

# Agroforestry Gardens

Baseline Document for the Workshop “Agroforestry Gardens”  
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## EARTH: A LIVING PLANET

Earth is a **dynamic living system**. It changes and develops constantly. Several scientists showed that on Earth the flow of matter and energy depend on life. James Lovelock, one of these scientists, suggested the use of the name **Gaia**, the Greek Goddess of Earth, to this **living system**.

As a rule, the natural ecosystems tend towards to increasing complexity along the time. Growing biomass (**organic matter**) and energy accumulation takes place as well as the number of species. More complex relationships among all life forms are established. Flows of matter and energy are improved. An image of what would be such a complex system is the **Tropical Forest**, with its thousands of plant species, million animal species and countless microorganisms species. While we move away of the tropics, the number of species decreases, but the strategy of living systems is always the same: **increasing complexity**.

Imagine an area degraded after deforestation and intensive use for agriculture. An area without any vegetation. Successively, seeds of plants arrive, established themselves, grow and modify the site's environmental conditions, making this place better for other species that were not able to survive in the previous conditions. For example, a seed of herb spread by the wind in a deforested site. Through photosynthesis, this herb uses the energy of the Sun to make leaves, branches and flowers from the Carbon of the atmosphere (CO<sub>2</sub>). In this process, plants release the oxygen so vital for us. It is why in China they say that Agriculture is the **Art of Harvesting the Sun**. When a fire burns the vegetation, the reverse happens: fire is a liberation of the energy that was organized in life by photosynthesis. The energy of the Sun is then released to space impoverishing the biological system.

When this herb dies, its leaves and branches fall in the ground and are decomposed by micoorganisms increasing soil fertility. The soil is now covered and a seed of shrub that would die in a cleared soil now is able to germinate. This shrub grows, carry out photosynthesis and more CO<sub>2</sub> is fixed. Again, the gas that might contribute to the

AIR

FIRE

EARTH

<sup>1</sup> Helena and Fabiana will organize the Workshop “Agroforestry Gardens” during the Conference.

*greenhouse effect*<sup>2</sup> becomes plant branches, leaves and trunk. When this shrub dies, soil is fertilized by the leaves, branches and trunk decomposition. The site increasing richness allows the establishment of more and more fertility demanding species. Larger and diverse, as well as high fertility demanding plants can now establish themselves in this site.

WATER

The *organic matter* accumulated in the soil from the decomposition of leaves, branches and trunk allows the storage of a larger quantity of water. Before, water used to flow away provoking soil erosion. Now, water is stored in the soil and in plants, staying in the system instead of flowing out. After all, water storage in the soil depends mainly on organic matter. So, the site, more and more wet and fertile, can support more and more species diversity and stores a higher level of biomass. Some organisms are short living and will quickly leave the place, like the herb of the beginning of the process. Others are long living, like the trees that grow with the support of the short living ones. This process is called *biological succession*.

Each species in the ecosystem has a specific function in this process to support succession towards a more and more *complex and abundant system*. For example, funguses that live in the soil help organic matter decomposition making food for other organisms. Full sun fast growing trees will protect long living trees that only grow in the shadow and so on. How about the Human Being? What is the Human Being function in the web of life in order to contribute for the maintenance of Earth as a Living System? Each species in the nature, every day, do something that transforms its own site to increase the abundance of life. And the Human Being? What can we do to be able to answer these questions at the end of our day: Did I contribute, today, to increase the amount of life in the Planet? *Was I useful to the Planet?* How can I become a beloved organism under the eyes of Gaia?

Ernst Götsch is an investigator and Swiss philosopher planting Agroforestry in the south of Bahia, Brazil. According to Ernst, the function of human being in the tropical forest is to be a *seed dispersal*. Yes ... seeds of avocado, sleeve, jack fruit, “cupuaçu”, “pupunha”, and any other succulent fruits from your country. All these delicious fruits that feed us. We can eat them and, in exchange, we have to plant their seeds so that these trees can spread and *produce more abundance in the future*. This should be our function. But it is not what we have been doing. On the contrary, most of the humanity has been contributing to deforestation and to trees harvesting instead of trees planting. The irrational consumption of energy, the industrial agriculture (large monocultures maintained on chemists' base), the increasing consumption of beef, the expansion of the cities and transport infrastructure, mining... all these are human activities that destroy the forests.

We are clearly not fulfilling our function. According to Ernst, when an organism does not do his function in the system (that in our case is to plant seeds), it will not become a beloved organism under the eyes of Gaia, so, it is predestined to be driven away

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<sup>2</sup> Gases that absorb the heat of the Sun in the Earth's atmosphere, producing the greenhouse effect. Carbon dioxide is a major greenhouse gas. Other greenhouse gases include methane, ozone, chlorofluorocarbons, and nitrous oxide. (<http://www.eon-uk.com/EnergyExperience/559.htm>)

from the system. Our challenge in order to reach happiness is to learn how to fulfill our function and live in harmony with Gaia.

## AGROFORESTRY SYSTEMS

An Agroforestry System is a food production system that reproduces the natural forest. While planting and managing an Agroforestry System, human being favors the succession of species and the improvement of life quantity and quality. Human being fulfills, so his function in the system, producing abundant food systems. **Agroforestry Systems are forests of foods.**

In such kind of system we can produce everything we want since we observe species characteristics and apply this knowledge to manage them: in which type of system the species naturally occurs? How much light, water and nutrients this species needs? In which succession stage this species has a function to fulfill. Most of the human being food is from systems of abundance (succulent fruits, corn, nuts, vegetables). So, it is possible to have all food needed managing an Agroforestry System if we push the System towards the abundance. Agroforestry Systems have, then, a strategic role on **humanity food security.**

### FIRE

Solar energy is reflected by the Earth surface and causes the atmosphere to get warmer, principally in the abundance of greenhouse gases. The clearer the surface of the Earth, the more solar energy is reflected. Since Agroforestry Systems are forests and forests are dark as seen from the sky (looking from a satellite image you will notice that forests are much darker than cities), it absorbs the Sun energy instead of reflecting it. That contributes to reduce the global warming.

