

UCCE

El Dorado County Master Gardeners

Present





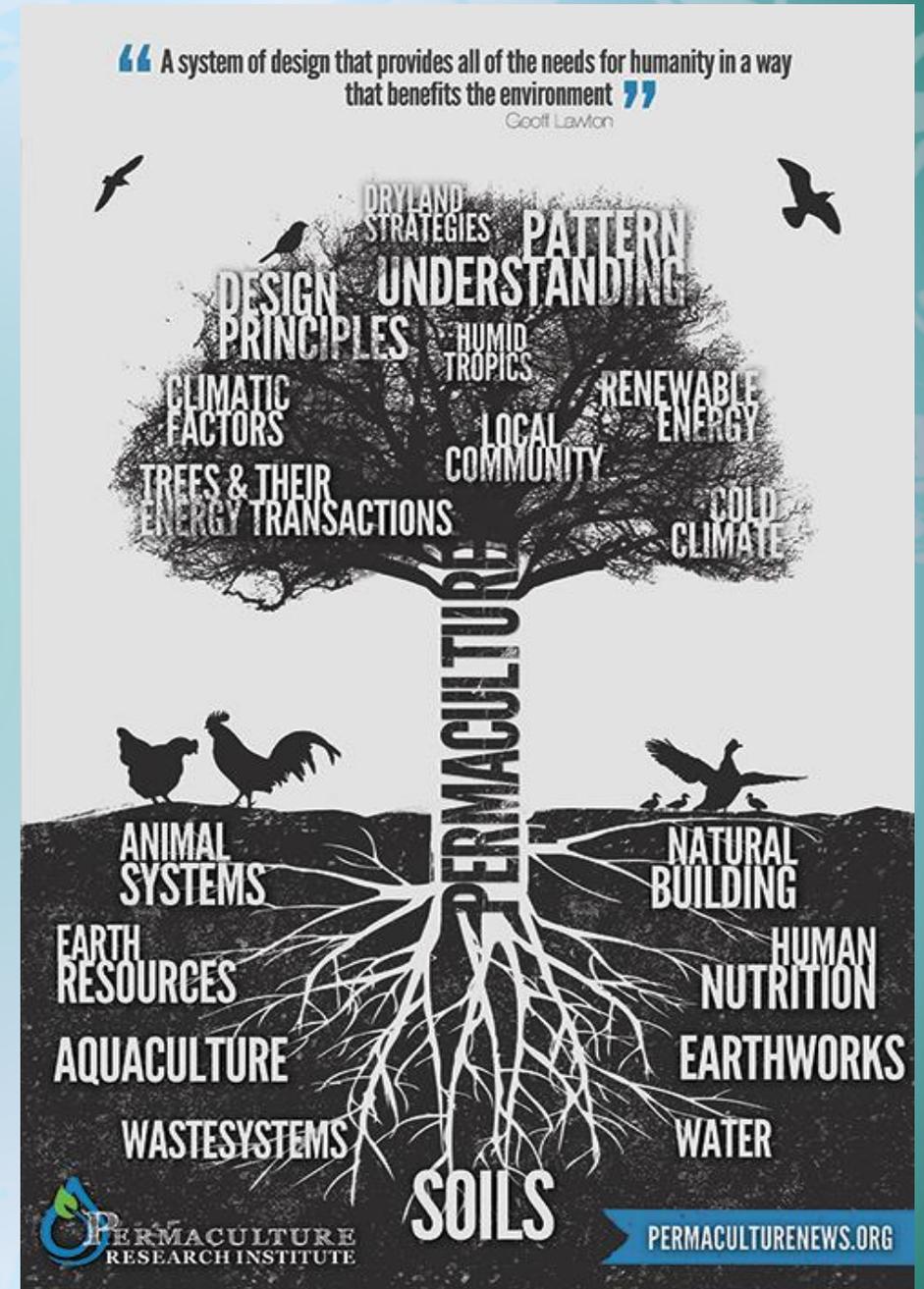
Permaculture for the Homesteader and Gardener

Permaculture Basics

- ❖ **History**
- ❖ **Core Tenants & Principles**
- ❖ **Theory**
- ❖ **Design Principles**
- ❖ **Common Strategies & Practices**

What is Permaculture?

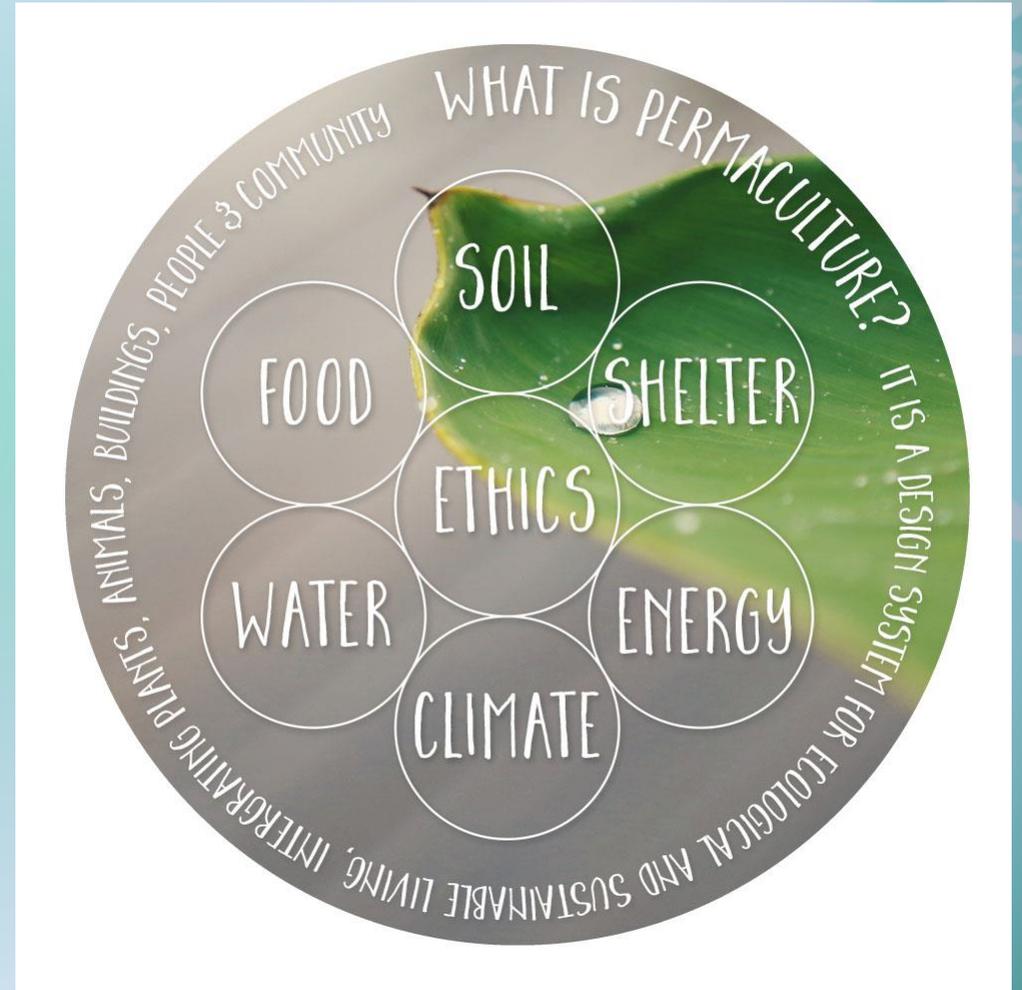
- ❖ A system of agricultural and social design principles based on emulating patterns and features observed in nature.
- ❖ "Permaculture is a philosophy of working with, rather than against nature; of protracted and thoughtful observation, rather than protracted and thoughtless labor; and of looking at plants and animals in all their functions, rather than treating any area as a single product system." – Bill Mollison



Permaculture

❖ Seeks to:

- **integrate people, land, resources through mutually beneficial cooperation**
- **imitate the no-waste, closed-loop systems seen in diverse natural systems**



Permaculture

❖ A multidisciplinary toolbox includes:

- agriculture
- water harvesting and hydrology
- energy
- natural building
- forestry
- waste management
- animal systems
- aquaculture
- appropriate technology
- economics
- community development

Permaculture

- ❖ **A design system using concepts, materials, and strategic components to benefit life in all its forms**
- ❖ **Work with, rather than against, nature**
- ❖ **Reduce footprint**
- ❖ **Identify and apply holistic solutions applicable to any scale rural and urban setting**

Permaculture

❖ **It has many branches that include, but are not limited to:**

- **ecological design**
- **environmental design & construction**
- **integrated water resources management**
- **sustainable architecture**

History of Permaculture

- ❖ **1929 - Joseph Russell Smith took up an antecedent term as the subtitle for *Tree Crops: A Permanent Agriculture***
 - saw the world as an inter-related whole and suggested mixed systems of trees with crops below
- ❖ **1930s**
 - **Toyohiko Kagawa pioneered forest farming in Japan - inspiration for “sustainable agriculture”**
 - **Masanobu Fukuoka advocated no-till orchards, gardens and natural farming**
- ❖ **Australian P. A. Yeomans**
 - **1940s - introduced observation-based approach to land use in Australia**
 - **1950s – used keyline design to manage the supply and distribution of water**
 - **1964 defined “permanent agriculture” as that which can be sustained indefinitely in his book *Water for Every Farm***

History of Permaculture (cont.)

- ❖ **Stewart Brand and Mark Lynas – grandfather's of the Green Movement**
- ❖ **Ruth Stout and Esther Deans pioneered no-dig gardening**
- ❖ **1978 – “Permaculture” first coined by Australians David Holmgren (then a graduate student) and his professor, Bill Mollison**
 - **originally referred to "permanent agriculture", but expanded to also stand for "permanent culture“**
 - **Primary agenda: to assist people to become more self-reliant through the design and development of productive and sustainable gardens and farms**

Core Tenets of Permaculture

❖ The three core tenants:

- Care for the Earth
- Care for the People
- Return of Surplus (Fair Share)



Core Tenets of Permaculture

❖ Care for the earth:

- **Condition necessary for all life systems to continue and multiply**
 - Without a healthy earth, humans cannot flourish
 - Apply environmentally and socially sound principles
 - Food, water and energy independence
 - Small-scale and long-term productivity
 - Rejuvenate landscapes

Core Tenets of Permaculture

❖ Care for the people:

- **Condition for people to access those resources necessary for their existence**
 - Encourage active cooperation
 - Empower people to act and care for themselves, family and community
 - Develop networks and trust

Core Tenets of Permaculture

❖ **Return of surplus:**

- **aka Fair Share**
 - take no more than what is needed before we reinvest the surplus
- **Reinvest surpluses back into the system to provide for the first two ethics**
- **Includes returning waste back into the system to recycle into usefulness**

Permaculture Design Principles

❖ Theory

- **Derived from the science of systems ecology and study of pre-industrial examples of sustainable land use**
 - Central concept: maximize useful connections between components and synergy of the final design
 - Focus is not on each separate element, but rather on the relationships among and between elements, the whole becoming greater than the sum of its parts.
 - Seeks to minimize waste, human labor, and energy input by building systems with maximal benefits between design elements to achieve a high level of synergy.
 - Designs evolve over time just like natural systems

Permaculture Design Principles (cont.)

