Permaculture Design for:

Hogs Grove Farms

Northwest, Iowa, USA
Client Background

- Clients are a married couple with 2 children. Primary income is expected to remain from off-farm sources for the foreseeable future. One-spouse stays at home during the day.
- Clients stated goals are to maximize food production and increase self-sufficiency to the extent feasible given time and financial constraints. Surplus will be consumed, returned to other elements of the farm, or sold/given/bartered with family, friends, and neighbors.
- Property is an existing homestead. House must remain largely as-is for the time being. Thus, this design focuses on food production systems in Zones 1 through 4 rather than house design/retrofit. A shade-house is recommended for some passive summer cooling. Home architecture does not lend itself to attachment of a greenhouse or glass house.
- Existing water supply is a public supply. Client desires a well. Windmills and hand pumps, and the use of gravity flow systems where possible, have been recommended to increase self-sufficiency and reduce energy requirements.
- Client hopes to begin raising a small number of hogs in the near future, followed by a pair of small cattle (e.g., Dexters). Poultry will also be considered.
- Fruit and nut-bearing trees are desired features, as well as expanded gardening space.
Site Location:

**Hogs Grove Farms**

Northwest, Iowa, USA
Site Information

• Climate
  – Koeppen classification = Dfa
    • Humid-temperate, hot summers, snow in winter
  – Strong continental effect
  – Mean annual precipitation ~ 25 inches/year
    • Min winter temp = -20 deg F (-29 deg C)
Hogs Grove Farms
Zone Dfa
Hogs Grove Farms
Zone 4b/5a
Site Information

• Landscape profile
  – Broad landscape is nearly level plains
  – Site is located on the top of a very slight, S-shaped landscape profile
    • East half of property is nearly level plateau with slopes less than 1% in all directions
    • West half of property slopes down to the west at approximately 1.3%
Contour interval = 1.0 ft
Site Information

• Vegetation
  – Native vegetation: tall-grass prairie
    • Bluestem, Indian grass, etc.
  – Existing surrounding vegetation
    • Corn and soybean row crop production
  – Existing on-site vegetation
    • Fescue and bermuda lawn
    • Various deciduous trees
      – Mulberry, locust, oak, apple, others
Site Information

• Soil
  – Loess deposits over sand and gravel outwash
  – “Galva” silty clay loam
    • Top 2.5 ft → 30-39% clay content
    • Next 2.5 ft → 22-30% clay content
    • Very few rock fragments
    • 3.5-4.5% organic matter in surface layer
Site Information

• Existing features
  – Older farmstead with typical infrastructure
    • Rock driveway
    • Barn
    • Round, metal grain bins
    • Corn crib and lean-to for equipment storage
    • Quonset building for equipment storage
    • Windbreaks (tree groves) on north and east property lines

• Existing water supply
  – Public water supply to house, barn, and concrete feedlot south of barn
Design Features

• “Hard” infrastructure
  – Access (i.e., driveways)
    • Leave existing rock drive as-is. Extended drive to equipment storage (lean-to and Quonset). Will need to add culverts for swale “passage”

  – Demolish
    • Collapsing chicken coop between house and north tree grove
    • Old brooding shed north of barn
    • Collapsing shed east of barn
    • Concrete feed-bunk lot SW of grain bins
    • Most of concrete lot S & E of barn
Design Features

“Hard” infrastructure (continued)

– New structures:
  • Chicken coop in Zone 2 north of house
  • Small greenhouse on south side of coop
    – Seed starting, garden season extension, passive heat for coop
  • Shade-house or pergola on north side of house
    – Supports trellising plants, passive cooling of house
  • Waterfowl shelter in SW corner of property

– Fencing (~3,600 total ft)
  • Create 3 hog paddocks in north tree grove
  • Fence chicken-run SW of coop
  • Fence 3 grazing paddocks on S & E sides of property
Design Features

• Water
  – 3 Swales (~ 500 ft combined length)
    • Small, flat-bottom ditches on contour (i.e., level)
    • Infiltration system (hydrates landscape)
    • Excellent tree growth on downstream berm
  – Earth tank (east side of property)
    • ~25,000 gallon water storage
    • Possible duck pond, aquaculture

– Pond (SW corner)
  • ~40,000 gallon
  • Possible duck pond, aquaculture
Design Features

• Water (continued)
  – 2 Windmills
    • East windmill pumps well, fills earth tank or elevated tank on concrete “pad” by lean-to
    • SW windmill fills pond, livestock water, and feeds swales
    • Place in “wind tunnels”
  – Rain barrels
    • Catch every gutter/downspout
  – Livestock water
    • One per paddock
    • Ideally well-fed using windmill/tank storage
Swales:
Level, flat-bottom ditch that infiltrates water. Berm is ideal for growing trees and other plants. Can be large or small.
Design Features

• Trees
  – Leave north grove largely intact, clear for fence and future oak/hickory trees (see figure)
  – Leave east and SE groves intact
  – Develop linear food forest along swales (see figure)
  – Add mixed trees on west and south property lines
    • Fruit & nut, fodder/forage, wind/sight barrier
  – Thick “fedge” north of drive (food hedge)
    • Edible fruits/nuts
    • Snow fence
Design Features

• Trees (continued)
  – Less dense, larger trees with no low-hanging branches south of drive
    • Allows snow to pass through
    • Forage/fodder crop for SW paddock
  – Large oak/hickory in SW paddock
  – Windbeak west of barn, SW of house, to help mitigate odors from neighboring hog confinement
North grove (Zone 4):
Limited clearing to construct fence and created glade for oak/hickory planting.

