

**What Is The
Future Of Farming
For Future Farmers?**



AQUAPONICS

**Aquaponics Is The Future of Farming because it solves these 5 Food
CRISES:**

- 1. Water Shortages**
- 2. Fertilizer Shortages**
- 3. Fish Shortages**
- 4. Soil Degradation**
- 5. Climate Change**



What Is Water Conserving, Multi-Crop Farming?

Teachers, are you ready to Teach your FFA Students Water Conserving, Multi-Crop Farming of the Future? Teach Aquaponics!

Aquaponics is a Multi-Crop Food Growing Technology that produces both Vegetables and Food Fish in a Closed, Cross Linked System where the Fish Fertilize the Plants and the Plants clean the Water for the Fish. Aquaponics doesn't need soil or even the sun as Systems can be set up indoors for year round growing using LED Grow Lights. But it does need Water, and it uses 90% less Water than traditional farming.

How is that possible? Aquaponics utilizes a **RAS**, which is the acronym for **Recirculating Aquaculture System**. Because Aquaponics is a Closed System, all of the Water stays in the System, continuously recirculating from the Fish Tanks to the Grow Beds and back. The only water loss is through Evaporation and Plant Uptake. The early Aquaponics Pioneers of the 1980's borrowed **RAS** Technology from the Aquaculture Industry, which itself is a young food production player having only been popular in the last 70-80 years. But Tank Aquaculture has a major flaw—the Water has to be dumped out and replenished often so the confined fish don't die in their own poisonous waste. Aquaponics solved that problem by adding the Vegetable component, because the Vegetables clean the Water for the Fish eliminating the need to waste all that Water. That brilliant idea marked the birth of Multi-Cropping of both Vegetables and Fish.

Economically, Aquaponics lends itself to Medium-Scale Systems of 10,000-30,000 sq. ft. that are being built in numerous locations across the U.S. harking back to the days when Americans were Agrarian and the Family Farm was ubiquitous. These Vegetable & Fish Growing Farms are also being miniaturized on a grand scale. Many Systems now fit into Family Garages, Spare Bedrooms, small Greenhouses and **Classrooms**, which is where Aquaponics USA comes into the picture.

Due to this prevalence of miniaturized Systems, Aquaponics is often erroneously described as “Gardening” when it's actually a **High-Tech Form of Farming**. **AUSA**, foresees a time in the near future, when Large-Scale Aquaponics Farms covering acres start getting built in great numbers for the five very important reasons listed below:

Water Shortages: Water covers 70% of our planet, but only a paltry 3% is fresh water, and modern industrial agriculture utilizes 70% of that. Agriculture uses more water than any other consumer and wastes much of it through ground absorption and run off. Is it any wonder that we're dealing with Worldwide Water Shortages? Rivers, lakes and aquifers are drying up or becoming too polluted to use. More than half of the world's wetlands have disappeared.

Bill Werkheiser, United States Geology Survey (USGS) Associate Director for Water Resources from the U.S. Dept. of the Interior, warned in January 2025 that, “By integrating data on water quantity, quality and usage, we are uncovering valuable insights that will help researchers and policymakers address the **critical challenges related to our water resources.**” This USGS Report states that “nearly **30 million Americans** live in areas where available surface-water supplies are limited relative to water use. There’s a high level of water limitation.” ([USGS News Release](#))

Aquaponics is here to save the day by bringing this High-Tech Farming, that merges Agriculture and Aquaculture, into your FFA Programs. Aquaponics Systems use a Recirculating Aquaculture System (RAS) Technology in which the Water is Recirculated through the System in multiple, endless passes, where no water is lost in the ground, making Aquaponics 90% more water efficient than soil Farming. The only water loss is through plant uptake and evaporation.

Arizona Water Shortages are of particular concern. Arizona shares water from the Colorado River with six other states, designated as Upper and Lower Basin States. There have been ongoing disagreements about fair proportions of the Colorado River water between these two groups since the first Colorado River Compact Agreement of 1922, and there is nothing indicating those fights will abate in the future. The unique situation regarding Water Shortages in Arizona needs to be taught in our Schools so every citizen of our State understands the importance of water conservation and voluntarily participates.

