

WAI GARDENS · MILILANI, O'AHU

The O'ahu Household Food Resilience Guide

What we actually import, what the state asks you to keep on hand, and what a family can grow here year-round, starting with a jar on a windowsill.

FREE · PLEASE COPY IT AND PASS IT ON



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Written by Wai Gardens, LLC · Mililani, Hawai'i

Every figure in this guide is sourced and listed on page 19.

HYDROPONICS
AQUAPONICS
WAIGARDEN.COM

WHY WE MADE THIS

You do not have to buy anything from us to use this.

We build hydroponic and aquaponic systems for a living. We would obviously like to build one for you. But most of what makes a household more resilient costs nothing, and it would be strange to write a guide about food security and hide the free parts behind a phone call.

So this guide has three kinds of pages in it. There are **the facts**: where our food comes from, how long the shelves hold out, what the state actually recommends you keep at home. There is **the growing**: what does well on this island, in which part of it, and why. And there are **the builds**, including one on page 9 that costs about twenty dollars, needs no pump, no electricity and no help from us, and was invented at the University of Hawai'i.

If you get to the end and decide to grow a jar of lettuce on your kitchen windowsill and nothing more, this guide has done its job.

How to use it

If you have ten minutes. Read pages 3 and 4, then tear out the checklist on page 18 and put it on the fridge. That alone puts you ahead of most households on this island.

If you want to start growing this week. Go to page 8, find your part of the island, then build the jar on pages 9 and 10. First harvest in about seven weeks.

If something is already going wrong. Page 14 covers the five things that kill a home system, and what each one looks like before it kills it.

If a storm is coming. Page 17. Written for people with a growing system, which is not something the standard checklists cover.

A word about tone

Nothing in here is intended to frighten anybody. Every number is sourced and every source is listed, precisely so you can check us rather than take our word for it. Islands import food; that is simply what islands do. Knowing the shape of it is not pessimism, and growing some of your own is one of the more cheerful things a household can do about almost anything.

WHERE OUR FOOD COMES FROM

O‘ahu grows very little of what O‘ahu eats.

Hawai‘i has some of the best year-round growing conditions in the United States and one of the most import-dependent food supplies in the developed world. Both of those things are true at the same time, and the second one is a fairly recent choice.

80–90%

of the food eaten in Hawai‘i arrives through Honolulu Harbor

11.6%

of food available statewide came from local production

5–7 days

of food on the shelves at any moment, residents and visitors together

19+ days

to restore the Port of Honolulu after a serious shutdown

HAWAII SEA GRANT CITING HI-EMA · AGRICULTURAL AND FOOD ECONOMICS (2010 BENCHMARK DATA)

It is a conveyor belt, not a stockpile

Roughly 400 containers land at Honolulu Harbor every day, and roughly 3,000 tons of food has to come off them, because that is what it takes to keep the shelves looking normal. The "five to seven days" is simply what happens to be sitting in stores and warehouses at any given moment while the belt keeps running. Average transit from the West Coast is four days. Neighbor islands can wait up to another fourteen.

There is no second harbor in the islands able to take this volume.

By category, it varies a lot, and that matters

CATEGORY	GROWN HERE	WHAT THAT MEANS FOR A HOUSEHOLD
Seafood protein	58.7%	The one category we largely feed ourselves in
Fresh fruit	38%	Better than most people assume. A tree does a lot of work.
Fresh vegetables	30%	This is the one you can move. Seven of every ten are shipped.
Fresh milk	12.4%	Not a household-scale problem
Meat and poultry	9.3%	Almost entirely imported
Rice	0%	No commercial production at all. Keep it in the pantry.

Fresh vegetables are the category a family can genuinely change, because the things that grow best here happen to be the things that travel worst.

THE OFFICIAL STANDARD

Hawai‘i asks for fourteen days. Most of the mainland is told three.

This is not our recommendation. It is the state's. The Hawai‘i Emergency Management Agency asks every household to keep at least **fourteen days** of supplies, and at least **one gallon of water per person per day for fourteen days**. The reason for the longer number is the harbor.

For a family of four, fourteen days means

56 gallons of water. Roughly eleven cases of bottled water, or seven five-gallon jugs.

SOURCE: HAWAI‘I EMERGENCY MANAGEMENT AGENCY, DISASTER SUPPLY KIT GUIDANCE

Hawai‘i Foodbank makes the sensible point that fourteen days is a goal, not a pass-fail test. Given what groceries cost here, any extra you can put aside is a real step forward. Build toward it a few items at a time with the regular shop rather than trying to do it in one expensive afternoon.

A starting pantry list

Shelf-stable, needs little or no cooking, and (importantly) food your family will actually eat. A two-week supply of things nobody likes is not a two-week supply.

