

# Products and Supplies for Operating an Aquaponics Farm

*Note: Not all of these items are absolutely necessary depending on things like source water filtration needs, pH adjusters based on alkalinity, packaging variations, etc. Purchase only those items that are necessary to starting and operating your farm. The frequency of order will also be dependent on the rate that the item is used. Replenish as necessary.*

PRODUCT	DESCRIPTION AND PURPOSE	FREQUENCY AND QUANTITY OF USE	SUGGESTED VENDORS
<b>Plant Supplies</b>			
Seeds	Seeds for production plants or microgreens	Determined by the number of plants being seeded for production based on the available space and crop rotation plan	Johnny Seed, Baker Creek High mowing Organic Seed The seed supply Mountain Valley
Plants	Plants purchased for growing or propagation	Used when propagating plants such as basil, mint, rosemary, strawberries, tomatoes	Garden center or greenhouse supply
Plug Trays or other preformed planting media	Preformed nursery plug trays for seeding or propagating large numbers of plants. Sold by the pallet for best pricing. Shipping expenses can be very costly.	Determined based on the number of plugs per tray and number of trays per week, plug trays or preformed media are available in various quantities, 64, 72, 80, 96, 105, 124, etc. Grow-Tech – Flexitray, Jiffy – Preforma, Grodan-Rockwool cubes, Oasis – Rootcubes	Garden centers, greenhouse and hydroponic suppliers
Nursery trays	10'x10" or 10"x20" slotted nursery trays to plant microgreens. Usually purchased in groups of 100.	Determined by the number of microgreen flats needed each week	Garden center, greenhouse, hydroponic supplier Growers Supply
Vermiculite, Coco coir, perlite, fabric matting	Media used to germinate seed for microgreens Media may also be used to pack plug trays when preformed trays are not available	Determined by the number of microgreen flats or plug trays being seeded and the amount of media used. We prefer #2 vermiculite in 3.5 cu ft bags	Garden center or greenhouse, hydroponic suppliers
Plant markers	Plastic or wooden stick, printed label, tape or white paint marker used to label, number and date nursery trays and microgreens	Used on each plug tray or nursery flat	Garden center, greenhouse supply or office supply

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<b>Nutrients and Adjusters – many nutrients cannot be shipped across state lines and have to be purchased locally</b>			
Calcium Carbonate or Calcium Hydroxide	Used to increase and buffer pH up and supply calcium to plants, Calcium carbonate may have a longer pH buffering capacity, calcium hydroxide will be a faster pH shift. Calcium may not need to be added if system water pH is above 7.0.	May need to be used every other day, weekly or monthly depending on source water, system pH buffering capacity (alkalinity), and nitrification	Univar Chemical companies Baking supply companies The Aquaponic Source
Chelated Iron DTPA 10-11%%	Used to supplement iron	May need to be added weekly to monthly depending upon source water, type and quantity of plant species cultivated and to overcome deficiencies	Chemical companies Hydroponic suppliers The Aquaponic Source
Potassium Hydroxide or Potassium bicarbonate	Used to increase and buffer pH up and supply potassium to plants. Potassium may not need to be added if system water pH is above 7.0.	May need to be used every other day, weekly or monthly depending on source water, system pH buffering capacity (alkalinity), and nitrification	Chemical companies Hydroponic suppliers The Aquaponic Source
Phosphoric Acid	Used to decrease pH and supply phosphorus to plants. Phosphoric acid may not need if pH is below 7.0.	May be used as needed to lower pH, likely only necessary to lower incoming source water if pH is above 8.0	Chemical companies Hydroponic suppliers The Aquaponic Source
Magnesium Sulfate	Used to provide magnesium and sulfur nutrients to plants if deficiency is identified.	May be used as needed to treat deficiency symptoms	Chemical companies Hydroponic suppliers The Aquaponic Source
Shell Grit	Crushed shells commonly referred to as chicken scratch, used to help naturally add calcium and magnesium to the system	Quantity depends on how much is need for size of system, pH, and water alkalinity	Farm supply store
Espertan	Organically certified N-P-K nutrient solution used to provide nutrients prior to fish stocking or supplement if necessary. Product made from fermented vegetable based, loaded with lots of great fulvic acids and nutrients. Makes the water very dark colored	Quantity needed depends on water volume, quantity of plants and if product is being used as all nutrients or as supplement to fish population. Product will need to be continuously dosed in the system when it is supply primary nutrients as plants absorb nutrients all day, everyday	American Clayworks US supplier

