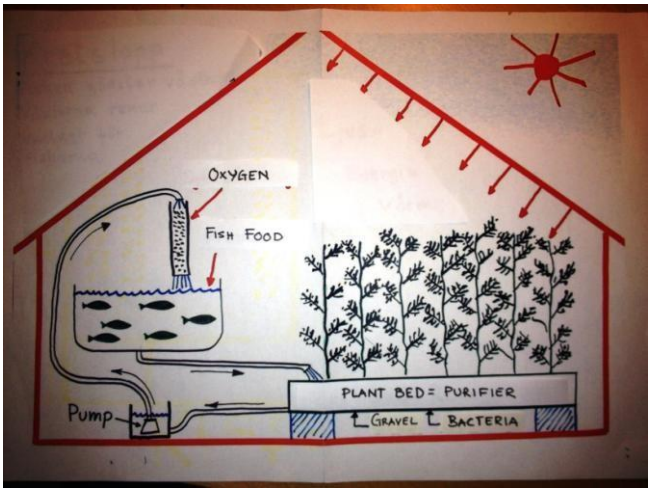
Mobile Aquaponics system

Background Aquaponics

Aquaponics has ancient roots which go back several thousand years. It is a process of combining Asian cultivated rice in paddy fields with fish. Aquaponics is the combined culture of fish and plants in a recirculating system. In Härnösand Sweden, Pecka Nygård has during the past 19 years in an R & D facility successfully developed a growing season for a 100% closed-loop system in which no nutritional spill occurs.

The nutrient-rich water from the fish farm runs into a plant bed where it is purified using a gravel bed and various vegetables that absorb nutrients.
The synergistic relationship between fish and plants requires no chemical additives and no antibiotics are introduced. The absence of soil reduces the risk of disease. The fish need less then 1 kg of fish food to gain 1 kg weight. Every 1 kg weight gain of fish yields nutrients equivalent to about 10 kg vegetables depending on the species of fish.



The Recycling Cultivation (aquaponics) process is completely closed as the water circulates and (only about 10 % of the water) freely runs from the fish tubs to the plant bed and back to the fish farm where the water is pumped to the oxygenation and back to the fish tank. This means that the project can function and be placed without regard to major access to water / sewer or fertile soil. One of the main characteristics of this type of farming is that there are no emissions to the environment. Recycling production is energy efficient, ecologically friendly and not affected by extreme climate.

Aquaponics in a container with greenhouse/plant beds

The goal of this project is to place the fish farm in a 20 foot cargo container and connecting to the plant beds in a greenhouse or outdoor.
In a standard 20 foot (about 6 m long) container, 2 tanks with fish will be placed which have a total volume of 6 m3 of water. It is possible to produce about 400 kg of fish in 8-10 month. Connecting to the container a small greenhouse and/or outdoors, where tomatoes, cucumbers, lettuce and other locally desirable vegetables will be grown in plant beds filled with gravel. Between 2500-3500 kg vegetables can be grown in the same time.

Spring/summer 2015:

Container with fish tank and a ”pit” (white tank) where the pump (*the only one*) is placed.

Inside the container:

This fish are rainbow trout

The fish to be cultivated in warmer countries is Tilapia, which is among the top 5 farm raised fish. It is suitable for fish farming as it is a very hardy fish which withstands temperatures between 10-40 degrees Centigrade (50-104 F) and also has the ability to retrieve oxygen from the surface.

Plant beds 2015:

Vegetables 2015

Cucumber, chard, broccoli and kale.

Different lettuce grown directly in water peas.

Tomatoes grown in greenhouses in Sweden

As the pictures show, the system is now up and running. During the summer of 2015 we will continue the development, where the focus will be on the oxygenation of the fish.

The project aims to develop a mobile Aquaponics system which is simple, energy efficient, ecologically smart and climate resistent and has a large enough capacity to supply food for several families, yet small enough to be transported in a standard container.