

## **The Future is Fishy Transcript**

**Allan:** When one thinks of agriculture, images such as vast fields of land, large tractors, and rows of crops might appear. But what if we told you there are other ways to grow? In this video, we are going to be going over non-traditional farming through the lens of aquaponics.

**Meghan:** To begin, we met with John Osborn from the Cornell Aquaponics lab to learn more about this growing technique.

**John Osborn:** So, I am John Osborn. I'm a technician in the aquaponics lab here at Cornell. And I work under Dr. Neil Matsson and Dr. Eugene Won. Dr. Matsson is in charge of the controlled environment agriculture, and Eugene Won is with animal science and in charge of the aquaculture programs here at Cornell.

### **\*Question 1: What is an aquaponics system?\***

**John Osborn:** Certainly. An aquaponics system is made up of the fish part and a plant part. The fish is in a fish tank, and then the effluent from that, the fish poop, flows out of that fish tank into a settling tank, and then the clean water that flows off of the top will flow into one more tank, which is usually the lowest point on the system, and that's called the sump. From that sump, there's one pump in that sump, only one pump per system, per closed system, and that pump will then pump the water back up through into the fish tank again after the solids have been taken out. There is one intermediary step in our system, and that is that we have what is called the bubble bead filter. It's an hourglass-shaped appliance that holds about one centimeter plastic balls where the beneficial bacteria live. Some systems have another water tank on the floor with some sort of plastic media that that bacteria can live on. I mention that because the beneficial bacteria is really the secret to the whole system. The fish generate their waste, but in order for the plants to be able to utilize it, that beneficial bacteria has to convert the Ammonia to Nitrite and Nitrite into Nitrate.

### **\*Question 2: Can Aquaponics be used on a larger, commercial scale?\***

**John Osborn:** Yes, Our lab is designed to be a fundamental system so that we can then test easily and accurately any modifications to that system. But I have been involved in and recently toured some large systems, commercial systems, that people are building. The beauty of an aquaponic system on a commercial basis is the ability to reuse the water. When you're growing plants even in a controlled environment agriculture like hydroponics, you still have a fair amount of water that you need to use and you have to add man-made nutrients. So, the beauty of aquaponics is that it's all organic. But on a commercial basis it's purely a function of your design, finding a simple design and replicating it over and over to get your volume, so it's very scalable.

It's when people try to design a large system that is all one system, so when a problem happens, it permeates throughout the system. But yes, I would say, particularly given the increased understanding of technology and new design techniques, it's definitely something that is very worthwhile on a commercial scale.

**\*Question 3:** What is the future of aquaponics within the next few decades ?\*

**John Osborn:** I think that aquaponics will grow geometrically over the next ten or twenty years. It's finally reached the point where the fundamentals of the system have been flushed out, and it's now really an issue of scalability and fine-tuning the system and then applying them in the right geographic areas so that people can have that food available to them when they need it. And that I think that aquaponics is really something that can make a huge difference in the world going forward with water quality, water availability, food availability, quality of life for people because people who don't have adequate nutrition, that's just the fundamental in their life that makes everything else go wrong.

**Meghan:** As of July 11, 2022, more than 32% of land in western states is classified as experiencing extreme or exceptional drought. Aquaponics uses 90% less water than traditional agriculture and can grow crops where land is scarce.

**Allan:** In light of the growing droughts and the climate crisis, aquaponics is on the rise and has great potential to be a force for good. It is up to us to decide the future of agriculture and to foster a sustainable future. Let's give unconventional techniques like aquaponics a chance.