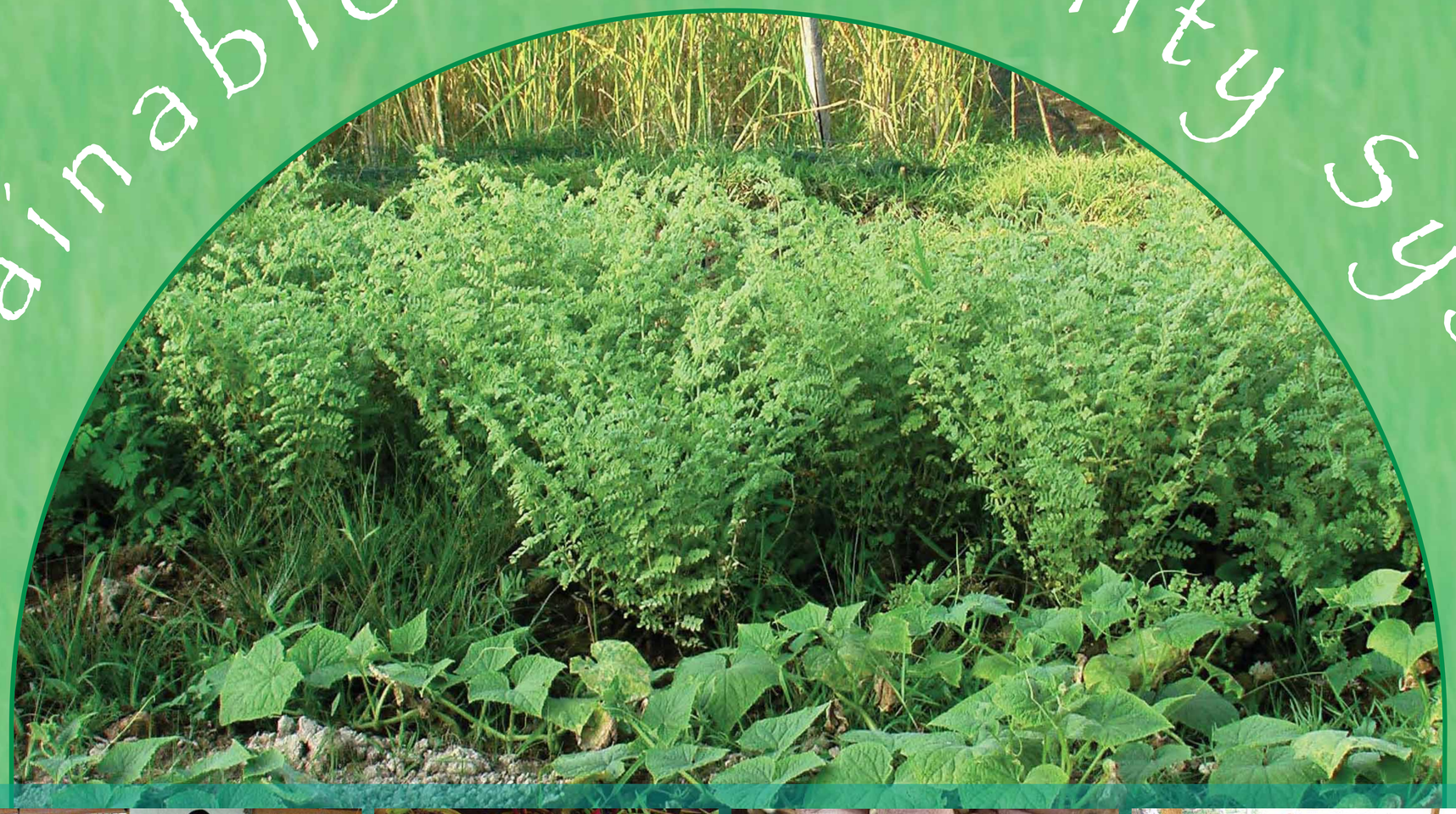
IDEP

About Permaculture

Sustainable Community Systems



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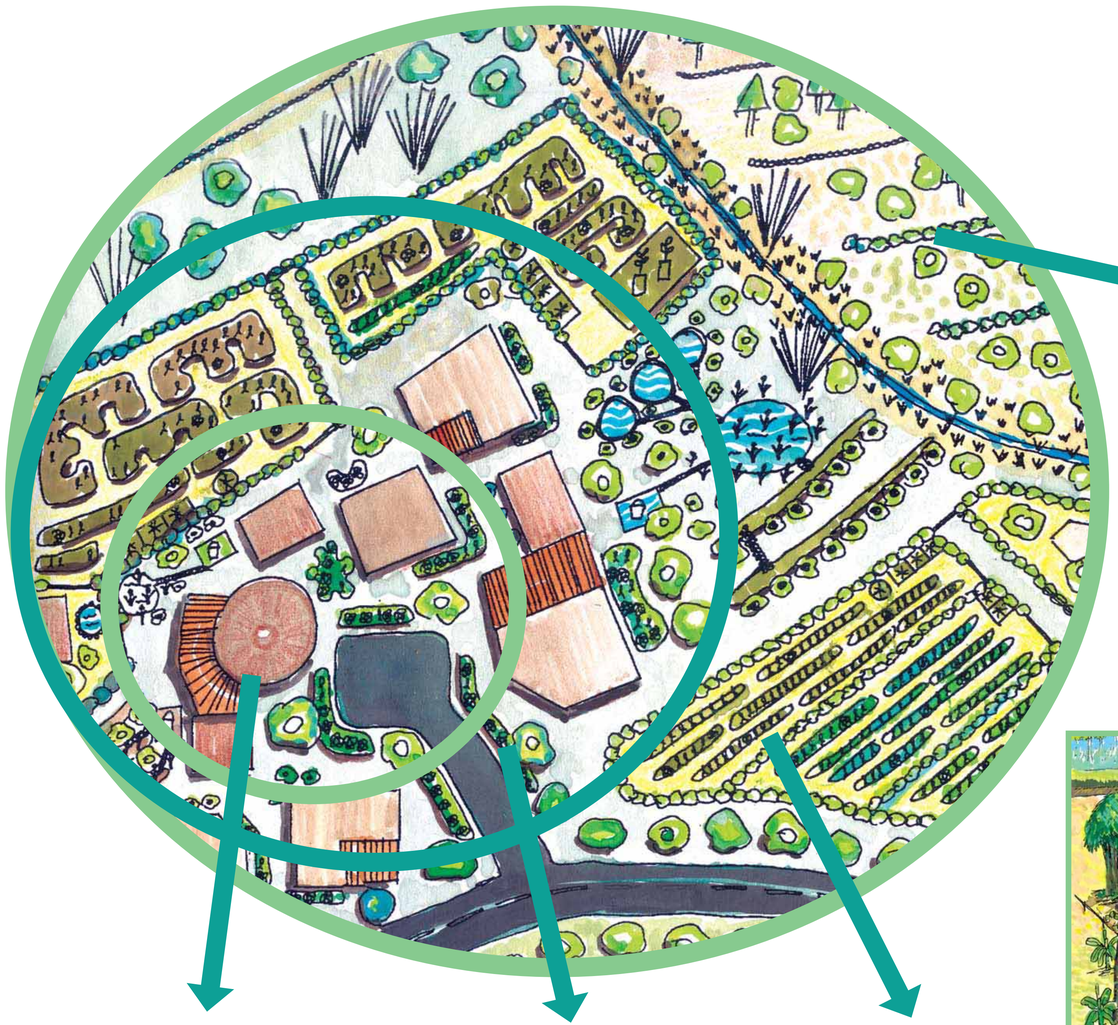
What is Permaculture? - Module 1 • A Permaculture Village

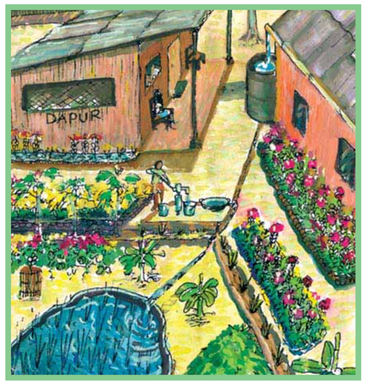
A Permaculture village design includes...

- Houses designed for good health and minimal energy use built with sustainable materials.
- All wastewater is cleaned on site and reused, recycled, or disposed of responsibly.
- Compost toilets provide compost and use minimal water and shower water is cleaned and reused.
- Many trees provide shade, fruit, nuts, and reduce wind.
- Appropriate technology like solar food driers and natural electricity generators are used.
- Home gardens, nurseries, composts, small animal husbandry production, and aquaculture are integrated.
- Appropriate disaster risk reduction steps, like tree planting above the village, are used to help protect the village.

Natural patterns and design - Module 2 • Permaculture zones



Zone 1



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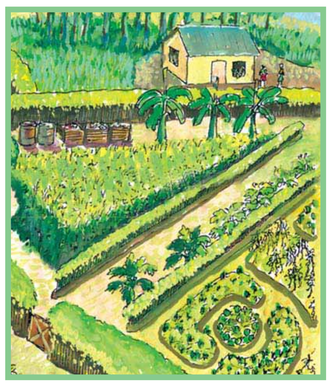