❖ Ecology: Life's Networks

- **'Nested ecosystem'**
 - Microclimates are nested in bioregions
 - Bioregions are nested in Earth's biosphere
- **Local systems are both autonomous and interdependent**
- **The greater diversity within a system, the more resilient it is**
- **The greater the diversity, the more energy is used efficiently**

Permaculture Design Principles (cont.)

❖ Ecological Design Principles

- Preserve genetic diversity
- Respect life of all species
- Allow ecosystems to evolve
- Use species and habitats sustainably
- ~~Design closed systems in which all needs are met~~

How Ecosystems Work

❖ Functions of healthy ecosystems:

- Create and support life
- Clean air and water through filtration
- Regulate the atmosphere by recycling nitrogen and carbon
- Build healthy soils
- Manage pests and diseases
- ~~○ Perpetuate themselves~~
- ~~○ Become closed systems~~

How Ecosystems Work

❖ Our Ecological Footprint

- The measure of a person, town, city or a nation's use of resources
- Average American requires approx. 17 acres to sustain lifestyle
- Everything we consume requires:
 - Raw resources
 - Processing
 - Manufacturing
 - Handling
 - Transportation

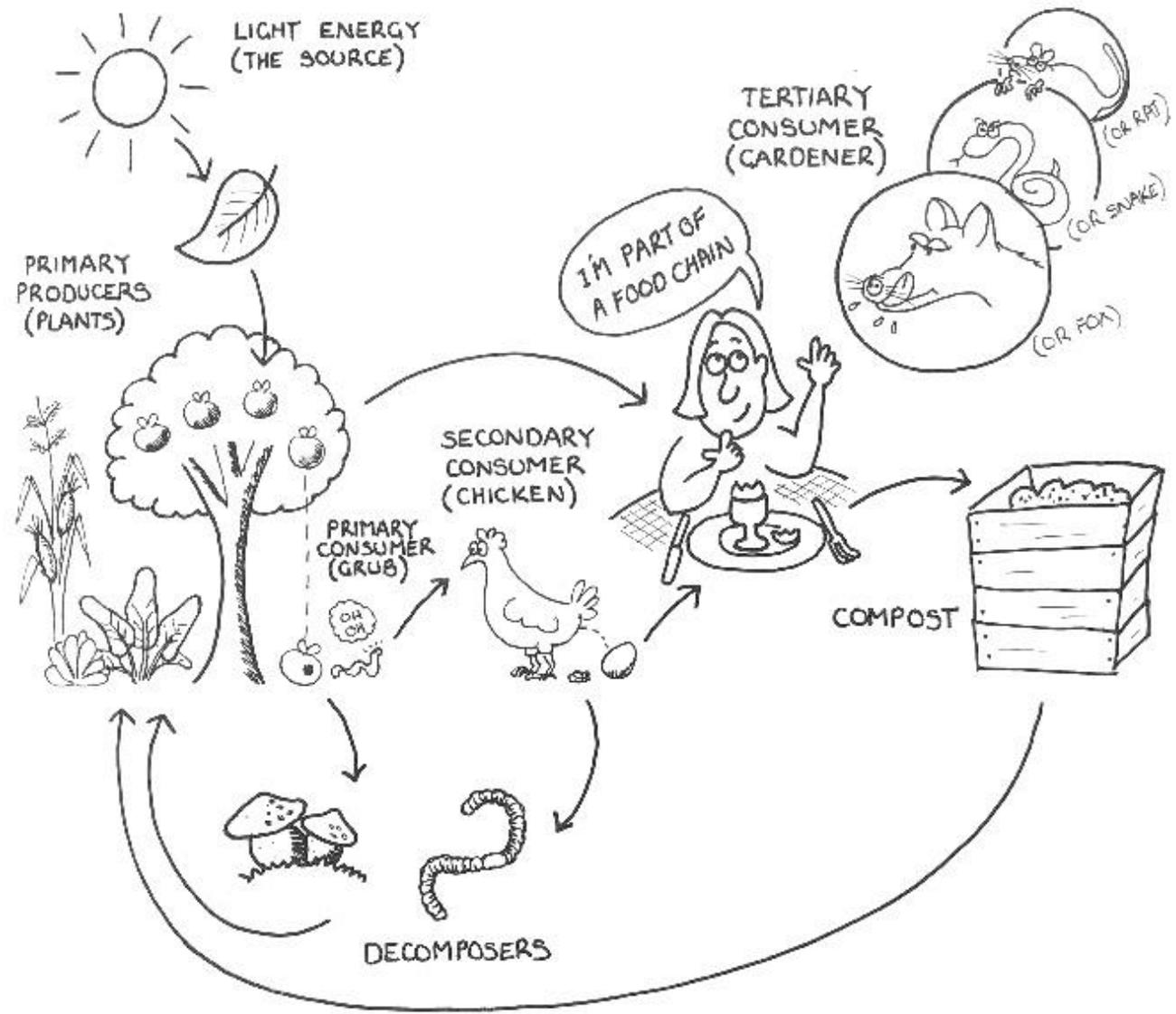
Ecological footprint (countries of one million people or more)

Country	Footprint per person	How many Earths?
Kuwait	8.9 global hectares	5.1
Australia	8.3	4.8
United Arab Emirates	8.1	4.7
Qatar	7.0	4.0
United States of America	6.8	3.9
Canada	6.6	3.8
Sweden	6.5	3.8
Bahrain	6.2	3.6
Trinidad and Tobago	6.0	3.5
Singapore	5.9	3.4
Source: GFN (2011 data)		

How Ecosystems Work

❖ Energy Flow

- All life forms require energy
- Sunlight > photosynthesis > chemical energy (carbohydrates, sugars, waxes, oils)
- Energy flows through the food chain via consumption
- Matter cycles
 - Eat and be eaten



How Ecosystems Work

❖ Surplus causes pollution

- Bioaccumulation / toxicity
- Systemic poisoning of water, air, soils

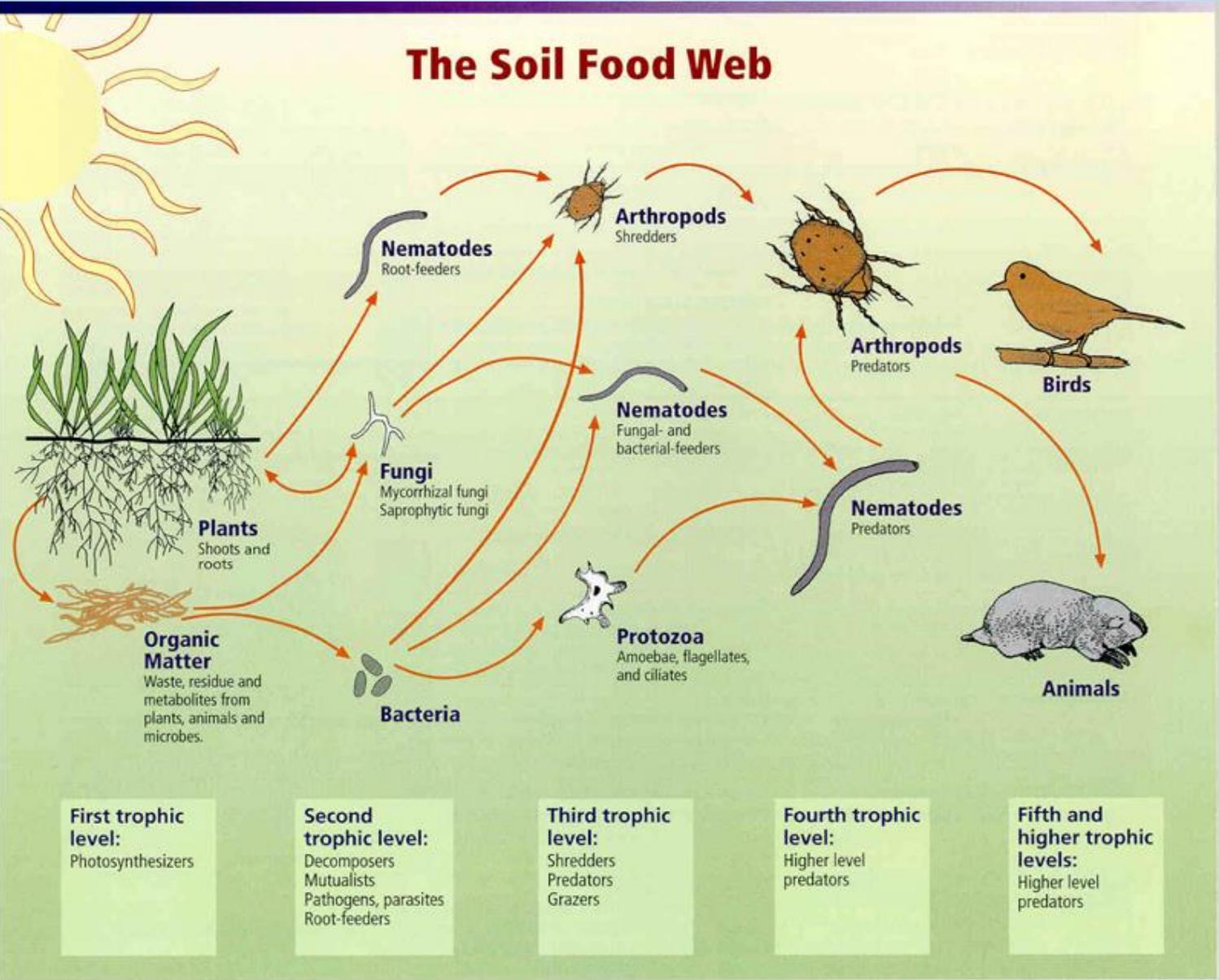
❖ Shortages result in depletion

- Shortage of nutrients results in poor growth / death

❖ Balance

- When food chains interlock they form a food web

The Soil Food Web



Relationships between soil food web, plants, organic matter, and birds and mammals
 Image courtesy of USDA Natural Resources Conservation Service
http://soils.usda.gov/sqi/soil_quality/soil_biology/soil_food_web.html.