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<b>Fishless Cycling</b>			
Pure Ammonia	Used to provide feed source for nitrifying bacteria, Comes in power or clear liquid form. Make sure that the product does not contain any other ingredients, surfactants, soaps, or cleaning agents	Quantity needed depends on volume of water. Typically fishless cycling is performed for roughly 30 days before stocking fish. However if fish aren't stocked into system, ammonia will have to be continued to prevent bacteria from dying.	The Aquaponic Source Ace Hardware
Nitrifying bacteria	Used to inoculate the biofilter and populate the appropriate quantity of bacteria to being and maintain the cycling process. Examples are Microbe-Lift Nite Out, Zym Bac.	Use the quantity appropriate for the amount of water in the system.	The Aquaponic Source Pond stores
<b>Water Quality Testing</b>			
Test kit – pH, Ammonia, Nitrite, Nitrate	Used to test pH from 6.0 – 8.0. It is advisable to get a pH test kit that can register below 6.0. Most freshwater aquarium test kits also include ammonia, nitrite and nitrate.	Daily to weekly depending on system being monitored for fish safety or plant nutrients	The Aquaponic Source API freshwater test kit Nutrafin LaMotte
Iron test kit	Used to test the iron available to plants.	Tested as needed for iron levels available to plants	Same as above
Phosphate test kit	Used to the phosphorous in the system.	Tested as needed for phosphorous available to plants	Same as above
Microbial test kits	Used to test for specific pathogens such as coliforms, E. Coli, Salmonella, Listeria	Tested as needed to ensure food safety compliance. Some self test kits available on the web. Find a local water quality lab or work with a third party testing and auditing group.	Local university extension or water quality lab
pH probe calibration solution	A 4.0 pH solution and a 7.0 pH solution is used to calibrate pH probe	The pH probe should be calibrated on a bi-weekly basis or when the probe indicates calibration is necessary.	The Aquaponic Source Hydroponic stores

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<b>Fish Supplies</b>			
Fish food	Usually purchased in 40-50lb bags, in a size and formulation appropriate to the fish species. Non-Gmo, and organic feeds are available and generally cost more than conventional fish feed.	Based on the fish age, biomass size, quantity, number of feedings per day, and water temperature. Choose extruded floating pellet whenever possible.	AquaNourish, AquaOrganic, Skretting, Ziegler, AquaMax, Cargill
Calcium Chloride	May be used during or after transport, or when nitrites are at high levels in the system	Quantity depends on water quality issues, should be needed possibly only during system cycling or if there is a major filtration overhaul. Use with caution as it gets very hot when mixed with water.	Hardware store, chemical supply, pool supply, baking supply stores
Sodium Chloride	Can be used during or after transport, or for treating injury or illness in an offline system (not connected to the plants). This is rock salt commonly found in ice melt, also found in pool supplies, baking supply (kosher table salt, non-iodized)	Quantity depends on frequency of stocking, transport or need for quarantine	Hardware store, chemical supply, pool supply, baking supply stores
<b>Water Filtration</b>			
Chlorine and chloramine remover	A chemical compound which can be added to municipal tap water treated with chlorine or chloramine to make the water safe to add to the system	Only needed if water source has chloramine or chlorine and chemical treatment vs filtration methods are used	The Aquaponic Source Pet or aquarium stores, pond stores, Amazon
Activated Carbon filter cartridge KDF filter	Can be used to filter municipal tap water to remove chlorine, chloramine, metals and other possible contaminants	Replace based on the number of gallons for the type of filter	The Aquaponic Source Hydroponic stores, RV and camper stores
Sediment filter cartridge	Used in conjunction with an activated carbon filter to remove large partials such as rust, sand or other materials from municipal tap water	Replace based on the number of gallons for the type of filter	The Aquaponic Source, Hydroponic stores, garden or greenhouse supply, RV and camper stores

