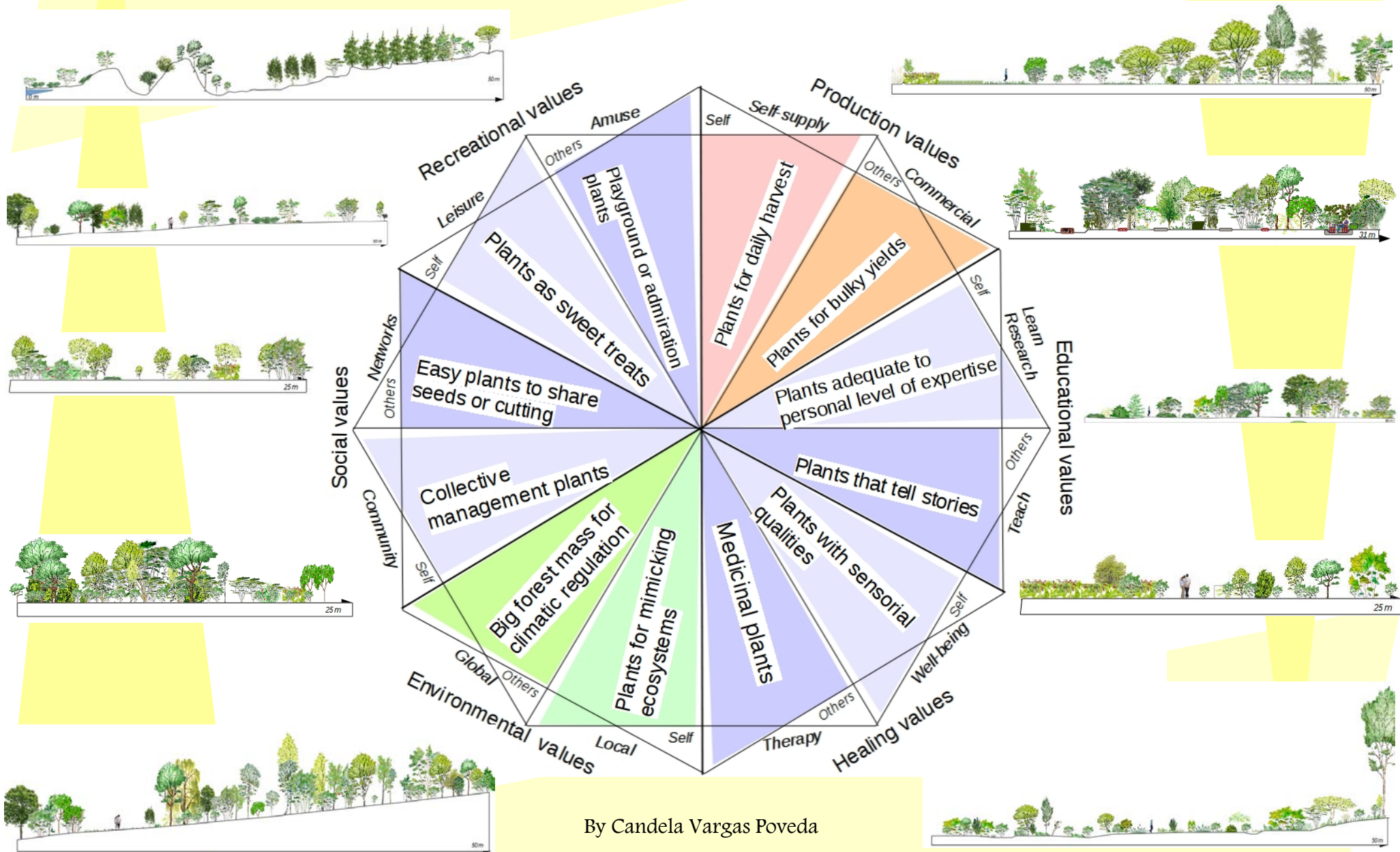


# Forest Garden Archetypes

Classifications based on real examples to provide guidance and inspiration



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# Introduction and aims

Forest gardens are food production systems, based on ancient tropical homegardens, that were first introduced into UK in the 1980's (Crawford M. 2010). Forest gardens are now gaining popularity amongst farmers, horticulturalists and the public throughout Europe.

It is clear that each forest garden is unique, designed in sympathy with its environment and the needs, visions and values of the creator(s). As with any seminatural systems, the management strategy of the system will influence its appearance, creating different landscape structures, from which it is possible to identify general patterns. In this fashion it is possible to apply pattern thinking, a concept that was described by Christopher Alexander 1977 as "Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice".

The aim of this booklet is to create a set of simple forest garden archetypes by distinguishing between the different goals that forest gardens can have and how this influences the specific forest garden structure and management system, using sites in the UK as a study system. The archetypes simplify both the complexities of people's motives and the visual qualities of the English forest gardens.

The intention is for these archetypes to provide a simple and practical design structure for all forest gardeners, especially beginners, to enable them to obtain a deeper understanding of the type of project they want to accomplish and to maximise the site's value as a temperate multifunctional food production system. This is particularly important for tree based systems as their development processes are very long term.

For information on how this booklet was developed and deeper understanding of the tools here explained read the corresponding master thesis (Vargas 2016).

# The temperate forest garden

The term Forest Garden is new phrase defining an old system. The classification of what exactly a Forest Garden is and where it fits within the other established tree based agriculture systems is still in discussion. To understand it better we will first look at the different agroforestry systems. Agroforestry systems have not been used a great deal in temperate climate despite being found in all agroecological zones and ancestrally also in temperate regions.

– Agroforestry: is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, etc) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economical interactions between the different components (Lundgren and Raintree, 1982).

The International Centre for Research in Agroforestry (ICRAF) classifies agroforestry systems based on the type of components in:

- Agrisilviculture → Crops and trees/shrubs.
- Silvopastoral → Pasture / animals and trees.
- Agrosilvopastoral → Crops, pasture /animals and trees.

Within none of these are the terms Forest Gardens or Food Forest used. However, from the descriptions used forest garden systems could be included in several of them. The classifications which can most easily include forest gardening are:

Homegardens → Intercropping with agricultural crops intimate, multistorey combination of various trees and crops around homesteads. Predominantly fruit trees and other woody species such as vines. Present especially in areas of high population density.

Homegardens involving animals → Intimate, multistorey combination of various trees and crops, and animals, around homesteads. Predominantly fruit trees, other woody species such as vines and animals. Present especially in areas of high population density.

These classifications make the concept narrower by requiring that there is a homestead associated to the agroforestry system. It is not always the case that there is a homestead attached.

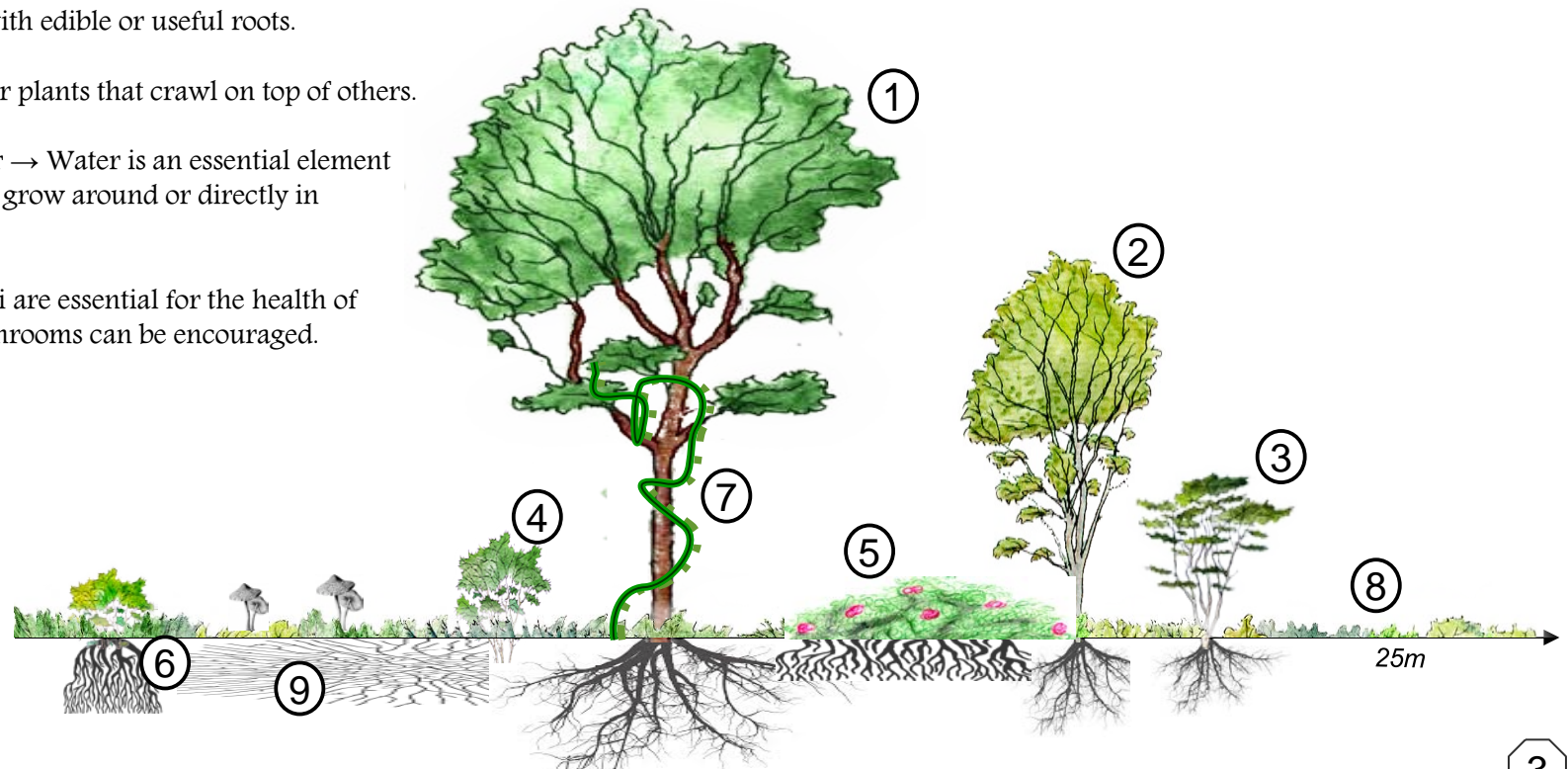
The Food Forest International Research Network (FFIRN) is at present working on defining the concepts as there are minor differences between the terms Food Forest and Forest Gardens. The terms Food Forest and Forest Garden can be used interchangeably to describe multi-level perennial polycultures, and we will continue to use them like this until a more precise distinction has been agreed.

# The layers of the forest garden

Forest gardens are diverse systems with plants growing close together at different heights. The original concept included 7 vegetation layers forming the forest garden. Recently, the Temperate Climate Permaculture Website has included 2 more layers in the concept.

In a temperate climate the plants must be much more spaced than in a tropical forest garden due to the light requirements.

- 1 - The canopy layer → The higher trees often over 9 meters of height. They are forest climax species as nut trees and conifers, as well as fruit trees on the most vigorous rootstocks.
- 2 - Low - tree layer → Includes smaller trees from 3 to 9 meters. The majority of orchard fruit trees.
- 3 - Shrub layer → From low bushes, cane fruits to small often coppiced trees, up to 3 meters height.
- 4 - Herbaceous layer → They are herbs and perennial vegetables in all sizes that die out in the winter or are self-seeding.
- 5 - Groundcover → It can also be herbs, but with the characteristic that they cover the soil surfaces efficiently.
- 6 - Rhizosphere → Plants with edible or useful roots.
- 7 - Vertical layer → Climber plants that crawl on top of others.
- 8 - Aquatic / wetland layer → Water is an essential element in forests. Many edible plants grow around or directly in the water.
- 9 - Mycelial layer → Fungi are essential for the health of the forest garden. Edible mushrooms can be encouraged.



# Forest gardeners drivers

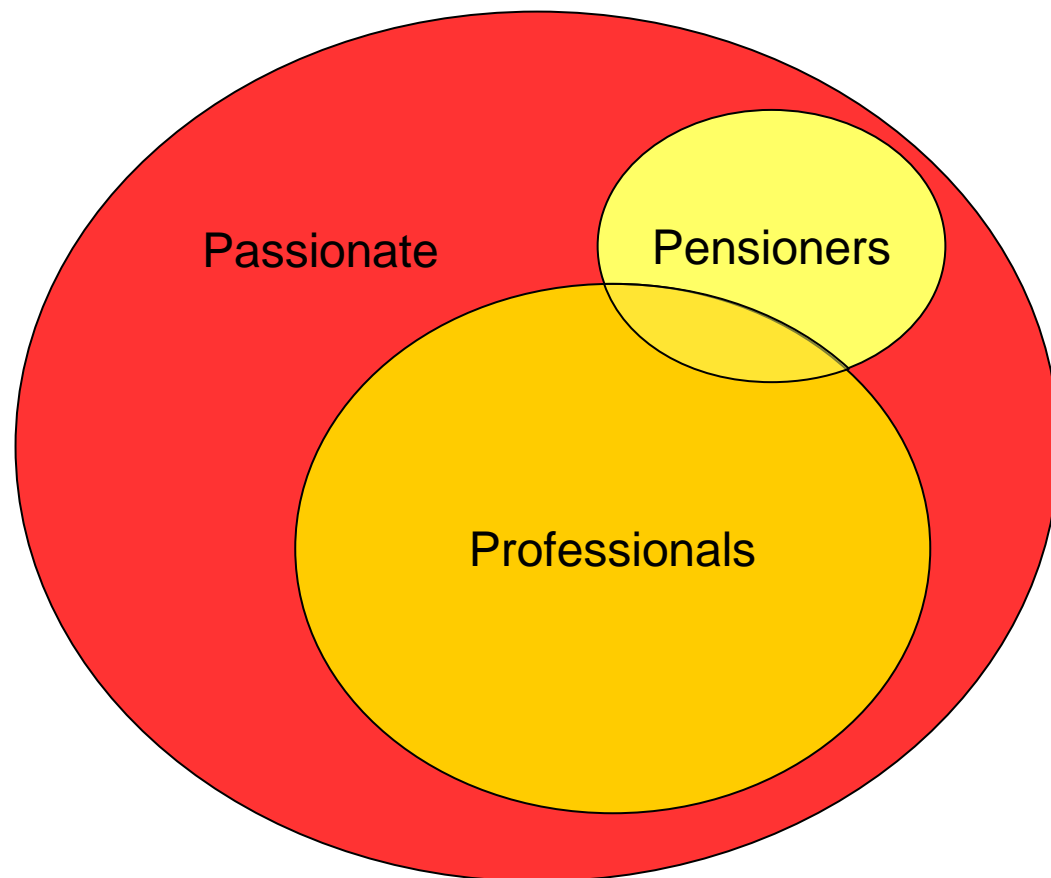
A forest gardener is a person that spends time and energy in the creation and management of a forest garden site.

The demography of this group of people is broad in relation to age, backgrounds and motives. In this booklet I will simplify this group into different categories. The first distinction used to categorise these people is the drivers that give them reasons to create and manage forest gardens. This classification is very generic trying to encompass the diversity of motives in major groups. This group represents what I found most commonly distinguish one type of forest gardener from another. Take note that these classifications build on each other and none of them are mutually exclusive.

**Passionate** → Their forest garden work it's done with passion. Not necessarily related to a way of making a living. There is multiple reasons for why they enjoy forest gardening. As being in contact with nature or having a positive impact and restoring the land. I dare to say that all forest gardeners are passionate forest gardeners, otherwise they will do something else.

**Professional** → Their forest garden work is strongly focused on earning an income and making a livelihood out of their practice. They earn at least part of their income from their forest garden practice or their knowledge. By selling their produce, being educators and / or advisors.