### AIR

Agroforestry Systems have also an important role in the landscape by protecting rivers, helping water recharge and promoting corridors for animals flow. Its existence beautifies the landscape. **The microclimate close to an Agroforestry System is more pleasant. Thermal amplitude (the difference between the higher and the lower temperatures during a day) is small. The air is more pure. Agroforestry System can be a strategic wind barrier too. Wind can cause serious damages on soil and plants through erosion and dehydration mainly in cleared and opened environments.**

### EARTH

In Agroforestry Systems, as in the natural forests, soil is not considered as only a physical support for plants. Soil is a living organism. The ideal soil is soft and light, dark and with a good smell. It is a complex system of interaction between organisms, water and minerals that is able to support the complex web of life. As well as in the natural forest, the Agroforestry soil is maintained constantly covered with mulch to protect and feed the organisms living there. The mulch, a layer of leaves and branches on the ground, avoids the straight sunstroke, maintaining soil moisture.

### WATER

**Agroforestry Systems are water producers.** And let's remember that a large part of the Planet is currently living a rapid process of desertification. As more organic matter is accumulated in the system, more water is stored, both in the soil than in the biomass (or, in other words, in life). **Because life is water organized.** Ernst, as well as others that are planting Agroforestry Systems, noted that the quantity of rain is higher

in his area than all around in the region. Besides, the streams that were dry can have running water again when degraded areas are recovered with Agroforestry Systems. That is what Ernst calls “ To Plant Water ”

Agroforestry management is carried out aiming to push on the evolution of the system by itself. No type of chemical input is used, neither pesticide nor fertilizer, all of them are unfavorable to life. These inputs, associated to mechanization, cause the slavery and dependence of farmers. They destroy life and pollute environments. They break the web of life while removing organisms that had a function in the system. They turn the soil, which used to be a living organism, into an inert and dead structure, unable to support life and store the precious water. They arrest farmers in an economical chain which only interest is to make money without evaluating the consequences. In general, energetic net balance of highly energy demanding systems based on chemical inputs and on the use of hard machines is negative. The quantity of energy obtained in the harvesting is small than the energy spent in the process of production (extraction, production and transport of fertilizers, seeds and pesticides, fuel for tractors, etc.). The Agroforestry, on the contrary, aims at having a positive energetic balance and the independence and autonomy of the farmer. Almost everything that is necessary to produce in abundance can be obtained with the use of local resources.

## **SEEDS AND KNOWLEDGE**

Seeds are the main strategic resource for Agroforestry Systems, as well as in any agroecological system. **Without seeds, the farmer is nothing.** Seeds represent the beginning of life. It is why the industries of chemicals for agriculture buy the industries of seeds. To avoid farmers to produce and plant their own seeds. To force him to buy, every year, seeds from these industries and to make him dependant of them to plant. With the hybrid and transgenic patented seeds, farmers are completely dependent. The independence and autonomy of farmers depends on their capacity of reproducing their seeds locally by themselves and on the freedom to exchange seeds with other farmers. Then, he will be able to be free and to prosper.

As well as seeds, **knowledge** is of vital importance for those who plant Agroforestry Systems. The most important skill in order to practice Agroforestry is the capacity of observation. Observation of nature, of planted systems and their dynamic. Observation of plants behavior and their relationship with other organisms. In Agroforestry Systems, all the farmer's traditional knowledge about his environment is of high value and importance. It is because Agroforestry Systems obey the same laws as natural forests. Farmers observations, shared freely with other farmers, can be transformed into an important knowledge on how manage Agroforestry Systems in order to improve food production.

## **AGROFORESTRY GARDENS**

Agroforestry Gardens are an adaptation of the concept of Agroforestry to urban environments. They join food production in small places together with the place

embellishment. But the **principles** are the same of those applied to Agroforestry Systems.

In the urbane environment, Agroforestry Gardens give the **opportunity of using organic residues** for production of life and food. Organic trash becomes, through Agroforestry Gardens, a resource, a fertilizer. Something that was an issue becomes a wealth. We always have to find a smart way of using local resources. For example, rubbles from building construction can be transformed into the structure of a Spiral of Herbs<sup>3</sup>. Gray water (the water from the kitchen wash basin) can be used as irrigation for an Agroforestry Circle<sup>3</sup>.

**WATER**

**Agroforestry Gardens are eatable gardens.** They are composed by eatable, medicinal and aromatic plants as well as spices and flowers arranged in harmonic and beautiful shapes, always observing the function of each plant in the system.

Through Agroforestry Gardens, cities inhabitants can get in touch with the world of plants. People can have the opportunity to re-connect with the life cycles. These gardens allow the approximation among human being and nature. Plants are smart organisms with a great adaptation capacity and able to produce chemical energy from the energy of the Sun. They are wonderful and sensitive. They have developed countless strategies to grow, reproduce and maintain themselves. By getting in touch with these organisms, we can access a relevant pathway of learning, meditation and spiritual evolution.

In general, in the cities, fruit seeds are released in the garbage! An incomprehensible behavior since seed is not a trash. **Seeds are the plants' babies.** Seeds are the possibility of the beginning of a new life. Agroforestry Gardens allow people living in cities to fulfill the function of being a seed dispersal. And, maybe, to be seen by Gaia as a beloved organism.

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<sup>3</sup> The Spiral of Herbs and the Agroforestry Circle will be presented in the Workshop during the Conference.