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<b>Sanitizing Products</b>			
Wet wall sanitizer KleenGrow	Used in wet wall reservoir to reduce calcium buildup, prevent algae and kill pathogens	Should be added to reserve to both do a deep clean and then in smaller doses for preventative per manufacturer's recommended dosing	Hydroponic or greenhouse supply company
H2O2 Oxidate or quaternary sanitizer	Product used to sanitize raft boards, net pots, harvesting tools, other surfaces. Can also be used as a boot wash (foot bath). Buy the restaurant or hospital grade and 29%	Quantity based on frequency of use for foot bath (number and size of bath), number of raft boards cleaned per week, and other areas being sanitized	Restaurant or janitorial supply, hardware stores, hydroponic or greenhouse supply company
Hand soap, hand sanitizer	Hand soap as each sink area. Hand sanitizer in biosecure entrance, and around the farm	Quantity based on use	Restaurant or janitorial supply, hardware stores,
Towels	Cloth towels are used to wipe and sanitize raft boards and farm cleaning. Consider buying different color towels	Quantity of towels and their need for replacement will be determined by frequency of use and durability	Restaurant or janitorial supply
Paper Towels	Dry hands after washing (considered a single use), also used for cleaning	Quantity of towels will be determined by frequency of use	Restaurant or janitorial supply
<b>Pest Management</b>			
Pest Management Products	Too many pest regiments to name. Products selected based on pest being treated, and safeness with fish and bacteria. Could include beneficial insects, insecticides, fungicides, sulfur pellets, soaps, oils, sprays, dusts, and water soluble formulations	Pest management is twice a week to several times a month activity which needs to be rotated between products and treatment types to be effect	The Aquaponic Source General Hydroponics Arbico-Organics.com Pestrong.com Microbe-lift
Rodent traps	Used to manage rodent pests in greenhouse and food storage facilities	Quantity depends upon rodent access and number of animals, check and replace as needed	Hardware store
Sulfur Prills	Used to prevent/treat powdery mildew, mold	Pour install greenhouse vaporizer and run only at night or when the lights have been off. No humans allowed in the room during vaporizing	Hydroponic or greenhouse store
Yellow and Blue sticky traps	Used to detect pest levels and locations.	Cards need to be replaced when they are full	The Aquaponic Source, Hydroponic, garden store

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<b>Harvesting and Product Packaging</b>			
Plastic Box liners 30x18x36 liner bags work well	A food grade clear plastic bag that is inserted into a cardboard box or a reusable plastic crate to keep the produce from touching the inside of the delivery container.	Quantity of box liners will be determined by the number of boxes or crates delivered to customers each day	Packaging supply Uline
Cardboard boxes*	Can be used to pack produce for delivery to customer. Boxes can be printed with farm logo and contact information. Usually packs 12 – 24 heads of lettuce or other greens. Can be used to pack other food products as well.	Quantity of boxes will be determined by the number of cases delivered to customers when cardboard is selected	Packaging supply Uline
Individual product bags*	Various different sizes and types of bags exist to create an individual produce amount	Quantity depends on the number of items individually packaged	Packaging supply, floral supply Uline.com Clearbags.com Producepackaging.com
Twist ties, rubber bands, twine*	Can be used in place of a bag to distribute products to customers	Quantity depends on the number of items individually packaged	Packaging supply Producepackaging.com Uline.com
Clam Shells*	Rigid plastic packaging that can be used for Bibb and other leaf lettuces, flowers, herbs and anything that easily damages	Quantity depends on the number of items individually packaged	Packaging supply Producepackaging.com Uline.com
Gloves	Used for seeding, transplanting or harvesting activities for anyone with open wounds Make sure to use food grade non-power and non-latex gloves	Quantity depends upon the number of people and frequency of use	Restaurant and janitorial supply
Hairnets and beard nets	Used to cover head during harvesting and other farm tasks. Can be reused.	May not be required in all states or for all applications. If you are packaging products destined for the end consumer (retail clamshell package, then it is required)	Restaurant supply
<i>* Only purchase if using this form of packaging</i>			