Aquaponics USA has prepared a Report called “**Colorado River Basin Water Wars**” to address this important issue, and included it in their Curriculum. Much of this Report is a Recreation of a Presentation by Mr. Tom Buschatzke, Director of the Arizona Department of Water Resources that was given to the AZ House of Representatives Committee on Natural Resources, Energy and Water on January 27th, 2026. ([See “Colorado River Basin Water Wars” Doc](#))

Fertilizer Shortages: In this decade, starting in 2020, there have been Fertilizer Shortage scares on three occasions. The first one happened when the entire world was shut down due to the Covid Pandemic.

Once the world was reopened, and the production of Fertilizers started ramping up again, Russia invaded Ukraine, February of 2022, and the Fertilizer Shortage reared its head again. Russia and Belarus are major global exporters of fertilizers accounting for a significant share of the world supply which led to direct disruptions in the production of Fertilizer and in Black Sea export routes followed by sanctions on Russia leading to a reduction of up to 15% of global supply.

Now the war in Iran is causing a renewed Fertilizer Shortage scare for two main reasons of which the first is the Persian Gulf region (Qatar, Saudi Arabia, UAE, Iran, Bahrain) is a major global hub for the production of nitrogen-based fertilizers. This fertilizer needs to be exported through the Strait of Hormuz, which, in March of 2026, was being blocked by Iran. As of this writing that situation remains fluid.

Aquaponics solves the Fertilizer Shortage issue in the simplest way possible. It doesn't use external Fertilizers. The Vegetables grown in an Aquaponics System are fertilized by the second crop in Multi-Crop Aquaponics Farms. That second crop is the Fish, which fertilize the Plants. Gone is the dependence on Fertilizers produced in or near war torn countries and needing to be exported through at risk marine locations like the Black Sea or the Strait of Hormuz.

Fish Shortages: The 4 drivers of the destruction of our Marine Ecosystems are **Overfishing, Oil Spills, Plastic Pollution and Agricultural Runoff**. Two comprehensive reports by the FAO, the United Nation's Food & Agriculture Organization, one in 2020 and the other in 2024 tell the sad story.

FAO's 2020 Report alerted us to big drop in fish stocks compared to previous years that were being fished at biologically sustainable levels leaving only 62%-65% of our Marine fish stocks biologically sustainable.

The FOA 2024 Report explained that the overall trend for assessed stocks remains concerning, with overfishing persisting in regions like the Mediterranean and Southeast Pacific. There was one positive caveat which is the success of the Pacific Bluefin Tuna. This species shows strong recovery due to international measures from the Western and Central Pacific Fisheries Commission (WCPFC) and the Inter-American Tropical Tuna Commission (IATTC). Together these two agencies created reduced catch numbers (especially of small fish), enacted effort controls, size-based limits and enforced monitoring.

Soil Degradation: In the U.S. Midwest Corn Belt (a major agricultural region), studies estimate that 35% ($\pm 11\%$) of cultivated area has completely lost its A-horizon topsoil due to historical erosion, with convex hilltops most affected. This leads to measurable yield reductions (around 6% on average) and billions in annual economic losses. (Quote from [PNAS.org](https://www.pnas.org) Article called "[Soil Loss across US Corn Belt](#)")

Globally, 33% of soils are considered moderately to highly degraded (due to erosion, compaction, salinization, nutrient loss, etc. per FAO (UN's Food & Agriculture Organization) and related assessments. The U.S. situation is generally better than many regions due to conservation efforts since the Dust Bowl era, but intensive agriculture has still caused substantial topsoil loss (**e.g., estimates of 57+ billion tons lost in the Midwest over 160 years**).

How does Aquaponics solve the Soil Degradation issue? Aquaponics doesn't use Soil. Aquaponics crops grow right in the Nutrient rich water or they are contained in raised Hydroponic Grow Beds where light expanded clay aggregate (LECA) Grow Bed Media is used in place of Soil.

Climate Change: For the most part, Agriculture takes place outdoors, and that's also where the weather is, which is why Climate Change can greatly affect food production. However, in most locations, Aquaponics takes place in indoor, protected environments like Greenhouses or even Warehouses, and the Aquaponics Farmer is in charge of those Climate-Controlled environments.

Air Conditioning Systems, Blue Flame Propane Heaters, producing growth enhancing CO₂, and even the warmth from the highly efficient LED Lights that replace sunlight contribute to the ideal climate that is created inside Aquaponics growing environments.