**Pensioners** → Are retired and backed up by a certain level of financial stability. They have always been interested in gardening and now they dedicate their working force to forest gardening.





# Forest garden knowledge

This is the second type of classification. It addresses how experienced forest gardeners are and how that influences their practice.

The experience of the forest gardener considerably influences the forest gardens system, in terms of the health and strength of the system as well in its structure and appearance.

– Apprentices → Forest garden work is relatively new for them. There is a will to learn and to try things out.

People learn in many different ways about forest gardening but learning through practical experience is a strong tendency amongst forest gardeners.

Some apprentices try things out even though they have little knowledge on forest gardening and there is no certainty that what they are doing is going to work out.

Although experimenting and trial and error is a valid way to learn about general gardening, when we consider the length of time taken for a forest garden to develop this approach can be counterproductive. Planting trees too close together, pruning wrongly or planting non-productive varieties are some of the most mentioned mistakes.

– Experienced → They have been learning throughout their lives with formal or informal education that are related or are part of the group of knowledge which is broadly related to forest gardening. Such as botany, horticulture or forestry. They are skilled at managing at least some of the layers of their forest gardens. Their interest and specific expertise influences significantly the forest garden structures which they develop. In this way an expert in horticulture might have strong low-tree and shrub layers while their groundcovers are not developed much. Alternatively, the herb and groundcover layers of a herbalist may be very diverse but there might not be many trees or those that are present may not be in great condition.

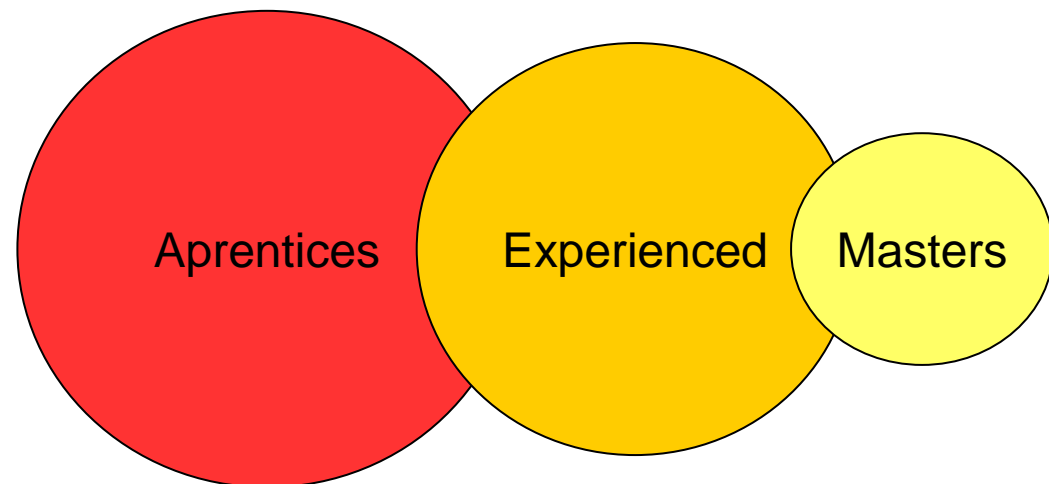
– Masters → Forest gardeners with a high level of expertise in forest garden management systems.

They are the pioneers in the area, the authors of the forest garden literature.

They give forest garden courses, tours and inspire almost anyone that passes by their forest gardens.

They are open to share their knowledge, but they are often very busy people.

If they find the correct media outlet for sharing their experience they can be extremely helpful to other similar projects.



# Forest Gardens

Here we look at forest gardens from the point of view of the different roles people involved can have in the project. These roles are owners, decision makers, managers and users. Due to the diversity of forest garden projects these categories are a bit loose and the rows in the box below do not necessarily fit with each other. In some cases the roles may change or swap. From all these classifications the most common forest gardens I define as:

Private forest garden where the site is owned by an individual or a family and often they run their small private company. All management decisions are taken by the owners and most of the management will be done by them, with the possibility of having volunteers or workers helping with certain jobs. The space is available to be used by who the owner allows. What tends to be its family and friends. However often owners are so proud of their sites that they might invite or allow many unknown visitors to the site.

Community forest gardens that will be a project organised as an association or a cooperative, and the space might be owned or rented by the organization or often had it donated to the project. The major decisions are taken by the core group of people involved in the project while many more people will be involved in the management and use of the space. There is a filter of only having around people that are genuinely interested in the project and often with the goal of making a collective livelihood from the project.

There are also often community projects which are owned by the municipality. These we call Public forest gardens. In this type the project members have to come to agreements and compromises with the municipality workers making the management more challenging. Often the forest gardens will be placed in parks or public spaces and the broader public will interact with the project making it very dynamic but also making the management much more challenging. Part of this comes from the project having to respond and adapt to destruction by dogs, inconsiderate users and even theft of plants. Other public institutions that tend to own forest garden projects are schools or universities. There these public forest garden problems are not common.

Forest garden power structures

Ownership of The project	Ownership of The space	Structural model	Decision makers	Managers	Users
Individual	Private	Private company	Management decisions Taken by the owners.	Owners Friends and Family, Volunteers	Group of Friends, family And volunteers
Group	Private owner loans it or Donates it to the project	Association	Core group of employees and Volunteers	Employees and Volunteers	Big close group
	Private owner that Sympathises with The project	Cooperative			Closest group And clients
	Municipality	Public institution	Collaboration between members of the project And the municipality	Employees, Volunteers Municipal workers	Open to the Broad public

# The levels of the Visions

As forest gardens are very long term projects it tends to be challenging to envision the complex picture they will create when they mature. In this section we divided the vision according to its time depth. It is worth baring in mind that the visions are not always static they often change or evolve in unexpected directions.

Utopic vision → It is the dream of how they want the world to be thanks to our actions.

We might never know if we will reach it or not, but is worth the try.

For example: "Forest gardening world wide stabilizing climate change"

It is the most static of the visions. But if person changes its perception on the world, it will also evolve.

Long term goals → Are the visions that look far into the future. They are closely related with the values of the project. A picture of what is the forest garden like and what functions are desired that it covers. For example. "Having a forest garden that makes us self sufficient"

It changes due to unexpected life circumstances that can make the project turn its direction 180 degrees. It can also evolve into something else as the project evolves and the participants realize where its full potential lays.

Medium term aims → They are clear achievements that can be reached in the site and are stepping stones towards the long term goals.

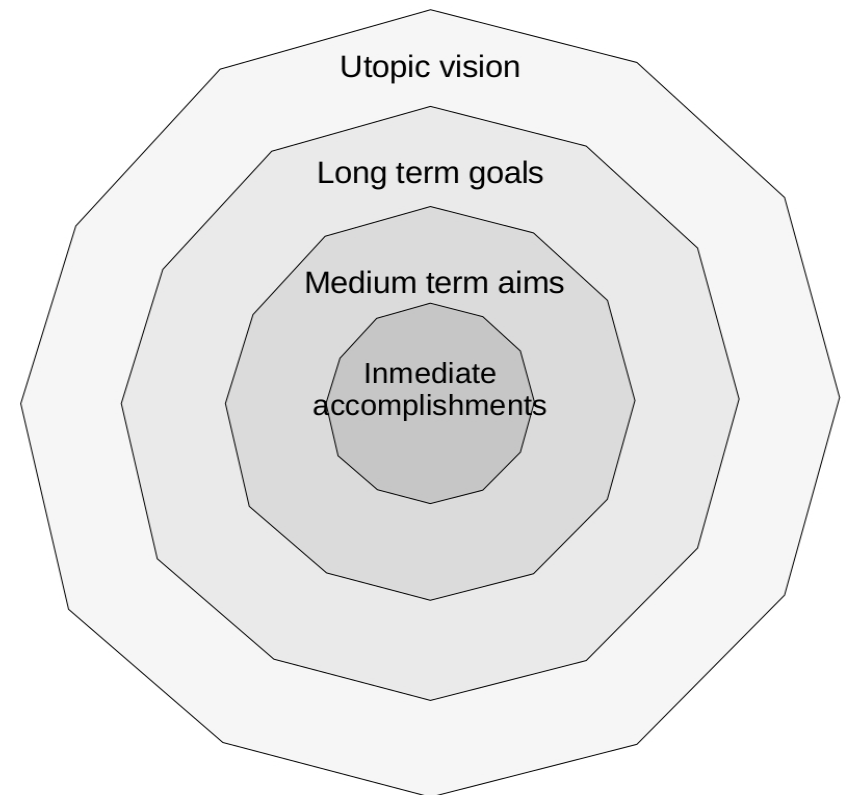
For example. "Establish an apple press or start hosting groups of students"

They evolve as the project evolves. Once the original aims are met, new aims come. If they cannot meet the desired goals it can cause frustration. However a change in the long-term goals that still complies with the utopic vision can bring the project in a new satisfactory direction.

Immediate accomplishments → These become fulfilled with the implementation itself. Just with the fact of getting started they are already fulfilling themselves. The goal is the process itself.

For example . "To be more in contact with nature through the forest garden"

They change as there are changes in people's desires and interests.



# The value wheel

All projects have a mix of different values that are important, together they form the framework that defines the vision of the project. Values are like the bricks on which the visions are built. They are a taxonomy for analysing various views of nature and living diversity (Kellert 1996:37). They are a reflection of the services one expect to get from the forest garden. For Forest garden projects to succeed it is essential that there is harmony between the different values the participants consider important for the project.

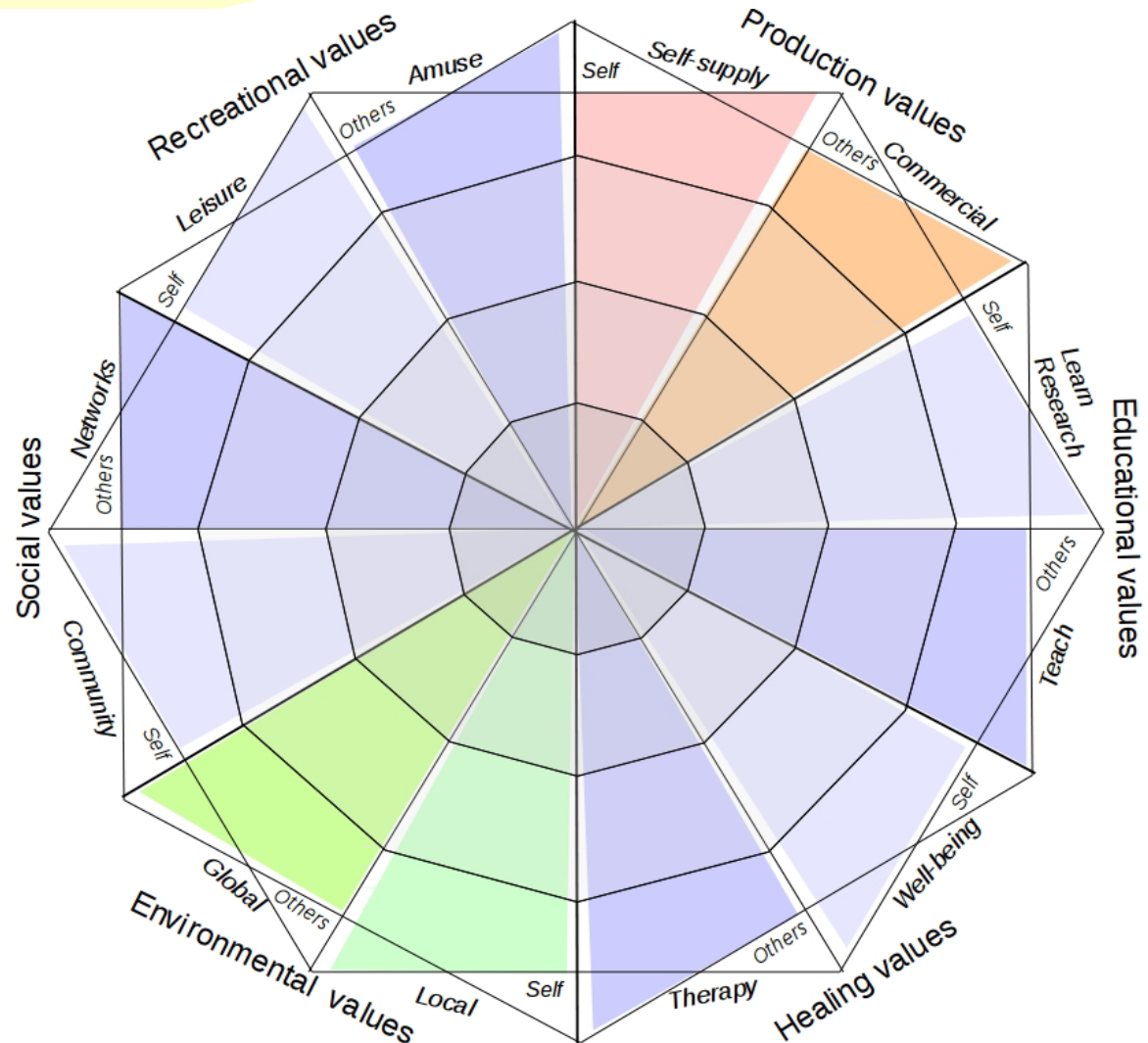
We classify the values in a framework for the participants to define their forest garden projects.

Values can be of very diverse nature. The colour coding classifies them as: the ecosystem services in provisioning (red), supporting (green), cultural (blue) services. Where cultural values are divided in 4 main groups. Social, Recreational, Educational and Healing.

The value wheel can be used to evaluate the desired goals for the forest garden project.

The way to use it is to mark the size of the colour coded triangles according to the comparison and prioritization between the values and in relation to the levels of the vision previously mentioned. So the most predominant values with longer term goals will show bigger triangles reaching to the edges of the hexagon and the less relevant values or expected only as immediate accomplishments will show very small triangles close to the centre of the hexagon.

The values can be related to the practices and spatial structures in the site. So whatever the main goals are, if they fit with the techniques and design features of the space there will be a higher chance for success. We will look at the spatial relationship of the values and the features in detail further down when going through the archetypes.



For now notice that all values are confronted with another value that can encourage or diminish each other depending on the specific methods used to put it into practice. For example: with proper regenerative practices production and environmental benefits will support each other. But with mainstream agriculture methods environmental benefits will decrease and in the same way with standard environmental practices, production gets compromised. Similar relations exist between Social / Educational values, and Recreational / Healing values.

On top of that a duality is represented as basic common ground for all of the values.

Each value can be understood from the perspective of the "Self". What you receive from applying that value. Or from the perspective of the "Others". What others receive from you applying the value. Be aware that the same features can bring many different values.

**Environmental values** → They are the expression of growing a forest garden for giving space to nature.

Local (Self) → For the sake of the local environment and its supporting services. As local biodiversity, soil fertility, clean water and air, etc.

Global (Others) → For the sake of the global environment and for future generations to come. Climate regulation, flood regulation, disease regulation, etc.

**Production values** → They are the nutritional, material and energetic outputs of the forest garden.

Self-Supply → Providing products for own consumption. The most common products are food, wood, fibres, natural medicines and cosmetics.

Commercial → Providing products for others. Often will be making a business out of the forest garden. It can also be a business based on exchange or in an alternative currency, even a gift economy where nothing is asked in return directly to the consumer, but it is part of a complex community system of trust and reciprocity.

Cultural values → They are the values that the culture and habits of people give to the forest garden.

They can be divided in 4 categories:

**Social values** → They are the value that a forest gardens can give for connecting with people and satisfy the basic human need of belonging.

Community → The personal connections with the local community around the forest garden.

Networks → Connections with a broader network of people involved in forest gardening or other green practices.

**Educational values** → They are the values embedded in the knowledge about the forest garden.

Learning → Gaining knowledge for oneself, in all the different ways that are mentioned in page number 37.