PRODUCT	DESCRIPTION AND PURPOSE	FREQUENCY AND QUANTITY OF USE	SUGGESTED VENDORS
<b>Office Supplies</b>			
Printer paper and ink supplies	Used to print invoices, sales receipts, taxes, reports and other information	Amount depends on volume of print material	Office supply
Pens, envelopes, postage, labels, tape, paper clips	Used for various farm and office tasks		Office supply
First Aid items	Ensure that there are one or more first aid kits readily available and refill supplies as needed	Includes band aids, sanitizer, antibiotic ointment	
Notebooks	Used as a farm log file to record seeding, transplanting and harvesting information, test results, nutrient additions, and such	Number depends on the quantity of entries	Office supply
Batteries	Used for flash lights, scale, and other equipment	Make sure to multiples of the right size	

## Consumable Utilities

Water	Used to fill system, maintain water level, wash hands, mix pest management products, wash produce (if necessary), cleaning filtration system, and possibly cooling in an evaporative wet wall. Water for the system should meet irrigation water standards and be free for pathogens such as E Coli, Salmonella, Listeria, chemical, heavy metals, or other contaminants. The pH should also be between 6.5 – 8.5.	The volume of water consumed will depend upon size of system, day length, temperature (plants consume more water in long hot days that short cool days), amount of water needed for cooling, and other cleaning tasks.	Municipal water source, well, rain water catchment, surface water such as agriculture ditch, ponds, lakes or streams should be used with caution, filter extensively and tested frequently
Sewer/septic or portable toilet	Bathroom facilities required onsite. Portable facility allowed. Costs associated with sewer tap and per gallons, pumping a septic or cost of disposal and cleaning for portable unit	Some water utility companies charge a sewer that is directly related to the amount of water consumed. Tried to see if they can be metered separately so there isn't the extra expense	Local sewer company, septic company or portable toilet company
Electricity	Used to run greenhouse fans, pumps, aerators, lights and other electrical equipment. Most of this equipment needs to operate 24 hours a day, 7 days a week	Amount consumed depends on greenhouse environmental conditions, temperature, humidity, settings	Local power company, solar, wind, hydroelectric, generator, battery bank
Heating supply	Used to heat fish tanks if necessary for species of fish and time of year. Used to heat the greenhouse air to keep plants alive in colder climates	Amount consumed depends on ambient temperature, and desired minimum temperature	Local power company, or dealer for natural gas, propane, fuel oil, pellets, wood, solar thermal, geothermal, compost heat or some other reliable heat source
Gasoline	Used to power generator in case of emergency	Store in a place with proper ventilation and container, don't allow to overheat	

## Small Equipment, Tools and Components

<b>Tables</b>	Used for seeding, transplanting, office work, harvesting, weighing	1-3	Plastic or stainless steel for sanitizing. Work surfaces can be permanently placed or folding tables
<b>Chairs</b>	Used for stationary tasks, can be used for seeding, transplanting, office work, relaxing	1-3	Plastic or metal to be sanitized
<b>Shelving racks</b>	Used for storage of food products to keep off the ground, and any other storage needs		Plastic or metal, not wood), make sure they are sturdy enough for the weight of heavy crates
<b>Foot bath tray</b>	Plastic tray that holds sanitizer solution	1 per door	Used to sanitize shoes at the bio-secure entry, may need more than one if different doors are used
<b>Farm shoes or boots</b>	Shoes or boots used only in the greenhouse	1 per person	Prevents bringing in outside contaminants, also prevents ruining personal shoes
<b>Flash lights</b>	Used around farm at night, or during power outage	1-3	Stored in places where they would be easily accessible
<b>Handheld pH and temp probe</b>	Tests the pH and temp, allows for testing in various areas	1 each	Has a 18 month warrant, needs to be calibrated
<b>Wall mount pH and temp monitor</b>	Tests the pH and temp of the water	1 each	Mount to wall, one unit can be connected to a network to send pH and Temp data
<b>Power tools and tool kit</b>	Should include various wrenches, pillars, hammer, pipe cutters, tape measure, PVC bevel tool, hole saws, drill, drill bits, hacksaw, screwdrivers, pipe clamps, miter saw		Having a toolbox onsite is very helpful. Tools are needed frequently, especially during installation. Used for greenhouse and aquaponics projects.
<b>Harvest Scissors</b>	Used only for harvesting plants	2-5 pairs	Should be culinary grade, cleanable, won't rust
<b>Work Scissors</b>	Used for other tasks in greenhouse or office	1-2 pairs	Should not be used to harvest plants
<b>Harvest bowls or buckets</b>	Used when harvesting plants	3-5 units	Pick metal or plastic that can be easily sanitized, that won't easily tip over
<b>Scale</b>	Use to weight harvested plants	1-2 scales	Look for a scale that can weight grams and up to 50 lbs. Digital scales need power or batteries
<b>Measuring cups and spoons</b>	Measure nutrient additions, seeds, pest regiments, etc - choose different color for different purposes	3-5 sets	NO glass container, plastic is preferred, have a designated set of measuring devices for each purpose
<b>5 gallon buckets</b>	Used to remove solids from tanks, plant material, compost	3+ buckets	Tons of uses for buckets
<b>Storage totes</b>	Used to store fish food, seeds, plant materials, nutrients We like the heavy duty black totes with yellow lids	3-5 totes	Heavy duty totes with lockable lids help prevent rodents and moisture issues,

