
Wonderful world
Technology

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Wonder Farm
Centre of Permaculture in Valley of Jequitinhonha

The Wonder Farm is located on the banks of river Jequitinhonha, at about 25km from Araçuaí downtown.

The farm belongs to the Social Project Santo Antonio and was ceded to the CPCD – Popular Centre for Culture and Development – for deploying the Centre of Permaculture in Valley of Jequitinhonha. Since 2005, the Wonder Farm is a laboratory of alternative technologies and a reference to the practices of permaculture in the region.

With the activities implemented, developed and shared, the farm aims to be a model of integrated, harmonious and sustainable development for the Valley of Jequitinhonha and Brazilian semi-arid regions.

Observing what happens and what works is worth a thousand words. Visit the farm and check it with your own eyes!


Araçuaí
Sustentável
Sítio Maravilha
Centro de Permacultura do
Vale do Jequitinhonha
Aqui vive-se e pratica-se a Carta da Terra! Um exemplo de propriedade sustentável. Uma "escola" onde a Natureza é a "educadora" e nós, eternos "aprendizes". Um modelo de desenvolvimento integrado, harmônico e sustentável para Vale do Jequitinhonha e semiárido brasileiro.

Permaculture

Permaculture means permanent culture. It's a way of thinking and acting, working and producing from three principles: care for the earth, care for people and sharing the surplus.

Everything has got to have, at least, two functions. One plant helps the other to grow. The waste becomes input. Problems are turned into opportunities!

When we follow the principles of permaculture to organize the activities in a site, we draw a plan for the best use of the space, to facilitate human work, to make great use of the energy sources. That's what happens in the Wonder Farm. The idea is to connect everything so all is utilized and there is no rubbish.

To accomplish each principle of permaculture, simply observe nature and inspire yourself by its teachings. Nature is the greatest teacher and we, lifelong learners.

The Wonder Farm Technologies

Constituted to be a laboratory, the farm has been an area for experiences and learning since 2005.

It means that we have made it right, we have made it wrong, and we have had a reasonable accrual of agricultural practices which prioritize the respect to nature and to people, at the same time.

The experience of permaculture is transformative and makes us understand the beauty of the teachings of nature and the concept of sustainability in a very concrete way!

The farm was transformed using permaculture as a methodological model of intervention. In 2005, the farm's soil was sandy, not very fertile and the land had only a few trees.

Just to give you an idea, between 2006 and 2011, over 3.800 seedlings have been planted in the farm in order to improve the biological quality of the soil. The outcome was a production of over 48 tons of healthy food, which supplied both social projects Ser Criança and Santo Antônio during the same period.

According to the report from the agronomist engineer Carlos André Gonçalves Pereira, in 2012, the improvement of the soil quality was significant.

Such improvement was due to the planting of mixed species, irrigation and increment of organic material, and as well for the abolition of fire and cattle treading, small animals breeding, use of techniques for conservation of the soil, all guided by permaculture.

We'll follow telling our experiences and the details of each technique applied in the Wonder Farm. Our intention is to take the readers on a tour around our most consolidated practices and invite them to adapt these techniques into their own site. Let's go?

TECHNOLOGIES

Zoning

Each thing in in the right place

It's the way of designing and organizing the property in order to facilitate cultivation, save human energy and define the best places for each plant, each building and each animal.

In the Farm, this was the best distribution we got to:

Zone 1

Next to the house – within about 50m – there are the vegetable gardens, the medicinal herbs, the small-sized animals (chickens, quails and rabbits), the water tank, the ponds, the composting toilets. Everything that needs to be next to people. It's an area of fundamental coordination of women, especially, in familiar properties.

Zone 2

In a second circle, there is the plantation of fruit and some grains which grow intercropped with the orchard.

There is an orchard in the Farm with many different fruit (banana, orange, mango, coconut) planted with seedlings and seeds.

Over 90% of the trees were planted a few years ago, such as the *embaúba* (cecropia), *angico* (mimosaceae), *carne-de- vaca* (mofumbo), *mutamba* (Guazuma ulmifolia Lam), *tamboril* (enterolobium maximum), etc.

Zone 3
Zone 3 is always the place for cultivating plants from the region.

It's the place for cultivating grains. In big properties, it's the place for pasture and cattle breeding.

In the Farm zone 3 is a farming area [with beans, corn, manioc, *feijão-catador* (a type of beans)] and also some native local plants such as *monjolo* (fabaceae), *aroeira, carne-de-vaca* (mofumbo), *tambori* (enterolobium maximum)*l, gameleira* (ficus) - *preta* e *branca, acácia* (thorntree), *pinhão-manso* (pine), *bamboo, jaca* (jack frui), *abacate* (avocado), *cajá-manga* (ambarella), *mamão* (papaya), *jenipapo* (American genipa), *leucena, gabiroba, ipê-amarelo* (tabebuia).