Teaching / Research → Inspiring and sharing knowledge with others or doing research for bringing new knowledge into the broad forest garden community.

**Recreational values** → It encompasses any enjoyable activity that can take place in the forest garden.

Leisure → Enjoyable activities for oneself. They can include satisfaction from doing physical exercise with the garden work, the pleasure in contemplation, etc.

Amusement → Bringing joy to others in the space. For example having trees for the kids to climb on or visitors to admire.

**Health values** → They encompass forest gardens with a focus in health benefits through medicinal plants cultivation and use, through doing activities that boost physical health or through creation of restorative environments that brings peace of mind.

Well-being → When the focus is to foster personal health through connecting with a piece of land.

Therapy → When the focus is to create space for healing other people as what are often called "Healing gardens".



# Forest Garden Archetypes

The values are a mirror of the services the forest garden creates. We use the value wheel as a basic structure for developing the forest garden archetypes. Forest gardens in their essence are complex multifunctional systems, so it is not possible to classify them based on one unique value. They all are a compendium of all the different values/services they provide. In this document we create the archetypes based on what values and services are predominate for each type of forest garden. We do this by analysing the key spatial features in the forest garden according to how they relate to the values.

We look at the following different spacial features.

The following spatial features are strongly related with the values and we will analyse them for each archetype.

**Social patterns** → We will look at the main patterns that sum up what are the characteristics that define the forest gardeners in this archetype.

**Plant patterns** → We will look at the main patterns that sum up what type of plants could be selected for the different sites to cover some desired functions.

**Forest garden structure and dynamics** → We will look at them in depth divided in two groups.

The horizontal structure. Is a simplification of the spaces looking at the three identified main structural types.

- Hedges → Long series of plants that clearly cut the space into two sides.
- Patches → They will be areas of diverse sizes that gather a mix of plants in different layers.
- Open spaces → Areas where the canopy, if there is one, is very open and that are easily accessible.

The vertical structure. Is what we called the vegetation layers. We will identify main patterns for each archetype if they are clear.

Examples. To be able to relate better to these structures and dynamics we will describe the structure of a real forest garden for each archetype using schemas made from measurements in the actual forest garden sites I have visited during my research.

**Water features** → We will look at the nature and functions of ponds, lakes and other water features in relation to the forest garden spaces.

**Remarkable features and techniques** → There are many diverse small elements that enhance the prevailing archetype, we will point out the most common ones.

**Constructions** → We will identify build elements as Compost toilets, tool sheds, green houses or pavilions that enhance the prevailing archetype.

**Soil management** → We will look at the main techniques forest gardeners use for managing the soil in the forest gardens in relation to the corresponding archetype.



# Other spatial features

The following spatial features have some relation to the archetypes but not as straightforward as the previously mentioned spatial features. Therefore we will talk about them separately.

**Size** → The common idea that smaller sites tend to be much more efficient in their use of space shows to be correct. As in the minor size forest gardens there is a clear tendency to take care of the detail and be highly prized. As well there might be less amount of the same type of plant but a higher diversity in species per m<sup>2</sup>. Therefore we could conclude that smaller forest gardens tend to focus more in the cultural values, while bigger forest gardens might move towards production or environmental values.

**Topography** → It is commonly known that the ideal orientation for a thriving temperate forest garden is a South facing gentle slope. As in this way it will be possible to design for maximizing sun exposition and water and nutrient use.

In reality many forest gardens tend to be quite flat or to slope in all directions depending on the possibilities the forest gardeners had. Quite successful projects are found in unexpected slope directions. While in most sites the land is left as found there are also some sites that set quite a lot of energy in doing earthworks as earth banks can improve the orientation and microclimatic conditions as every degree that the slope is facing south has the effect of increasing the growing season by 2 days (Jacke & Toensmeier 2005). Other reasons for doing earthworks as terracing is to reduce the water runoff.

Any of the forest garden archetypes could present the different topographies (flat, gentle slope, terracing earthworks, etc). Anyhow very complex and intricate earthworks might limit bigger production sites.

**Borders and access** → All forest gardens show to be well sheltered behind high vegetation. In most cases it is based on trees that are external to the forest garden. This is beneficial for physical reasons as they protect the site from strong winds. But as well for immaterial benefits, as creating a sense of enclosure and delimiting the forest garden space. This links with the fact that most forest gardens have very well clear entrances with gates or ports. In this way to access the forest garden automatically creates a sense of the space, that brings the person into a particular state of mind. The feeling that the space creates will be closely connected with the desired values. Inviting entrances with ports will be found in forest gardens with high social values, and functional simple gates will be found mainly in sites with production focus.

**Paths** → Paths are of a big diversity of sizes and materials. From the sites I saw during my research it was challenging to find a direct relation to the archetypes. Therefore we will comment on them in a generic way. The most common paths are made out of grass or wood chip. We also found some small forest gardens with paths made of stones or tiles to facilitate the access.

The width of the paths will depend on the size of the forest garden. In small sites the paths will be narrow to make best use of the growing space. In bigger sites they will allow for bigger paths that could even seem as open areas. The paths will follow the hedges so according to shape they will follow similar archetype patterns as the hedges.



Earth banks with stone pockets accumulate and release heat slowly in form of thermal mass sheltering and protecting trees that might not survive in that climate otherwise.



Ports with climbers create a sense of quiet fascination and curiosity to go through and explore what lies ahead.

# Environmental archetype

All forest gardens have a base in the environmental archetype. As the basic concepts arise from growing food in a more sustainable manner giving more space to the natural world. In practice there is a slight difference when doing forest gardening for the local environment and its supporting services as mentioned in the values or doing it for the global perspective and for future generations to come. This strategy is distinguishable by a fine gradation towards more and more hands off strategies and more forest masses.

## Social patterns

Most forest gardeners pursue an environmentally friendly lifestyle. By showing a strong awareness on their personal consumption and trying to lead by example.

The very environmentally focused forest gardeners have strong connection with natural forest and wilderness. Many see themselves more as foragers than gardeners. Meaning this that they don't want to control nature but simply benefit from the gifts it wants to offer.

## Plant patterns

Plants for the environment are plants that cover essential environmental functions.

Plants for the local environment are plants that will encourage the ecological restoration and protection of the site itself. In terms of plants that can bring fertility, biodiversity or shelter. We will call them nurturing species.

Plants that bring fertility for keeping the nutrient balance can be nitrogen fixers as plants that thanks to a bacterial symbiosis make atmospheric nitrogen available in the soil for other plants to use as all leguminous plants. As well plants that can make available for surrounding plants high amounts of other required mineral nutrients as (phosphates, potassium or calcium). As *Comfrey symphytum* sp. or sting nettles *Urtica dioica*.

Plants that bring biodiversity, host predators or other beneficial creatures for pest management.. As flowering plants for bees, or other insects. Important biodiversity plants are the keystone species, which are species that have a substantially greater influence on other species in the food web of the ecosystem. Many native trees as oaks *Quercus* sp, rowans *Sorbus* sp. or guelder-rose *Viburnum* sp. are keystone species as they provide habitat in form of both food and shelter for many birds, insects, fungi among other living forms. Biodiversity benefits can come as well from allowing space for wilderness and rare native plants to appear.

Plants that provide shelter for other plants in the forest garden. This will be windbreak hedges, as trees and bushes that can grow tight green cover for reducing wind speed. As Alders *Alnus* sp. or hazels *Corylus* sp.

## Plants for world environment

Plants that provide climate regulation. This is mainly focused on forest masses as they are able to store large amounts of carbon, cool down and filter air, buffer rain events and keep clean ground water reservoirs. The larger the forest mass, the more effective this function can be as well as the capacity for regulating its own health against pests and diseases.



Old trees and dead trees cover ecological functions that no young tree can cover. They take hundreds of years to reach that state. So preserving them is essential for the health of the ecosystem.



The meadow area attracts pollinators and honey bees.



## Forest garden structure and dynamics

The horizontal structure.

The hedges in these sites are designed and managed mainly as wildlife corridors. Their main purpose is connecting habitats and therefore allowing wild species to move around without being disturbed.

The patches in these sites are focusing on growing healthy trees but at the same time creating habitat for wild species such as foxes, hedgehogs, birds, etc

Open spaces can have two main focuses, some are for allowing natural regeneration to occur. This means letting wild trees to grow back on their own, these areas might be fenced to protect from browsing. The second focus is to have meadows, swamps or boggy areas for attracting a broader biodiversity of insects and birds.

The vertical structure.

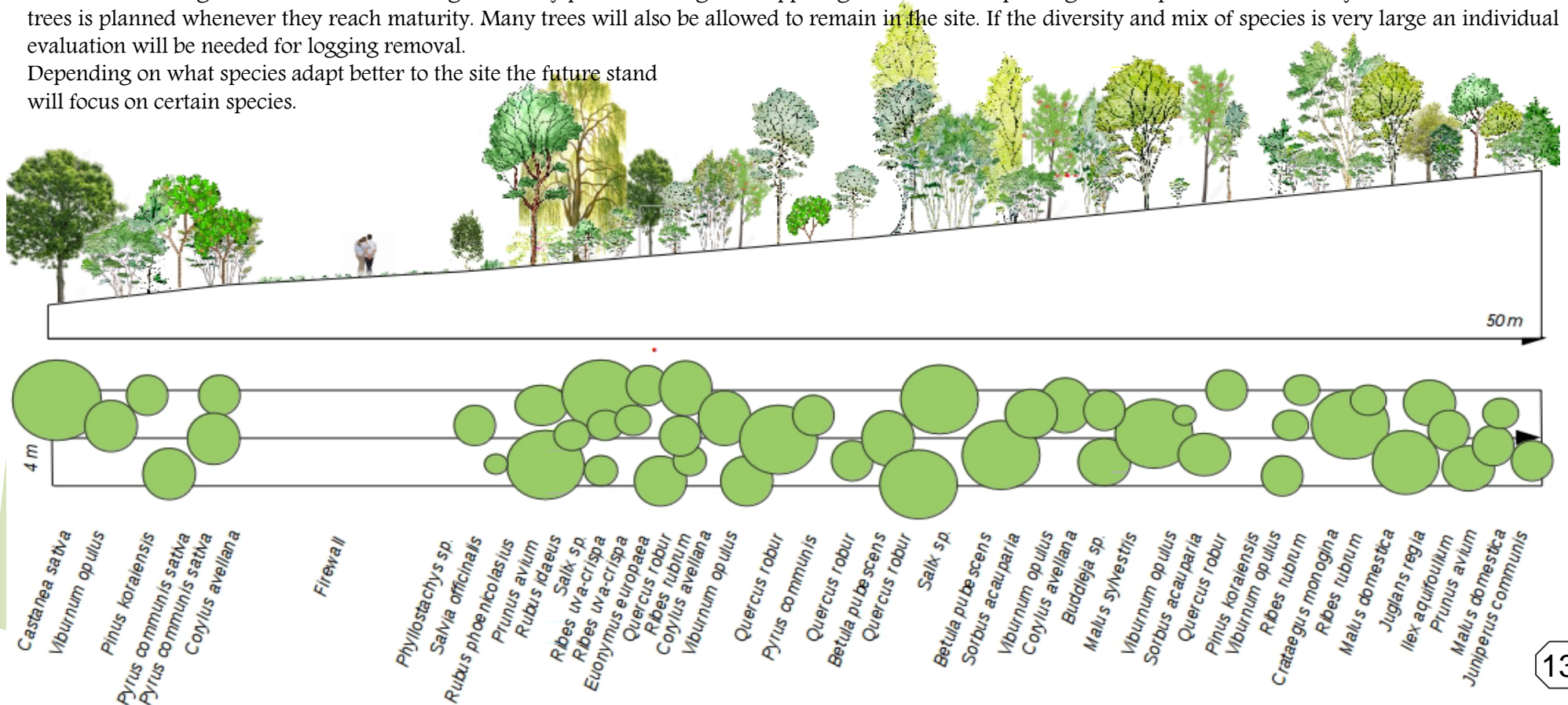
Environmental forest gardens try to be as close as possible to the system they are mimicking, the natural forest.

The canopy layer is the predominant vegetation layer and has a clear priority in both design and implementation.

### Example.

In this environmentally focused forest garden the site is divided in many patches of approximately 300–400 m<sup>2</sup> each. Within each patch there are forest trees that compose the higher layers of the forest garden. As the canopy is quite close very few under storage plants grow there but in the outskirts of the patch is in a decreasing height gradient we find smaller trees and bushes of the intermediate layers of the forest garden. Few ground cover plants have been used in the very edge of some patches. But in general there has been very little focus on this layer. Between patches there are grass corridors of approximately five meter wide which allow sunlight to reach at least the edges of every patch. Pruning and coppicing are essential to prolong the lifespan of the trees. Anyhow removal of some trees is planned whenever they reach maturity. Many trees will also be allowed to remain in the site. If the diversity and mix of species is very large an individual evaluation will be needed for logging removal.

Depending on what species adapt better to the site the future stand will focus on certain species.



## Water features

Ponds or small lakes are a “must have” in environmental focus forest gardens. These ponds are made again as habitats for wildlife, as water is essential for most animals to drink from, and for many species to reproduce and live in. They will be at least partially covered with vegetation as reeds and duckweed. The size of the pond will be according to the size of the forest garden and it will also determine what fauna would it host. As in small forest gardens we can find very small ponds that will give home to salamanders or other amphibians as well as give drink to bees. Big forest gardens can have small lakes with fish and small islands for ducks to dwell.

## Remarkable features and techniques

As the focus will go towards increasing biodiversity, dead tree trunks will be used for climbers to grow against or rotting wood logs would be left around for hosting a diversity of fungi, lichens and insects. Also carefully produced insect hotels can be placed in strategic spots of the site.

Remarkable management techniques used in this sites are about rising a forest as fast as possible. By planting the trees quite close to each other so they will compete for the light and race their way to the top of the canopy. A strategy is also removed the lower branches so the trees would focus their growth upwards rather than sideways. The main difference with conventional forestry is the huge diversity of species mix in the site.

## Constructions

Not many constructions will be created in this type of forest garden. Unless that the owners actually live in the site. Then they might have a house made out of natural materials that blends well with the natural environment. Compost toilets might be a centric feature so the manure can be easily used in the forest.

## Soil management

The soil is valued and observed with care as one of the main goals is to encourage microbial biodiversity and store carbon in the soil. For this purpose different techniques will be used.

In small forest gardens hole patches might be covered with mulch as wood chips, while in bigger forest gardens it might only be the walking paths. The intention with this will be to encourage decomposer organisms as fungi and many invertebrates to degrade the material and fertilize the area.

Another common soil management technique will be to scythe the naturally occurring grassland areas and encourage for dynamic accumulator plants to grow and feed the soil.

## Strengths and challenges

These type of projects are very valuable as environmental projects for conservation or afforestation.

It might be possible to finance the creation and maintenance of the site through environmental funding. If this is not successful it might be very challenging to keep the project running. It will be a good idea to have focus on some other values as well to introduce other functions as education or production as a source of income for the project.

There can be other challenges such as the relationship with their neighbourhood as people might not understand what is being done and feel threatened by unconventional practices and appearance.



This pond is covered in water lilies *Nymphaea sp.* that gives habitat to many other living organisms, filters the water and is edible.



Dead wood is left in the garden to decompose naturally giving in this way habitat to insects, anfibiens and microorganisms in the forest garden. Often is also inoculated with edible mushrooms.





The complexity of the forest garden layers creates a diversity of habitats



Snag in the middle of a forest garden is home to many creatures.



# Production archetype

All forest gardens have a certain level of the production archetype within them. As the forest garden concept itself started from the idea of using the natural ecosystems as agricultural models to be able to supply for human needs with a nearly self managing system that requires a low maintenance effort. Therefore all forest gardeners find the way to make use of at least some of their products. Anyhow in this case the differences in the strategies within self-supply productions and commercial productions are huge. We will explain them below.