How Ecosystems Work

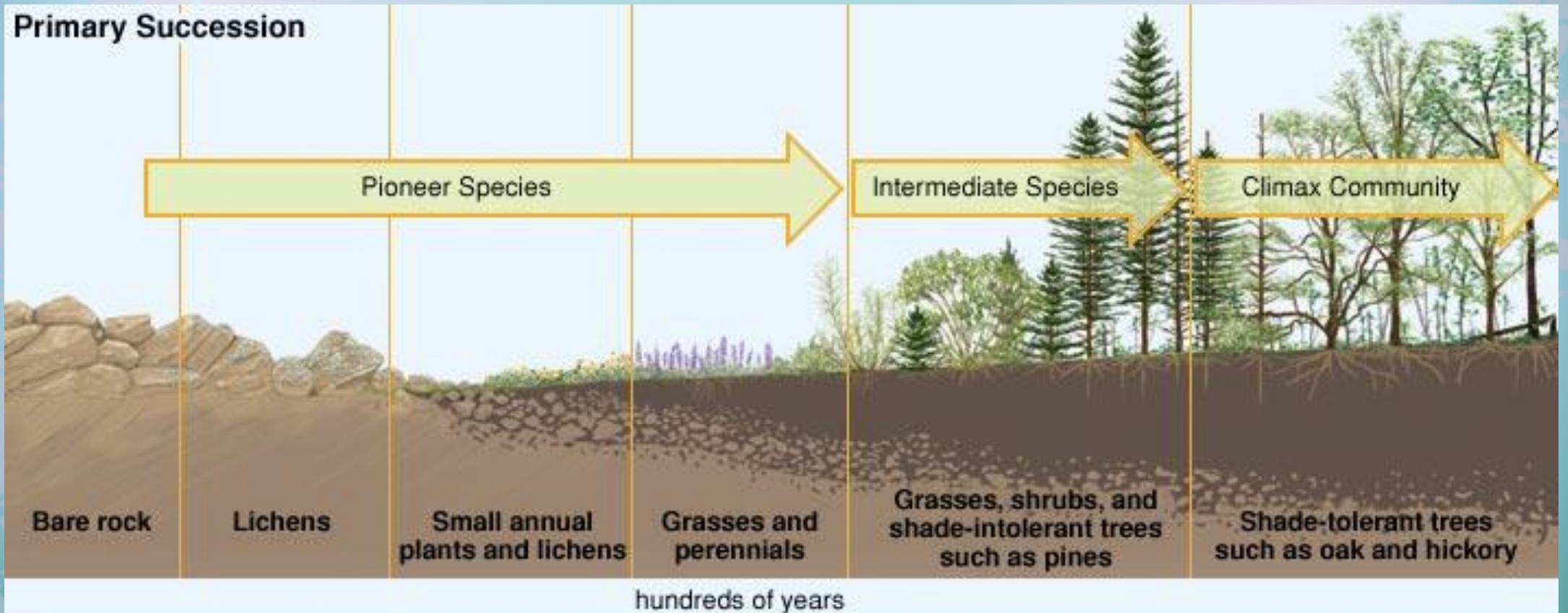
❖ Limiting factors

- Temperature
- Rainfall
- Soil
- Daylength
- Altitude

❖ Climate is the primary determinant of vegetation

How Ecosystems Work

❖ Succession



14 Permaculture Design Principles

1. **Observe and interact**
2. **Connect**
3. **Catch and store energy**
4. **Each element performs multiple functions - stacking functions**
5. **Each function is supported by multiple elements - redundancy**
6. **Least change for greatest effect**
7. **Use small and slow solutions**
8. **Optimize edges**
9. **Use and value renewable resources and services**
10. **Turn problems into solutions**
11. **Obtain a yield**
12. **Creatively use and respond to change**
13. **Apply self-regulation and accept feedback**
14. **Mistakes are tools for learning**

Design Principles (cont.)

1. **Observe and Interact: Get to Know the Land**

Use protracted and thoughtful observation rather than prolonged and thoughtless action. Observe your land through all of the seasons before taking action.

- **Topography**
- **Solar orientation**
- **Hydrology**
- **Climate and Microclimates**
 - Coldest and hottest temps
 - Prevailing winds
 - Cold sinks, hot spots
 - Length of day
 - USDA Region
- **Soils**
- **Existing Vegetation**
- **Fire Danger**
- **Neighbors**
- **Views**
- **Noise**
- **Wildlife**

Design Principles (cont.)

2. Connect

- Use relative location: Place elements in ways that create useful relationships and time-saving connections among all parts

3. Catch and Store Energy / Energy Cycling

- From sun to water to waste, seek to create a closed-loop cycle
- Conservation

Design Principles (cont.)

4. Each element performs multiple functions - Stacking Functions

- Choose and place each element to perform as many functions as possible
- Nothing has just one function
 - a trellis supports and shades
 - A compost pile recycles waste, boosts soil health, gives you exercise
- Beneficial connections between diverse components create a stable whole

Design Principles (cont.)

5. Each function is supported by multiple elements – Redundancy

- Use multiple methods to achieve important functions and to create synergies.
- Redundancy protects when one or more elements fail
 - Plants benefit from multiple strategies: irrigation, mulching, wind deflection, shade, companion planting

Design Principles (cont.)

6. Least Change for Greatest Effect

- Find the “leverage points” in the system and intervene there, where the least work accomplishes the most change

7. Use Small and Slow Solutions

- Start with the smallest solutions that will do the job, and
- Build on your successes, with variations
- Grow by chunking

Design Principles (cont.)

8. Optimize Edges

- Nature doesn't waste space, and it often uses edges (of ponds, paths, etc) for greater diversity
- By increasing the amount of edges you can increase your own diversity
 - keyhole gardens

9. Use Biological and Renewable Resources

- Use small branches for a trellis instead of a plastic store-bought version

Design Principles (cont.)

10. Turn Problems into Solutions

- Constraints can inspire creative design

11. Obtain a Yield:

- Design for both immediate and long-term returns from your efforts: “You can’t work on an empty stomach.”

12. Creatively Use and Respond to Change

- The designer’s imagination and skill limit productivity and diversity more than any physical limit

Design Principles (cont.)

13. Apply Self-Regulation and Accept Feedback:

- Look at what is working and not working, or even feedback from your neighbors
- Ignoring the signs of a dysfunctional system spells disaster

14. Mistakes are tools for learning

- Look at what is working and not working
- feedback from your neighbors

6 Permaculture Zones: Zones 0-5

- **Zones - a way of intelligently organizing design elements on the basis of the frequency of human use and plant or animal needs**
- **Frequently manipulated or harvested elements located close to the house**
- **Less frequently used or manipulated elements, and elements that benefit from isolation (such as wild species) are farther away**
- **Zones are about positioning things appropriately, and are numbered from 0 to 5**

Permaculture Zones (cont.)

Theory

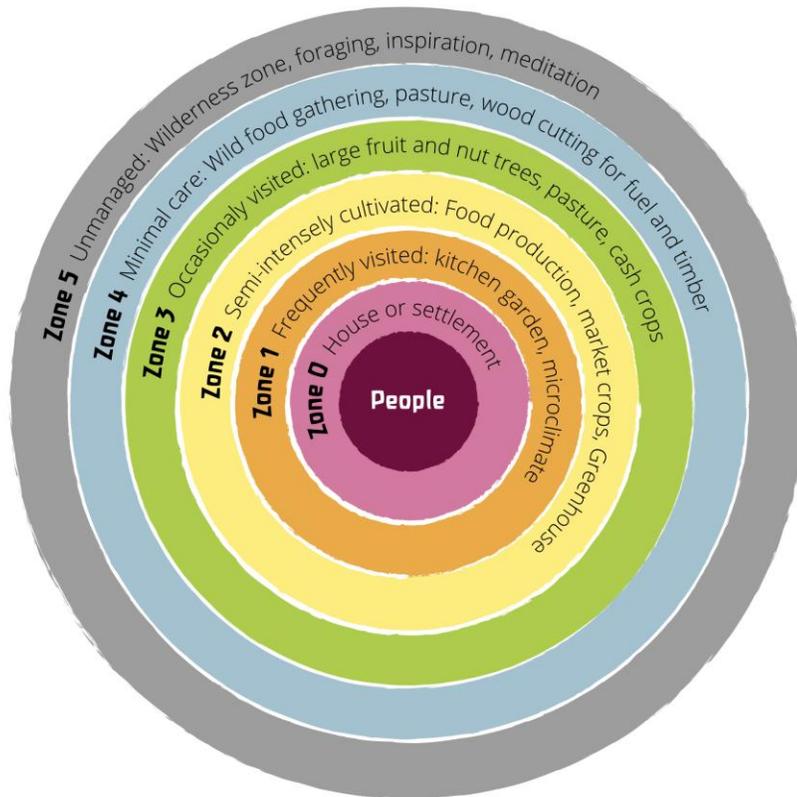


Illustration: Felix Müller (www.zukunft-selbermachen.de) Licence: CC-BY-SA 4.0

Reality



Permaculture Zones (cont.)

❖ Zone 0

- **The house, or home center**
- **Aim to reduce energy and water needs**
- **Harness natural resources such as sunlight and roof and grey water**
- **Create a harmonious, sustainable environment in which to live and work**

Permaculture Zones (cont.)

❖ Zone 1

- **zone nearest to the house**
- **elements that require frequent attention, or that need to be visited often**
 - salad crops
 - herb plants
 - soft fruit like strawberries or raspberries
 - greenhouse and cold frames, propagation area
 - worm compost bin for kitchen waste, etc.
 - raised beds in urban areas

Permaculture Zones (cont.)

❖ Zone 2

- **perennial plants that require less frequent maintenance, such as occasional weed control or pruning**
 - berry bushes
 - orchards
 - pumpkins and squash
 - sweet potatoes
 - corn
 - beehives
 - chicken coop
 - rabbit hutches
 - large-scale composting bins

Permaculture Zones (cont.)

❖ Zone 3

- **Crops both for domestic use and for trade purposes**
- **After establishment, minimal care and maintenance required**
 - watering or weed control maybe once a week

Permaculture Zones (cont.)

❖ Zone 4

- semi-wild area
- grazing animals
- forage and wild food
- production of timber for construction or firewood

Permaculture Zones (cont.)

❖ Zone 5

○ Wilderness area

- No-intervention apart from the observation of natural ecosystems and cycles
- A natural reserve of wildlife, fungi, bacteria, molds and insects that can aid all zones

Permaculture Strategies & Practices

❖ Produce No Waste

- **Precycle - practice of consuming, while keeping waste reduction in mind**
 - recycle, reuse, compost...work toward nothing going to the dump
 - Produce no waste through using all resources as nature does
 - Minimize maintenance and inputs

❖ Design from Patterns to Details

- **Look for patterns in nature to work with**
 - rounded edges and spirals to conserve energy

Permaculture Strategies & Practices (cont.)

❖ Integrate Rather Than Segregate:

- **Some plants can support your trees, your trees can support your animals, and so on.**
- **Creating synergy, create less work**
 - Fruit trees provide food as well as shade
 - Bamboo could provide stakes for supporting pole beans and other vining plants.
 - Grow many types of perennial food plants—such as arrowhead, sorrel, chicory, and asparagus—in addition to standard garden vegetables

Permaculture Strategies & Practices (cont.)

❖ Use and Value Diversity

- **Don't plant one variety of tomato, or invest in one breed of animal**
- **Diversity creates health and minimizes the loss from disease, drought, etc.**
 - grow as many different and non-competing crops as possible

Permaculture Strategies & Practices (cont.)

❖ Layers

- **A healthy ecosystem has a huge number of relationships between its component parts**
- **a diverse community of life is able to grow in a relatively small space, as each layer is stacked one on top of another.**
- **7 recognized layers in a food forest (some include fungi as an eighth layer)**

Permaculture Strategies & Practices (cont.)