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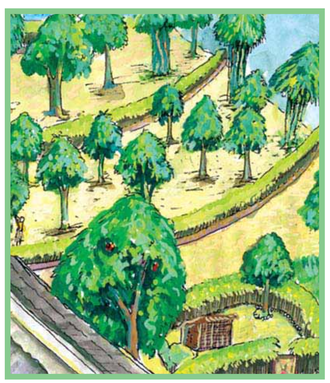
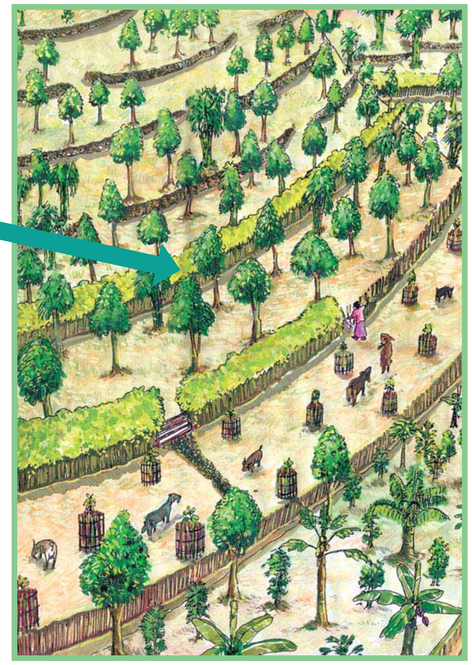
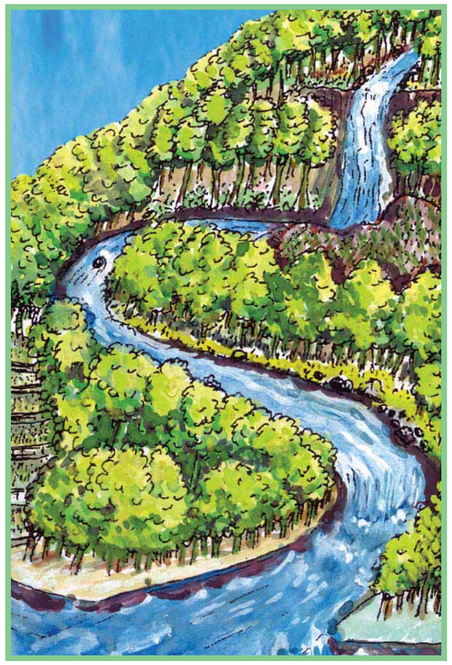
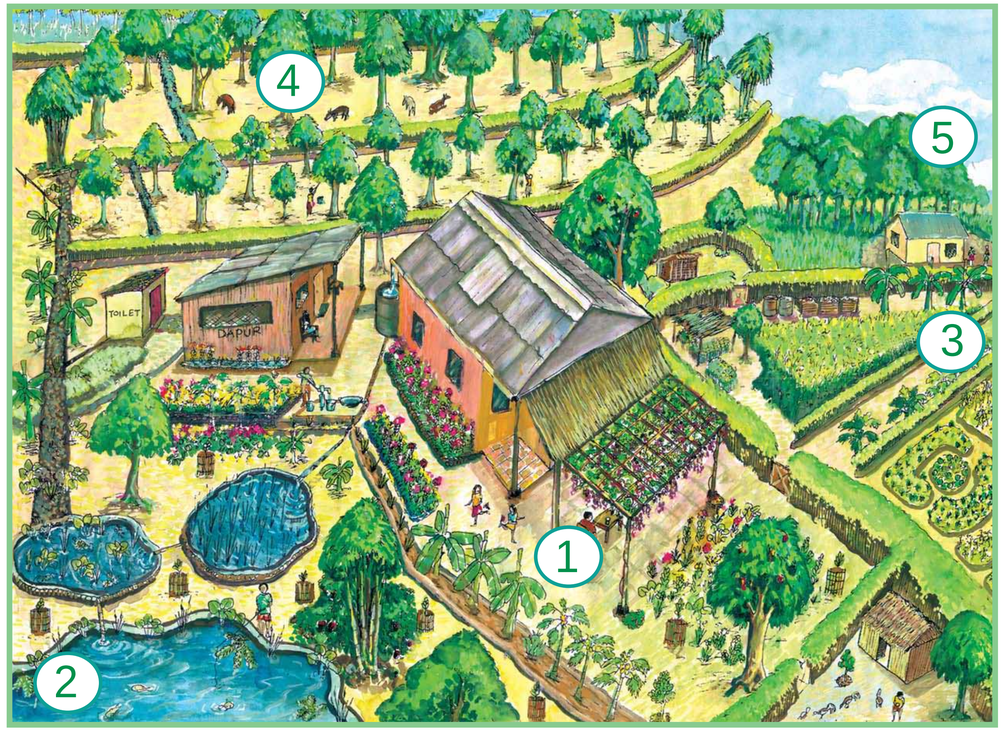