## Social patterns

The thinking thread of self-suppliers has a very personal approach. Because they focus on understanding the tenant's own needs and designing a space that can provide for that as much as possible. It seems that few temperate forest gardens have reached total self-sufficiency. But many have up to 70% of their food needs covered. However it really depends on what the people want to eat. If they are fruitarians or Jain's who only eat fruit nuts and seeds then they will be self sufficient. On top of being used by the owners, the products will be served in gatherings, workshops or any food related activity happening around the forest garden.

While forest gardens for commercial purposes tend to professionalize focusing the production in certain yields searching for maximum cost-efficiency and for creating a product demanded by the market. Even then they search for satisfying their own needs from a holistic point of view. Forest gardens that try to make a business out of their production are still quite rare. But as forest garden knowledge is rising these systems are appearing and slowly thriving. As harvest is tedious and is a limiting factor for a cost-efficient production there are two main strategies being used.

One is to have a mayor working force as volunteers and woofers that want to learn about forest gardening to help out in the project. Then a big part of the production is processed into for example fruit juices and jams.

The other strategy is to make self-harvest systems. Where the client comes to the forest garden and picks the product himself. Ways of selling the produce is with connections with local stores, and often following Community Supported Agriculture models so there is direct connection with the consumer, no intermediaries and therefore a higher revenue.

## Production plants

Plants that offer tangible products as: Food products as fruits, nuts, vegetables, salads, spices, seeds, flowers, fungi, sap, honey and fodder for animals. Medicinal, cosmetic and household products as plants for teas, essential oils, lotions, creams, soap, dye and resins. Materials as fibres for tying or basketry, poles and canes, wood for furniture or other crafts. Energy products in form of Firewood or other bio fuels.

Plants for Self-Supply → In forest gardens with a self-supply focus it is common to find a big diversity of plants that are good for harvesting small amounts of all through the season. As herbs and foliage greens. There are also several varieties of fruits trees and berry bushes, that will produce at some point of the season, enough for storing in form of jams and fruit leathers for a big part of the year. It is also common that they have small kitchen gardens connected within the forest garden with all the common annual edibles such as carrots, cabbages, tomatoes or squash.

Plants for commercial production →The most common plants in this forest garden are well known fruit species that make big bulky harvest as temperate fruit trees. Mainly apple trees, cherries, and pears. Also berry bushes like raspberries *Rubus* sp. gooseberries *Ribes uva-crispa* and currants *Ribes* sp. Experiments are being done with nut trees as hassle *Corylus avellana*, walnut *Juglans* sp. and chestnut *Castanea* sp. but few sites are having true productions. The popularity of kiwis *Actinidia* sp. as production climbers is rising. Few ground covers are used in this productive systems. But actually the potential of producing fresh greens, flowers, herbs, or tubers is high. Some forest gardens also produce large amounts of wood both for their own use and to sell, this can be potentially a major income source.



A common everyday salad from a self supply forest garden. It has around 30 different species of greens and flowers.



Apples are the most common production crop in forest gardens. During an open day in this forest garden they present the big diversity of varieties of apples they have.



## Forest garden structure and dynamics

Self-supply forest gardens can be very intricate and complex while commercial forest gardens follow simple patterns. Here we will focus on explaining the insights of a commercial site.

The horizontal structure

The hedges are straight or with a very gentle curve as the main purpose is efficiency to facilitate the management. Therefore hedges and rows are very common and useful. But they are not as long as in conventional productions and often following the contour lines with what is called keyline design (Yeomans 1958).

The patches in productive forest gardens are strictly limited to the species that are required. these will be mainly the productive tree mix with the few “nurturing species” that are necessary for the site to be a functional ecosystem. They will be a diversity of species with supporting functions as nitrogen fixers

Open spaces exist for practical reasons as for example having space for a harvest pickup van or some other machinery to manoeuvre.

The vertical structure.

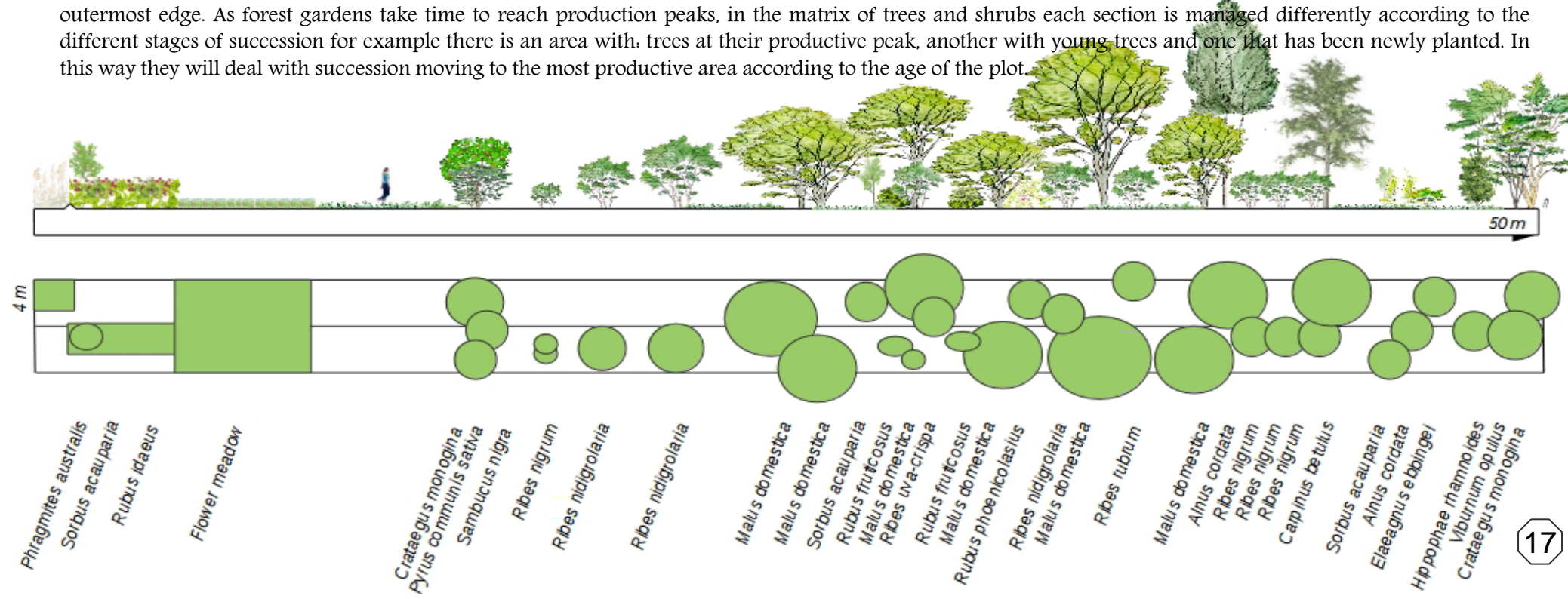
The vegetation layers in commercial production forest gardens are focused on the main marketable products and just the essential nurturing trees. The most common at the moment are sites with predominant canopy layers with fruit trees and bush layer for berries. However some commercial forest gardens where the trees are well spaced from each other are developing systems with productive herbaceous and groundcover layers that include some rare perennials as well as common market garden products.

### Example.

This forest garden is made in concentric circles with the centre as a biodiversity hotspot that will manage pests for the productive species that expand until the outermost edge. As forest gardens take time to reach production peaks, in the matrix of trees and shrubs each section is managed differently according to the different stages of succession for example there is an area with: trees at their productive peak, another with young trees and one that has been newly planted. In this way they will deal with succession moving to the most productive area according to the age of the plot.



Area with newly planted apple trees *Malus domestica* and junipers *Juniperus communis* for making alcoholic beverages



### Water features

Ponds can be very productive ecosystems with a big diversity of crops and fish. But most of these products are not very common and these systems are not yet well developed into commercial production. At present it is more common to find them in self-supply productions as experimental systems. It will always be possible to find a water reservoir or storage of some kind.

### Remarkable features and techniques

Production forest gardens are well fenced to protect from wild animals that could damage the crops. There is a fence around the whole site and as well they use nets to protect some crops from birds when they are about to be ready to harvest. In nut productions we will find traps against squirrels, as it is the only way to avoid they eat the crop. Another interesting feature is that many production forest gardens have small door stand shops with an "honesty box". A social feature that people feel trusting enough to leave their produce out without guarding it. In that way they can sell their produce without needing to spend time as salesman.

### Constructions

In the commercial forest gardens some type of small industry installations are key for making a proper business. A common one is to own an industrial juice press for making juices and ciders. In many they do not limit to pressing the fruit from their own forest garden but also import fruit from other local orchards and process it for them. They can also make juices for private owners that want to have their own fruit juiced. Other interesting constructions are greenhouse. In most self-supply sites it is possible to find a greenhouse connected to the forest garden they are mainly for propagation and for growing some annual crops. In commercial forest gardens greenhouses are completely focused in market garden products. Anyhow a single pioneer temperate forest garden in the Rocky Mountains in USA is an example of the incredible possibilities greenhouses can offer by having tropical and mediterranean commercial forest gardens inside passively heated greenhouses

### Soil management

To keep a nutrient rich soil is very important in a system where a large harvest will be taken away from the site because the parts of the plants which are harvested contain nutrients which will be removed from the system. It is essential to feed the soil with mulch of some kind to keep the soil life and replenish the lost nutrients. The most common technique is addition of wood chips, bark chips and debris. Once the trees are grown and the soil is mature is old enough the imported additional material is reduced and the material comes from the trees in the own property creating a self fertilizing system. This technique is known as "chop and drop". Compost is also added in most gardens both from garden material and kitchen waste. Using green manure is a common technique for nurturing the soil and having a constant cover crop that prevents from loss of organic matter (Nyle C.2002) It is done by scything the plant cover. It can bring complications as productions tend to be quite big and there will be a high requirement of working force. Some sites end up getting small grass clipping machinery. But the weight could be detrimental for the trees superficial roots.



When the cherries *Prunus avium* are about to be ready they get covered with a fiber textile to protect them from being taken by the birds.



Debris and woodchips is a valuable resource for bringing fertility into the garden. Often it can be found as a left over from industry



Squirrel traps are scattered around the property. When the forest gardener finds them, he shoots them with an air pressure gun and eat them so they do not go to waste.



A very common soil management technique for starting new plots is to cover the soil with a black plastic tarp sheet for 1 or 2 years. This will keep the soil structure while at the same time kill the former plants and prevent new weeds from establishing as they have no access to light. Then when the tarp is removed the area can be used for planting the desired plants without having to till or damage the soil structure.

Another common way to recycle the nutrients back into the soil while at the same time getting a yield is by cultivating edible mushrooms in wood logs.

The most common species used are Oyster mushrooms *Pleurotus ostreatus* and Shiitake *Lentinula edodes*.

### Strengths and challenges

That this type of forest gardens focuses on being a productive site by mimicking nature and using its principles as a model. When the practices are used thoroughly the fertility blooms and the amount of production might have nothing short of what you may find in small scale conventional production. However there are very few examples of productive temperate forest gardens that actually have researched in depth their yield amounts.

The drawbacks of these systems compared with conventional small scale productions, as for example fruit orchards, can be that as monocultural production is not an option, it is necessary to create innovative trade opportunities that fit a model of smaller amounts of certain product but a higher diversity of products. This requires a very high level of design and planning of both the forest garden system and the marketing strategy.

A drawback in self-supply forest gardens is that as the systems tend to be very complex and the plants are mixed with each other sometimes forest gardeners have troubles noticing when some crops are ready to harvest and they can get lost because of not getting them in time. An interesting solution to this is to develop a thorough design work grouping by areas plants that ripen at the same time. So in that way even that the crops to harvest are diverse it can be more efficient and be noticed easily because they are all in the same part of the forest garden



Shiitake mushrooms *Lentinula edodes* growing in woodlogs that have been inoculated for the purpose.



Wild mushrooms growing from the debris and chopped canes from the bambus behind. This type is sadly not edible.



In some sites wood chips or sawdust is placed only in the paths. In that way the degradation of the wood encourages a beneficial network of fungi to spread through the property.





A close composting system in the middle of the site. So the resource is where it is needed.



Plastic tarp covering a patch of soil for one or two years to prepare it for new planting.



Kitchen gardens can be entangled within the forest garden to benefit from the conditions.



Productions and sells can be diverse, a very common thing is to sell self grown plants.





The water tower has sun pannels to pump the rainwater from the greenhouse roofs into the high storage tank and compost tea tanks.



The north side of the greenhouse is protected with insulation so the heat remains inside. As well there is water tanks inside the greenhouse to keep thermal mass.



An outdoor sunpowered shower right by the forest garden entrance in a private forest garden site.



A homescale production greenhouses can be beautiful and cozy on top of overwhelmingly productive.



# Community archetype

This archetype revolves around the idea of having forest gardens as common spaces for interaction that allows and encourages communities to thrive.

## Social patterns

According to (McMillan & Chavis 1986) People develop the sense of communities due to 4 factors that will be described below. Here we will explain how they relate to specific forest garden communities. However readers should be aware that is possible that a community expands to a broader network of projects with similar goals and motives.

**Membership**→ Is the feeling of belonging. Members are part of a forest garden project that is defined within a physical space, where they invest their energy and time in developing that specific forest garden project.

**Influence** → Members feel that they have influence over the community and the community having influence over them. They can take an active role in whatever aspect of the managing of the forest garden and that has a clear gain for other members.

**Integration and fulfilment of needs** → This essentially means that by joining a community forest garden members get what they hoped to get by joining. This can consist of learning to grow a forest garden or simply having others to share their common interest with.

**Share emotional connections** → Members will have a history of experiences together creating friendship bonds and meaningful relationships.

## Plant patterns

We will look at the main patterns and what type of plants could be selected for the different sites to cover some desired functions.

**Community plants** → They are plants that make people come together around them in some way. In some villages it can still be found a big magnificent tree in the middle of the main square. This is because in old days the space under this sacred totem tree was the meeting point for making the town's legislation and making all sort of agreements. (D. F. Hulmes 2009)

Other ways plants bring people together is through collective management activities with plants that are laborious to harvest, and many hands will ease the work. Examples could be berry bushes, or Szechuan pepper that have thousands of many small pepper grains per bush.

**Networking plants** → This will be plants for exchange between the broad network, with other projects with similar visions or methods. So this will be plants that are easy to propagate from seeds, runners or cuttings so they can be shared. Having an extended network that takes care of the same species that you do brings security, so if your plant dies you can get it back from someone else. Common exchange plants are flowers seeds, orpine *Hylotelephium telephium* and mints *Mentha* sp. because they are very easy to propagate.



To pick the Autumn olive berries *Elaeagnus unbellata* is a laborious harvest for the one is optimal to be a group.



Small ditch for defining the forest garden patch and bringing water into the patch.



## Forest garden structure and dynamics

The horizontal structure.

The hedges in community gardens are useful to bring a sense of enclosure that delimits the space and makes the area of the forest garden comforting and distinct.

The patches in community forest gardens tend to go towards chaotic organization models. This is a concept that implies both chaos and order in its structure (Dee W. Hock). In forest gardens it can be understood in two ways: From an organised main pattern and chaos in the detail. By having a general division of plots and then in each plot the individual contribution unrelated from what is going on in the other plots, showing the chaos within the system. The other way will be by having common patches where many members manage the plants within them by trying to come to agreements on how to deal with the whole system. These second type will seem much more chaotic in the general overview, but as many eyes and hands are working on keeping track of the space the end result will be a functional organised system.

Open spaces in community forest gardens are areas for gathering. They are comforting spaces both to be in and to notice from outside (Kaplan et al 1998). These spaces are limited and have diverging sizes between 20m<sup>2</sup> to 100 m<sup>2</sup>. But often big enough to have the whole community standing in circle where everyone can see each other and do group activities.