Zone 5:
Leave north buffer as “wild space.”
East grove (Zone 4): Limited clearing by hogs or goats. Plant forage/fodder species in openings.

Zone 3: Plant forage/fodder trees along fence lines and swale. Plant windbreak species on south fence line. Plant one large oak/hickory in summer wind sector.
Zone 3:
Windbreak and snow fence species along west property line and north side of drive. Add forage/fodder/fruit species if desired.

Zone 1:
Trellis and espalier species as desired

Zone 2:
Food forest on west side of swales.
Design Features

• Trees species
  – Orchard
    • Apples, pears, serviceberry
  – Summer windbreak
    • Thornless honey locusts, poplar, filberts, plum
    – Also provide forage/fodder for livestock and/or food for humans
  – Winter windbreak
    • Arborvitae, Norway spruce
  – Paddock/grove
    • Oak, hickory, and/or walnut
Design Features

• Trees species (continued)
  – Hedge/fedge
    • Highbush cranberry, wild plum, filberts
    • Blueberry, raspberry, blackberry
  – Food forests
    • Mixed assortment of varying sized trees with complimentary functions
      – Mini-dwarf fruit trees to large fruit and nut trees
    • Ideal for berms on downslope side of swales
    • Immediate plant cover crops after grading
    • Focus on soil-improving and N-fixing species
    • Utilize succession to “fast-track” productive species
Food Forests

• Maximize “layers”
  – Choose complimentary mix of species (i.e., guilds)
  – Species includes herbaceous plants (herbs/flowers), small trees, and large trees
  – Each species occupies a “niche”
More guilds

WALNUT GUILD
APPLIES TO WALNUT, BLACK WALNUT, BUTTERNUT, HEARTNUT

- COMFREY
- SPRING BULBS / MINT
- WALNUT
- GOOSEBERRY OR CurrANT
- CHERRY (ON EITHER STANDARD OR SEMI-DWARF ROOTSTOCK)
- MULBERRY

FRUIT TREE GUILD
STANDARD OR SEMI-DWARF TREES OF APPLE, PEAR, APRICOT, PEACH, NECTARINE, OR CHERRY. DIAMETER FROM 20'-60'

- WILD GINGER
- HAZEL
- HORSERADISH
- GARLIC / CHIVES
- VIBURNUM (Highbush CRANBERRY)
- SPRING BULBS / STRAWBERRIES
- ASPARAGUS

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Design Features

• Gardens/crops
  - Kitchen garden
    • Between shade-house and coop north of house
    • Greens, tomatoes, peppers, other veggies
  - Edible ornamentals
    • Attractive but edible plants south of house
      – Specialty varieties of peppers, sweet potato vines, lettuce, etc.
      – Edible/medicinal flowers/herbs (borage, lemon balm, sacred basil, mint, hyssop, sunflowers, nasturtium, calendula, etc.
  - Herb spiral
    • Grow moisture-loving herbs near bottom, and drought-tolerant herbs at top (see figure)
Drought tolerant species at top: rosemary, thyme, sage, etc.

Moisture-loving species at bottom: bee balm, spearmint and other mints, ferns, sorrel, etc.

Shade side: ginger, goldenseal, parsley, chives

Sun side: basil, lemon balm, dill, chamomile, sage, coneflowers, yarrow
Design Features

• Gardens/crops (continued)
  – Chicken garden
    • Grow low maintenance crops chickens will eat near coop/run
      – Sunflowers, amaranth/quinoa, hostas, kale, other greens
  – Pollinator habitat (flowers, etc.)
  – Main crops
    • Low maintenance crops
      – Potatoes, sweet corn/maize, squash/pumpkins, etc.
  – Berry patch
    • Expand south from existing raspberry patch
    • Consider: blueberries, aronia berries, gooseberries, currants
Design Features

• Gardens/crops (continued)
  – Livestock crops
    • Grains, cut forage, and fodder for chickens, cattle, hogs, sheep
      – Clover, amaranth, oats, flax, sunflowers, squash
  • In/near paddocks, consider tubers such as Jerusalem artichokes, turnips, radish (diakon, etc.), and other brassicas
Design Features

• Pasture/forage
  – Grazing/browsing areas for cattle, sheep, goats, hogs, and poultry/fowl
    • Can choose species and manage pastures accordingly
    • Multi-species integration/rotation for optimal fertility and self-sufficiency
  • Large paddocks in East Zone 4, South Zone 3
  • Smaller paddock possible in West Zone 3

– Potential forage plants:
  • Clovers, millet, sorghum, alfalfa, foxtail, Bermuda grass, timothy, bluestem, grama, hyacinth bean, Sudan grass, etc.

– Shrubs/tree species along paddock fence
  • Cabbagebark tree, quickstick, willow, thornless honeylocust, poplar, fruit trees, nut trees
Design Summary