❖ 8 recognized layers in a Food Forest

1. Canopy

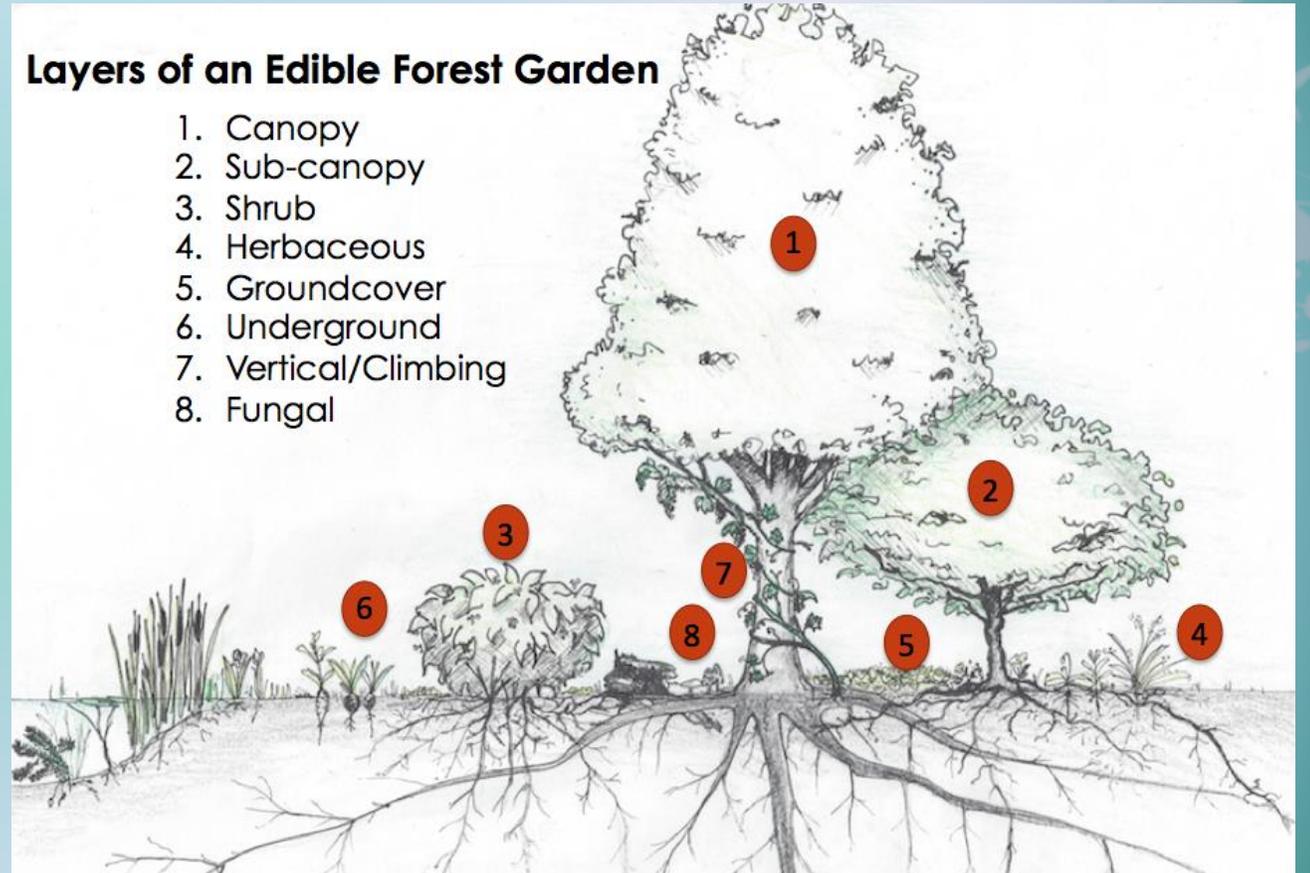
- the tallest trees in the system; large trees dominate but do not completely cover an area

2. Sub-canopy

- trees that grow in dappled light of the canopy

Layers of an Edible Forest Garden

1. Canopy
2. Sub-canopy
3. Shrub
4. Herbaceous
5. Groundcover
6. Underground
7. Vertical/Climbing
8. Fungal



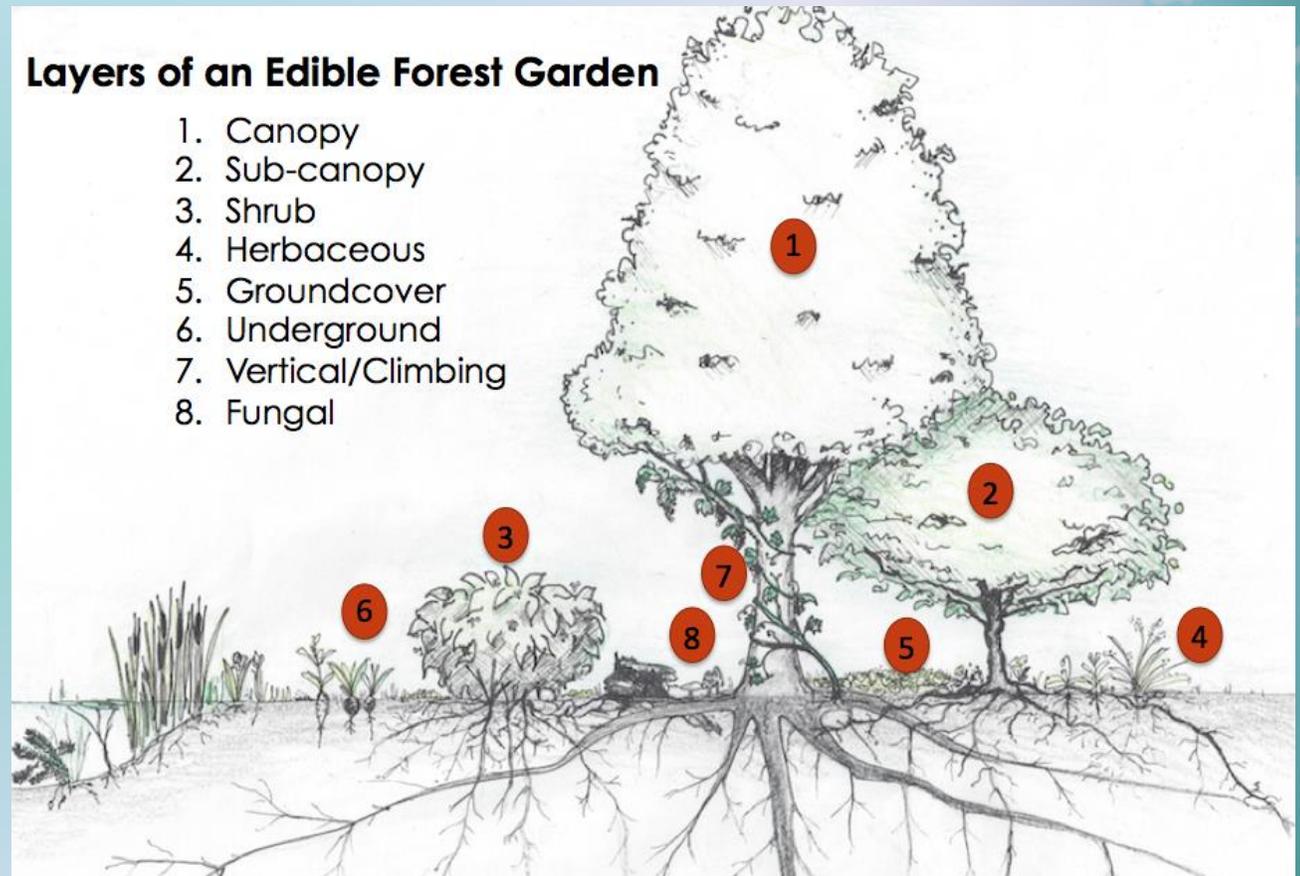
Permaculture Strategies & Practices (cont.)

3. Shrub layer

- a diverse layer of woody perennials of limited height; includes most berry bushes

4. Herbaceous layer

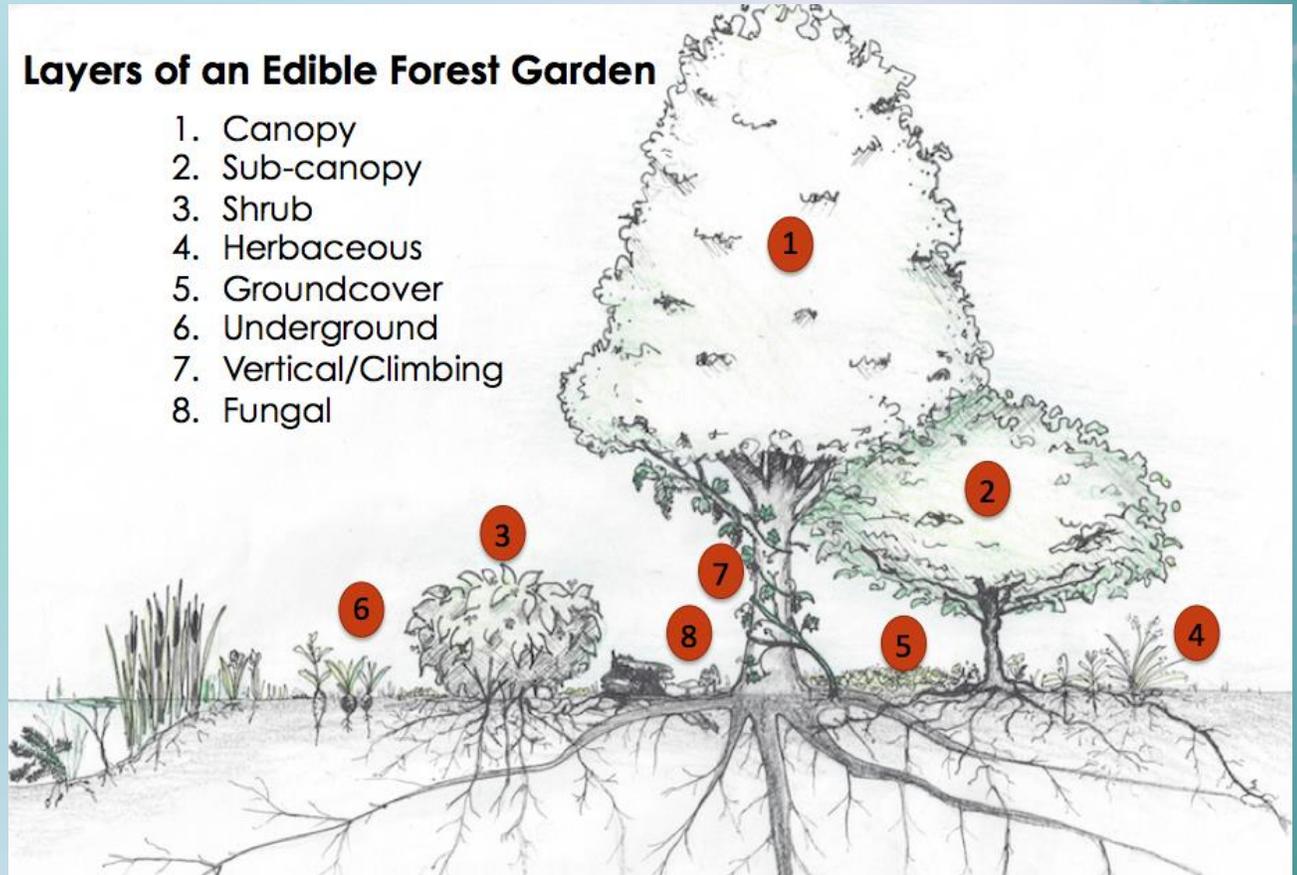
- annuals, biennials or perennials
- large variety of beneficial plants
- may die back to the ground every winter
- many culinary and medicinal herbs



Permaculture Strategies & Practices (cont.)