The vertical structure.

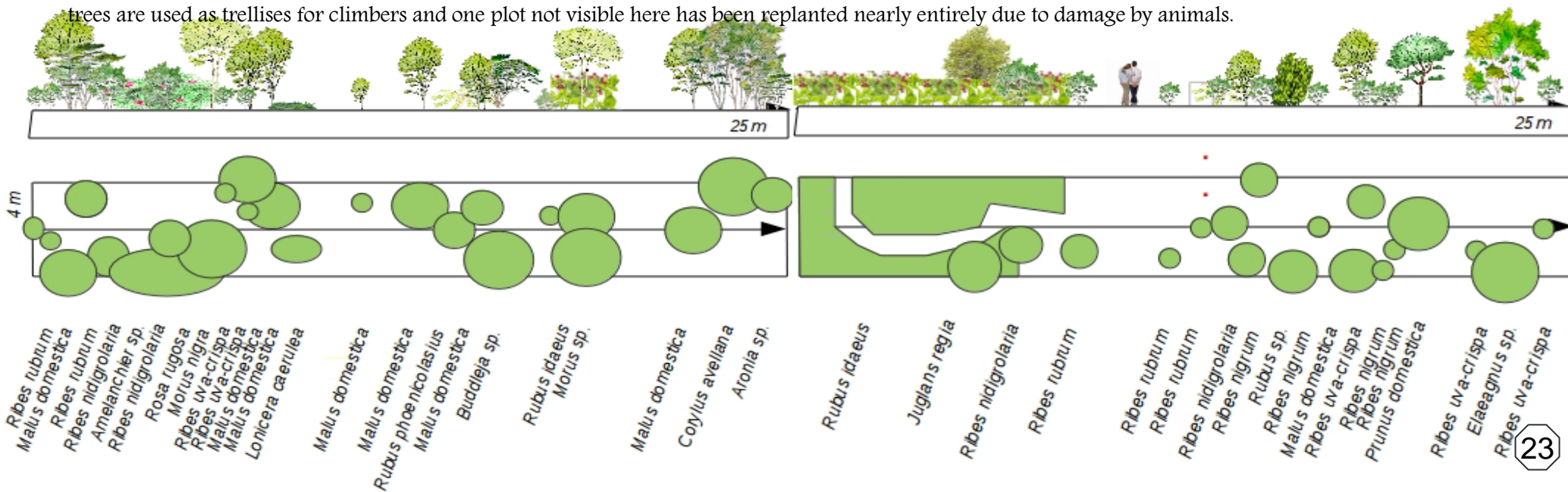
In community forest gardens the predominant layers will entirely depend on interest and expertise of the forest gardeners.

### Example.

In this community forest garden we find several patches surrounding a big open space. Each patch is designed and managed by a different person and they all follow very different strategies. For example in some of them there is a clear use of intercalating productive tree species with nursing species as nitrogen fixer trees, in other plots the same species are gathered together. There is one plot managed in common and it is perceivable that it is more developed and rich in vegetation, both in the higher layers with cherries *Prunus avium* and pears *Pyrus* spp. as in the intermediate layers with many berry bushes. Another of the plots is very rich in ground covers because the designer sees an added value to these layers in form of edibility and environmental benefits for insects and soil protection as well as leaf and organic matter in the soil. The third plot is much more simple. Having a big area of monocultures raspberries *Rubus idaeus* and an open area with scattered trees and bushes on maintained grass lawn. The dynamics of the garden are also different depending on the plot. In some areas dead trees are used as trellises for climbers and one plot not visible here has been replanted nearly entirely due to damage by animals.



Path is defined by the creeping comfrey *Symphytum grandiflorum* growing by the edges. Later it will be used for mulching the bed.



Ponds have not shown to be central features in community forest gardens. But mainly because of a matter of prioritizing other features. Anyhow if the option to create them is there they can be a relevant tool for group bonding activities.

To reach social engagement through activities for the local community is a key to the success of the community forest gardens. For example some community forest gardens organize meals where the whole neighbourhood is invited. This is a very good way to get people interested in the forest garden and empathic with the project. When neighbours do not understand what is happening and why, it is easy for conflicts and criticism to arise. This is especially true in the most public forest gardens where it is more probable that some users have no relation or attachment to the forest garden. Therefore community forest gardens have many features to get people to interact with each other as benches, picnic tables, fireplaces, bread ovens or playgrounds.

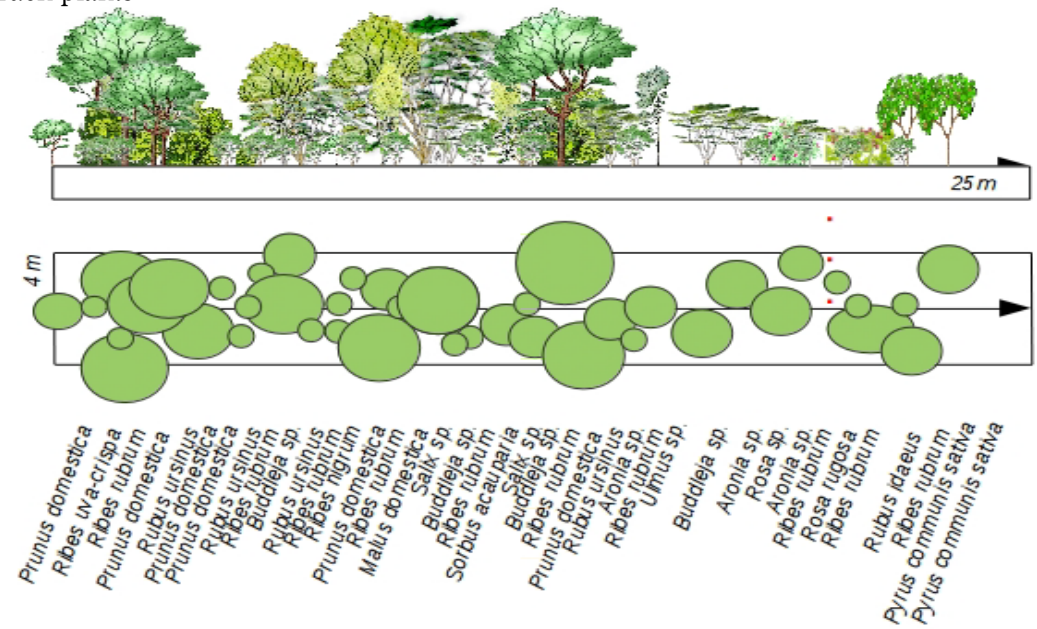
In these forest gardens community pavilions are ideal constructions for holding activities, as music events, workshops of food gatherings.

In community forest gardens it is important to define very well the borders of the patches or garden beds. When they are elevated there is no problem, but for ground level patches we find different techniques such as using strong ground covers as creeping comfrey *Symphytum ibericum* to mark the edge of the path. This plant is very resistant to be stepped on, and it can be used as mulch by chopping it and letting it fall within the garden bed. Another interesting technique is to dig a small trench around the patch that defines the edge. In this way the grass can be cut easily without damaging the plants within the patch and it will gather water directly into the roots of the forest garden plants

In community forest gardens both strengths and challenges are present in the same concept of communication. Community forest garden have a large amount of people involved in the project. Therefore collaborations and cooperations with other projects from the broader forest garden network can be abundant and fruitful as more people can tackle more contacts and activities exchanging resources, knowledge, working forces and making a more dynamic and diverse use of the space. However in the same way, more people involved in a project can mean more people to deal with, more opinions to consider and potentially more conflicts to handle. Fruitful communications can be challenging when groups have different visions and perceptions of the project. Therefore it is essential to develop good communication methods and make sure that the common objectives are clear.



A pavilion with an outdoor kitchen by the lake is an ideal community gathering spot.







Group work as picking and processing apples or making food together with the products of the forest garden are some activities that create community bonding.



# Educational archetype

The educational forest garden archetype stems from the wish of gaining a deeper comprehension on how far it is possible for forest garden systems to become a way to sustain the world population's needs. From that overall idea it scales down towards how to bring awareness of this systems to the broader public, what are the possibilities within certain regions or projects and all the way down to what knowledge about forest gardening can I gain to improve my practice. The difference between learning and teaching is a gentle gradation rather than a defined border. When it comes down to the appearance of the site the polarity between learning/research and teaching is becomes clear.

## Social patterns

It is possible to simplify the mention gradation saying that forest gardeners in educational forest gardens have two main motives. One is to learn themselves what it is needed to improve in their forest gardening practice. Any research activity is embedded in this category as a way to gain deeper knowledge on forest garden practices. The other one is to inspire others with their knowledge and practices using their projects as a model for replication.

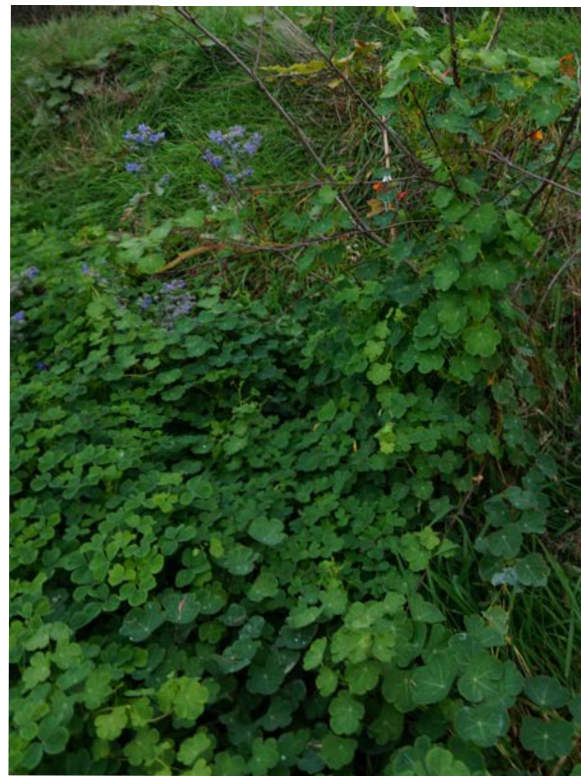
As forest gardening is still a very new discipline many forest gardeners focus on teaching and sharing their knowledge with the absolutely inexperienced public. Within the last few years popularity and interest is growing so much that collaborations with educational institutions are fast increasing. However, despite the fact there are some learning/research forest gardens have collaborations with universities there are still very few forest gardeners that have developed proper research on temperate forest gardening.

## Plant patterns

Educational plants will be classified in the mentioned duality.

Learning and researching plants will depend on the practitioner's level of knowledge. If it is a total newbie to forest gardening it will be important to start with easy growing resistant plants to get the success feeling. Further down the learning line it is interesting to start researching with peculiar plants that might require special growing conditions or rare varieties which commercial use is not well understood yet but that potentially could be relevant crops. As perennial grains, a big variety of nuts or edible dalias.

The plants for teaching are plants that tell stories. It can be plants with historical value due to their traditional uses. Some common ones are the lost crops of the incas Oca, *Oxalis tuberosa*, Mashua *Tropaeolum tuberosum*, and amaranth *Amaranthus* sp. As well as stories due to the plants intrinsic properties like medicinal plants such as willow the original source of aspirin, or uncommon exceptional qualities as Caucasian spinach *Hablitzia tamnoides* a shade tolerant perennial climber which each branch can grow 8 m long and has a taste like baby spinach leaves.



Oca *Oxalis tuberosa* and Mashua *Tropaeolum tuberosum*, Two of the most common "lost crops of the incas" growing together.



This patch is forming a very clear guild of endemic plants where all have signs with their names and qualities



## Forest garden structure and dynamics

Structures in educational forest gardens will in any case be neat and simplified as much as possible. In teaching forest gardens with the intention to illustrate through examples the basic concepts and principles of forest gardening in a user friendly way. In the case of research forest gardens for the sake of reducing chances of error and other factors that could influence in the results of the experiments.

The horizontal structure

Hedges in educational forest gardens are simple examples of multifunctional edges or they investigate if new functions and interrelations can work. So they might represent “the edge as a place of exchange”, wind barriers in different levels or design for a long time scale as in the picture to the right.

Patches are clear stereotypes of forest garden guilds. So they show plants that have specific symbiotic or mutualistic relationships with each other. Or they include innovative interactions or managing techniques following a procedural protocol, at least to certain extent.

Open spaces in education forest gardens are planned as outdoor classrooms. They can differ in sizes but wide spaces would be able to host big groups that attend courses and major educational activities.

The vertical structure.

The predominant vegetation layers in educational forest gardens will depend on what are the educational main topics.

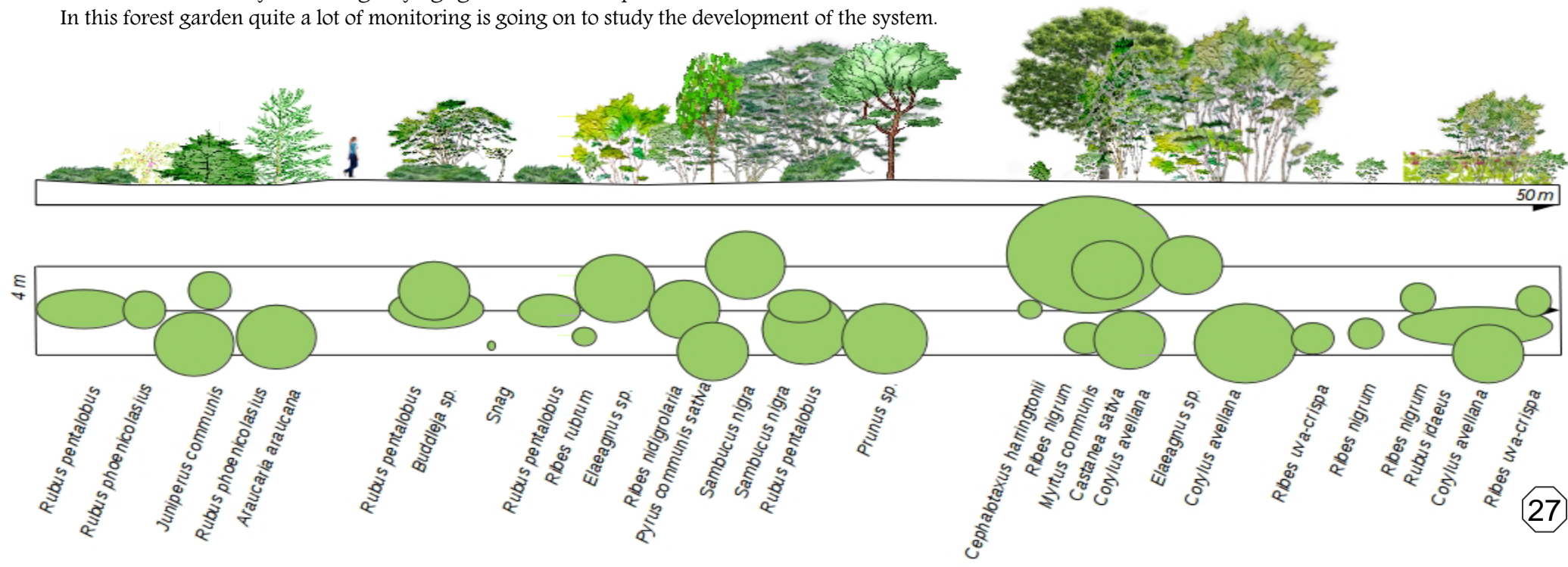
To reach further we will look at two very different examples of educational forest gardens that represent the duality within this archetype.



Forest garden research facilities need spaces for plant formation, as tables and pots. A greenhouse might be necessary to ensure survival of some plants.

## Examples.

Research forest garden. This forest garden is a university facility created followings the original design of Robert Hart's forest garden. It has a complex structure with plants in all layers of height. Each patch has a clear identity defined by the predominant species within it that shape open or closed canopies. Many trees are well matured but not yet reaching a dying age A tree rotation pattern can be noticed where small trees are introduced in some cleared areas. In this forest garden quite a lot of monitoring is going on to study the development of the system.



