SKILL GUIDE · WATER & FOOD

Building a Food Forest

The Water & Food chapter's Tier 3 Greenhouse / Season Extension item and The Act of Thriving's Physical Foundation chapter both point here for the actual design behind "permaculture" and "food forest." This guide is that design: the real 7-layer structure, how long it actually takes to become productive, and an honest look at which permaculture claims have real evidence behind them and which don't.

Assess the site before laying out a single layer

The seven layers below only work in a real arrangement if you actually know how sun, water, and wind move across your own site first, guessing at this is how a canopy tree ends up shading the exact bed that needed full sun. Spend real observation time before committing to a layout, ideally across at least one full season, not one afternoon:

- **Sun mapping**: note which parts of the site get full sun, partial shade, and deep shade at different times of day, and how that shifts through the seasons as the sun's angle changes. Sketch it on a simple base map of the property; light-demanding herbaceous and root crops go in the sunniest spots, shade-tolerant understory and groundcover plants go in what's left.
- **Water flow**: after a real rain, walk the site and note where water actually pools, where it runs off fast, and where it soaks in. Low, slow-draining spots are where a swale or a water-loving plant belongs; a spot that stays wet longest is also where root rot becomes a real risk for anything planted there.
- **Wind**: note the prevailing wind direction, since that determines where a windbreak row of hardy shrubs or trees actually helps versus where it just shades something that needed sun instead.

Put this together on one base map showing existing trees, structures, slopes, and utility lines before placing a single new plant. In the northern hemisphere, canopy trees generally belong on the north side of the design so their shadow falls away from the shorter layers rather than across them.

The real design: seven layers, not one

A food forest mimics a natural woodland's vertical structure instead of a single layer of row crops, stacking multiple productive layers into the same footprint.

Layer	What goes here
Canopy	Full-sized fruit and nut trees, spaced to let real light reach everything below
Understory	Smaller, shade-tolerant fruit trees
Shrub	Berry bushes and mid-sized fruiting plants
Herbaceous	Culinary and medicinal herbs, vegetables
Groundcover	Low, spreading edible or living-mulch plants
Vine / climber	Climbing fruit and vegetables trained up trunks and structures
Root / rhizosphere	Perennial root crops sharing soil space with everything above

The design logic is filling every niche a real forest edge would, not planting seven layers for their own sake; a small, well-planned food forest can skip a layer entirely if nothing genuinely useful fits it on that site.

An honest timeline and labor curve

This is the actual tradeoff for less land and less long-term labor: years of upfront patience and work before the system carries itself.

Phase	Timeframe	What's happening
Establishment	Years 0–3	Annuals and herbs already producing; shrubs and understory still filling in. Heaviest labor: 2–4 hours/week per 500 sq meters for weeding, watering, and pruning.
Adolescent	Years 4–7	Shrubs fruiting well, canopy trees beginning to bear. Labor drops to roughly 1–2 hours/week for the same area.
Mature	Year 8+	Full canopy, peak system productivity. Under an hour a week in most reports, with seasonal spikes for spring mulching and winter pruning.

Grafted fruit trees typically bear in 2–5 years depending on species; a full-sized canopy tree can take considerably longer to reach real productive maturity. Plan the annual and herb layers to carry real food production during those first several years, not the trees.

Real case studies, at their actual confidence levels

Two real, long-running examples are worth knowing, and they're not interchangeable.

Martin Crawford's forest garden (Devon, UK, established 1994)

One of the most cited forest gardens in the world, 2.1 acres, still running after three decades. Worth knowing honestly: even Crawford's own published material doesn't reduce the garden to a clean yield-per-acre figure, he specifically argues that comparing systems by yield alone misses what sustainability actually costs. Treat this as the best-documented example of the design holding up over decades, not a source for a specific output number.

Mark Shepard's New Forest Farm (Viola, Wisconsin, 15 years, 106 acres)

A converted row-crop grain farm turned into a commercial-scale perennial system, hazelnuts, chestnuts, walnuts, and apples, roughly 250,000 trees planted. This is the closer US-climate analog for what a mature food forest looks like at real scale, and the strongest evidence that the design works commercially, not just in a hobbyist backyard.

What the land-per-person numbers actually rest on

The oft-repeated "quarter acre per person" figure for permaculture, combining fruit trees, poultry, and aquaponics, traces back to homesteading guides rather than research; other sources put real full self-sufficiency closer to a half-acre to a full acre. The one figure with genuine research behind it, roughly 4,000 square feet per person, comes from John Jeavons' biointensive method, an intensive annual-crop spacing technique, not a food forest's perennial guild design. Treat any specific land-per-person number here as a loose planning range, not a benchmark with the same footing as a directly measured yield.

WARNING

'Dynamic accumulators' are permaculture folklore, not a documented mechanism

Permaculture literature widely claims certain plants (comfrey is the most common example) mine nutrients from deep soil layers and concentrate them near the surface for other plants to use. A search of the actual scientific literature turns up no studies supporting this specific mechanism, and the term isn't used by soil scientists at all. What real evidence does show: a plant like comfrey has most of its roots in the top foot of soil, not deep down, and it only shows elevated nutrient levels when it's already growing in nutrient-rich soil. Chop-and-drop mulching with any nitrogen-rich green material is a real, useful practice; the specific "dynamic accumulator" framing for why it works isn't backed by real evidence.

Swales: real, but genuinely conditional

Swales, shallow trenches on contour that slow and sink rainwater, are permaculture's standard water-harvesting earthwork, and they have real evidence behind them in the right conditions: one study found trees near mulched water-harvesting earthworks grew 33% larger than those without. They're also not universal. Standard swales are only recommended on slopes under about 15%, steeper terrain risks the trapped water lubricating soil layers and triggering a slide. And a site with an already-high water table shouldn't have one at all, for the same reason that site disqualifies a walipini: there's nowhere left for the water to go. Site conditions decide whether this technique helps or actively causes a problem, not general climate alone.

Northern Utah note: real, but under-documented here

Food forests are viable in the Wasatch Front's semi-arid climate, but they're genuinely less documented here than in the wetter regions most published case studies come from. Two real regional considerations: **caliche**, a cemented calcium-carbonate hardpan real in parts of the Southwest, blocks root penetration outright where it occurs and needs checking for before committing to tree placement; and **chill-hour matching** for the canopy layer, tart cherries are more reliable than sweet cherries at Wasatch Front elevation, and any fruit variety needs its chill-hour requirement checked against local winter patterns, not just its cold-hardiness zone. USU Extension's own fruit variety recommendations are the real, regional-specific starting point rather than a generic national planting guide.

Sources

- The 7-layer food forest design: Chelsea Green
- Martin Crawford's forest garden and his own framing on yield versus sustainability: Gardens Illustrated; Agroforestry Research Trust
- Mark Shepard and New Forest Farm: New Forest Farm; Wikipedia
- Fruit tree bearing timelines and food forest labor curve by phase: GrowPerma
- John Jeavons' biointensive land-per-person figure: Ecology Action
- Dynamic accumulators, lack of scientific support: Garden Myths; Temperate Climate Permaculture
- Swale effectiveness, slope limits, and high-water-table risk: Permies; Liberation Ecology
- Arid-climate and Southwest food forest challenges, caliche: Urban Agriculture & Regional Food Systems; Caliche
- Wasatch Front fruit variety and chill-hour guidance: USU Extension

- Permaculture site assessment method (sun mapping, water flow, base mapping): Permaculture Practice; Treeyo Permaculture