There is also an area of green manure, from the planting of *mucuna-preta* (black mucuna), *guandu* (gandule bean), *crotalaria* (crolataria), *batata-doce* (sweet potato).

Zone 4
According to the principles of permaculture, it's part of the property zoning to keep a reserve area in zone 4. This must be a protected area. The property's green frame keeps foreign animals away, and also protects the cultivation areas.

In the Wonder Farm, the reserve area is made up of native vegetation. These trees have helped the soil to be stronger as well as more fertile. Where once it was the river beach, on the banks of river Jequitinhonha, it is now a productive area! Gradually, pioneer plants which grow on poor soils and have rapid growth and short life span, give way to definitive plants: *monjolo* (fabaceae), *aroeira* (pink pepper), *tamboril*... Such a beauty!

The diversity of species and maintenance of the soil protected by organic material is priority in all the zones.


Aracuai
Zona 1
Área de +- 50m de raio ao redor da casa. Plantio de hortaliças e ervas medicinais. Instalações para
Aracuai
Zoneamento
orma de "desenhar" e organizar propriedade. Facilita o trabalho, conomiza energia humana, define os locais para


Aracuai
Zona 2
Plantio de frutíferas da região. Pomar consorciado com grãos.


Aracuai
Zona 3
Plantio de grãos, mandioca, abacaxi, batata doce, etc. (o que for propício para a região). Em grandes propriedades é o local das pastagens.


ZONA 04
Reserva
ZONA 03
Lavoura
ZONA 02
Pomar
ZONA 01
Casa/ Horta
ZONA 02
Pomar
ZONA 03
Lavoura
ZONA 04
Reserva

Seedling Nursery

Cultivating and protecting trees

At the nursery, seedlings are cultivated and protected until they are strong enough to be planted.

We prepare fruit and native seedlings from the Valley of Jequitinhonha in the farm. Cashew, *acerola* berries, mango, guava, *tamarindo, ingá, angico, gameleira, ipê, viu-viu* are some of them. The seedlings are shared with the rural communities around and also planted in the farm. Each child born in Araçuaí is given one of these seedlings. As Celso, who works in the farm, says: "we want to reforest the world!"

How to make a seedling nursery?

A seedling nursery like this one on the picture must be constructed in a light, irrigated area. The seedlings must be protected from the direct sunlight, wind and rain.

A *sombrite* (plastic material used for shads) cover is a good option. It's recommended to choose a flat land near a water source, so no extra energy is wasted in the irrigation of the seedlings.

You can create a seedling nursery in any place protected from direct sunlight, wind and rain. Where there are well maintained seedlings and protection for them to grow strong, there is a nursery!

Seeds House

A place for appropriate storing and preservation of seeds.

"*Crioulas*" seeds are the ones collected and stored by the farmers themselves. They are adapted to each environment and, therefore, they are more resilient and less dependent on any input, as for example, fertilizers.

It is very important to cultivate seeds and exchange them with neighbors so you do not need to buy new ones. Hybrid seeds that give rise to plants, but do not generate new seeds are sold in shops. They were created by the agribusiness industry precisely to cause the farmer to buy more and more every season.

Seeds are an asset to be cultivated by each of us!

In the Wonder Farm, the Seeds House consists of types grown and harvested in the region. It was built with *adobe* (clay-brick) and a green roof, making it a cool protected place for the good conservations of seeds. There have been many donations and is now possible to exchange seeds and knowledge about them and about plants!

But, how do we collect and store seeds?

It is necessary to cultivate each plant in a specific way. See our seeds catalog, where we tell how to collect and store seeds of some native species of Araçuaí, according to popular knowledge www.projetocaminhodasaguas.org.br).

Usually, seeds are stored in reused PET bottles which are kept in the shade and periodically opened to let the seeds breathe.

Other than the Seeds House in the Wonder Farm, there are others in many communities, for exchanging experiences and seeds.

Food Forest

The art of combining trees with agricultural cultivation and animals

It is an ancient form of using the land, which has been practiced for centuries by country men in all parts of the world.

Also known as agroforestry, food forest houses together, native plants, fruit, food and small animals. With it, we make an environmental reserve area, along with the breeding of small animals and growing food. Preservation and production together!

The principle of food forest is cultivating plants for cutting, producing and growing.

In the Wonder Farm, the experience includes the planting of native species and regional fruit trees. Mango trees, orange, lemon, *umbu* (s. tuberosa), ambarella, guava, plum rose, avocado, blackberry, pineapple, *graviola* (Brazilian pawpaw), hog plum, and some trees like coconut, pepper tree, *angico* (mimosaceae), *mutamba* (guazuma Ulmifolia Lam), *monjolo* (fabaceae), *carne-de-vaca* (combretum), *ipê* (tabebuia) and American genipa, which were already on the property and have been protected.