Given the fact that Big Agra Farms with thousands of acres of crops cannot be replaced by climate controlled Aquaponics Farms, what can and will happen in the near future is the return of the small Family Farm. If enough of those 160,000 Family Farms that disappeared between 2017 and 2022 return, they could give Big Agra a run for their money by joining the Local Food Movement and capitalizing on the advantage of not needing to transport their food production over hundreds of miles. So, just like with Fertilizers and Soil Degradation, Climate Change is of little consequence because Aquaponics Systems are cloistered in protected climate-controlled Greenhouses and Warehouses.



The picture on the left demonstrates most of the different types of Growing Technology used by Aquaponics Farmers starting from left to right:

- 1. Stacked Horizontal Beds**
- 2. The Fish Tanks**
- 3. A Floating Raft System**
- 4. Deep Media Grow Beds**
- 5. Vertical Towers**

Aquaponics borrowed much of its Growing Technology from Hydroponics, which outdates it by about 50 years. Hence, most Aquaponics Systems use Hydroponic Growing Technology, which causes some confusion between the two.

Understanding how Aquaponics works to solve all 5 major Farming Crises translates into the need to give Arizona National FFA Organization Students the best School Based Agricultural Education (SBAE) possible with Aquaponics Classroom and Lab Instruction, both Foundational and Immersion Supervised Agricultural Experiences (SAEs) and FFA Student Leadership Opportunities. With this knowledge, an Aquaponics FFA Program becomes practically mandatory. (See their [“The Future Of Farming” Doc](#))

Aquaponics is the perfect fit into the National FFA Organization. The Classroom instruction, with AUSA’s extensive Science Curriculum, informs and reinforces the SAEs and FFA Leadership opportunities. This model ensures comprehensive preparation: knowledge from the classroom, application via SAE, and development through FFA. ([See their “Curriculum Tour” Doc](#))



Aquaponics USA offers eight System Designs for FAA Classroom Labs and Foundation or Immersion SAEs. Their Aquaponics Designs are differentiated by both size and configuration starting with the **space saving Compact-7 with 7 sq. ft. of growing area** and ending with their **65 sq. ft. workhorse, the FGS-65, that has a 500 gallon Fish Tank.** ([See “8-Systems Brochure” Doc](#))

National FAA Organization Sponsored Tours of the AUSA Demonstration Greenhouse could be conducted in which AUSA gives a brief instructional Class about Aquaponics and shares their proprietary **Leafy Green Vertical Growing System** designed by their retired NASA Engineer, Oliver Duffy, who became an Aquaponics Expert.



The following series of Photos exemplify what this Tour would entail with a walk-through AUSA's 15' x 30' Demonstration Greenhouse growing two kinds of Lettuce, Romaine and Butter, Herbs like Basil and Cilantro, Leafy Greens like Swiss Chard, Bok Choy and Arugula, Peppers, Tomatoes, Cabbage and Eggplant to name a few.

These custom made 4' x 8' Grow Beds are lined with Pond Liner, and have been running continuously for nine years using what is called a Flood & Drain Process in which the water from the Fish Tanks is routed into grow beds and then returned to the fish tanks by way of a loop siphon.



Above, on the left are 2 Deep Media Grow Beds full of expanded clay Grow Bed Media called Hydroton (red pebbles), which holds the Plants as well as makes an ideal environment for the Beneficial Bacteria. One type of Beneficial Bacteria converts the fish waste into usable Fertilizer for the Plants and the other type of Beneficial Bacteria converts the toxic components of the fish waste, like Ammonia, into a form of nutrients that the plants can use called Nitrates.



On the right are two more Deep Media Grow Beds. The front Grow Bed is growing Peppers in the same expanded clay Grow Bed Media, Hydroton, which is pH neutral and never needs to be changed. It does need to be cleaned of root mass and debris about once a year.

The second Grow Bed on the right is growing some huge Swiss Chard. On the left are Tomato Plant leaves from a big Indeterminant Cherry Tomato Plant that is over four years old. Indeterminant Tomato Plants grow and produce continuously as long as they are properly trimmed so the sucker branches don't deprive the Plant of nutrients that are needed to produce the Cherry Tomatoes.



This Vertical Array of Butter Lettuce is growing on what the AUSA [TicTok](#) Followers coined a “**Lettuce Wall**”™ when a Video of harvesting this Wall was posted there, it went Viral and got over 3 Million Views. This “Lettuce Wall”™ has been growing 2 kinds of Lettuce, Romaine and Butter, for 6 years. It produces 108 heads of Lettuce every 8-9 Weeks, or less, depending on the time of year.