Zone 4

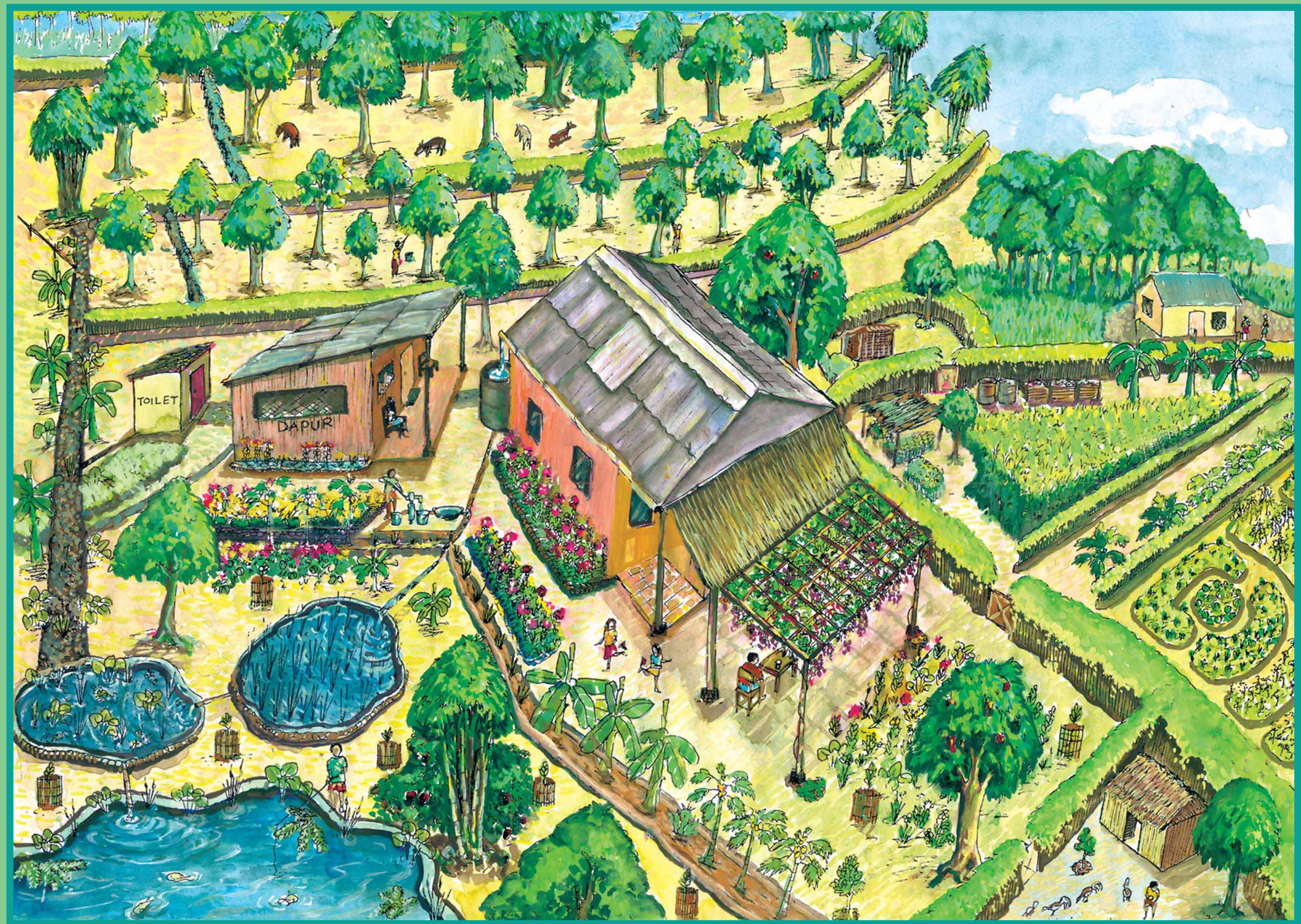


Zone 5





- **Zone 1 includes:** The house, home garden, shower/wash rooms, kitchen, toilet, small animals, seedling nursery, and things which need daily attention.
- **Zone 2 includes:** Home and market gardens, small animal husbandry and large animals that need regular attention, intensive fruit tree systems, and small aquaculture systems.
- **Zone 3 includes:** Larger and lower maintenance fruit tree systems, large animal husbandry, larger crops that require less maintenance, and aquaculture systems.
- **Zone 4 includes:** Large scale system of trees, crops, large animal husbandry, and low maintenance aquaculture systems.
- **Zone 5 includes:** Rivers and wild forest, wild plants that produce food, medicine, timber, protection of the environment including native trees, plants, birds, and animals – it is a place to study natural environmental processes.



Many elements of house design, water, and waste management can be seen in this illustration...

- Buildings are made from sustainable materials, use local materials, and have verandas.
- Water is collected from roofs and stored in a tank.
- All waste water from the kitchen, shower, toilet, and washing area is cleaned using a wastewater garden system and then fed into fishponds.
- Small gardens of flowers, vegetables, herbs, and large tree seedlings are planted around the house to provide shade.
- Swales with trees above the house reduces risks of landslide, flooding, and erosion.

