sustainability. The Basque Government Departments of Fisheries and Education have also worked with Breen in relation to planning actions of marketing and of social awareness. The action also informs the authorities about the properties and qualities of tilapia that can for example be a good option for school meals. Marketing issues have also been advanced by the Spanish partner Breen who have made contracts with companies that have 200 fish markets. Similarly Breen has made contracts with companies that sell vegetables. These include tomatoes, lettuces, strawberries and aromatic herbs.

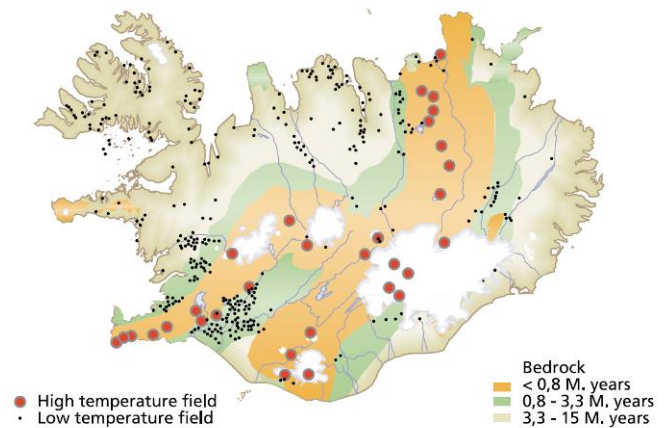


**Figure 2. Tomato plants in aquaponics at NER-Breen**

### **Example from Iceland - geothermal energy - direct use for aquaponics**

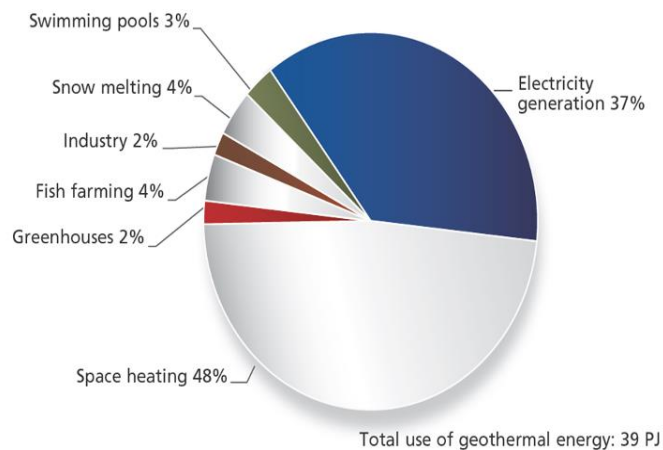
In Iceland the abundant geothermal energy and water sources provide unique opportunity for sustainable food production, especially in aquaculture and horticulture. Nevertheless, Iceland is importing a large part of the consumed vegetables that could be produced domestically.

The specific objectives of EcoPonics in Iceland are to implement new circular food production methods focusing on the direct use of geothermal energy to produce high quality sustainable food products and maintaining a zero-waste production process. Geothermal energy is clean and sustainable. Several countries worldwide have access to geothermal energy, including the European countries, Italy, Germany, France, Austria, Switzerland, Russia, Turkey, Portugal and Iceland. Direct use of geothermal energy dates back thousands of years when people began using hot springs i.e. for bathing, and cooking food and today direct use of geothermal energy is developing with new modern methods emerging. Iceland has abundant geothermal resources associated with the country's volcanism (Figure 3) and its location on the Mid-Atlantic Ridge. Thus, the country can serve as an excellent Geothermal Laboratory, developing modern direct-use systems for new applications.



**Figure 3. Volcanism in Iceland**

One of the future ideas is to establish A CIRCULAR FOOD PRODUCTION CENTRE linked to the industry park at Hellisheidi Geothermal Energy Power Plant. Hellisheidi Power Plant is situated in Hengill area, one of Iceland's largest geothermal areas that are associated with three volcanic systems. The plant is located in a popular recreational area with 100 km of hiking trails offering a great scenery including hot springs and warm rivers. Thus, the area provides an excellent opportunity to experience the nature of Iceland emphasizing the geothermal energy sources. A geothermal energy exhibition offered at the Hellisheidi Power Plant is very popular showing how geothermal energy can be utilized in a sustainable manner for production, especially for electricity production and house heating. Moreover, geothermal heat is used in Iceland for swimming pools, snow melting, industry, fish farming and greenhouses as shown on Fig. 4. The main aim of Svinna is to increase the direct use of geothermal energy for industry, fish farming and greenhouses by introducing aquaponics and related methods in Iceland.



**Figure 4. Geothermal use in Iceland**



### **Example from Denmark - semi urban - urban - green cities**

In Denmark the overall aim of the aquaponic production was to incorporate it into food systems shortening the food supply circuit from both the local as well as global rural to the urban areas. The potentials in aquaponics of being a closed food system minimizing effluents and smells to the local environment opens up for a new type of food production in the proximity of where people live and work as well as enjoy their leisure time.

However, local food production in the proximity of urban areas face the challenge of being in fierce competition for space with other sectors that can generate a much higher return for land prices than food. This goes in regards to residential or office buildings, where the latter are often occupied by the financial sector or multinational corporations willing to pay a high price for the value of being close to inner city transport and high mobility range.

Therefore, to support a larger local oriented food production in the proximity of larger urban areas, it is necessary to install policies of protecting 'space' for food and shield the land as a factor of production from other productive sectors competition. If not, the local food initiatives that will arise will only be small islands of sanctury, surviving on some sort of charity – either in the form of local residents paying a higher price for the produce or reconizing that the production delivers food in combination with other social goods such as community building, job creation, education on environmental awareness which in some cases can be supported by the public or social oriented entities.

A local urban oriented food policy based on more universal right of food and food security for all citizens will require a food policy incorporating the following strategies:

- Establishing a new administration targeting specific urban oriented agriculture, but including already existing expertise from the various departments on business and jobs, environment, social issues and education, since food production is contributing with social goods in all these areas for the city
- A zoning regulative protecting land-use from other competitive sectors has to be installed. IGFF proposes a *dynamic* approach rather than a conservation approach of a zoning specifically targeting urban agriculture, but supports the principle of CPULs (continuous productive urban landscapes) (Viljoen, 2005). This means always protecting and keeping spaces of wedges open and green in the urban, but the land-use can dynamically change depending on people's or society's preferences - be it for example more for leisure or simply having the possibility of actively engaging in urban agriculture. The zoning should imply lower rents to the producer - just likes farmers today are benefitting from their land use in rural zones - and hence in this way support a competitive food production in the city or its proximity.
- Questions of ownership and risk sharing, types of contracts or lease, has to be made and thought of for securing willingness on more longerterm and high productive investments and jobs related to for example greenhouses and fish tanks

- The question of protection of private food production or animals and in the same time having open access to public supported areas has to be cleared in formal contracts.



**Figure 5. Urban food production in Copenhagen Denmark creating other social goods such as space for shade, shelter, beauty and leisure (photo: Paul Rye Kledal)**

*This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of Svinna, Breen, IGFF and HI and can in no way be taken to reflect the views of the European Union.*



Co-funded by the Eco-innovation  
Initiative of the European Union