5. Groundcover:

- overlap with the Herbaceous layer
- grow much closer to the ground, grow densely to fill bare patches of soil
- cover crops retain soil and minimize erosion
- green manures that add nutrients and organic matter to the soil, especially nitrogen



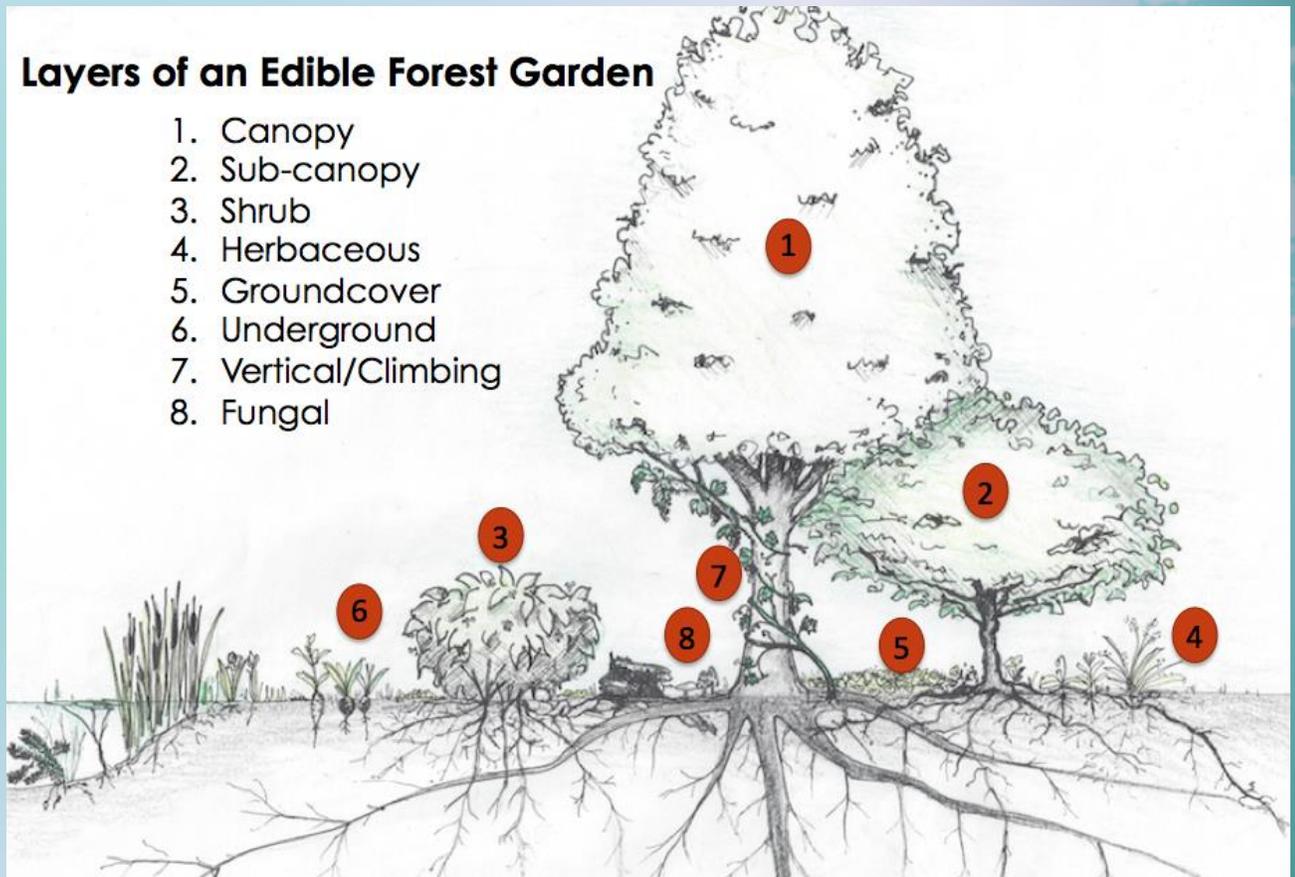
Permaculture Strategies & Practices (cont.)

6. Underground / Root Crop layer

- potatoes and other edible tubers

7. Vertical / Climbing layer

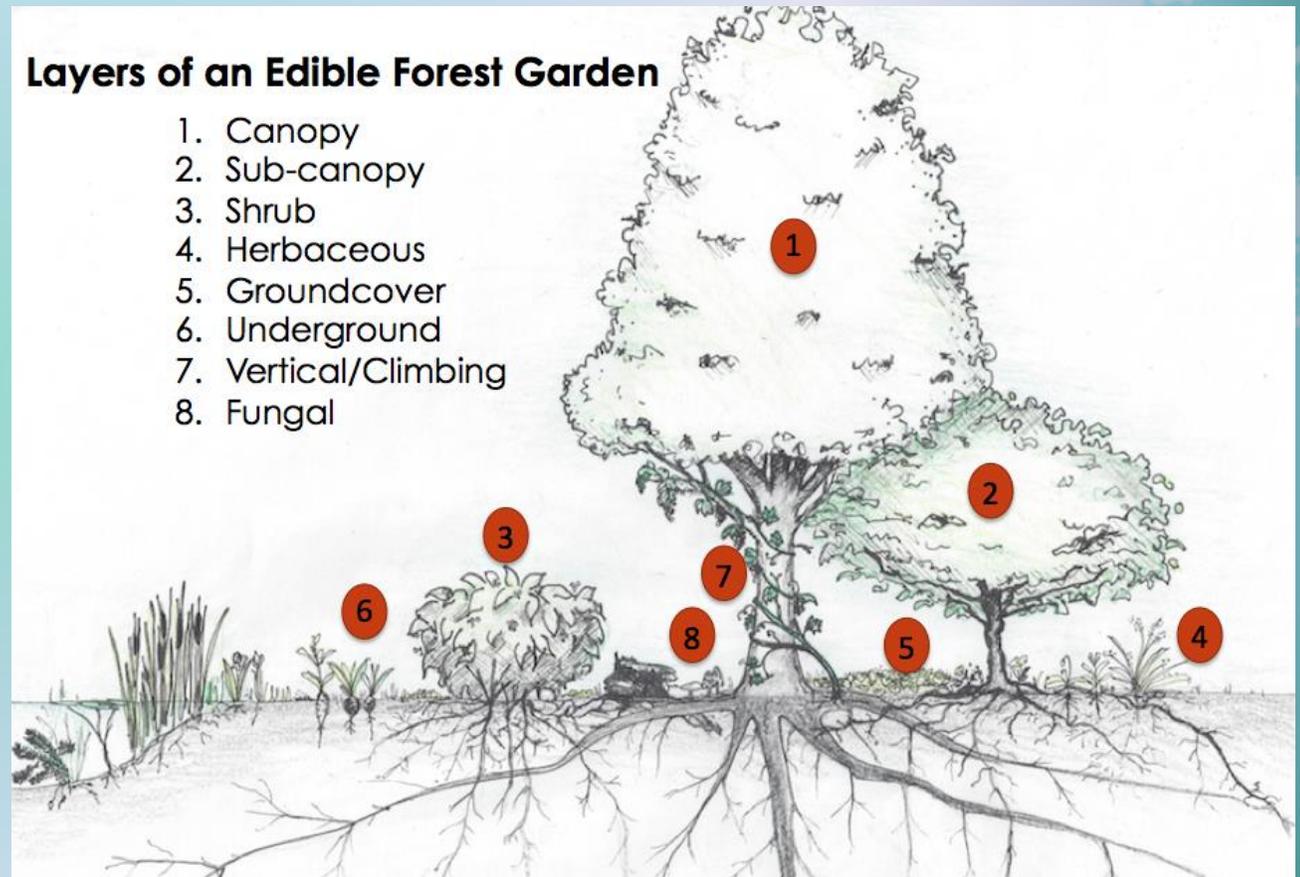
- climbers or vines
 - runner beans and lima beans (vine varieties)
 - grapes
 - kiwi



Permaculture Strategies & Practices (cont.)

8. Rhizosphere (Fungal)

- Root layer within the soil
- major components are soil organisms that live within it in relationship with roots
- soil organisms: bacteria, fungi, microarthropods, insects, nematodes, worms, etc.



Permaculture Strategies & Practices (cont.)

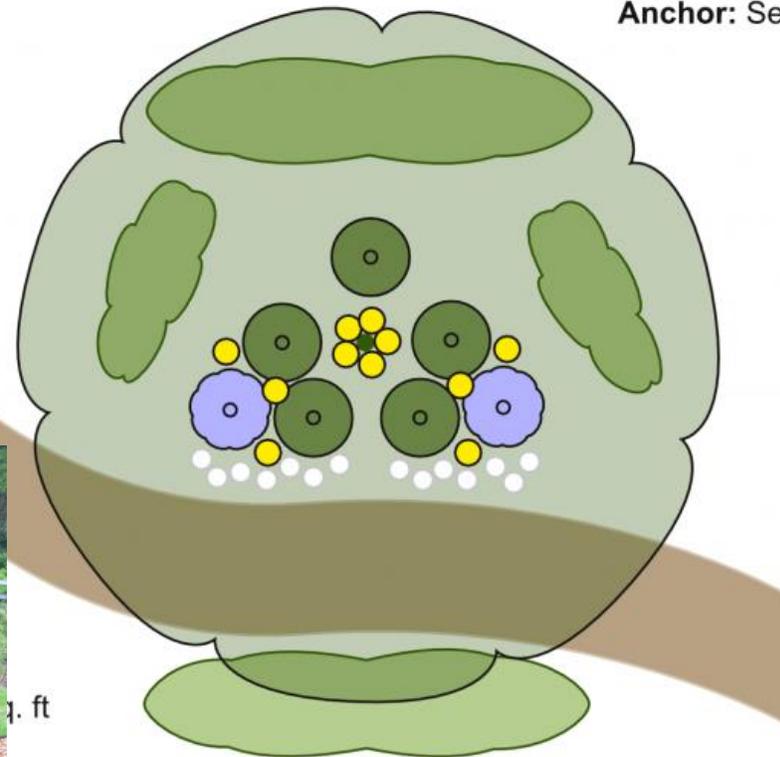
❖ Guilds

- a group of species where each provides a unique set of diverse functions that work in conjunction, or harmony
- mutually beneficial
 - More complex than companion planting

Guild Example

Example Fruit Tree Guild

Anchor: Semi-dwarf fruit tree



Support Species:

-  *Baptisia australis*
(wild blue indigo)
-  *Symphytum x uplandicum*
(Russian comfrey)
-  *Narcissus pseudonarcissus*
(daffodils)
-  *Fragaria vesca*
(Alpine Strawberry)
-  Wildflower mix
(Clover, bachelor button,
yarrow, chicory, etc.)



Permaculture Strategies & Practices (cont.)