These species last for over 10 years and were planted intercropped with corn and beans, which last one year.

There is also in this area *café sombreado* (shaded coffee) and plans for planting manioc soon. Next to the new water tank, which is located in this area, there will be recovery of land that was removed with crotalaria and pumpkin.

The food forest helps reducing deforestation, as it doesn't allow agriculture cycles to be temporary. It also recovers and reuse degraded areas. It is quite affordable and combines sustainability with products that can be sold at fairs and markets. Thus, the producer takes fewer risks (climate and market), grows only one or a few products and guarantees his consumption and income.

Rainwater Pond

Fish Hatchery and birds "pool"

The rainwater pond is another alternative for capturing water. The pond serves for rearing fish, for the birds' bath, for manual irrigation of plants and for storing as much rainwater as possible.

For building it in the Wonder Farm, we dug quite a large space in the ground and made its bottom waterproof by using clay, natural from the soil. Then, we covered the bottom with 25 cm of soil for protection from incidence of sunlight and fish and we also built gutters so that rainwater runs into this reservoir. We're rearing *tilapia* (fish) and *pacu* (fish) in the pond.

The pond also helps making the property fresher.

How to build it?

You can dig with a hoe or use a machine. The secret is to choose the wettest place in the property. Start by putting river water in it and let it complete with rainwater. The mixture is important.

Vegetation around lakes, dams and water holes

Surrounding the blue with green

The vegetation around the lake helps retaining rainwater. Channelizing rainwater to the pond facilitates its infiltration in the soil to then run to the groundwater areas.

So, we carried out the planting of trees of various types around the pond, but also we built small dams to protect the water holes in the land.

The "*barraginhas*" (small dams), made of small cement walls or other materials, help the soil to absorb water and reduce the impact of floods, forming small ponds each time it rains. They make the soil more fertile and decrease erosion.

The water holes are sources of water that flow directly from groundwater. They are extremely important as sources of pure water and so it is necessary to surround them carefully, such as:

• Avoid animal trampling throughout the course of the water (avoiding dirtiness and soil compaction);
• Plant native species within 50 m;
• Surround the water sources with "*barraginhas*"(small dams) or nettings to prevent the accumulation of runoff and waste.

Overall, the vegetation that protects the water in a property creates a microclimate much more pleasant and fresh.

In the farm, the vegetation around the pond is formed by species like *angico* (Mimosaceae) and *American Genipa*. The same trees from the food forest are placed here, minus the *aroeira* (acardiaceae) and *tamboril* (enterolobium maximum) - tamboril leaves kill the fish and are abortive for cattle.

Organic Composting

Feeding the soil

Organic composting is natural food for the soil. In the forest, when dry leaves, ripe fruit, animal droppings and other organic material fall, they become food for the soil, ensuring its nutrients and fertility.

In order to increase the land production, we've prepared at the farm, a mixture of cow and chicken dung, sugar cane bagasse, ash, milk whey, sawdust, water hyacinth, chicken feathers. All this is brought together in stacks, often mixed, protected and within 6 months of fermentation and decomposition, it turns into compost.

How do we make it? Let's see the details of the layers.

The first layer is made of 30 cm of crushed sugar cane bagasse, on the ground. The bagasse can be mixed with dry grass, dry leaves, rice straw, chicken feather, cuttlefish eggs, coffee straw, water hyacinth (if the water hyacinth is placed on top of the mulch there is no need to moisten it again), green branches of pruning or eggshells. The important thing is to use the remains available in your property and not waste anything. We water everything to ensure humidity.

After that, add up 10 cm of cow or chicken dung to the top of the layer. Again, it is necessary to make it wet with water or whey.

We alternate these two types of layers at the same proportion, and make sure the compost pile isn't higher than 1.5m.

For the last layer we put enough dry material to hold moisture in the composting and do not attract flies. On the top of it, it is good to put some ash, which is made from soda and help decomposition.

After building the pile, revolve the material each week. The more you revolve it, the better it gets.

Tests are needed to check the progress of composting.

Each two days we stick an iron rod into the composting. Two minutes are necessary to give us an idea of its progress. If, at hand touch, it is too hot, then the compost is not good: you must mix it a little for oxygenating or pour some water in it. If the rod is cold, it means that the compost is dry, so it needs water. It's good if the rod comes out warm, in a temperature that is possible for us to hold it.

With a thermometer it gets even more precise: at 40 degrees, it is ready. At 60 degrees, it needs oxygen and water. And, if it is cold, it also needs water for composting.

The compost will be ready in about 90 days, if it's a small pile overturned weekly. When the compost is cold, with porous, uniform consistence and whitish appearance, it is ready for use.

To use it, pass it on a coarse sieve and use it to fertilize intensively mandala gardens.
If the pile is too big the process may last about 6 months..