STAPLES	FOR FOUR	NOT FOOD, STILL ESSENTIAL	NOTE
Rice	10–15 lb	Water, 1 gal/person/day	14 days
Canned protein (fish, chicken, spam)	28+ cans	Prescription medicines	14 days
Canned or dried beans	14+ cans	Manual can opener	the classic miss
Canned vegetables and fruit	28+ cans	Battery radio + batteries	HI-EMA
Peanut butter	2 jars	Flashlights, first aid	both
Crackers, saimin, pasta	assorted	Baby, elder and pet supplies	as needed
Shelf-stable milk	as used	Cash in small bills	cards fail
Coffee, tea, salt, sugar, oil	as used	Camp stove and fuel	outdoors only

Rotate it, don't entomb it

A kit you never open expires. Keep the emergency food in the normal pantry, eat from the front and restock at the back, and the whole thing stays current without a single wasted can. The fourteen-day supply that works is the one you are already eating.

BEING STRAIGHT WITH YOU

What growing adds, and the part it will never solve.

The pantry on page 4 handles calories. Growing handles something different, and it is worth being precise about which is which, because a guide that blurs them is not being honest with you.

What a home system genuinely does

- Replaces most of the leafy greens and herbs you buy
- Takes those items out of the shipping and recall equation entirely
- Produces year-round here, with no dormant season to plan around
- Uses far less water than growing the same crop in soil
- Grows without pesticide sprays, in a root zone you control
- Keeps producing on the week the shelves are stripped
- Gives children something to look after, which is not nothing

What it does not do

- Replace rice, flour, oil or the pantry staples
- Replace protein. Aquaponics helps, but only partly
- Run without electricity, unless it's the passive build on page 9
- Look after itself. A system is livestock, not furniture.
- Pay for itself purely as a saving on lettuce
- Survive full Ewa afternoon sun without shade cloth

The honest arithmetic

A modest system of thirty to forty plant sites keeps a household of four in salad greens, herbs and green onion more or less permanently. That is not food independence and we will not call it that. It is a meaningful share of the fresh produce you currently buy, harvested the minute you want it, from a plant whose entire history you witnessed.

The resilience argument is simpler than people expect. In every disruption this island has seen, the fresh aisle empties first and comes back last. It is the most perishable, the most shipping-dependent and the most panic-bought category in the store. It is also, conveniently, the easiest thing in the world to grow here.

Why greens and not potatoes

Calorie crops (taro, sweet potato, breadfruit, ulu) are the real food-security backbone of these islands, and if you have the land for them, plant them. They are just not what a lanai or a driveway does well. Leafy greens and herbs give you the highest return per square foot, the fastest turnaround, and they happen to be the category with the worst import numbers. That is why this guide points there first.

PART TWO · WHAT GROWS HERE

There is no growing season. There is just growing.

Every gardening book you can buy is written for somewhere with a winter. Ignore the planting calendars on the back of mainland seed packets; they are describing a problem we do not have. On lowland O'ahu the limiting factor is not cold, it is **heat, rain and light**, and those are all things you can manage.

CROP	TO FIRST HARVEST	WHY IT WORKS HERE
'UH Mānoa' lettuce	50–60 days	The one to start with. Bred by UH CTAHR for exactly these conditions: heat tolerant, slow to bolt, resistant to tip-burn, and it grows year-round even at low elevation. CTAHR's one caution is to protect it from heavy rain, which is precisely what a covered system does.
'Anuenue' lettuce	50–60 days	The other CTAHR release for warm regions. Forms a bigger head when conditions allow.
Green onion	~30 days, then cut-and-come-again	Effectively continuous once established: cut what you need and it regrows. One of the most-bought and most-wasted items in an island kitchen.
Basil	25–35 days	Thrives in the heat that makes lettuce sulk. Pinch the tops to keep it bushy and stop it flowering.
Mint, cilantro, parsley	30–40 days	Highest value per square foot of anything you can grow, and the fastest to wilt in transit, which is exactly why store herbs cost what they cost.
Pak choi, mizuna, mustard cabbage	30–45 days	Fast, heat-tolerant Asian greens suited to the local climate and the local plate. Often easier than lettuce for a first-timer.
Kale	45–60 days	Forgiving and productive. Harvest outer leaves and leave the crown, and one plant can run for months.
Okinawan spinach	45–60 days	Thrives in lowland heat where temperate spinach simply will not. Perennial, takes cuttings readily, and one plant becomes many for free.
Cherry tomato, pepper, eggplant	70–90 days	Slower, needs more light and physical support, and wants a bigger reservoir. Productive for months once it starts. Do these second, not first.

VARIETY GUIDANCE: UH CTAHR, *LETTUCE FOR THE HOME GARDEN*. DAYS TO HARVEST VARY WITH SEASON, LIGHT, ELEVATION AND SYSTEM TYPE, SO TREAT THEM AS A GUIDE, NOT A PROMISE.

PICKING WELL

Start with three. Add more when the first three are boring.

The commonest way a home grower fails is enthusiasm: twelve varieties in week one, all of them needing something slightly different, and by week five the whole thing is a science project nobody is enjoying. Three crops. Get bored. Then expand.