❖ Principles of a Guild based on forest ecology

- groups of plants, animals, insects, etc., that work well together
- food production
- tap roots that draw nutrients up from deep in the soil
- supports a greater variety of soil organisms
- nitrogen-fixing legumes
- attract beneficial insects and pollinators
- repel harmful insects and disease

Permaculture Strategies & Practices (cont.)

❖ Stacking Functions

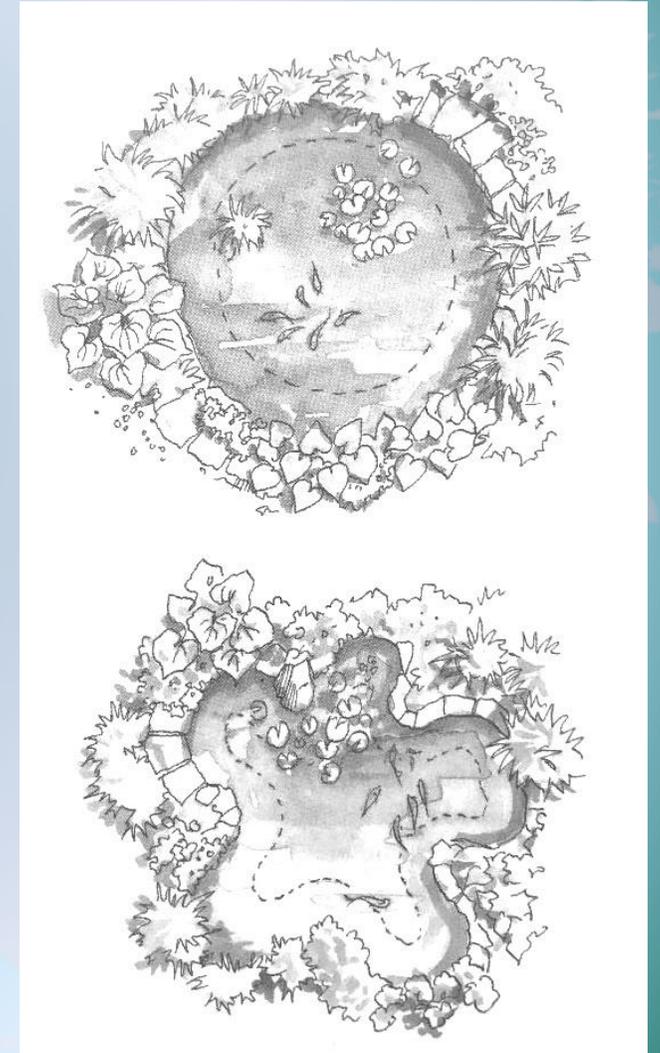
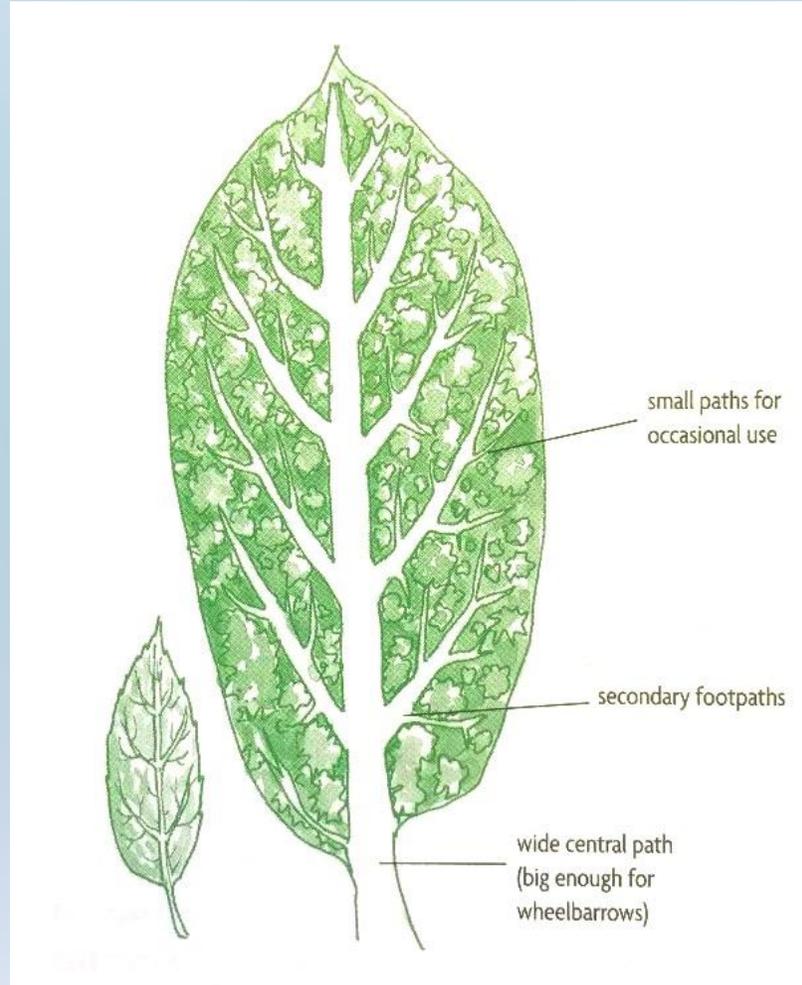
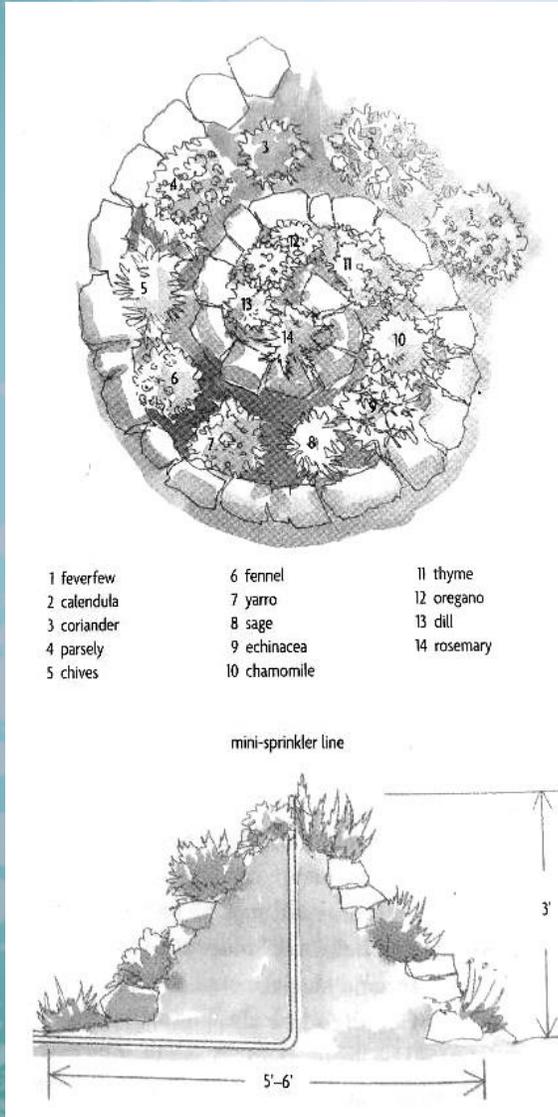
- **every element in a design performs more than one function**
 - Trees can provide fruit, provide shade, and act as a windbreak
 - Dill can be used as a herb, the flowers attract beneficial insects, and add visual appeal to your garden
 - Hedges can provide fruit, privacy, and shelter for wildlife
 - Ponds can grow aquatic plants, hold fish, and attract birds and other wildlife
 - Walls can give privacy, support climbing plants, and store heat (for growing plants in cooler areas)

Permaculture Strategies & Practices (cont.)

❖ Edge effects

- **the effect of the juxtaposition or placing side by side of contrasting environments on an ecosystem**
- **It's where differing systems meet:**
 - forest and meadow
 - ocean and land
 - mountains and valleys
- **generally the most diverse parts of ecosystems**
- **wavy or undulating edges have greater length than simple ovals, circles and rectangles**

Permaculture Strategies & Practices (cont.)



Permaculture Strategies & Practices (cont.)

❖ Food Forests

- **an integrated approach of combining trees and shrubs with crops and/or livestock**
 - Combines agricultural and forestry technologies to create more diverse, productive, profitable, healthy and sustainable land-use
 - Mimic natural forests
 - incorporate processes and relationships known to be valuable in natural ecosystems
 - Numerous permaculturists are proponents of Food Forests:
 - Graham Bell wrote *The Permaculture Garden* in 1995
 - Patrick Whitefield wrote *How to Make a Forest Garden* in 2002
 - Dave Jacke and Eric Toensmeier co-authored the two volume book set *Edible Forest Gardening* in 2005
 - Geoff Lawton presented the film *Establishing a Food Forest* in 2008.

Permaculture Strategies & Practices (cont.)

❖ Food Forest examples



Permaculture Strategies & Practices (cont.)

❖ Edible Landscaping

- **An integrated approach of combining edible plants and trees within a traditional landscape or make it look like a more traditional landscape**
 - Rosalind Creasy, Edible Landscaping, 2010

Permaculture Strategies & Practices (cont.)

❖ Edible Landscape Examples

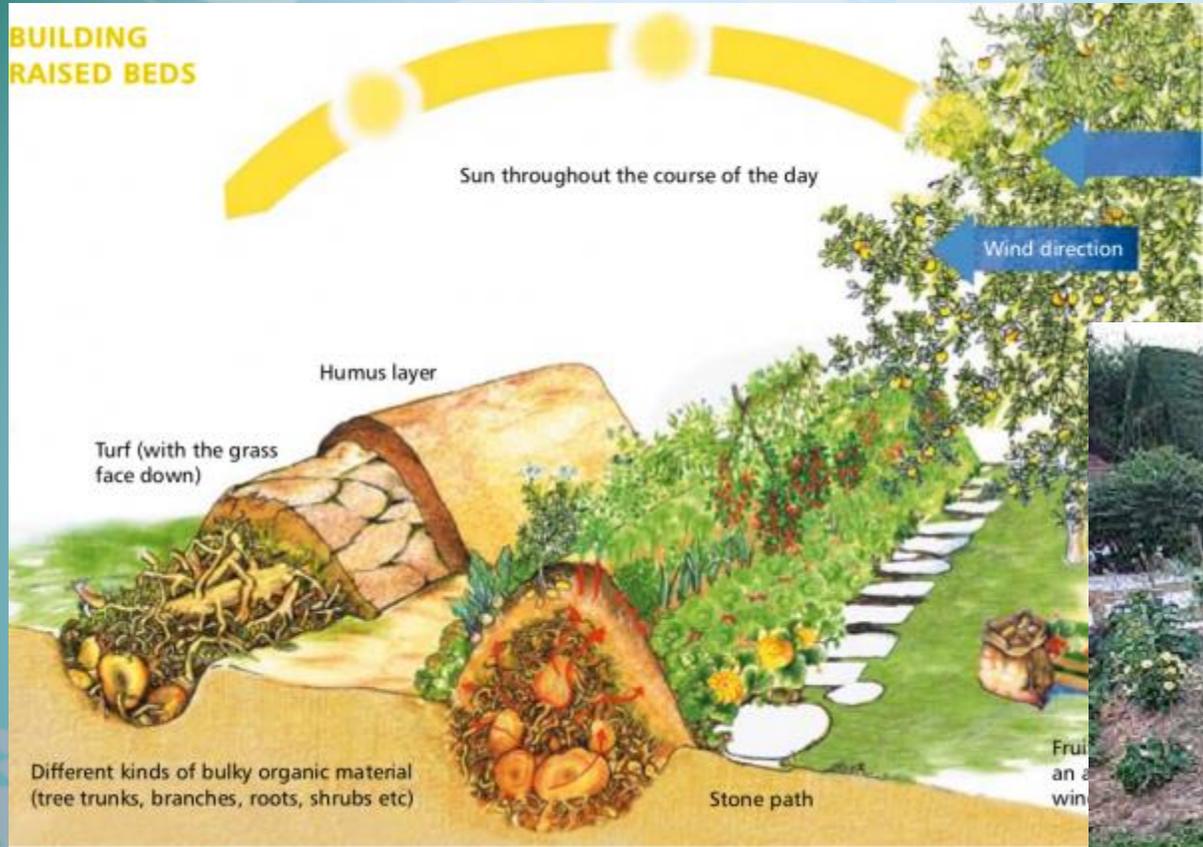


Permaculture Strategies & Practices (cont.)