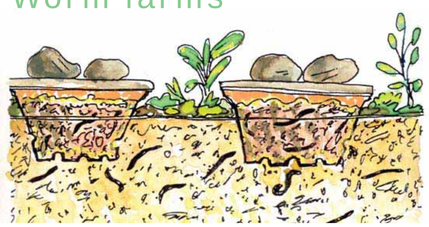
Liquid compost

Composts

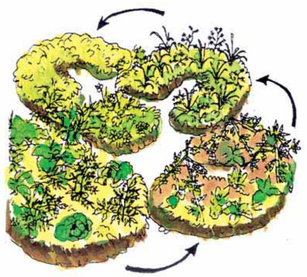
Effective Micro-organisms (EM)

Terracing

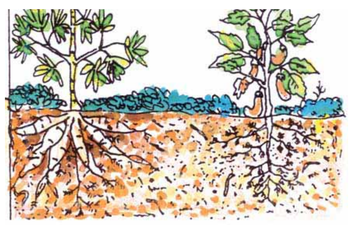
Worm farms



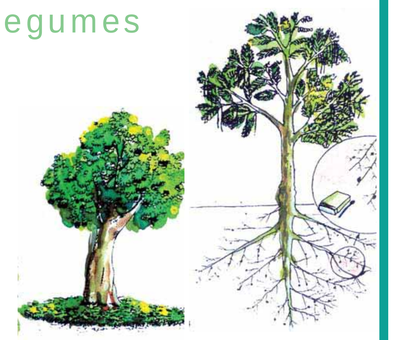
Crop rotation



Mulch



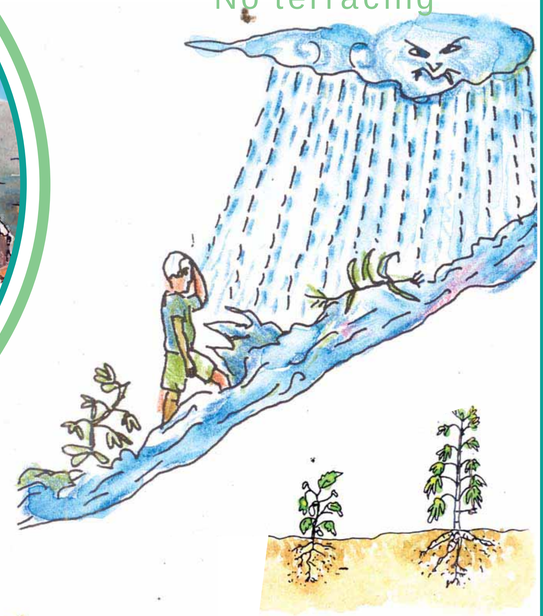
Legumes



Monoculture crops

Burning

No terracing



Chemical pesticides and fertilizers

No mulch

Healthy soil...

- Contains a constant readily available supply of nutrients and minerals.
- Is alive with billions of tiny animals and soil biota.
- Contains lots of humus and organic matter.
- Is soft, is made up of 50% air, and can hold a lot of water.
- Has good structure and mix of sand and clay, and a balanced pH level.
- Compost, mulch, terracing, worm farms, micro-organisms, legumes, crop rotation, and reducing soil compaction will help promote healthy soil.
- Burning, using chemical pesticides and fertilizers, no mulch, no terracing, and planting monoculture crops will damage healthy soil structure.

About nurseries

- The nursery provides protection from sun, rain, strong wind, and animals.
- The nursery is easy to manage and the young seedlings on tables are protected from crawling insects like snails and ants.
- A “hardening” area next to the nursery prepares young trees for planting.
- The nursery has compost and liquid compost nearby so preparing soil mix and feeding the plants is very easy.
- Some of the garden grows plants for seed, a community house stores seeds and tools, a small shop sells seeds, trees, and other products.
- The community nursery is integrated with a larger system including animal husbandry, vegetable gardens, fruit trees, fish, and legumes.

