Case Study: Aquaponics – An Integrated Aqua-Agriculture System

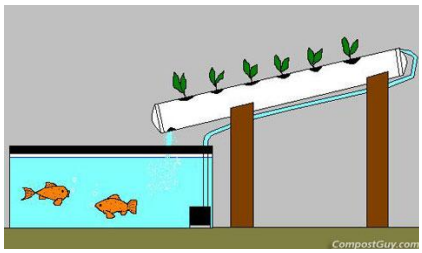

Fig. 01: Aquaponics system
Source: CompostGuy.com

Issue: The food production system 'Aquaponics' combines conventional aquaculture (raising aquatic animals such as fish or prawns in tanks) with hydroponics (cultivation of plants in water) in a symbiotic and controlled environment.

Technical Features: In an aquaponic system, water from an aquaculture system is fed to a hydroponic system; the water is then recirculated back to the aquaculture system (Fig. 01). Nutrients, which are excreted directly by the fish or generated organic wastes, are absorbed by plants cultured hydroponically most of the nutrients required for plant growth. The plants act as a natural filter for the water, therefore a separate biofilter is not needed as in other recirculating systems.

Socio-economic Features: Aquaponic systems utilize local resources optimally and are applicable at household as well as at industrial level. It can turn out as an effective way to support poor families with self-grown food. The material inputs to the aquaponic system are essentially fingerlings (young fish), fish feed, seedlings and water. Another cost input to the aquaponic system is power supply to run the water pump and air pump.

Sustainability Concerns: Aquaponic systems offer several advantages such as: (a) Increase of farm productivity and profitability without any net increase in water consumption, (b) re-use of water and nutrients otherwise wasted, (c) reduction of net environmental impacts and (d) increased output without need for additional agricultural land.

Fig. 02: Aquaponics application in Gaza strip. The FAO project started in 2010.
Source: www.canadianaquaponics.com/2013_12_01_archive.html

Examples from the MENA region:

- Egypt: The Bustan Aquaponics farm is a 1,000 square metres operation located on the outskirts of Cairo, and is the first and only commercial aquaponics farm in Egypt, producing pesticide-free tilapia fish, four varieties of lettuce, baby spinach, purple kale, swiss chard, celery, etc.
  Source: http://groundupproject.net/2014/04/04/egypt-turns-to-aquaponics/.
- Abu Dhabi: JBA Agritech is launching the worlds largest AQUAPONIC system for the Government of Abu Dhabi. Source: http://www.jbauae.com/projects.php
- Gaza Strip: In cooperation with FAO, aquaponic food production units where installed on the rooftops of 15 mostly poor and female-headed households in Gaza (Fig. 02). In most cases, families were able to grow enough tomatoes, peppers and eggplants during three summer months to meet all their household needs, plus up to 20 kilos of fish during a nine-month growth cycle.
  Source: http://www.fao.org/ag/agp/greenercities/pdf/GGCLAC/FAO-Gaza-aquaponics.pdf)

Transferability: There is excellent potential for large expansion of aquaponics, particularly in dry, urban areas and, as shown by the Gaza Strip example, aquaponics is a very flexible technology.

Further hints: http://www.dw.de/aquaponics-expert-brings-sustainability-to-the-desert/
http://www.gardenculture.net/aquaponics/3147-3147
http://www.fao.org/fileadmin/templates/FCIT/PDF/Fact_sheet_on_aquaponics_Final.pdf
http://www.agramiddleeast.com/en/Media-Centre/Press-Releases/PressRelease13