❖ Hügelkultur

- **Practice of burying large volumes of wood to increase soil water retention and add organic matter to the soil**
 - masses of buried wood can absorb enough water during the rainy season to sustain crops through the dry season
 - Technique originated by Sepp Holzer
 - used by permaculturalists Toby Hemenway, Paul Wheaton and Masanobu Fukuoka

Hügelkultur Beds



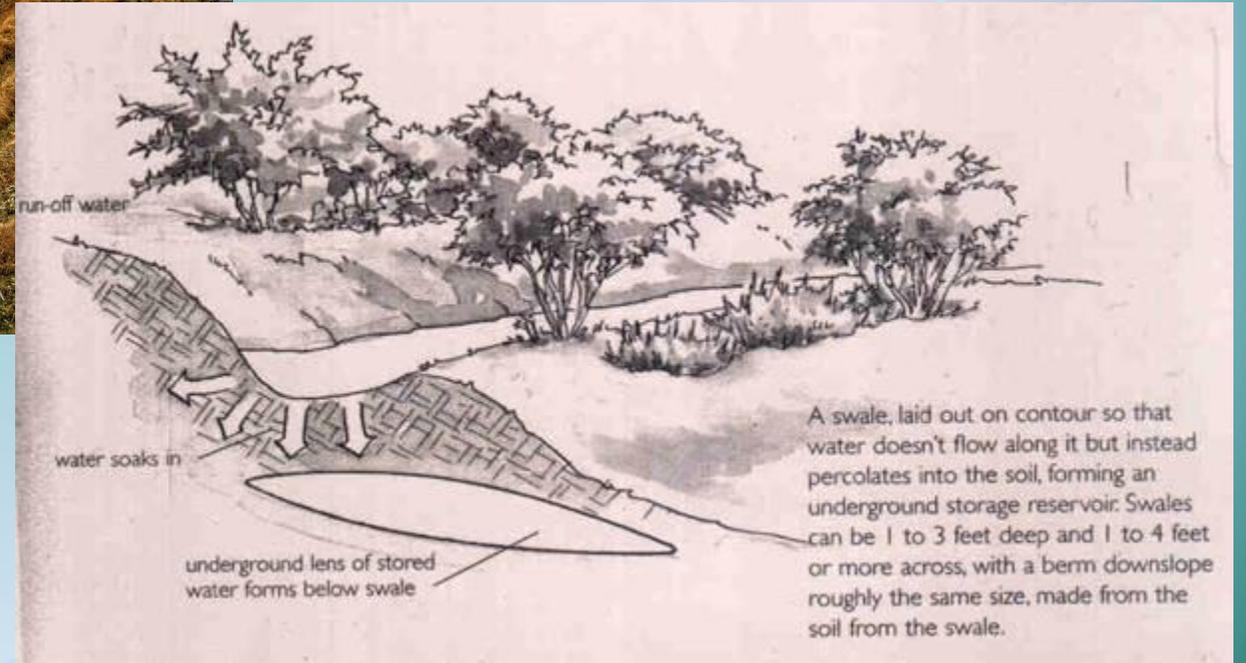
Permaculture Strategies & Practices (cont.)

❖ Water Harvesting

○ Contour swales

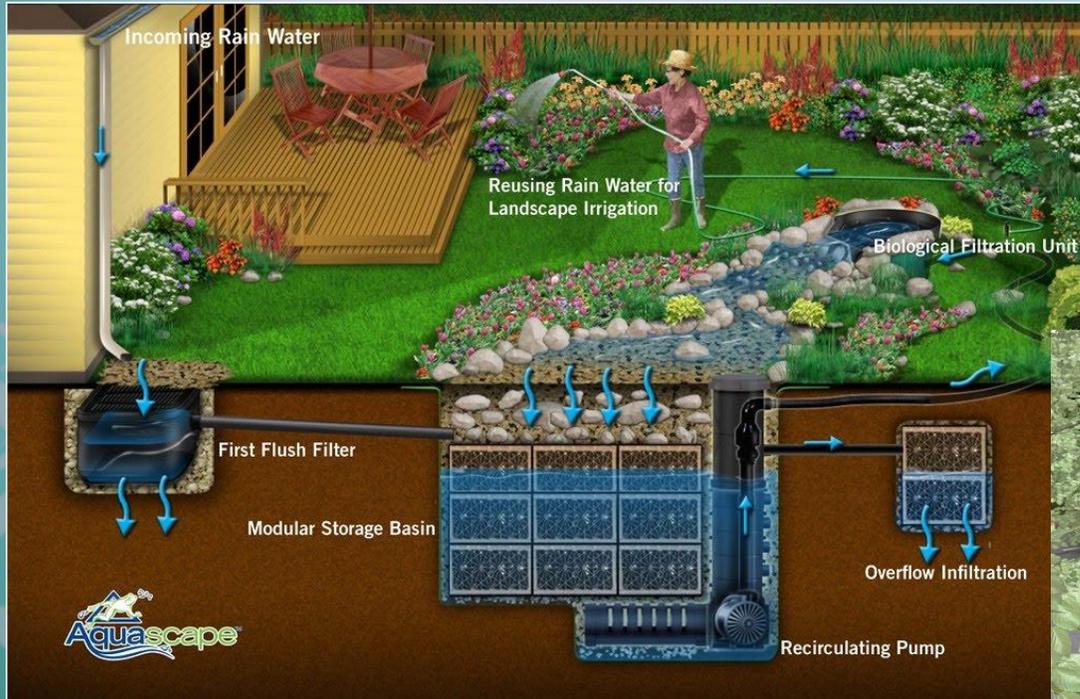
- **accumulating and storing for reuse before it reaches the aquifer**
 - provide drinking for livestock & water for irrigation
 - supplement the subsoil water level
 - stormwater harvesting

Contour Swales



Roof Rainwater Systems

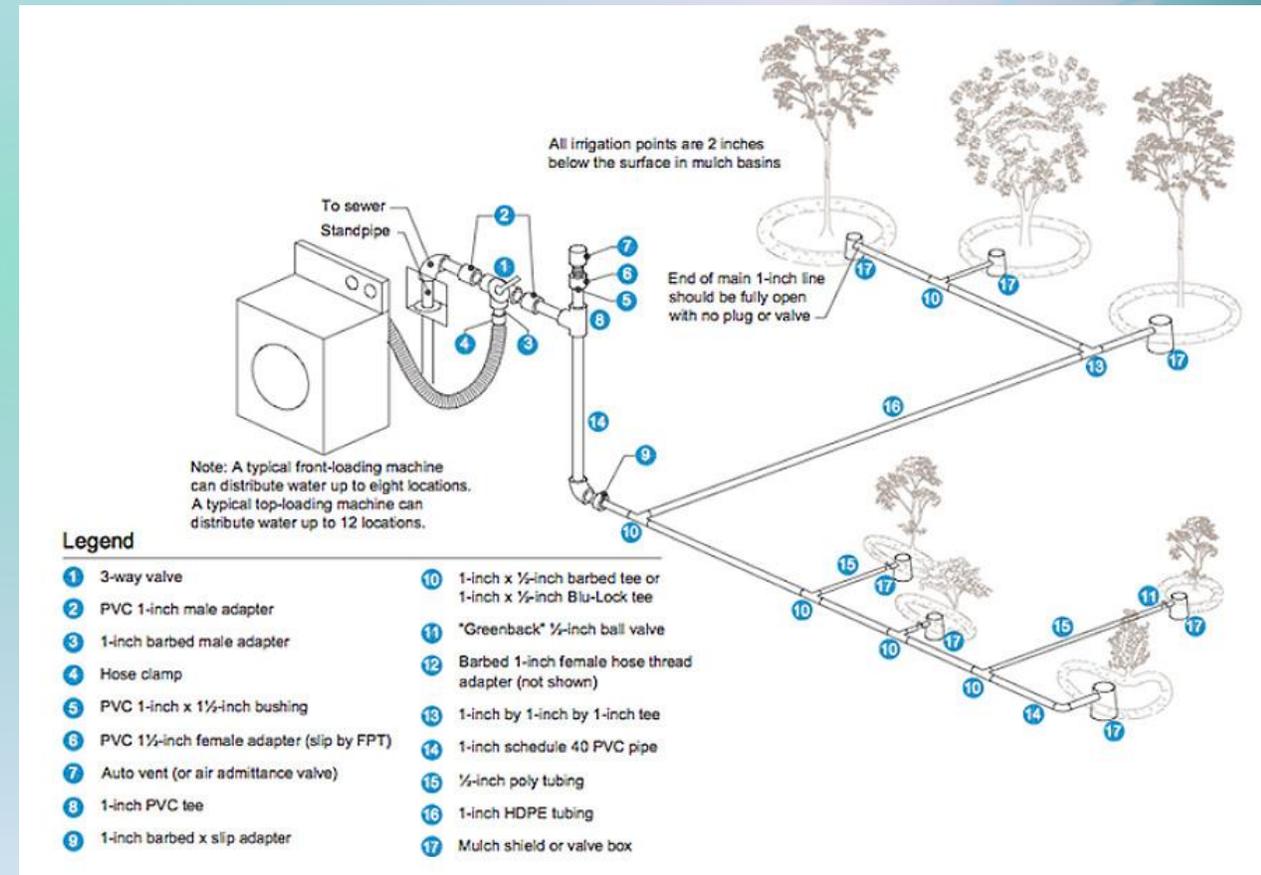
❖ Rainwater harvesting from the roof



Permaculture Strategies & Practices (cont.)

❖ Greywater

- Wastewater generated from laundry & dishwashing
- Used for landscape irrigation and constructed wetlands
- Not potable (drinkable)
- Not considered blackwater
- Legal in California
- Must not bury outlets



Permaculture Strategies & Practices (cont.)

❖ Keyline Design

- a technique for maximizing beneficial use of water resources of a piece of land
- developed in Australia by farmer and engineer P. A. Yeomans.

Permaculture Strategies & Practices (cont.)