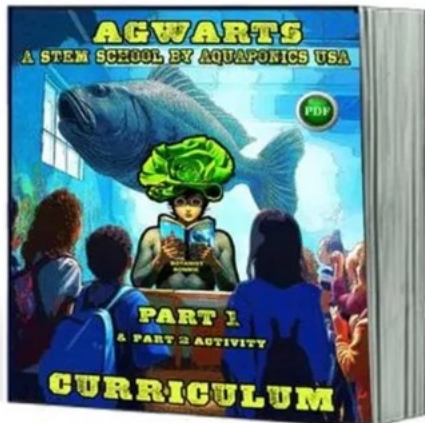
Above are two of the four 320 gallon AUSA Fish Tanks in their Fish Room. There are about 25 Fish in each Tank.

On the left, are a group of the smaller AUSA Tilapia as most of their Fish are around 7 years old and weight in at about 5 Lbs.

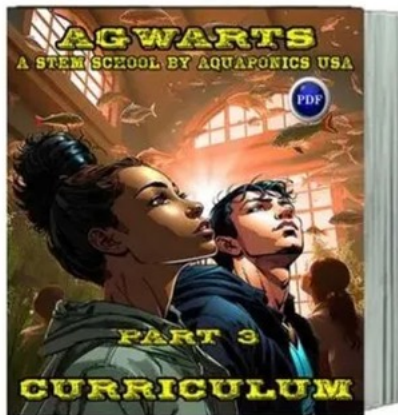
Tilapia are the most recommended Fish for Aquaponics because they are very hardy and can withstand beginner Aquaponics Farmer water quality issues.

AUSA would love to Host an FFA Group Tour and share their passion for what they believe is the Sustainable Future of Farming with Future Farmers.

Our AGWARTS Curriculum



Parts 1 & 2 with 219 Pages



Part 3 with 210 Pages



Part 4 with 259 pages

We Have Curriculum For All Grades

NOTE: Aquaponics USA understands that FFA Programs focus on Grades 5-12 so only a portion of their Elementary Curriculum would be of interest. The Grade Level Offerings are easily distinguished so simply skipping the lower level Lessons would be easy for FFA Classroom Lab Teachers and SAE Advisors to do.

1. The Curriculum is totally unique starting with its Name, which, of course, is a take off from the popular story by J.K. Rowling about a magical world called Hogwarts.

[\(See their “Curriculum Tour” Doc\)](#)

2. The Curriculum is a Compilation of Open Source Science Curriculum available to Teachers. It is woven into a uniquely written storyline about AGWARTS™—the Principal, the Teachers, the Students, the Teacher Liaisons and their Mascots— that mimics Graphic Novels and is full of wonderfully weird Cartoon Characters who populate it.

3. Part 2 of the Curriculum is an Optional Activity that allows your FFA Students to choose to be one of these many Characters within an Aquaponics Teaching [“PUPPET THEATER KIT”](#) that includes the Paper Puppets and the Stand alone Theater.

This Activity, by its very nature, puts Middle School Students into gleeful excitement. High School FFA Teachers will need to demonstrate how their Students can produce, write and practice their “Aquaponics Teaching Puppet Shows” and then take them on the Road to teach Elementary & Middle School Students about Aquaponics or create Social Media Videos to share. This Activity would fit nicely into the FFA Immersion SAEs and FFA Student Leadership Opportunities.



On the left, are six of the over 40 Characters that appear in the AGWARTS™ Curriculum.

One unique Character is “Handy-Helper”, which is animated by your Students’ hands in a White Plastic Glove with Eyes. “Handy-Helper” helps the Paper Puppets hold things during a Performance.

The Theater is 31 x 67 inches tall with a main performance window in the Center and an extra window at the top to add variety to the show.

At the top of the Theater is Rita Radish, who is one of 20 Cartoon Vegetable Characters. In the center is the Professor who is the Principal of AGWARTS™, and on his left is “Tommy Tilapia” with the “Can Of Worms” on his right, which represents Photosynthesis. Billy is at the bottom announcing PUPPET Shows.