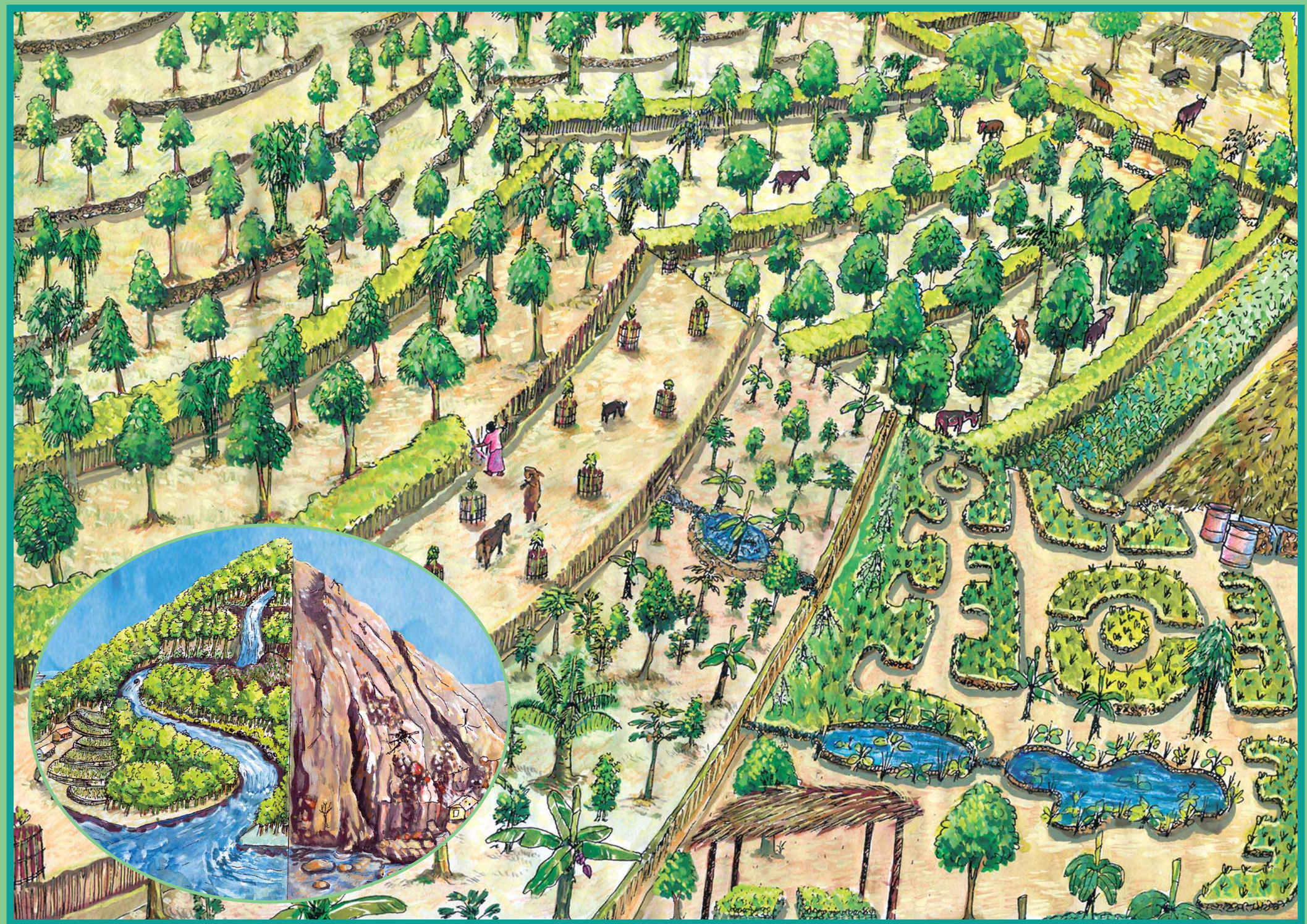
About the gardens

- Garden beds are a variety of shapes and sizes depending on needs and the land.
- Grains, vegetables, herbs, flowers, and small fruit trees are planted together to increase diversity and yield.
- Large trees surrounding the garden provide wind protection.
- A legume living fence surrounds the garden, protects from animals, and provides mulch, compost material, animal fodder, and nitrogen.
- Animals pens are next to the gardens, the animals are used in the garden to clean land, control pests, and provide manure.
- Compost and compost pits are abundant.
- A small nursery grows tree and vegetable seedlings.
- Terraces and swales are used on the sloped land.

About this system

- Natural forests near the farm are protected, especially on mountains and around water sources.
- All water sources are protected and managed in a sustainable way.
- Windbreaks, reforestation, living terraces, and good water management improve farming production and reduce damage from extreme climate.
- Animals are part of land management rotation systems and provide manure for the soil.
- Diversity and rotation of crops improves soil management, production, and minimizes pest problems.
- Compost, mulch, legumes, and animals provide soil nutrients, and terraces, trees, good soil, and fishponds help store those nutrients.

Tree crops and reforestation - Module 8a • Integrated systems



How you can protect the future

- Tree and bamboo crops provide sustainable products and long term income.
- Tree and bamboo crops hold and protect soil, reduce erosion, and store nutrients in the soil.
- Disaster risks of landslides and flooding are greatly reduced.
- Legume tree terraces improve production, provide nutrients and organic material, prevent erosion, and divide the land for animals.
- Animals can be included in integrated systems and used to manage weeds and provide fertilizer.
- Annual crops can also be integrated in the system.

What future do you choose?