❖ Mulching & Sheet Mulching

- a protective cover placed over the soil
 - Any organic material can be used
 - wood chips, leaves, cardboard, newspaper
 - absorbs rainfall
 - reduces evaporation
 - provides nutrients
 - increases organic matter in the soil
 - feeds and creates habitat for soil organisms



- suppresses weed growth and seed germination
- moderates diurnal temperature swings
- protects against frost
- reduces erosion
- aids in the formation of humus

Permaculture Strategies & Practices (cont.)

❖ Sheet mulching

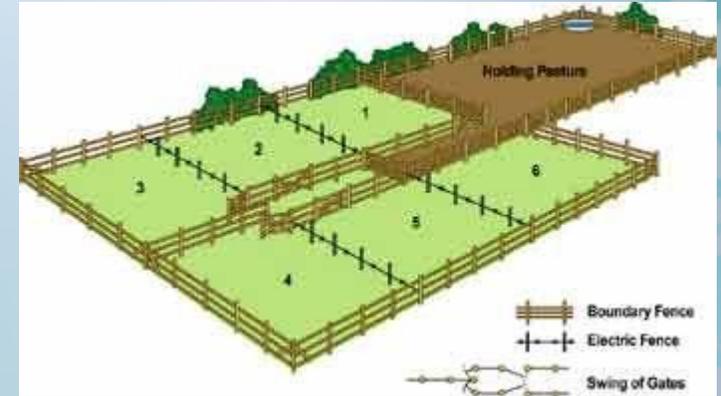
- an agricultural, no-dig gardening technique that mimics natural processes occurring within forests
 - mimics the leaf cover that is found on forest floors
 - Generates healthy, productive and low-maintenance ecosystems
 - serves as a "nutrient bank" as the organic matter slowly and naturally breaks down
 - improves the soil by attracting and feeding earthworms, slaters and many other soil micro-organisms, as well as adding humus
 - promotes accumulations of earthworms



Permaculture Strategies & Practices (cont.)

❖ Intensive Rotational Grazing

- Grazing, done wrong, can be environmentally destructive
- Managed Intensive Rotational Grazing (MIRG)
 - ruminant and non-ruminant herds and/or flocks are regularly moved to fresh pasture, range, or forest to maximize the quality and quantity of forage growth
 - cell grazing or flash grazing
 - disturbance is followed by a period of rest which allows new growth
 - can be used with cattle, sheep, goats, pigs, chickens, rabbits, geese, turkeys, ducks and other animals depending on the natural ecological community being mimicked
 - One variation on MIRG that is gaining rapid popularity is called eco-grazing
 - *used to either control invasives or re-establish native species*



Permaculture Strategies & Practices (cont.)

❖ Fruit Tree Management

- “No-pruning option” often practiced by default in people’s back gardens
 - reduces work
 - can lead to higher overall yields
- Masanobu Fukuoka - Tao-philosophy of Wú wéi (“no-action against nature) - no unnecessary pruning
- trees should be raised all their lives without pruning, so they form healthy and efficient branch patterns that follow their natural inclination
 - achieved yields comparable to or exceeding standard/intensive practices of using pruning and chemical fertilization

Permaculture Strategies & Practices (cont.)

❖ Integrated Pest Management

- An ecosystem-based strategy
 - Focuses on long-term prevention of pests or their damage
 - Uses a combination of techniques: cultural, biological, physical, and chemical

Permaculture Strategies & Practices (cont.)

❖ Natural building

- **Building systems and materials that place major emphasis on sustainability**
 - Straw bale
 - Rammed earth
 - Cobb
- **Materials**
 - Durability and minimally processed to lessen the environmental impact without sacrificing comfort, health or aesthetics
 - Plentiful or renewable resources,
 - Recycled or salvaged materials

Permaculture Strategies & Practices (cont.)

- **Design considerations include:**
 - Building orientation
 - utilization of local climate and site conditions
 - emphasis on natural ventilation
 - fundamentally reduce operational costs and environmental impact
 - Building compactly to minimizing the ecological footprint
 - on-site energy acquisition
 - on-site water capture
 - alternate sewage treatment and
 - water reuse

Permaculture Design Process

❖ Permaculture Design Framework

- **Observe & Survey**
- **Analysis & Assessment**
- **Visioning**
- **Conceptual Planning**
- **Master Planning**
- **Detailed Design**
- **Implement**
- **Maintain / Monitor / Evaluate**

Permaculture Design Process (cont.)

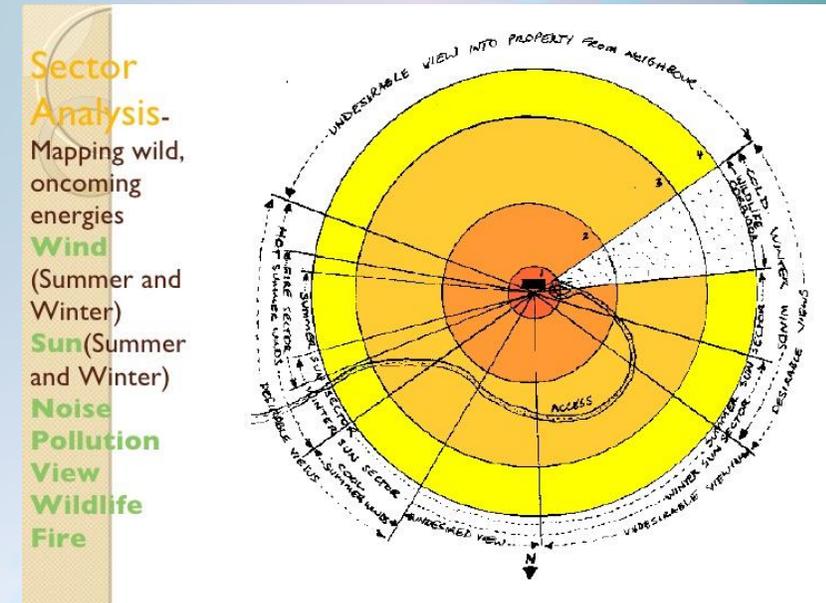
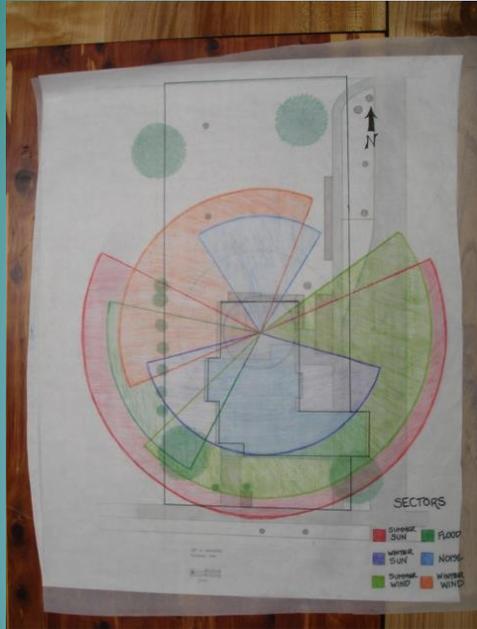
❖ Observe & Survey

- **Observation guides and grounds design so it is reflective and responsive to place**
- **Develop a base map**
 - captures everything that exists on property
 - Property lines
 - Topography
 - Hydrology (streams & creeks)
 - Wells & springs
 - Buildings (including neighbors)
 - Fences
 - Major vegetation
 - Pathways & driveways
 - Public utilities
 - Soils

Permaculture Design Process (cont.)

○ Sector Analysis

- Depicts what is happening on and around the site
 - Sun's path (at each season)
 - Prevailing wind and rain directions
 - Hot sun and shade areas, microclimates
 - Views
 - Noise
 - Fire danger



Permaculture Design Process (cont.)

- **Local & State Regulations**
 - Zoning regulations
 - Building codes
 - HOA & Road Association CC&Rs
- **Federal & State Regulations**
 - Clean Water Act
 - State Fish & Game
 - State Water Resources

Permaculture Design Process (cont.)

❖ Analysis & Assessment

- Without assessment, design is not rooted in the land, but in ego
- Designs based on observation have a connection to place
- Aim is to *compose with* rather than *impose upon*
- Identify Opportunities & Constraints

Permaculture Design Process (cont.)

❖ **Visioning**

- **Goal setting: asks people to envision the future, state values, and develop a common statement for their vision and goals**
- **List the design systems and elements that support the vision/dream**
 - Structures: home, greenhouse, barn, coops, shelters, etc.
 - Food: food forest, edible landscape, veggie beds, etc.
 - Energy: solar, wind
 - Water

Permaculture Design Process (cont.)

❖ Conceptual Planning

- The relative placement and proportioning of the areas
- Locate, shape and size required areas using rough bubble diagrams with notes
- Define circulation



Permaculture Design Process (cont.)

❖ Master Planning

○ Go into details

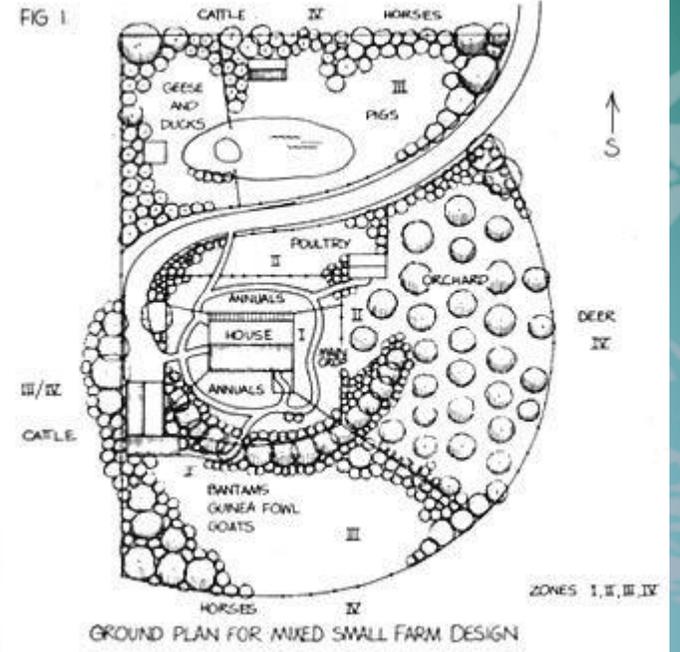
- determine size, shapes and locations of individual elements,
- use needs & yields and random assembly methods to determine how to connect pieces of design



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Master Plans



Permaculture Design Process (cont.)

❖ **Implement**

- **A plan of action to follow based on priorities, budget and logical order of establishment**

❖ **Maintain / Monitor / Evaluate**

Permaculture for the Homesteader and Gardener

- ❖ **“Permaculture is neither a specific recipe, nor an end point. Rather it is an ongoing process of harmonious adaptation to nature’s changing conditions.” – Maddy Harland**
- ❖ **“You don’t DO permaculture, you USE Permaculture in what you do.” – Scott Pittman, Director of The Permaculture Institute**

Permaculture for the Homesteader and Gardener

❖ Resources:

- **Gaia's Garden: a Guide to Homescale Permaculture – Toby Hemenway, 2009**
- **Edible Landscaping – Rosalind Creasy, 2010**

UCCE El Dorado County Master Gardeners



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