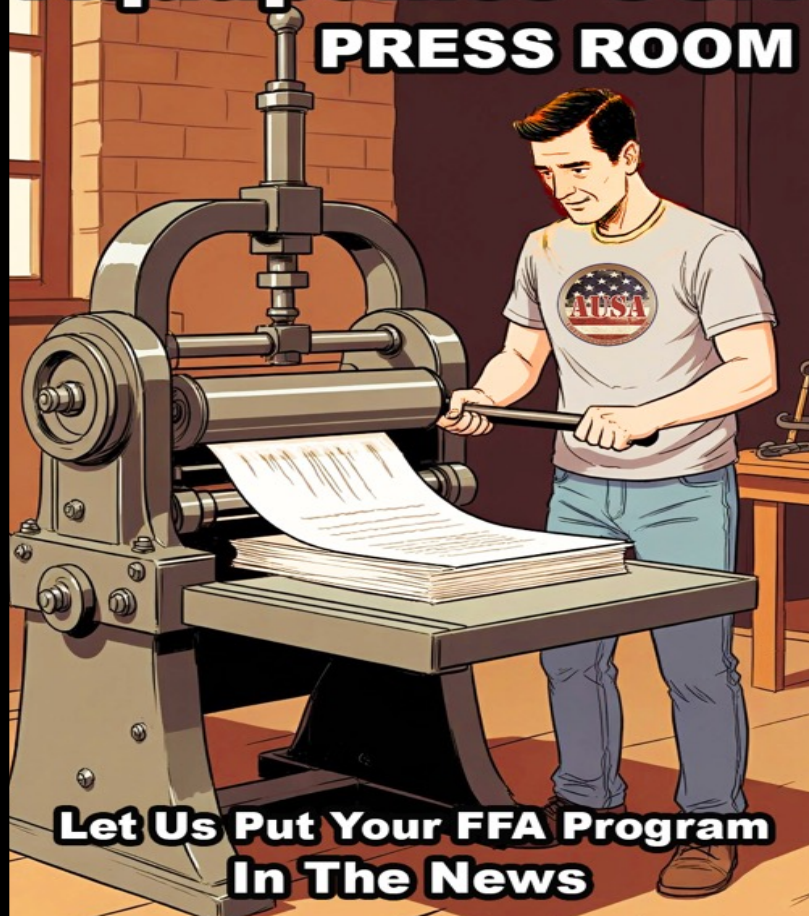
Puppet Theaters Are So Much Fun!

Below are Blue-Eyed Red Bird, Reggie, OC Cat, Casey Cabbage and Quinton Cucumber.

To Learn More, (See their Curriculum TOUR).



Aquaponics USA PRESS ROOM



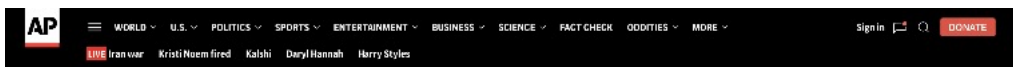
**Let Us Put Your FFA Program
In The News**

Your Stories Are Our Stories

And we know where to send them. Let us share your Aquaponics FFA Program like we know how in Press Releases that reach across the Nation.

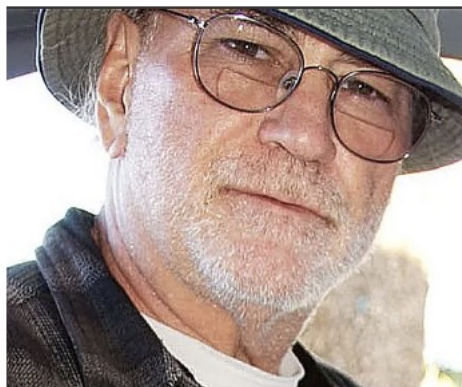
We'll drop an Announcement Release for every one of your FFA Classroom Labs, SAEs and Leadership Opportunities that are doing Aquaponics. Then we'll add more Releases once your Systems are up and running showing your Teachers, your FFA Students and their Veggies and Fish.

WE'RE Geared Up With A Press Room



PRESS RELEASE: Paid Content from FIN Presswire | NewsAnalytics. The AP news staff was not involved in its creation.

Aquaponics USA Poised To Enhance Arizona CTE Programs



This was only our 2nd Press Release, and it made it into the [Associated Press!](#)

We're showing only the Headline. See our Press Room Information Package for the whole story.

This Release also went out to the [Global Education Journal](#) along with about 100 other places.

[\(See Their "AUSA Press Room"\)](#)

Thank You for Viewing

**The National FFA Organization
Aquaponics Program Proposal**



Created by Aquaponics USA

**And Distributed to District Superintendents,
Principals and Teachers**

**For More Information or To Schedule a Tour,
Email: urbanfarmer@aquaponicsusa.com or**

Call: 760-671-3053