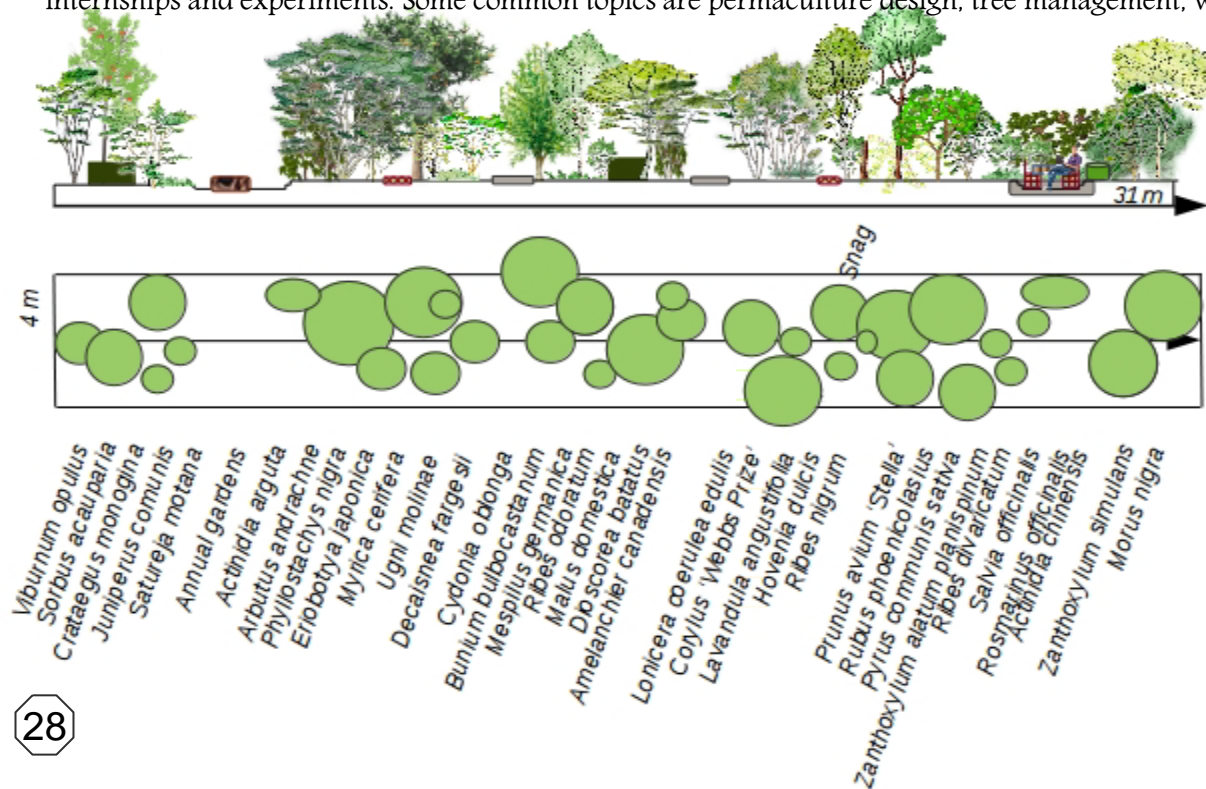
Teaching forest garden. This forest garden is placed on the rooftop of an educational institution for global awareness. More than 500 plants grow in around 200 m<sup>2</sup> and trees up to 6 meter high grow in only 30 cm of soil. This is possible since they selected carefully dwarf rootstocks to prevent the roots from growing too much. Furthermore most trees will develop tap roots to anchor themselves to the ground and use their horizontal roots to tap the nutrients in the topsoil. The structure will change with time but pruning is an essential management technique to prolong the life of the trees and keep the actual structure. This site might change when some of the older trees die and are replaced with new ones. Both ends of the garden have outdoor classroom spaces. These are connected to the centre by a mesh of entangled corridors defined by two entwined paths that cross the site. One is made of stone tiles to make the garden accessible for disabled people. The other path is smaller and made of wood chips, its purpose is to allow access to all plants without stepping all over the garden.

### Water features

Ponds have not shown to be central features in educational forest gardens. This is mainly because a matter of prioritizing other features and educational elements. Nevertheless rain water collectors are central features. In the same way aquaponic and greywater systems are powerful sustainability educational features that can be relevant elements in forest garden systems.

### Remarkable features and techniques

Important features in educational forest gardens are maps and informative signs. An overall map of the site is often placed close by the entrance to give an overview of the site. On the ground or attached to the plants we find small signs with the names and some characteristics of each plant. Other types of signs explaining interesting concepts can be very useful to transmit knowledge for random visitors. Some educational forest gardens have intentionally no explanatory signs because they want to encourage people to ask, discuss and exchange knowledge orally rather than read simplified information on their own to keep the quality of the communication. One more reason for not having signs for individual plants is that they are concerned that some of the plants might be stolen. This clearly shows that with or without signs the most important teaching comes from educational activities held in person in the forest garden. These activities can be garden tours, workshops, lectures, internships and experiments. Some common topics are permaculture design, tree management, wild plants and bees.



Hedge with interspersed fast growing alder trees *Alnus sp.* and slow growing plum yew *Cephalotaxus sp.* The 2nd one will be covering the fence by the time the 1st one will be cut down.



## Constructions

Outdoor classrooms can be open air facilities with sitting space and a flip chart. For teachers and students to make the best use of the space it is appropriate to have a roof as a pavilion and other materials as a blackboard and space for doing practical activities and research.

## Soil management

The mentioned rooftop garden has a very intensive management of the soil for the plants to survive. There is a yearly addition of compost and woodchip mulch to create topsoil that helps to nurture the plants. Every 6th year rock dust is sprinkled on the soil surface to supply the minerals that the trees will normally find in the deeper soil layers.

## Strengths and challenges

Educational forest gardens are often very good incubator projects that inspire many people that pass by to start their own projects somewhere else, reinforcing the forest garden concepts and methods.

However within the projects themselves they tend to struggle with generational change. As in all forest garden especially in educational ones there is a small core group of active members that has worked with the subjects and particularly with that forest garden space for longer time. They are considered the experts and as long as the project runs smoothly everything is OK. But renovation of active members is needed at some point and to pass on properly the knowledge on the forest garden can be very challenging. Often relevant information vanishes from one generation to the next. To avoid knowledge gaps it is a good idea to have clear transition periods and activities where old and new core members are collaborating actively in the information exchange.

In experimental sites it is essential to put a big effort into the monitoring process. This is because there is often a serious lack of documentation invalidating the work of educating as it becomes impossible to learn from the experience and the management mistakes.



An anemometer for measuring wind speed in the forest garden will help the forest garden see the effect of his design.



Outdoor classroom space only requires splace for participants to sit. It is appropriate to have an enclosed areas to avoid distractions.



Experimental apple tree *Malus sp.* with five different grafted varieties.



Informative signs explaining essential concepts of the forest garden and its qualities



# Recreational archetype

The recreational archetype encompasses any enjoyment that comes from the forest garden. It includes the satisfaction from doing physical exercise working in the garden, enjoying its benefits, the pleasure gained in contemplation and the importance of the aesthetics of the site, and spiritual beliefs related with the forest garden.

## Social patterns

Forest gardeners in the recreational archetype are often hobby forest gardeners outdoor living rooms. A space to enjoy doing forest gardening work and get the satisfaction from the connection with the land as their private playground. It is also very common that recreation forest gardens arise out of a community, as leisure activities are essential for holding communities together.

There are also professional forest gardeners that design and create recreational forest gardens for others to enjoy. However this type of project tends to be less successful as it can easily miss the deeper understanding of what it is that the users really need. Only when the group around the forest garden is truly involved in the design and management of the site can it be shown to function smoothly.

## Plant patterns

Recreational plants are plants that provide joy in some way. It can be through passive contemplation of the plant structures and features as appreciating the aromas and dwelling on the blossoms of the cherries *Prunus avium* or the unusual branching patterns of the monkey puzzle tree *Araucaria araucana*.

Recreation also comes from active use of the plants, first and foremost for children to play with. Big old trees are often used for swings, tree houses or simply for climbing. In the same way shrubs can be ideal for hide and seek and an infinite number of nature games.

A last type of recreation is through consumption of plants for recreational purposes, this can feel like finding bits of candy.

Plants like this could be raspberries *Rubus* sp. or strawberries *Fragaria* sp. Other recreational consumptions could be plants with conscious altering properties as *Cannabis* sp. Despite of its frequency in many other alternative garden environments it was not found in any forest garden in the study.



Trees as walnuts, are wide with soft bark, what makes them ideal for kids to play in them. But due to its allelopathic substances they can give headaches.



Children and adults enjoy searching for the delicious wild strawberries *Fragaria vesca*.



The blue beans from the blue bean tree *Decaisnea fargesii* are as curious to look at as they are tasty, like candy jelly beans.

## Forest garden structure and dynamics

The horizontal structure.

Hedges in recreational forest gardens will rarely be straight. They tend to be winding because curves have an elegant aesthetic. Actually they may also be winding so as to gain ecological advantages as the curves might follow the contour lines to prevent erosion or create sun pockets to store heat.

Ideally in recreational forest garden the patches would be quite coherent, in the sense that they are well organized and easy to understand by having repeating themes and unifying textures. So for example patches will have a guild of plants that is used repeatedly. This pattern is noticeable in forest gardens that are specially design by a few individuals. When a group comes together as mentioned in community forest gardens the patches become more complex and chaotic. This means that eventhough it seems chaotic, there is an intrinsic order.

Open spaces in recreational forest gardens are highly appreciated because they allow for views that reveal the extent of what is around and out there. This is a valuable and enjoyable quality of restorative settings (Kaplan et al 1998). Of course open spaces are also used for groups to do leisure activities and defined as outdoor living rooms.

The vertical structure.

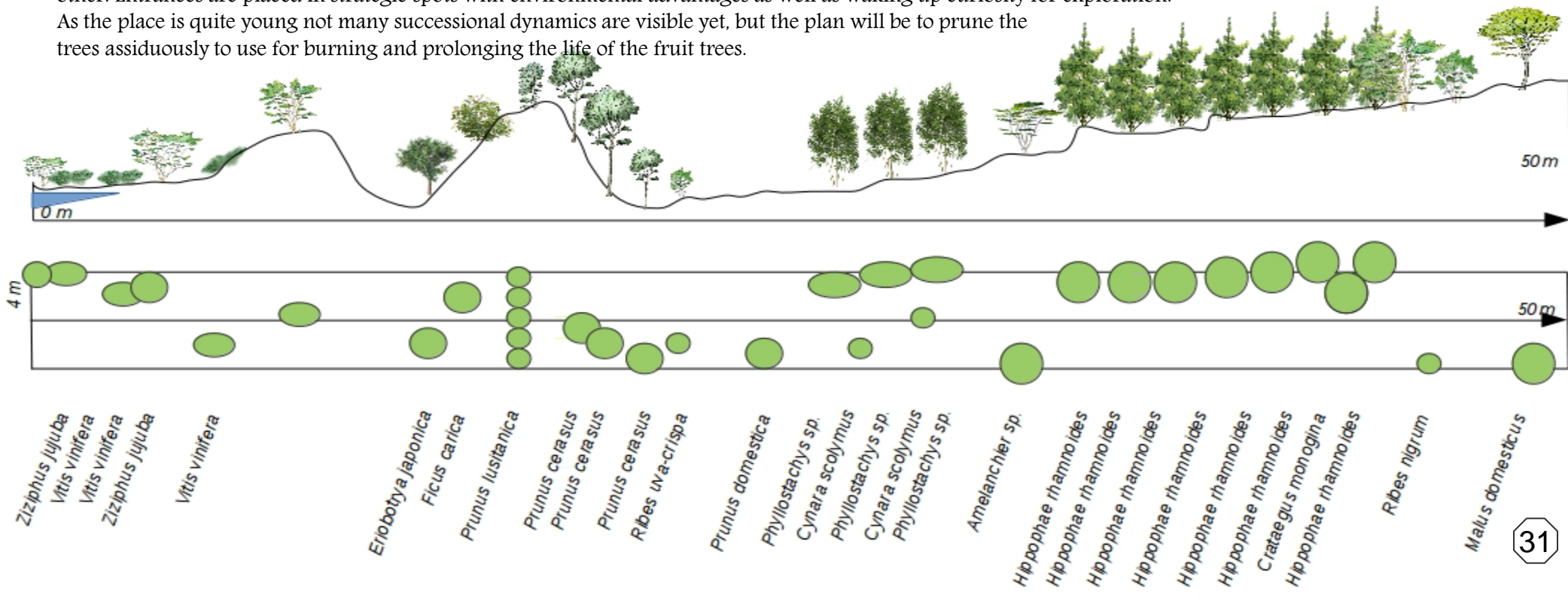
The layers present in the recreational forest gardens are well scattered. But if there is the chance they will often include some high and old canopy trees due to their magnificent appearance (Alexander, C 1977).

### Example.

This site had a clear planting pattern. Stated as "outdoor living rooms". The landscape was divided in circular belts made of earth banks and multipurpose hedge plants, these define the different living room spaces. Within each circle a variety of trees and bushes give a different theme to each space.

The hedge plants have rows of several meters with the same species planted close together. While the trees and bushes in the central areas are well spaced from each other. Entrances are placed in strategic spots with environmental advantages as well as waking up curiosity for exploration.

As the place is quite young not many successional dynamics are visible yet, but the plan will be to prune the trees assiduously to use for burning and prolonging the life of the fruit trees.





### Water features

Water is a very important recreational feature. Both for quiet admiration and for active fun. In recreational forest gardens there is either a wild looking pond with edges surrounded by vegetation or stones or a natural swimming pool designed appropriately with a biofiltration area to keep the water clean for human safety. Obviously it is an exceptional recreational possibility to swim in the forest garden so the natural swimming pool is the key figure of the forest garden laying right in the middle of the garden and being defined as "the heart of the garden". On top of that it also covers an important ecological function by being surrounded by plants and trees that require extra warmth so the sun heats the water and this heat radiates to the plants form the stored thermal mass in the water.

### Remarkable features and techniques

Interesting recreational elements are willow weaved structures, sculptures and other decorative elements and art forms. Natural playgrounds will be a must if the space is going to be used by children. Any recreational activities as sports, meals, games or music are encouraged as long as there is no misuse of the forest garden space.

### Constructions

Structures such as tea houses or glass houses are rising high the level of satisfaction from the forest gardens because it provides a space for contemplating the garden even under unpleasant weather conditions.

In the aforementioned forest garden example there is a very interesting long term development processes incorporated into the design which has taken a great deal of thought. In an area where a fast growing conifers are planted close together as a windbreak the forest gardener plans to make a dirt wall around it once the trees are fully grown, turning them into strong pillars for constructing a big room around them while storing carbon in the walls.

### Soil management

In recreational forest gardens the most common soil management technique is scything the grass. It is documented that humans have exist a psychological preference towards smooth ground, because it is easier to understand and interact without damaging it or hurting yourself. Scything can also bring a big diversity of nice smelling meadow flowers and it is an excellent exercise.

### Strengths and challenges

Recreational forest gardens are powerful spaces for creating a strong sense of place amongst their user's. They are also good for empowering people about how to take care of the land, their local environment and bringing them together, through this awareness.

Even if no other archetypes which values stand strong besides recreation, and the space is used primarily for parties there is a risk for falling into an empty festivity that can get to be counterproductive personally and for the forest garden.



The natural swimming pool has a decreasing slope in the area for getting into the water, so it gives a beach sensation. There is an hair pump for making sure that the water is being properly filtrated.