If you want it easy

Green onion · basil · pak choi

Fast, tough, forgiving of a missed week. All three will tolerate more heat and more neglect than lettuce will, and you'll be harvesting something inside a month.

If you want salad

'UH Mānoa' lettuce · mizuna · cilantro

The classic combination and the one that most visibly replaces a grocery habit. Needs a little more attention to heat and shade than the easy set.

If you want to feed people

Kale · Okinawan spinach · cherry tomato

Bigger plants, bigger reservoir, more support and more patience, but far more volume per square foot once they're running.

Stagger, don't batch

Plant every site on the same day and you will harvest every site on the same day, then eat nothing for seven weeks. Instead, start a few new seedlings **every week or two**. Once the rhythm establishes itself you'll have something ready more or less continuously, which is the entire point.

A simple rotation for a twelve-site system: four sites of lettuce, four of mixed fast greens, four of herbs. Each time you harvest one, a seedling that's already three weeks old goes straight into the empty spot. Keep a small nursery tray going alongside the main system.

Seed, not seedlings

Seed keeps for years in a sealed container in the fridge, costs a fraction of transplants, and, relevant to the subject of this guide, a packet on your shelf is not dependent on anybody's shipping schedule. Buy heat-tolerant varieties selected for Hawai'i rather than whatever the mainland catalogue is pushing. Save seed from anything that does especially well for you; over a few generations you are effectively selecting for your own yard.

One thing worth knowing about lettuce

Lettuce prefers it below about 75°F. Above that it starts thinking about flowering, or **bolting**, and once it bolts the leaves turn bitter and the plant is finished. This is why 'UH Mānoa' matters so much here: it was bred to resist exactly that. If your lettuce keeps bolting early, the answer is almost always more shade in the afternoon, not more water or more fertiliser.

KNOW YOUR PATCH

O‘ahu is not one climate. It is about six.

A system that thrives in Mililani Mauka can struggle in Ewa Beach, and the reason is never the system. It is sun, wind, rain and salt. Find yourself below before you buy anything.

Central: Mililani, Mililani Mauka, Wahiawā

Higher and cooler, more cloud, steady trades. The easiest growing on the island and the most forgiving of lettuce. Wind can be persistent on exposed lots.

Lettuce and greens do well with little or no shade. Watch for wind damage on tall plants.

Leeward: Kapolei, Ewa, Makakilo, Wai‘anae

Hot, dry, intense sun, long days of it. Evaporation is high and afternoon leaf temperature is the enemy.

Plan on 30–50% shade cloth from mid-morning. Prioritise basil, peppers and Okinawan spinach over delicate lettuce.

Windward: Kāne‘ohe, Kailua, Waimānalo, Kahalu‘u

Wetter, softer light, frequent showers. Growth is fast but so is fungal pressure, and heavy rain bruises soft leaves and dilutes open reservoirs.

Cover your system. A simple clear roof solves most of the problems this side has.

Town: Honolulu, Kaimukī, Mānoa, Makiki

Warm, often still, and frequently short on direct light because of buildings and trees. Mānoa and Nu‘uanu are wetter and cooler than the rest.

Light is usually the constraint, not heat. Find the sunniest four to six hours you have and build there.

North Shore: Hale‘iwa, Waialua, Pūpūkea, Kahuku

Strong sun, strong wind, and salt spray near the coast. Salt on leaves and in reservoirs is an underrated problem here.

Shelter from wind matters more than shade. If you're on catchment, test your source water before you mix nutrients.

Pearl Harbor / ‘Aiea corridor

A middle case: warm, moderate rain, moderate wind. Most things work with modest adjustment.

Start without shade cloth and add it if you see afternoon wilting or early bolting.

The five-minute test that saves you a season

Pick the spot you're considering. Look at it at **9am, noon and 3pm** on a clear day and write down whether it's in sun or shade. That's it. Four to six hours of direct light is plenty for greens; all-day unbroken sun usually needs shade cloth; under three hours and you should find a different spot rather than fight it. While you're there, check there's a hose bib and an outlet within reach. Retrofitting those is the expensive part.

PART THREE · BUILD IT · LEVEL ONE

The twenty-dollar jar that needs no pump, no power and no us.

Here is a thing most people on this island don't know. The simplest hydroponic method in the world, with no pump, no air stone, no electricity and nothing moving at all, was developed right here, by **Dr. Bernard Kratky at the University of Hawai'i's College of Tropical Agriculture and Human Resources**. It is used by growers worldwide and it is called the Kratky method. It came from here.