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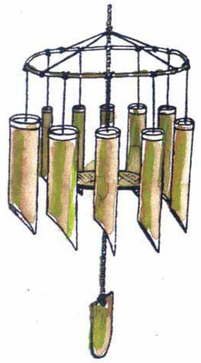
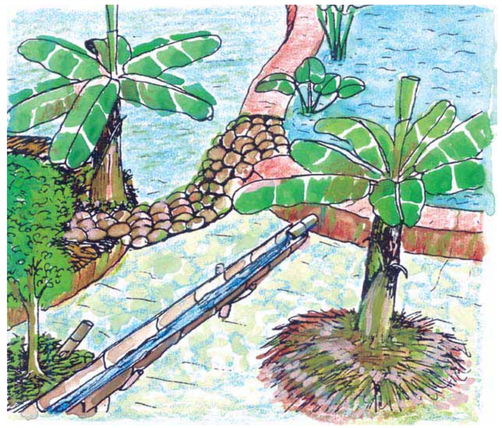
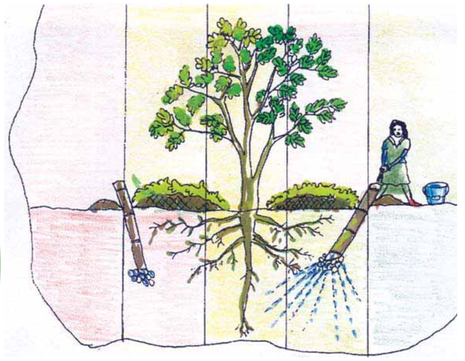
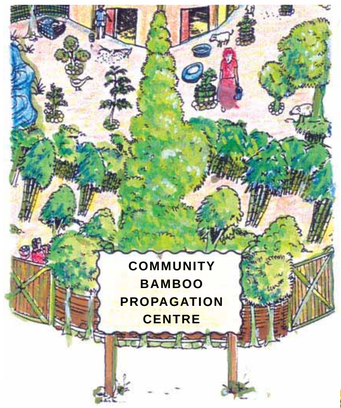
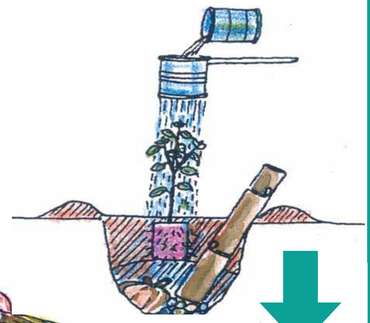










Multifunctional bamboo

- Bamboo is very easy to propagate and maintain and is fast growing.
- Living bamboo has many functions including erosion control, river bank protection, living fences, windbreaks, animal fodder, and animal grazing management.
- Bamboo poles need to be properly selected, cut, treated, dried, and stored to ensure that the bamboo products last a long time.
- Bamboo is incredibly versatile and strong and can be used for building a wide range of products from buildings to buckets.
- Bamboo is also an excellent food and provides many agricultural functions including irrigation, trellising, and fencing.

Integrated Pest Management (IPM) - Module 9 • Key components of IPM

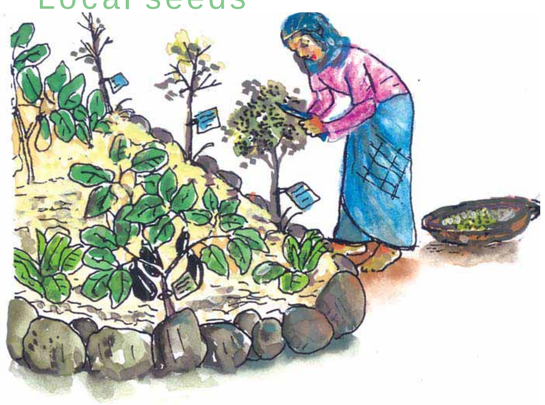
Healthy soil

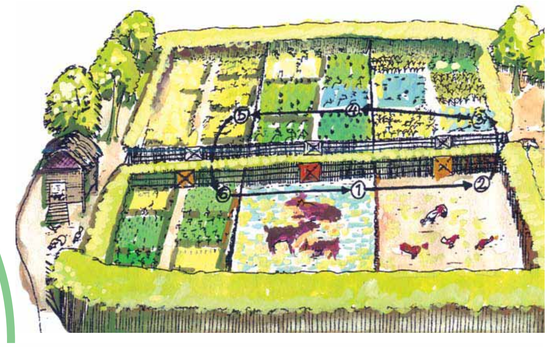
Healthy environments

Good land management

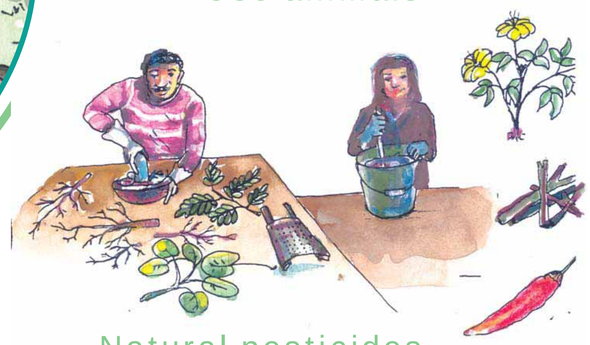
Prevention

Local seeds



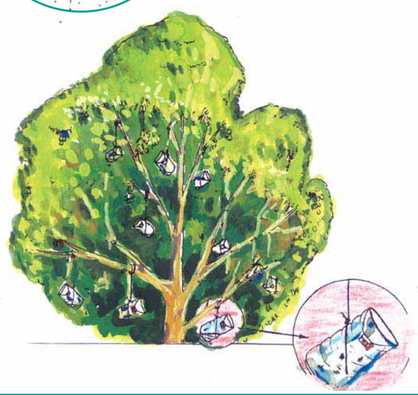


Use animals



Pest predators

Pest traps



Natural pesticides

What is IPM?