<b>Fish nets - large</b>	Used to catch larger fish	1-3 nets	Should have separate nets for each fish tank (if possible)
<b>Fish nets - small</b>	Used to scoop uneaten fed, system solids, algae, roots	4-6 nets	Having smaller nets to catch and scoop things
<b>Wall utility rack</b>	Used to hold fish tank nets, cleaning brushes, brooms, etc	1-2	Place in an area that will be easy to access so workers keep things off the floor
<b>Bins or totes</b>	Trash cans, compost bins, recycle bins, used around the greenhouse for various purposes	1-3	Ensure that they can be easily washed and cleaned
<b>Lockable storage</b>	Used to store nutrients, adjusters, pest regiments	1-3	Should be lockable, non-flammable and labeled
<b>Collapsible plastic crates</b>	Used to hold harvested products for storage and delivery	15-25	Stackable, collapsible crates are handy for storing produce and moving it around, use with plastic box liners
<b>Brooms and mop</b>	Used for cleaning, depends on subsurface	1-3	
<b>ShopVac</b>	Used for cleaning around greenhouse and in system.	1-2	Wet and Dry Vacuum suggested
<b>Extension Cords</b>	Heavy duty cords will be useful for temporarily plugging in sump pumps, shop vac or other power equipment.	1-3	Make sure to get a grounded extension cord that is rated for the load of the application you are using it.
<b>Timers</b>	Used for lights, vaporizer and pumps	1-5	Buy only grounded timers, in the right time intervals
<b>Hoses</b>	Various sized hoses will be needed to run from water source to tanks, for draining and other farm tasks	1-5	Buy the best hoses you can find in 1" diameter that won't kink when rolling.
<b>Sump pump</b>	Used to drain or move water. Sump pumps are not intended to be used on a continuous basis or they die.	1-2	Make sure the sump pump you purchase is rated for aquatic applications and doesn't use oil lubricants.
<b>Vaporizer</b>	Sulfur burner to hang in middle of greenhouse	1	Use at night/dark to reduce/prevent mildew and mold
<b>Tyvek Coveralls</b>	Personal Protection Equipment Pest Management	1 pp	Replace if they get ripped
<b>Respirator</b>	Personal Protection Equipment Pest Management	1 pp	Replace cartridges per manufactures recommendations
<b>Goggles</b>	Personal Protection Equipment Pest Management	1 pp	Replace when they get broken or unusable
<b>Long length rubber gloves</b>	Personal Protection Equipment Pest Management	1 pp	Used only for mixing and spraying pest regiments
<b>Greenhouse gloves</b>	Used for various tasks around the greenhouse	1-2 pp	Different gloves should be used for different purposes, clean, pest management, mixing nutrients and adjusters
<b>Sprayer</b>	Backpack or cart sprayer (2 - 4 gallons)	1	Determine if you want to carry a heavy sprayer or roll through greenhouse
<b>Hand sprayer</b>	small hand pump sprayer	1	Spot treatment between total crop spraying