Food & Business Knowledge Platform

Factsheet final findings Global Challenges Programme Call 2

Promoting healthy diets and agri-business development through Aquaponics farming

Summary

Aquaponics is an innovative food production method in which fish and vegetable farming are integrated The nutrient rich water from the fish tanks is utilized by the vegetables that grow directly with their roots in the water thereby cleaning it. The circularity of the system saves water compared to rainfed and irrigated agriculture and can be implemented on non-fertile lands as it is a soil-less growing technique. It is therefore highly suitable for Ethiopia, with scarce land and water resources. Aquaponics production being independent of rainfall offers year-round availability of both fish and vegetables in local, malnourished, communities. The research looked into the possibilities for the creation of a sustainable business model that enables local households to grow vegetables and fish, improving their diets, while selling a surplus to the community. The income from sales serves to support operational costs and pay back investments costs and additionally allows making a small profit. In cooperation with local administrations entrepreneurs in various regions have been selected. For each site a different approach was chosen to allow comparison of business models: 1. Shewa Robit: 8 female entrepreneurs with a system of 12m2 each; 2. Metehara: A system of 3000m2 managed by a cooperative of unemployed youth; 3. Hawassa: 8 poor family entrepreneurs with a system of 12m2 each. The aquaponics facilities were offered to the households on credit to foster responsibility. They received training on technology and business skills and were advised to foster peer-group learning and creating bargaining power in accessing inputs and targeting clients for sales.

Research findings

1. The technical functioning of Aquaponics has been proven
Aquaponics is highly water, nutrient and energy efficient. The development of a value-chain proved to be essential for good functioning. At the start fingerlings and fish feed where not available thus value chains to provide them have been set-up. Besides aquaponics, hydroponics appeared to be attractive as management is less dependent on constant inputs, and it avoids the more costly fish production. In Awassa some participants switched to hydroponics.
2. Increased production of fish and vegetables is achieved
Through the project fish and vegetables have been produced and can continue to be produced. Fish is produced every 6 months and vegetables every 6 weeks thus production is year-round leading to their increased availability to participating households and their environments, especially important outside the rainy season.
3. Increased income and nutrition for the producer(s) and their larger environment
Participating households consumed their fish and vegetables improving nutritional composition of their diets. They sold some of their produce to neighbours and in local markets thereby earning a modest income and contributing to availability of nutritious food items in a location where they are normally absent.
4. In each locality Ethiopian people are trained in supporting aquaponics systems

Outcomes achieved

1. The female entrepreneurs in Shewa Robit initiated a group to share insights and ideas on how to run their aquaponics, what crops to grow and where to sell them. Each woman stayed responsible for her own business. One woman has started as fish feed producer. The group regularly invited the local university expert for advice. At project completion the group took ownership through sending a letter to the University to negotiate continued advice and access

to inputs in return for hosting students. At project ending some women expressed their intention to expanding their aquaponics gardens.
2. In Metehara unemployed youth were selected by the government to run a large scale aquaponics farm as a cooperative. The farm technically functioned, but collective management proved to be a problem. As the facilities were given for free, nobody felt responsible and distrust and individual side-selling prevented the group from making the farm profitable. A new start was made with a new business model in which each of the participating youth had to buy in (via government credit) to assure their responsibility.
3. Aquaponics offers great potential in producing year-round crops, however the high investment costs still prove a challenge. In theory the investment could easily be earned back in the first 2 years. In the project case, technical and institutional challenges during the start-up phase have caused the entrepreneurs to take much longer. In further projects consortium partner TGS is experimenting with supplementing the plants with mineral nutrients to guarantee profitability and production from the start (hydroponics phase). As soon as the farm is running well the fish component, with its supply chain, is added. In this way challenges are tackled one by one.

The developed websites are maintained to ensure knowledge dissemination after project completion and two centres of support have been initiated in Ethiopia. One project staff member has started his PhD on aquaponics in Ethiopia. In Ethiopia aquaponics has been included in the fisheries policy. TGS has expanded aquaponics services to many other countries.

Messages to

A) Actors from private sector:
Investing in groups of small-scale entrepreneurs is an alternative to large farm investments and more inclusive especially when investments can be earned back quickly. The sales could create profit for local entrepreneurs, suppliers, traders and investors.

B) Civil society and practitioners organizations:
- Introducing aquaponics could substantially increase household nutrition and add additional income for people that do not own enough land for conventional farming, or are located in areas with low rainfall, water scarcity and low soil fertility.
- Aquaponics could be proposed to women that have no access to land and limited labour available as aquaponics is soil-less and labour extensive, and women may favour inclusion of the produce in household diets. Aquaponics could be proposed to refugee camps as the systems need little space and material.
- Interested entrepreneurs should receive trainings in technology and business skills. Participants should not receive aquaponics as charity. They should only be selected as entrepreneur and buy-in to guarantee individual responsibility. Combined with peer group learning this seems most effective.

C) Policy makers:
Policies should create incentives for companies with agricultural knowledge to share their knowledge and/or equipment with local entrepreneurs (small and medium enterprises).

Knowledge products

- Several resources (& practical tools) have been created with the goal of guiding Ethiopians in starting their own aquaponics (Languages: Amharic, Oromia and English):
- Online aquaponics platform: www.aquaponicsethiopia.com; Aquaponics manual; Video;
- Various scientific publications have been published;
- Presentation in special session on inclusive business models at LANDac conference 2018;
- PhD thesis of Abebe Tadesse in Addis Ababa University, Ethiopia.

Knowledge networks

To build knowledge internationally the project has launched a website (www.sustainable-aquaponics.com) that is currently being integrated with knowledge on aquaponics in Kenia and other parts of the world. TGS has been in touch with several NGOs (e.a. Mercy Corps) and private enterprises to discuss project results. Besides, commercial demo-farms have been started in Kenya, Kyrgyzstan, Palestine and Egypt based on findings from Ethiopia.

Co-creation

Co-creation has been at the core of the project as private sector (TGS), Universities (AAU, WUR) and NGO (SREDP) have worked together. The involvement of TGS has guaranteed that outcomes are shared in projects worldwide, both through their operations and through maintaining the knowledge platform. Furthermore, staff of Addis Ababa University has indicated an interest to explore working with the private sector more often as this has been completely new to them. They see the relevance of the private sector to build the supply chains and to support economic development instead of charity and to avoid project knowledge from being lost after completion. Lastly, the aquaponics entrepreneurs have been co-creating the systems by co-deciding with AAU and TGS on the sizes of the systems, the choices of crops and their outlets.

Consortium Partners

- Wageningen University and Research (NL)
- TGS business & development initiatives (NL)
- Addis Ababa University (Ethiopia)
- SunRise Development Program (Ethiopia)

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Project websites

- F&BKP Research Project page