- **Healthy soil** is the base for IPM. It produces strong plants that are more pest and disease resistant.
- **A healthy environment** creates balance, diversity, pest predators.
- **Pest predators** such as lizards, frogs, small birds, bats, and insects control pests. Provide homes for them to increase their numbers.
- **Local seeds** are more pest and disease resistant than imported seeds.
- **Good land management** such as crop rotation, companion planting, plant diversity, and natural patterns reduce pest and disease problems.
- **Prevention example:** Ripe black palm fruit in rice paddy water will make rats itch and stop them eating the rice.
- **Pest traps example:** Aqua bottles filled with sweet liquid to catch fruit flies.
- **Animal use:** Chickens and ducks as part of a rotation system will eat pest insects and their eggs.
- **Natural pesticides** will control pest or disease outbreaks.

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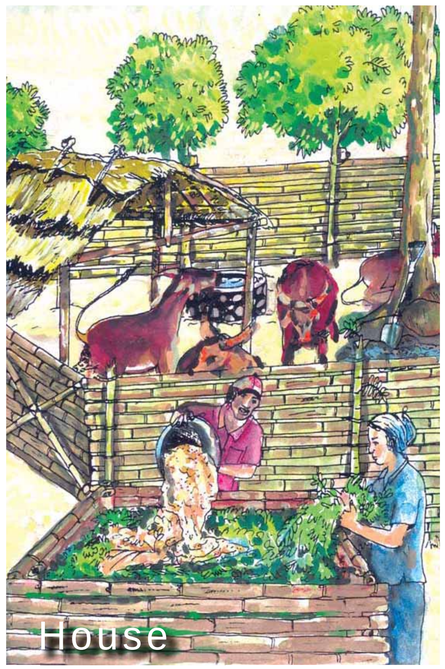
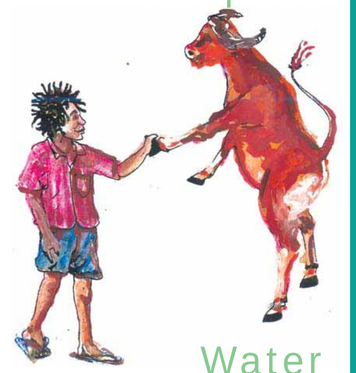
Good health

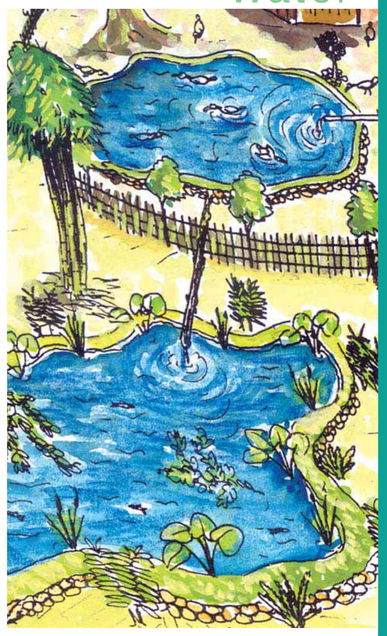


An example: providing all chicken needs in one design

Respect



Water



Protection from predators

Basic animal needs

- **House:** A good house will provide protection from predators, food and drink areas, roosting/ sleeping area, shade, and a healthy environment.
- **Health:** Most animal health problems can be prevented by providing good living conditions.
- **Food and environments:** Most animal food and materials for building animal houses or feeding areas can be found locally and can be sourced from sustainable resources.
- **Respect:** Treat animals with respect and they will be healthier, happier, more productive, and have more offspring.
- **Optimal systems:** Integrate animal houses and feeding areas with other systems like farming, fruit trees, and aquaculture for more diversity, more production, and more sustainable systems.

Aquaculture - Module 11 • An integrated aquaculture system

For best results...

- An integrated aquaculture system provides fish, vegetables, fruit trees, bamboo, organic fertilizer, other animal production, and improves the local climate.
- Water sources are clean and reliable and water channels are utilized for planting fruit trees.
- Fishponds also grow water plants and are surrounded by productive trees and plants.
- Other animals are integrated such as chickens, pigs, and ducks to provide natural pond fertilizer
- All of the nutrient rich run-off water from the ponds is used for watering vegetables or productive trees.
- The more integrated and diverse an aquaculture system is the more self-sustaining it is.
- Fish benefit from having water plants, shallow pond edges, some shade for the pond, nesting areas, and hiding areas for protection from predators.

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