Willow weaving art figures bring a magical atmosphere to the forest garden.



A seesaw in the children area deep in the middle of the forest garden





Recreational forest gardens create a inviting environment for holding music, workshops and food events.



# Health archetype

“Healing gardens” are a type of garden that is rising in popularity due to the well known benefits they promote, as reducing stress and anxiety (Stigsdotter & Grahn 2002). They are being introduced in hospitals, care centres, around the globe. Healing gardens are not directly related with forest gardens, but as many healing gardens have multiple layers and element these two concepts can be easily intertwined.

## Social patterns

There are many theories concerning the healing effects on users of healing gardens.

They can be summed up in three points:

- 1- The effects are derived from the experiences of the garden space.
- 2- The effects are primarily derived from the activities in the garden.
- 3 The effects are derived from a mix of the experiences and the activities.

These effects are clearly related with the reason for creating and caring for a healing forest garden.

The healing properties of forest gardens were very underestimated by forest gardeners in general and not considered a goal in anyway. Anyhow most forest gardeners reported on the benefits afterwards. Within the forest gardeners that had the purpose to create such a site, their main reason was to cure themselves from both a physical problem they were going through, as well from the psychological damage that came with it or other aspects of their lives. This was mainly for gaining the healing effect of actively doing gardening work. There is also a group of professional forest gardeners that design and manage forest gardens for others to receive the benefits. In this last model the public that use the space will mainly receive effects derived from experiencing the place.

## Plant patterns

Health plants encompass plants that are cultivated for their medicinal qualities. as many aromatic herbs or flowers like sage, lavender or marigolds. In many forest gardens teas and simple creams are being produced. While more specific medicinal plants might be present complex medicinal preparations are not commonly prepared. Some medicinal plants as foxglove *Digitalis purpurea* can be very toxic if consumed directly. So it is important to create awareness that in order to use the garden there must be knowledge and respect for the garden. Anyhow many medicinal plants are cultivated for their sensory qualities rather than for their strictly medicinal purposes. So plants for these forest gardens are plants of outstanding beauty for restorative contemplation as Chinese dogwood *Cornus kousa*, good smells like roses *Rosa* spp. or nice to touch as myrtle *Myrtus communis*.



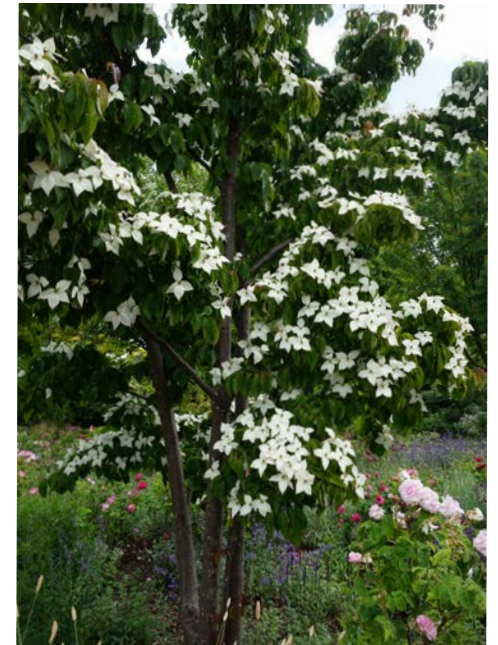
Rue *Ruta graveolens* is a common plant in medicinal forest gardens, but it is important to know its effects because among other effects it can trigger abortions.



Sage *Salvia* spp. is a relaxing aromatic herb that also attracts pollinators and repels pests.



The monkeypuzzle tree *Araucaria araucana* is a recurrent tree because its rare shapes. There is always a hope that one day it will fruit its delicious nuts.



The Chinese dogwood on top of having beautiful flowers for a long period of time. In the autumn it gives edible berries.



## Forest garden structure and dynamics

### The horizontal structure

Hedges in healing forest gardens are important for delimiting spaces and separating from distractions.

so that nothing can undermine the feeling of being in a different world.

Patches will be arranged in beautiful geometrical patterns that brings peace of mind and enhance admiration.

Open spaces can play an important role in enhancing self confidence and sense of control to the users if there is a variety of spaces to choose from. Some more private and some more open, some sunny, some shady, some with background sounds, some without, and so forth. So the user can find the area that fits best its mood.

### The vertical structure

The vegetation layers in healing forest gardens can be diverse. Anyhow an open canopy will allow a good amount of sunlight for medicinal plants and it will see less mysterious and therefore less threatening as a very close canopy. So bushes and herbs will be very abundant.

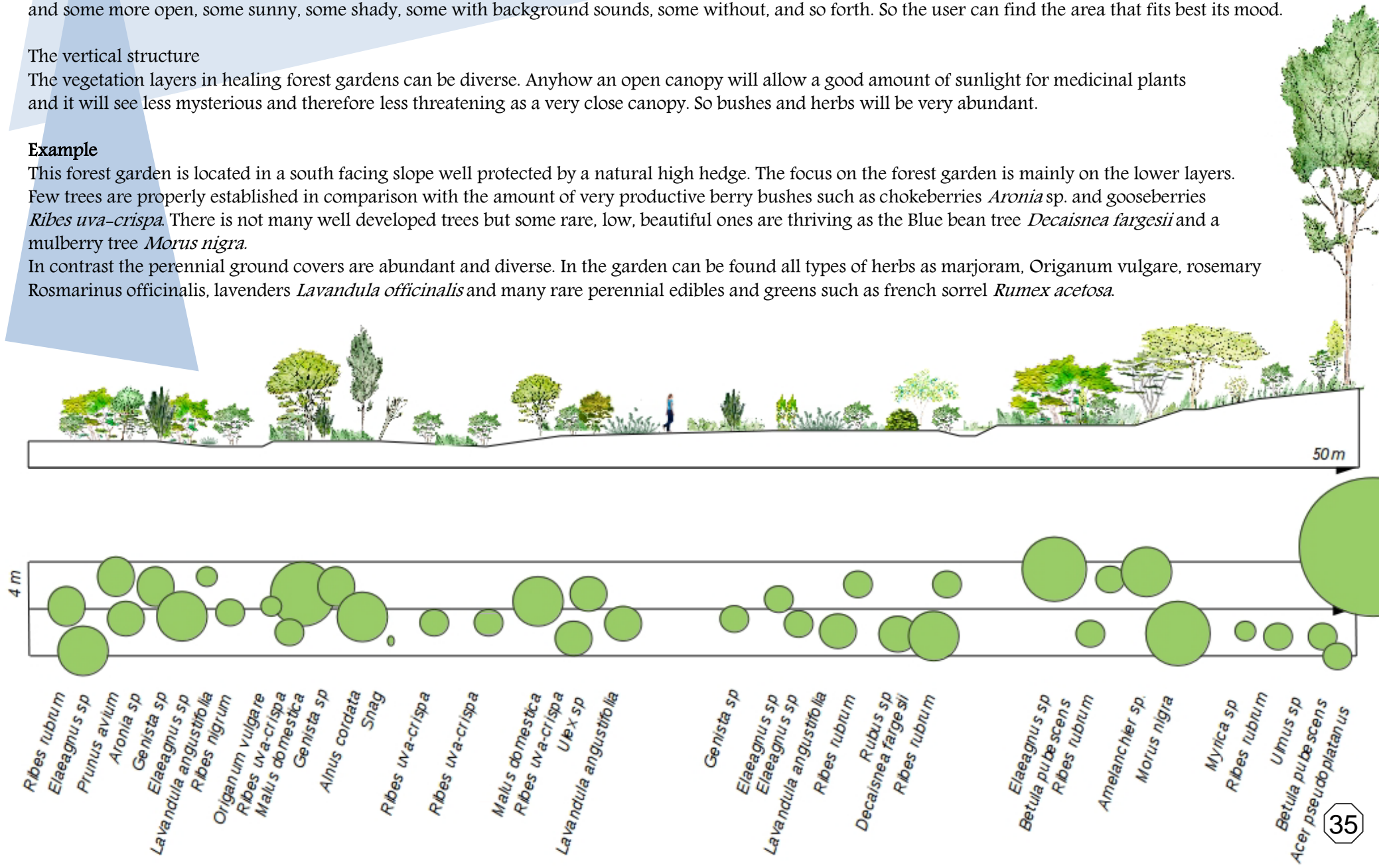
### Example

This forest garden is located in a south facing slope well protected by a natural high hedge. The focus on the forest garden is mainly on the lower layers.

Few trees are properly established in comparison with the amount of very productive berry bushes such as chokeberries *Aronia* sp. and gooseberries

*Ribes uva-crispa*. There is not many well developed trees but some rare, low, beautiful ones are thriving as the Blue bean tree *Decaisnea fargesii* and a mulberry tree *Morus nigra*.

In contrast the perennial ground covers are abundant and diverse. In the garden can be found all types of herbs as marjoram, *Origanum vulgare*, rosemary *Rosmarinus officinalis*, lavenders *Lavandula officinalis* and many rare perennial edibles and greens such as french sorrel *Rumex acetosa*.



### Water features

Water features are very important in healing gardens. There is no need for a big pond, but to be able to see a natural water edge or to hear running water flowing have strongly therapeutic capacity.

### Remarkable features and techniques

A recurrent feature in therapeutic gardens are climber plant tunnels. They will normally be made by a productive species such as grapevines or kiwis which bring beauty and specially an aspect of curiosity enticing users to experience passing through.

In healing forest gardens some artistic features are enhancing creativity and imagination amongst user's. However it is important to avoid abstract art and sculpture, which ill people can interpret in negative ways. It will be more appropriate to use natural materials in simple ways that do not disturb the mind. To give the chance to users to do some practical work or physical activity in the forest gardens will increase the health benefits of the space.

### Constructions

Overnighting in the forest garden brings a grounding and nurturing feeling to many people. So to have camping space, a shelter or a cabin to sleep in, has a huge added value.

### Soil management

For people to truly be comfortable in the setting it is key that there is a feeling of being able to move around the space. Therefore smooth ground surfaces are preferable. The most common will be well clipped grass, but woodchips and sawdust are also good options for paths. It is fine to use other ground covers plants as long as they keep a uniform texture that calms the senses.

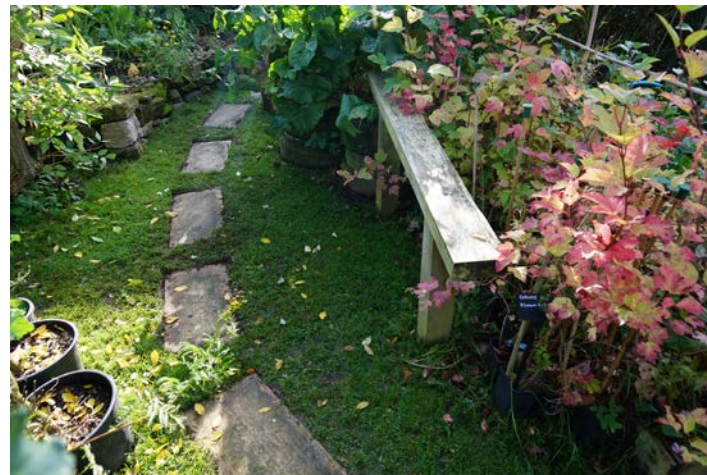
### Strengths and challenges

People that truly want to get healthy and see the connection between “healing the earth” and healing themselves have an immense amount of power of accomplishment. Their processes can deeply inspire others to follow similar paths.

But often these healing experiences of connecting with the land take place unseen. We personally think it is important that individuals who have gone through this type of personal experience speak up and tell their stories to the world for helping in this global healing process.



Ponds with stone edges and mosses give a natural appearance and a habitat for animals as ducks that also have many other functions in forest gardens, as pest control.

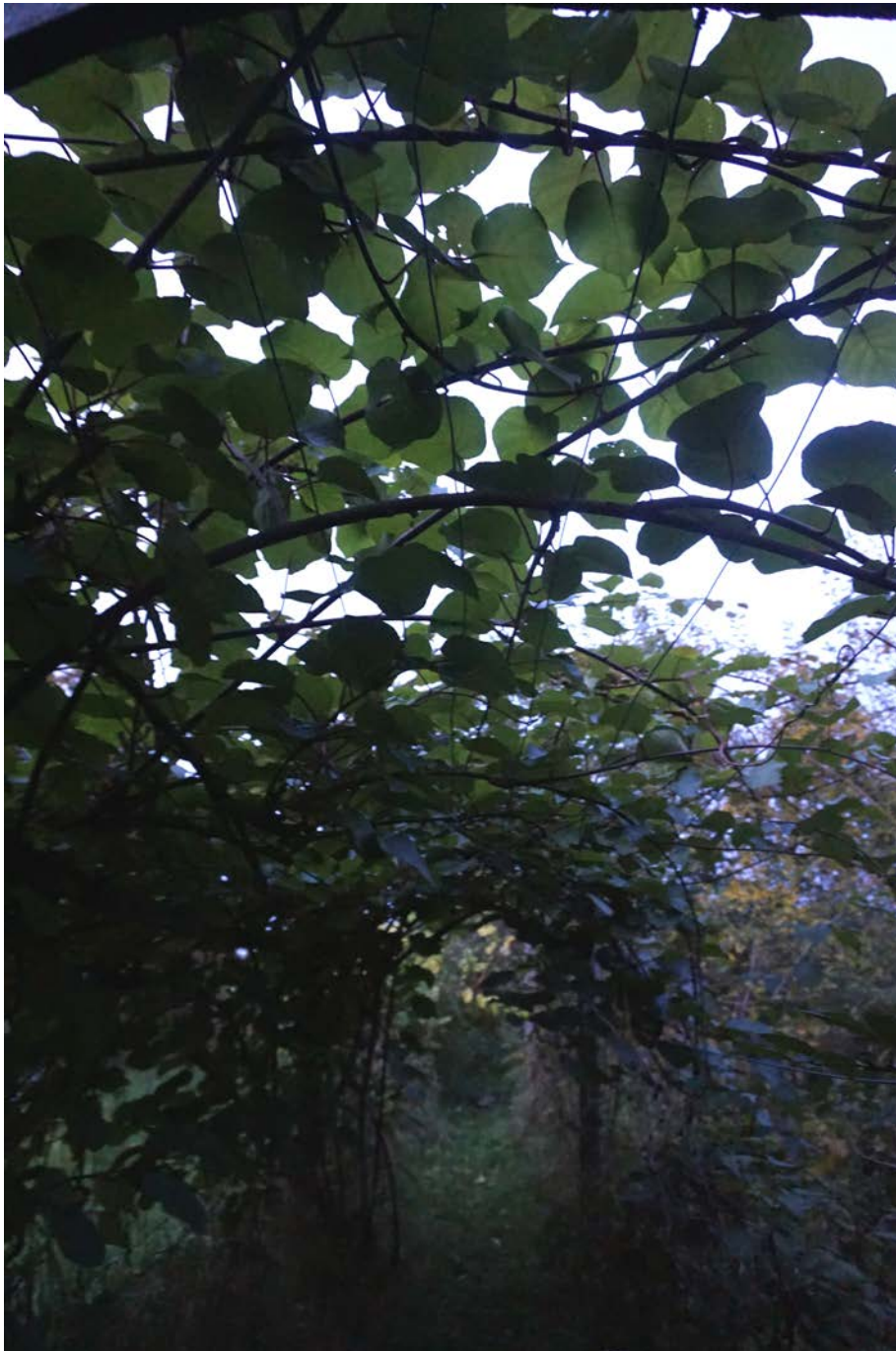


Benches in small hidden corners give room for privacy.