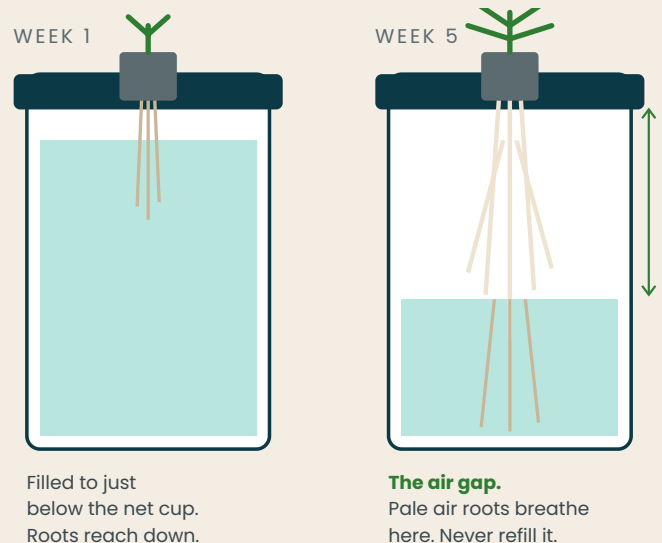
It is also, by some distance, the best possible way to find out whether you enjoy growing food before spending real money on it.

Why it works without a pump

Every hydroponic system has the same job: get the roots both **nutrients** and **oxygen**. Most solve it by moving water around with a pump. Kratky's insight was that you don't have to move anything. You just let the water level fall.

You fill the container once, at the start. As the plant drinks, the level drops and a **widening gap of humid air** opens between the lid and the water. The lower roots stay submerged and keep feeding. The upper roots, left in that gap, thicken into pale "air roots" that take oxygen straight from the air. The plant builds its own two-zone root system, and it does it for free.

The one rule: once that air gap has formed, never top the container back up to the lid. Drowning the air roots suffocates them and the plant rots from the root up within days. Let it fall. That is the whole trick.



What it's good at, and what it isn't

Excellent for lettuce, basil, cilantro, kale and other fast, short-cycle greens. Workable for a cherry tomato in a five-gallon bucket. Poor for root vegetables and big vine crops. Each container runs one cycle then gets emptied and restarted, so it doesn't produce continuously the way a circulating system does, which is exactly why people who like it eventually build something bigger.

A note on the University of Hawai'i

We cite UH CTAHR research throughout this guide because it is the best work available on growing in these conditions, and because we think local growers should know it exists. **Wai Gardens is not affiliated with, endorsed by, or sponsored by the University of Hawai'i or CTAHR.** We are simply a local business that reads their publications and recommends them. Their materials are free to the public at ctahr.hawaii.edu.

LEVEL ONE · THE BUILD

Build it this afternoon. Eat from it in about seven weeks.

What you need

ITEM	NOTES
A wide-mouth jar or tub, roughly ½ gallon	opaque
2-inch net cup	or a cut yoghurt pot
Growing medium: rockwool cube or clay pebbles	either
General hydroponic nutrient, A + B	one bottle set
pH test drops or strips	cheap
Seed: start with 'UH Mānoa' lettuce	one packet

Roughly \$20–45 all in for your first jar, depending on what you already have. The nutrients and seed will do many more after that, so jar two costs almost nothing.

Why opaque matters

Light on nutrient solution grows algae, algae competes with your plant for oxygen and nutrients, and the water turns green and smells. If your container is clear glass, wrap it in foil, tape or a sock. This is the single most common beginner mistake and it is completely avoidable.

The build

- Sprout the seed**
Soak a rockwool cube, push one or two seeds a few millimetres in, keep it damp and out of direct sun. You'll see green in three to seven days.
- Cut the lid**
Make a hole so the net cup sits in it with its rim resting on top, the cup hanging below.
- Mix the solution**
Follow the bottle for a leafy-green strength. Mix into water, always adding nutrient to water and never the reverse, then check pH and bring it into the **5.5–6.5** band.
- Fill to the right level**
Fill so the solution just touches the bottom of the net cup. Touching, not swamping. This is the level that gets the young roots started.
- Set the seedling in**
Cube into the net cup, pack clay pebbles around it to hold it upright and block light.
- Put it in the light, then walk away**
Four to six hours of direct sun. Now do nothing. No topping up, no stirring. Watch the water fall and the air roots appear.
- Harvest at 50–60 days**
Take the whole head, or pick outer leaves and let the middle keep going. Tip out, rinse, restart.

Two safety notes, both important on this island

Mosquitoes. Any standing water outdoors can breed them, and in Hawai'i that is a public health matter, not a nuisance. A Kratky container must be **properly closed**: a fitted lid with no gap around the net cup, or fine mesh over any opening. Check it weekly. If you ever see larvae wriggling, empty it out and start again with a better seal.

Nutrients are not food. Store the bottles closed, labelled and out of reach of children and pets, the same as any garden product. Keep them out of direct sun. And never mix A and B concentrates together undiluted. They need to go into water separately, or they'll lock up into a useless sludge.

LEVEL TWO

The five-gallon bucket: same idea, real dinner.

When the jar has worked and you want more than a side salad, the next step is the same method in a bigger vessel. A five-gallon bucket holds enough solution to carry a cherry tomato or a pepper through a full cycle, and enough thermal mass to ride out a hot week without cooking the roots.

