Aquaponics FAQ (source: https://aquaponics.com/aquaponics/aquaponicsfaq.php)
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What is aquaponics?

Aquaponics is the combination of recirculating aquaculture and hydroponics. In aquaponics, you grow plants and fish together in one integrated system. The fish waste provides nutrients for the growing plants and the plants provide a natural filter for the water the fish live in. This creates a sustainable ecosystem where both plants and fish can thrive. Aquaponics is the ideal answer to a fish farmer's problem of disposing of nutrient rich water and a hydroponic growers need for nutrient rich water. In the desert, the technique uses considerably less water than traditional gardening.

Is aquaponics organic?

It is in a way. Aquaponics is a process, which make use if that nitrogen cycle which occurs in all lakes, ponds, rivers and waterways on earth. The only input to an aquaponic system is fish food. The fish eat the food and excrete waste, which is converted (by beneficial bacteria) to a form that plants can use. In consuming these nutrients, the plants help to purify the water. You cannot use herbicides, pesticides or other harsh chemicals in an aquaponic system, making the fish and plants healthful and safe to eat.

This process could not be more organic but getting a USDA organic certification for a culture system that does not use soil is tricky. A couple of commercial growers in the US have had their plants certified as organic. The USDA has not finalized organic certification standards for fish yet.

What are the benefits of growing Aquaponically?

The combination of aquaculture and hydroponics is quite new and the potential for using aquaponics to grow high quality food around the world is tremendous. Here are some of the many advantages of aquaponic food production:

- Aquaponics utilizes the nutrient rich water from aquaculture that otherwise would have been a waste product or would need to be filtered in a costly manner.
- Aquaponics eliminates the cost and time involved with mixing traditional hydroponic nutrients.
- Aquaponics provides a truly organic, natural form of nutrients for the plants.
- By eliminating the soil in vegetable production, you eliminate all soil borne diseases.
- Aquaponics uses a fraction of the water that traditional field production does because no water is wasted, lost to soil infiltration or consumed by weeds.
- In aquaponics, plant spacing can be very intensive, allowing you to grow more plants in a given space.
- With high stocking densities in the fish tank, plants will quickly grow and develop in an aquaponic system.
- In aquaponics there cannot be any pesticides or herbicides used, making the end product healthier and safer.
- If your climate permits or if you are growing in a greenhouse, you can grow crops in an aquaponic system year-round.

What plants can I grow?

So far, plants that have been successfully raised in Phoenix include many types of lettuce, greens, strawberries, beets, carrots, red chard, garlic, marigolds, celery, a number of types of tomatoes, beans, & peas.

What fish can I raise?

Many different types of fish are possible. However, for food crops I would recommend tilapia (Oreochromis species), channel catfish, rainbow trout, and freshwater prawns. Ornamental fish like Koi work well also though their densities will be low.

How many fish can I put in my fish tank?

The number of fish depends on the size of the tank and the type of filtration (type and size of plant grow bed) you have. In larger systems with proper filtration, commercial growers usually stock the tank to a maximum of 1/2 lb of fish/gallon of water. For the beginner I would recommend no more than 1/2 pounds of fish per 300 gallons of total system water (that includes the water in the fish tank and the total amount of water stored in the grow beds).

How many plants can I have with a certain number of fish?

The number of plants you can grow is directly related to:

1. The number of fish
2. The size of the fish

3. The amount of fish food added daily

The scientists at the University of the Virgin Islands have determined that for each 60-100 grams of fish food added per day, you can support 1 sq. meter of plants in raft aquaponics. For growth, the fish are fed at 3% of their estimated body weight per day.

Can I make money doing this?

Maybe. Aquaponics, like any business, takes an adequate investment in equipment, proper design and excellent management and marketing skills. Plus, you need to be a skilled fish culturist and plant grower. With those qualifications, an aquaponic farm can be quite profitable.

Commercially, aquaponics is in its infancy but, as the technology develops and is refined, it has the potential to be a more efficient and space saving method of growing fish, vegetables and herbs. By incorporating aquaponics, hydroponic growers can eliminate the cost and labor involved in mixing a fertilizer solution and commercial aquaculturists may be able to drastically reduce the amount of filtration needed in recirculating fish culture. Although there are currently a limited number of commercial aquaponic operations, many people are expressing a strong interest in this sustainable method of food production.

I found some old tanks; can I use them for the fish tank?

Your fish tanks and the materials used in your system should be food-grade plastics. This means that they won't leach chemicals into the water in the system. You should not use any tanks or containers that have been used for chemicals.

What do I feed the fish?

If your goal is optimum growth rates and food production, you should feed your fish a species-specific, commercially available fish food. There are many manufacturers of fish food. You can search for sources online or through local resources such as feed stores and ag suppliers. If you have a low-tech system and maximum production is not your goal, you can grow or make your own fish food. Duck weed, water lettuce, worms and similar live feeds are often fed to tilapia.

Do I need a greenhouse?

A greenhouse provides protection from environmental factors such as heat, cold, wind, rain and insect intrusion. In most climates a greenhouse is useful though not required. A greenhouse can even be beneficial in the tropics to protect the crops from rain, wind and insects. The type of greenhouse and the environmental control equipment varies widely depending on climate. There are aquaponic growers, however, that have hobby systems indoors, in a basement or garage. When indoors, they have to add artificial lighting for the plants. If you don't use a greenhouse, a 50% shade screen is recommended.

Can I do this as a hobby or school project?

On a hobby scale, aquaponics is catching on quickly. A home aquarium, with ornamental or food fish, can be combined with a mini garden, growing herbs, vegetables or flowers. A hobby system can serve as a beautiful showpiece or a food production system, depending on the size. Many backyard gardeners are setting up systems to grow hundreds of pounds of fish and all the fresh vegetables a family needs. Around the Phoenix and Tucson area, a number of schools are introducing aquaponics as means of teaching biology, ecology, botany, zoology, development, chemistry, mathematics, physics, sustainability and business.

What about laws and regulations?

There are laws and regulations regarding apuaponics in Arizona. If you wish to raise fish in your backyards and do not plan to sell them you do not need a license. However if you plan to do this commercially even on a small scale you do need an aquaculture license of which the minimum cost at this time is $200 annually or $25 for a school (research) facility. Arizona Game and fish also requires a stocking permit but it is free. There are certain restrictions on the stocking of tilapia as well that are detailed in the Game and Fish documentation.

References:

Arizona Department of Game and Fish **http://www.azgfd.gov/** (Search for: Application for Aquatic Wildlife **Stocking Permit**)

Arizona Department of Agriculture **http://www.azda.gov**/ (Search for: Aquaculture Permits) Click on "Applications and Forms"

An Aquaponics Class may be found @ http://homegrownhydro.com. Meeting is at Home Grown Hydroponics Tempe Store at 5:30 pm. It is free and there is no registration required. Class is approx. 1.5 hours in length.