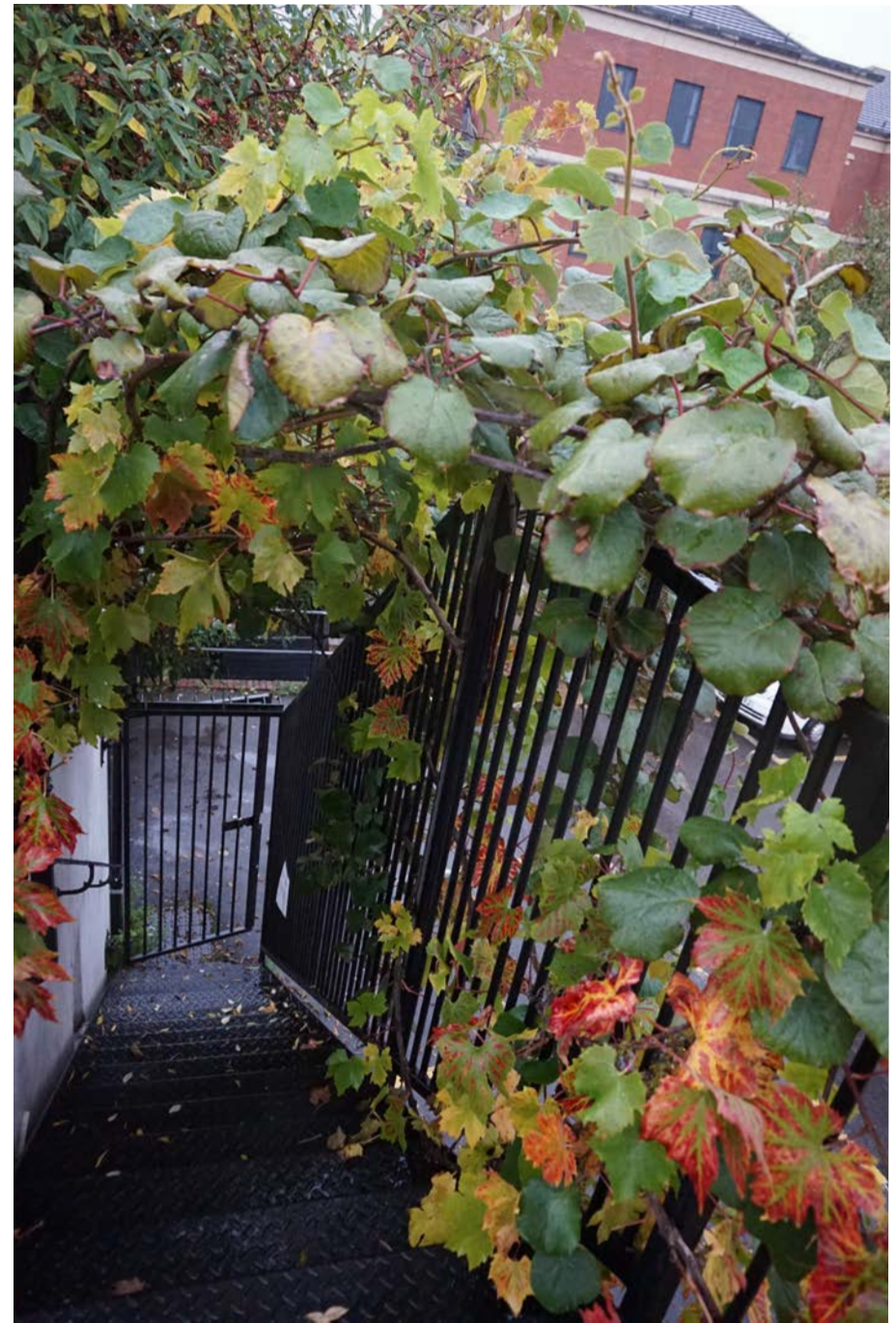


Small tea houses allow to enjoy the forest garden even under undesirable weather conditions.





Kiwi *Actinidia arguta* tunnel separates two very different areas of the forest garden.



Grape vine *Vitis vinifera* staircase brings you into the forest garden

Both tunnel trellises preparing you for changing setting through the walk.



# Checklists for developing a forest garden

To wrap up the insights of this booklet we give an overview on how to use this information for developing and evaluating forest garden projects together with some recommendations on different ways of learning in depth about forest gardening.

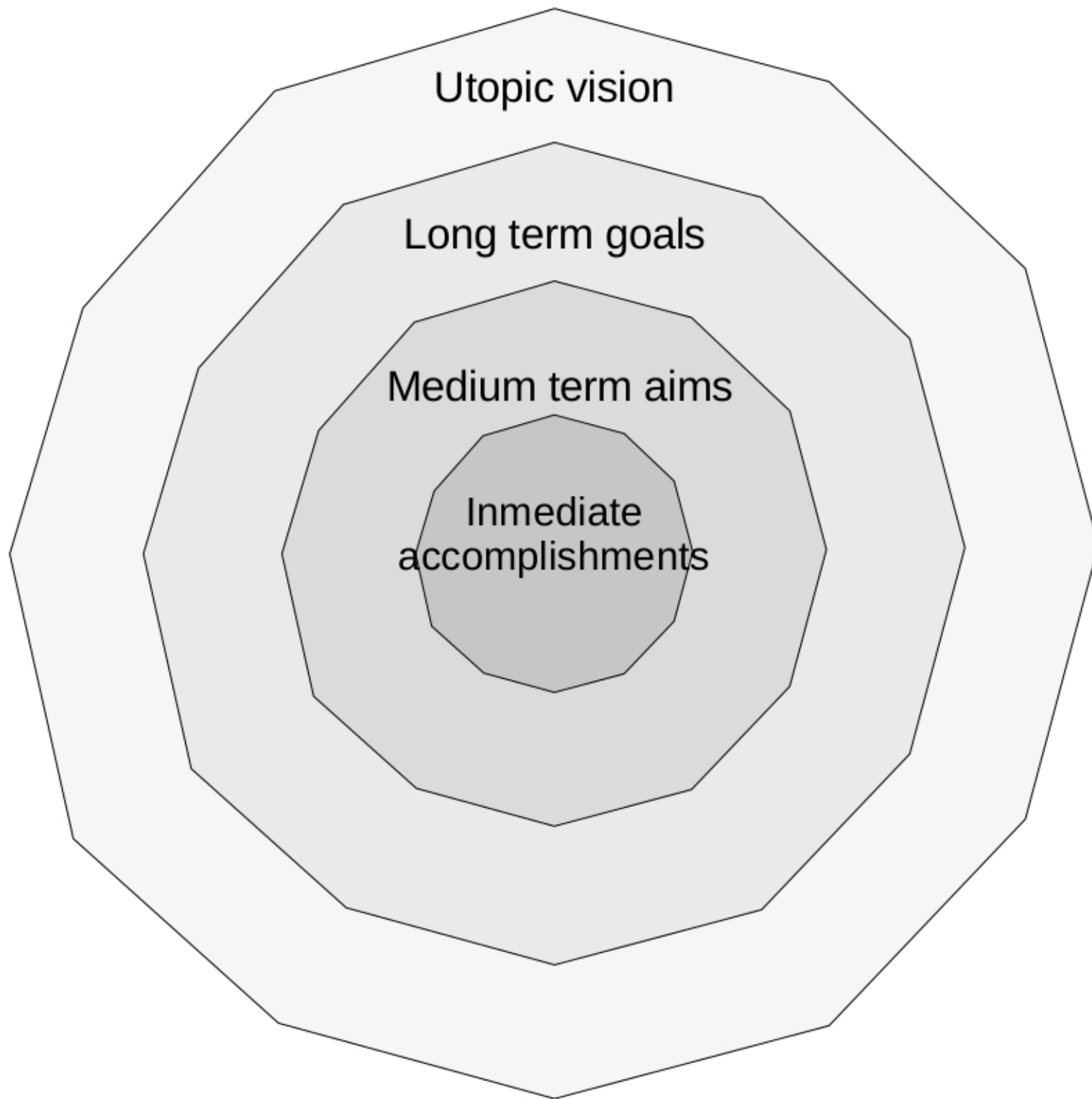
Theoretical		Practical	
Read	Connect with others	See	Try
Subscribe to useful resources as The permaculture magazine Agroforestry Research trust brochures Plants for a future database	Ask and share with friends And anyone with green interest	Visit places that are doing forest gardening. Then observe, smell, sense and be curious to ask. You never know how the knowledge can be useful.	Find a place to grow a forest garden. Putting the hands in the soil is one of the best ways to learn. But remember to build up experience before you take major decisions. It is a good idea to start together with others that know more than you do.
	Join the local permaculture association Or forest gardening group. They will help you in your process.	Take a forest garden course	
These are the most used books to Support the creation of a forest garden:  - Creating a Forest Garden. Working with Nature to grow edible crops. Martin Crawford - Forest Gardening. Rediscovering Nature . Robert Hart - How to make a forest garden. Patrick Whitefield - Edible Forest Gardens. Volume 1 and 2. Dave Jacke and Eric Toensmeier	Join facebook groups and other web based forums As there is many experienced people sharing their successes with forestgardening in the net.	Learn well about guilds and tree management. The wrong placing or pruning can show its Effects many years latter .	
	Join research networks as FFIRN to learn and share your experiences And take part of collaborative experiments		Define well your project: 1st specify your values and vision. Then relate that realistically to the possibilities of your land, After, design how to apply it in the land. Implement the project and do not Forget to evaluate on what you have Accomplish and how does it fit Wirh you original idea.
	Share your Forest garden plans and ideas with an expert advisor. Integrate their knowledge but do not rely 100% on their ideas. You know best what you want to accomplish with your project.		



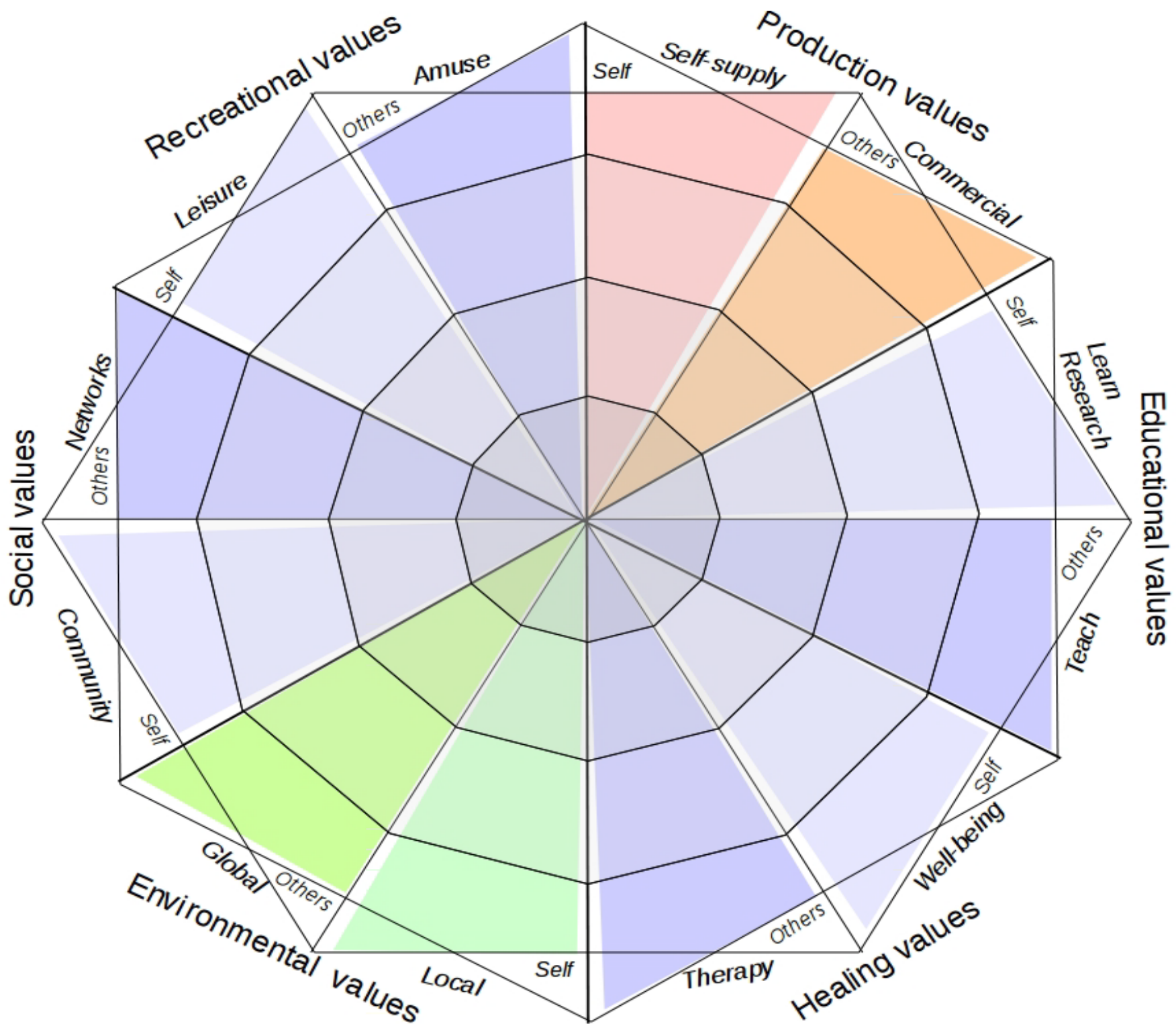
# Archetypes overview

Use the value wheel to consider the values of your project. Then relate them to the archetypes to see how that could be applied in the reality of your project. The archetypes are listed here representing in keywords the main patterns they relate to. Bare in mind that this is a simplification and there is many more patterns and elements that are not mention that also will add a huge value to the forest garden. Remember that you can also use these tools to evaluate in your project.

Archetypes Features	Environment		Production		Community		Education		Recreation		Health	
	Local	Global	Self-supply	Commercial	Local Community	Extended Network	Learn Research	Teach	Self Leisure	Amuse Others	Self Therapy	Others Well-being
Who makes This prjects	Foragers	Activists	Sovereigns	Entrepreneurs	Committed To relationship	Committed To group	Curious	Inspiring	Hobby Gardeners	Profesional Designers	Health seekers	Profesional Designers
Plant Patterns	Plants for mimicking Ecosystems	Forest mass for climatic Regulation	Plants for daily Harvest	Plants for Bulky yields	Collective Management Plants	Easy plants to share seeds Or cutting	Plants adequate to personal level Of expertise	Plants that Tell stories	Plants as Sweet treats	Playground or admiration Plants	Medicinal Plants	Plants with sensorial Qualities
Plant Layers	Equitable Distribution Of layers	Preference to High canopy	Small trees Bushes Ground covers	Small trees Bushes Market garden	Acorcing to interest		Acorcing to interest		According to Interest	Equitably Scattered	Bushes and herbs	
Hedges	Entangled for wildlife connectivity		Straight lanes for Maximum efficiency		Enclosing for delimiting the space		Diverse for Multifunctional examples		Winding lanes for Aesthetics reasons		Enclosing for Bringing security	
Patches	Random structure as A natural forest		Regular distribution of Productive species + required nurture plants		Chaordic organization with Clumps, clusters or scattered Distributions of plants		Stereotypical / Experimental simple Guilds constellations		Coherent structure with Clusters or constellations Of species		Geometric Patterns In plant distribution	
Open spaces	To allow for natural regeneration To take place or Biodiversity meadows		Practical space For transport and maneuvering		Areas for gathering groups		Areas for Outdoor classrooms		Areas to allow for distant views		Diversity of spaces to be able to choose the preferred one	
Construction	Natural homes with Compost toilet		Industrial instalations And greenhouses		Pavillions, gathering tables, Outdoor kitchens		Outdoor Classroom, Signs, lab		Tea house, natural playground, Art and sculptures		Sitting spaces, Shelters or cabins	









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The image features two large, overlapping yellow geometric shapes. One is a long, thin triangle pointing towards the top right corner, and the other is a narrower triangle pointing towards the top left corner. They overlap in the upper left quadrant of the page.

By Candela Vargas Poveda

8 August 2016