What changes

- **Volume.** Roughly four gallons of solution, leaving headroom for the air gap.
- **Support.** A tomato needs a stake or cage from the start; retrofitting one into an established root mass is a bad afternoon.
- **Cycle length.** 70–90 days rather than 50–60, so the solution has to last longer.
- **One top-up, done properly.** Fruiting crops generally need a mid-cycle addition. Add it **slowly, from the side**, and stop well below the air roots. Never flood back to the lid.
- **Heat.** A dark bucket in the Ewa sun will cook the root zone. Use a light-coloured bucket, or shade the container while leaving the leaves in the light.

Root-zone temperature is the quiet killer

Warm water holds less dissolved oxygen than cool water. Get the solution up past the mid-70s°F and the roots start suffocating even though nothing about the setup has changed, which is why a system can fail in August that was perfectly happy in March. Shading the *container* rather than the plant is the cheapest fix there is.

Good bucket crops

CROP	CYCLE
Cherry tomato	70–90 days
Pepper / chilli	70–90 days
Eggplant	75–90 days
Kale (one big plant)	45–60 days
Basil (as a bush)	30+ days
Okinawan spinach	perennial

Scaling without a pump

Six buckets in a row on a sunny wall will genuinely change what you buy each week, and none of them need power. Stagger the start dates by a week or two so they don't all finish together, and keep a nursery tray of seedlings so an empty bucket never sits empty for long.

This is the point where most people discover the limitation: refilling, emptying and restarting a dozen containers by hand every cycle is a chore. That is what a circulating system exists to solve.

Level three, in one paragraph

A circulating system (NFT channels, deep water culture, or a media bed with fish) shares one reservoir across every plant site. That means you dose, test and correct in one place instead of twelve, the solution stays properly oxygenated by the pump, and sites get replanted individually so production is continuous rather than in waves. It needs power, it needs designing around your actual site, and it needs someone to look after it. That is our job, and it's on page 20. But please build the jar first. Everything you learn from it transfers.

PART FOUR · KEEPING IT ALIVE

pH and EC, in plain language.

Two numbers do most of the work in hydroponics, and neither is complicated once someone explains what they're actually for. You can grow a good jar of lettuce without ever measuring either. But the moment something goes wrong, these are what tell you why.

pH: can the plant reach the food?

pH measures how acidic or alkaline the solution is. It doesn't describe how much fertiliser is in there; it decides which parts of it the roots can actually absorb. Drift too far either way and nutrients that are physically present become chemically unavailable, and the plant starves in a full tank.

Target: 5.5 to 6.5. Anywhere in that band is fine. Chasing a decimal point is a waste of an evening.

Yellowing between the leaf veins while everything else looks healthy is the classic sign of pH drift, not of underfeeding. Adding more nutrient at that point makes it worse.

EC: how much food is in the water?

EC is electrical conductivity, and it stands in for concentration: more dissolved salts, more conductivity. It tells you strength, not balance.

Leafy greens and herbs want it on the **low side**. Fruiting crops want more. Follow your nutrient bottle's leafy-green figure. Every brand is mixed differently and the bottle knows its own product better than any general rule.

In a Kratky jar EC naturally *rises* through the cycle as the plant drinks water faster than it consumes nutrients. That's expected. It's also why you start at leafy-green strength rather than full strength.

Your source water is not neutral

Where your water comes from changes what happens next, and this is the part most guides skip.

Municipal supply arrives treated and usually carries some alkalinity: dissolved carbonates that resist pH change and push your solution upward over the cycle. **Catchment** is soft and swings the other way, and its chemistry depends on your roof. Either is perfectly workable. You just need to know which one you're arguing with.

Test your source water on day one, before you mix anything into it. Write the number on a piece of tape and stick it to the nutrient bottle. That single measurement explains most of the pH behaviour you'll see for the next year.

The three-minute weekly check

Look: is the solution clear, not green or cloudy? **Smell:** clean and earthy, not sour or sulphurous? **Touch:** are the roots firm and pale, not brown and slimy? **Check:** no mosquito larvae, no gap in the lid? Four questions, three minutes, and you'll catch nearly everything on the next page before it becomes terminal.

TROUBLESHOOTING

The five things that kill a home system.

Almost every failure we get called out to is one of these five. All of them announce themselves days before they become fatal, if you know what you're looking at.

1 · Root rot from topping up

WHAT YOU SEE

Roots go from firm and white to brown, slimy and stringy. A sour or sulphurous smell off the reservoir. The plant wilts in the middle of the day even though the tank is full.

WHAT'S HAPPENING

The air roots were drowned. In a passive system the falling water level *is* the oxygen supply, so refilling to the lid suffocates the exact roots that were doing the breathing. Anaerobic bacteria take it from there.

THE FIX

Prevention is the only real cure: let the level fall. If it's early, tip out, rinse the roots gently, trim the slimy material, refill to *below* the air roots and give it more light and airflow. If most of the root mass is brown, start again; you'll lose less time than nursing it.

