**What is Aquaponics? Adapted From “How Stuff Works”**

Aquaponics is a system for farming fish and plants together in a mutually beneficial cycle. Fish produce wastes that turn into nitrates and ammonia. These aren't good for the fish if they build up too much, but they're great fertilizer for plants. As the plants suck up these nutrients, they purify the water, which is good for the fish. Many cultures have made use of this cycle to grow better crops and nurture the fish as an additional food source. Rice paddies in the China and Thailand have used aquaponic techniques for years. The Aztecs developed a system of building floating islands for food-plants such as maize and squash. Fish propagated around the islands, leaving their waste on the lake bottom, where it could be collected to fertilize the plants.

Modern aquaponics is slightly more high-tech, but it's still an efficient and environmentally friendly way to produce food. Fish are kept in large tanks and the plants are grown hydroponically; that is, without soil. They are planted in beds with a little gravel or clay and their roots hang down into the water. The water is cycled through the system, so that it collects the "waste" from the fish; then it’s pumped to the plant beds, where it is filtered naturally by the plants and can then be returned to the fish tanks. Unlike traditional farming methods, no chemical fertilizers are needed for the plants: they all come from the fish-waste. It also tends to be organic, because the use of pesticides would be damaging to the fish.

Once the system is set up, only a little extra water is needed to make up for evaporation, because the same water is constantly recycled. This is a great improvement on traditional plant-growing, which consumes a lot of water. Many types of plants can be grown in aquaponic farms (whether commercial- or home-sized), especially leafy plants and herbs. The most commonly used fish is tilapia, although many others are also suitable.

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| **Aquaponics – Growing Power – Milwaukee** |
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| Aquaculture is the symbiotic cultivation of plants and aquatic animals in a re-circulating system.  Growing Power uses Tilapia and Yellow Perch to fertilize a variety of crops and herbs using aquaponics.    Aquaponics is the method of growing crops and fish together in a re-circulating system.  In the Growing Power aquaponics model crops grow vertically on raised beds.     |  |  | | --- | --- | | http://www.growingpower.org/images/aquapo1.jpg | Fish such as Tilapia and Yellow Perch are raised in a large tank of water.  Growing Power uses Tilapia and Yellow Perch in our aquaponics systems because they are relatively easy to raise and because we can market them to restaurants, market basket customers, and they are a favorite in ethnic markets.  Read more about Yellow Perch and Tilapia below. | |  |  | | http://www.growingpower.org/aquapo2.jpg | By using gravity as a transport, water is drained from the fish tank into a gravel bed.  Here, beneficial bacteria break down the toxic ammonia in fish waste to Nitrite and then to Nitrogen, a key nutrient for plant development.  On the gravel bed, we also use watercress as a secondary means of water filtration. | |  |  | | http://www.growingpower.org/aquapo3.jpg | The filtered water is pumped from the gravel bed to the growing beds, where we raise a variety of crops from specialty salad greens to tomatoes.  The water is wicked up to the crops roots with the help of coir, a by-product of coconut shells and a sustainable replacement for peat moss. | |  |  | | http://www.growingpower.org/aquapo4.jpg | Finally, the water flows from the growing beds back into the tank of fish.   Growing Power uses this type of aquaponics system because it is easy to build and only needs a small pump and heat to get the system running. |     **Types of fish we grow:**    **Yellow Perch**  [[http://www.growingpower.org/aquapo5.jpg](http://www.growingpower.org/imgres?imgurl=http:\\pond.dnr.cornell.edu\nyfish\Percidae\yellow_perch.jpg&imgrefurl=http:\\pond.dnr.cornell.edu\nyfish\Percidae\yellow_perch.html&h=63&w=149&sz=275&tbnid=nyRHhFQG47kJ:&tbnh=63&tbnw=149&prev=\images%3Fq%3Dyellow%2Bperch&hl=en&sa=X&oi=image_result&resnum=1&ct=image&cd=1)](http://www.growingpower.org/imgres?imgurl=http:\\pond.dnr.cornell.edu\nyfish\Percidae\yellow_perch.jpg&imgrefurl=http:\\pond.dnr.cornell.edu\nyfish\Percidae\yellow_perch.html&h=63&w=149&sz=275&tbnid=nyRHhFQG47kJ:&tbnh=63&tbnw=149&prev=\images%3Fq%3Dyellow%2Bperch&hl=en&sa=X&oi=image_result&resnum=1&ct=image&cd=1)Yellow Perch is a species of perch found in the United States and Canadaandis a glacial lakes species.  They prefer cooler water which makes them ideal to raise in our hoop houses at Growing Power.  These full-bodied fish are a favorite with chefs due to their white, flaky, delicious meat.  Yellow Perch are also in short supply.  Lake Michigan's yellow perch numbers have decreased 80 percent since 1990. States surrounding the Lake Michigan have put regulations on yellow perch fishing. For instance, Wisconsin banned commercial fishing for yellow perch in Lake Michigan in 1997.  What does Perch eat?  In nature, Yellow Perch are primarily bottom feeders and eat almost anything, but prefer minnows, insect larvae, plankton, and worms.  At Growing Power, our perch eat a combination of  commercial feed and worms.    **Tilapia**  Tilapia fish leftOriginally found in Africa, Tilapia has been farmed for more than 2,500 years.  Tilapia is a perfect fish for aquaponics because of its rapid growth, large size, and because it tastes great.  This hardy fish can adapt to most any condition with the exception of water temperature.  Tilapia prefer warm water - at least 75 degrees Fahrenheit.  It takes about 9 months for our Tilapia to grow to a harvestable size, about 1.5 pounds.    What does Tilapia eat?  At Growing Power, we feed our fish duckweed, ground-up salad greens from the greenhouse, worms, and Tilapia love to eat algae from the side of the tank.    **Why do we use compost in our system?**  We fill our growing pots with a mixture of coir and [compost](http://www.growingpower.org/compost.htm).  The coir is made from discarded coconut husks and helps wick water to the plant's root system.  The compost provides extra nutrient to grow an abundance of crops within the system.  Traditional hydroponic growing, or growing without soil, relies on fish waste alone to fertilize the crops.  The problem is, you can only grow crops with lower nutritional needs such as basil.  For example, in most traditional hydroponic systems, Boron is found in very low quantities.  Boron is essential for flower development in crops - tomatoes, peppers, and cucumbers - which means that production for these kinds of crops is very low in hydroponic systems.  At Growing Power, we solved this problem by adding nutrient rich compost to the pots in our system. Still have doubts?  Come by the farm and try one of our tomatoes grown in our aquaponics system.   Satisfaction is guaranteed.    **Interested in learning more?**Come to Milwaukee and learn how to build your own system at a Growing Power's [workshop](http://www.growingpower.org/from_the_ground_up!.htm). |