2 · Algae

WHAT YOU SEE

Green film on the solution, on the medium, or up the inside of the container. Water turns cloudy and eventually smells.

WHAT'S HAPPENING

Light is reaching the nutrient solution. Algae is a plant too. Given light and fertiliser it does exactly what yours is doing, while competing for oxygen and nutrients and fouling the roots.

THE FIX

Block the light. Opaque container, opaque lid, clay pebbles packed around the net cup so nothing gets in past the collar. Clean the container properly between cycles rather than just rinsing it. In our climate this is the single most common problem and it is entirely a construction issue, not a growing one.

3 · Heat and bolting

WHAT YOU SEE

Lettuce stretches upward, the centre elongates, leaves turn bitter, and it runs to flower well before it should. Or leaf tips brown and crisp, which is tip-burn.

WHAT'S HAPPENING

Lettuce prefers it below about 75°F. Above that it switches from making leaves to making seed. Meanwhile warm solution holds less dissolved oxygen, so the root zone is struggling at the same moment the leaves are.

THE FIX

Afternoon shade: 30–50% cloth from mid-morning in Leeward and North Shore areas. Shade the container as well as the plant. Grow heat-bred varieties: 'UH Mānoa' and 'Anuenue' exist precisely for this. And in the hottest stretch, lean on basil, pak choi and Okinawan spinach instead of fighting the lettuce.

TROUBLESHOOTING

...and the two that catch experienced growers.

4 · pH drift

WHAT YOU SEE

Growth simply stops. Leaves yellow between the veins while the veins stay green, or new growth comes in pale and small. Nothing looks diseased. It looks like the plant lost interest.

WHAT'S HAPPENING

The solution has drifted out of the 5.5–6.5 band, usually upward if you're on municipal water with carbonate alkalinity. The nutrients are all still in the tank; the roots just can't take them up any more. This is why the instinctive response, adding more nutrient, makes it worse rather than better.

THE FIX

Test, then adjust back into the band with pH down or up, a little at a time, mixing between additions. Retest the next day; a solution can drift straight back and tell you something about your source water. If you never want to think about it again, that's one of the things a properly sized reservoir buys you: bigger volumes drift far more slowly.

5 · Pests, and the ones that matter here

WHAT YOU SEE

Aphids clustered on new growth. Whitefly rising in a cloud when you brush the plant. Chewed leaf edges and black specks: caterpillars, usually at night. Slugs and snails after rain.

WHAT'S HAPPENING

Year-round growing means year-round pests; we don't get a winter that resets the population. The good news is that a raised, contained, soil-free system removes a great deal of the pressure before it starts.

THE FIX

Look under the leaves twice a week. Nearly everything is easy while it's twenty insects and miserable once it's two thousand. Blast aphids off with water. Pick caterpillars by hand in the evening. Keep the area clear of leaf litter. Avoid reaching for sprays: the whole point of growing it yourself is knowing what didn't go on it, and at household scale your hands and a hose genuinely are enough.

And the one that isn't a problem at all

Thick, pale, slightly fuzzy roots sitting in the air gap look alarming the first time and are exactly what should be happening. Those are the air roots doing their job. Firm and pale is health. Brown and slimy is the problem. If you remember one diagnostic from this guide, make it that one.

THE YEAR

What actually changes, month to month.

There's no planting season to obey here, but the year isn't flat either. Roughly: a cooler, wetter stretch from about November to April, and a hotter, drier, brighter one from about May to October. Hurricane season in the Central Pacific runs **1 June to 30 November**. Plan around those, not around a mainland frost date.

Jan	Best lettuce of the year. Plant generously; heads get bigger and bolt later now.	Jul	Hot and bright. Root-zone temperature is the thing to watch; shade the container.
Feb	Still cool and kind. Good month to start a second container or try a new crop.	Aug	Usually the hardest month. Expect early bolting; keep cycles short and expectations modest.
Mar	Light lengthening, growth speeding up. Watch reservoirs dropping faster than you expect.	Sep	Still hot, peak storm season. Keep the system light enough to move or tie down.
Apr	Transition. Get shade cloth ready now rather than in the middle of a hot spell.	Oct	Easing. Lettuce becomes rewarding again. Restart anything you let lapse in August.
May	Heat arriving. Shift the balance toward basil, pak choi, Okinawan spinach.	Nov	Season closes end of the month. Cooler and wetter, so cover systems against heavy rain.
Jun	Hurricane season opens. Read page 17 before you need it. Shade cloth on in Leeward.	Dec	Cool, shorter days, slower but very reliable growth. Good time to build the next one.

The pattern underneath all of that

In the cool half of the year you are managing **rain**: dilution, bruised leaves, fungal pressure. A cover solves nearly all of it. In the warm half you are managing **heat**: bolting, tip-burn, low dissolved oxygen. Shade plus crop choice solves nearly all of that. Two problems, two answers, twelve months of harvest.

PART FIVE · WHEN IT COUNTS

The thing a garden does that a pantry can't.

A fourteen-day supply is a countdown. It starts full and it only goes one direction. A growing system is the opposite: it is the one thing in your house that is still producing food on day fifteen.

Day 1

Shelves strip in hours. Fresh produce goes first, every time.

Day 3

Pantry is doing its job. Nothing fresh anywhere on the island.

Day 10

Supply may be moving again, or the harbor may not be.

Day 15

The pantry is finished. The greens on the lanai are not.

Which is why it's greens

It would be easy to write this guide about calories and be wrong. Your pantry covers calories perfectly well, and far more cheaply than any garden. What a pantry cannot do is produce a fresh vitamin-bearing leaf on the fourteenth day, and what the store cannot do is restock one when the harbor is shut.

That overlap, between the thing that's most fragile in the supply chain and the thing that's easiest to grow here, is the entire argument of this guide. It's a small argument. It is also completely true, and it costs about twenty dollars to act on.

Keep seed in the house

A sealed jar of seed in the back of the fridge is the cheapest resilience you will ever buy: a few dollars, years of shelf life, and entirely independent of anybody's shipping schedule. Most households on this island have a flashlight and a case of water and no seed at all. Put a packet of 'UH Mānoa' next to the batteries.

None of this means the boats are going to stop. It means a head of lettuce growing in your yard doesn't care whether they do.

STORM SEASON · 1 JUNE TO 30 NOVEMBER

When a storm is coming and you have a growing system.

The standard hurricane checklists are excellent and you should follow them first: people, water, medicine, documents, pets. This page covers the part they don't: what to do with the thing you've been growing. Work through it when a watch is issued, not when a warning is.

72 to 48 hours out

- ☐ **Harvest everything usable**
Anything close to ready, take it now. Greens keep a week in the fridge and nothing keeps in a flattened system.
- ☐ **Move what can be moved**
Jars and buckets come inside, into a garage, or against a sheltered wall. Low and indoors beats tied down outdoors.
- ☐ **Take down the shade cloth**
Cloth and clear panels become sails. Remove them rather than trusting the fixings.
- ☐ **Clear the loose items**
Empty pots, tools, net cups, trays. Anything that can travel in 90 mph wind is a projectile aimed at a window.

24 hours out

- ☐ **Fill containers with water**
Clean, empty growing containers are water storage. Label them plainly so nobody drinks nutrient solution by mistake.
- ☐ **Secure or drain the big reservoirs**
A full tank that tips is a hazard. Lash it down properly or drain it.
- ☐ **Photograph the setup**
Two minutes now, and you have a record for insurance and a reference for rebuilding.

During and after the power cut

- ☐ **Pumps off is survivable, briefly**
Plants tolerate a stopped pump for a day or two. What kills them is warm, still, deoxygenated water sitting around the roots for longer.
- ☐ **If it'll be days, drop the level**
Lower the solution so part of the root mass is in air. You are deliberately creating the Kratky air gap, and it will carry the plants through.
- ☐ **Move it into the shade**
No pump plus full sun is the worst combination there is. Shade buys you days.

Once it's passed

- ☐ **Assume the water is suspect**
Flooding contaminates. If floodwater reached a system, discard the crop, don't eat it, and clean everything thoroughly before restarting.
- ☐ **Check for standing water**
Post-storm containers breed mosquitoes fast. Empty or seal anything holding water.
- ☐ **Restart small and quickly**
Get seed into medium in the first few days. Greens in 30–45 days is a very good thing to have coming while the supply chain sorts itself out.
- ☐ **Share the surplus**
If yours came through and your neighbour's didn't, that's what the surplus is for. This part matters more than any of the rest of it.

CENTRAL PACIFIC HURRICANE SEASON RUNS 1 JUNE TO 30 NOVEMBER. FOR HOUSEHOLD EMERGENCY GUIDANCE GENERALLY, FOLLOW FEMA. THIS PAGE ONLY COVERS THE GROWING SYSTEM.

TEAR THIS PAGE OUT · PUT IT ON THE FRIDGE

The O'ahu household checklist.

The fourteen-day basics

- ☐ Water: 1 gallon per person per day, 14 days
A family of four: 56 gallons
- ☐ 14 days of food everyone will actually eat
- ☐ 14 days of prescription medicines
- ☐ Manual can opener
- ☐ Battery radio, flashlights, spare batteries
- ☐ First aid kit
- ☐ Cash in small bills
- ☐ Baby, elder and pet supplies
- ☐ Documents in a waterproof bag
- ☐ Rotate the pantry: eat from the front, restock the back

The one most people skip

- ☐ A sealed packet of seed in the fridge
Years of shelf life. A few dollars. Put it next to the batteries.

Growing: the weekly three minutes

- ☐ Solution clear, not green or cloudy
- ☐ Smells clean and earthy, not sour
- ☐ Roots firm and pale, not brown or slimy
- ☐ No mosquito larvae, lid properly sealed
- ☐ Checked under the leaves for pests
- ☐ Started a new seedling or two

The rules that prevent most failures

- ☐ Never refill a passive container once the air gap forms
- ☐ Keep light off the solution: opaque everything
- ☐ pH between 5.5 and 6.5
- ☐ Shade the container, not just the plant, in summer
- ☐ Stagger plantings: don't start everything at once
- ☐ Store nutrients closed, labelled, away from children

When a storm watch is issued

- ☐ Harvest everything usable
- ☐ Shade cloth down, loose items away
- ☐ Containers moved inside or lashed down
- ☐ Clean empty containers filled with water

My planting log

DATE STARTED	WHAT / WHERE	EXPECTED HARVEST	HOW IT ACTUALLY WENT

CHECK US

Every figure in this guide, and where it came from.

A guide that asks you to think about food security ought to be checkable. If any of this has gone out of date, tell us and we'll correct it in the next edition.

Imports, inventory and the harbor · pages 3 and 16

Hawai'i Sea Grant, *How Food Secure Are We if Natural Disaster Strikes?*, citing Hawai'i Emergency Management Agency analysis. Source of the 80–90% import share, the 5–7 days of inventory, ~3,000 tons and ~400 containers per day, 1.1 million tons a year, the four-day West Coast transit, the extra neighbor-island time, and the 19-plus-day port recovery estimate. SEAGRANT.SOEST.HAWAII.EDU

Self-sufficiency by category · page 3

"Hawai'i's food consumption and supply sources: benchmark estimates and measurement issues," *Agricultural and Food Economics*. Source of the 11.6% localization ratio and every category figure. **These are 2010 data**, the most recent comprehensive peer-reviewed benchmark we could find, and we've labelled them as such rather than presenting them as current.

LINK.SPRINGER.COM/ARTICLE/10.1186/2193-7532-1-10

The fourteen-day standard · pages 4 and 18

Hawai'i Emergency Management Agency, disaster supply kit guidance: at least fourteen days of supplies, and one gallon of water per person per day for at least fourteen days. Hawai'i Foodbank's disaster preparedness guidance makes the point about building toward it gradually.

DOD.HAWAII.GOV/HIEMA · HAWAIIFOODBANK.ORG

Varieties and growing · pages 6, 7 and 13

University of Hawai'i CTAHR, *Lettuce for the Home Garden*. Source of the 'UH Mānoa' and 'Anuenue' guidance, the 50–60 day figure, the heat tolerance and tip-burn resistance, the note about protecting from heavy rain, and the sub-75°F preference.

CTAHR.HAWAII.EDU

The Kratky method · pages 9, 10 and 11

Non-circulating hydroponic methods developed by Dr. Bernard A. Kratky at the University of Hawai'i's College of Tropical Agriculture and Human Resources, published from the early 2000s onward. Days-to-harvest and cost ranges are typical figures and will vary with your conditions.

No affiliation with the University of Hawai'i. Wai Gardens, LLC is not affiliated with, endorsed by, sponsored by or acting on behalf of the University of Hawai'i, CTAHR or their staff. Their research is cited here because it is publicly published and it is the best guidance available for growing in Hawai'i. Variety names such as 'UH Mānoa' and 'Anuenue', and the Kratky method, are referred to descriptively. Any errors in how we have summarised that work are ours, not theirs.

Hurricane season · pages 15 and 17

Central Pacific hurricane season runs 1 June to 30 November. For household emergency planning beyond the growing system, follow HI-EMA and your county; they do it better than we could.

What we're less certain about

The days-to-harvest figures, the regional notes on page 8 and the month-by-month page come from working experience on this island rather than published research. They're honest and useful, but they're guidance, not measurement. Your yard will have opinions of its own, so treat the first cycle as an experiment and write down what happened.

IF YOU WANT HELP

We build these for a living. But build the jar first.

Wai Gardens designs, installs and maintains hydroponic and aquaponic systems across O'ahu: homes, restaurants, and schools. If you get to the point where hand-filling a dozen buckets has become the limiting factor, that's the conversation to have with us.

Free space evaluation

Tell us where you'd put a system and we'll come look at it. You'll get a straight answer about whether your spot will actually work, what it would grow, and what it would cost. No obligation, and if the answer is "build another bucket instead", we'll tell you that.

We also work with schools, including help finding the grant money to pay for it.

Get in touch

(808) 726-9493

Tyler@WaiGarden.com

waigarden.com

Mililani, Hawai'i

This guide is free. Print it, copy it, email it, leave it in the break room. The more households on this island growing something, the better off all of us are.

The O'ahu Household Food Resilience Guide · First edition, September 2026 · Wai Gardens, LLC, Mililani, Hawai'i · Sources listed on page 19.

Wai Gardens is not affiliated with, endorsed by or sponsored by the University of Hawai'i or CTAHR; their research is cited because it is publicly published and it is the best guidance available for growing here.

Nothing in this guide is medical, financial or emergency-management advice. For emergency planning, follow HI-EMA and your county.