Caution:

• Be careful when placing sawdust in the compost. If it is treated-wood dust, it prevents composting;
• Do not put earth in the pile, it hampers the entry of air and hinders composting;
• Compost can be made directly on the ground or on top of a canvas without holes;
• If it is a sloping land, it is important to use the canvas to reuse the slurry generated by the process and return it to the composting;
• To enrich the compost against fungi and bacteria, add to one of the dry material layers, some neem leaves (max. 10 cm).

Dry Composting Toilets

Nothing is wasted; everything is transformed…and reused

In the process of composting it is possible to transform human waste - feces and urine - into compost for trees and gardens.

But, how is that? Through the construction of dry toilets, which do not use water to flush, we store human waste along with other debris such as sawdust, dry leaves, straw and coffee husk. This material, put together in a composting chamber (which may be a drum), will decompose with the help of certain bacteria and much heat and be transformed into compost.

To avoid excessive urine in the composting, we can divide the work: women peeing in the dry toilet and men peeing near fruit trees that need urea! This way, we distribute better the fertilizer!

This material, after approximately 12 months of composting and decontamination, turns into a high quality fertilizer used for recovering degraded areas, orchards and food forests.

But, how does the composting happen? In the Wonder Farm, it happens this way:

1. When full, the drum is exposed to the sun, preferably fit into a hole dug to let half of the drum out. Its cover is removed and it stays semi-closed: covered with shading (sort of screen) and a loose tile on top, avoiding rainwater. The tile protects it and also helps keeping the heat! This stage lasts about 6 months.

2. When the drum is lighter, it is because it lost moisture and composting is going well. It's time, then to complete the cycle: a base with dry material - especially sugar cane bagasse - is covered with the compost from the drum. The small pile should be well covered with more dry material.

3. From there, you must mix it from time to time and observe: in about 3 months the composting is ready for use.

You can confirm whether the composting is ready by doing the earthworm testing.

Putting some earthworms in the compost helps confirming if the compost is ready to be used: if they stay in the composting, it means that it has the right temperature and is ready!

The advantages of this process range from saving water, preserving soil and rivers, until the reduction in the use of pesticides to combat pests.

In the Wonder Farm, there are three composting toilets. One of them was the first dry toilet in the region. We are improving their design. They got more beautiful with the earth ink painting. Also, it was invented a sink with rainwater, so nobody leaves the toilet without washing their hands. The grey water that comes out of the sink goes straight to the banana circle and is, of course, reused!

For further information you may check the Dry Toilet Booklet, available on the following websites: www.projetocaminhodasaguas.org.br | www.cpcd.org.br


Aracuai
Banheiro-seco
(ou banheiro de "compostagem")
Não usa água para descarga.
Usa-se pó de serragem para cobrir
as fezes. Não produz mau
cheiro, se bem utilizado.

Green Manure

Preparing the soil...

The green manure is the preparation of the soil for the main production, through cultivating certain fodder plants and/or leguminous. This green coverage is good for fertilizing the soil and making it ready for future cultivations.

In this practice the planting is done by a certain time. Before the plant grows completely, it is cut to incorporate nutrients into the soil.

Green manure prevents erosion and soil compaction, retains water and nutrients in the soil, it amazes weeds and searches for deep nutrients (with the long roots of the leguminous).

For this purpose, we often plant pumpkin, *andu* beans, crotalaria, beans and *mucuna* (Guazuma Ulmifolia Lam) in the Wonder Farm, as a way to recover soils weakened by constant use.


Araçuaí
sustentável
Adubação verde
Plantas forrageiras e/ou leguminosas (batateiras, abobreiras, guandu, crotalária, feijão de porco, mucuna).
Manutenção de solos férteis;
recuperação de solos enfraquecidos pelo uso constante.

Shaded Coffee

Coffee plantation intercropped with other trees

A consortium between the cultivation of coffee and leafy trees is an alternative for helping coffee trees to produce better.

Growing under the shade of trees, the coffee trees have good conditions for developing, especially in very hot places such as the Valley of Jequitinhonha. The coffee trees are protected from direct sunlight and wind, the maturity of the plant saves time (and coffee quality), the microclimate is more humid, the temperature amplitude decreases and the soil starts requiring less water.

A higher quality coffee makes a difference for consumption and trade! It adds value to the production. This is not only due to shading, but also to the caring for harvest at the right time and the proper storage of the coffee grains.

The shaded coffee production is also an important ally of the preservation of forests and water resources.

Mobile Chicken Coop

Chickens as guests to fertilize the vegetable garden...

The mobile chicken coop is one of the practices that seek to combine breeding of small-sized animals to the best use of their manure in order to fertilize the soil. It is designed with a route so each spot of the land receives the chickens for a period and gets the benefits from their stay.

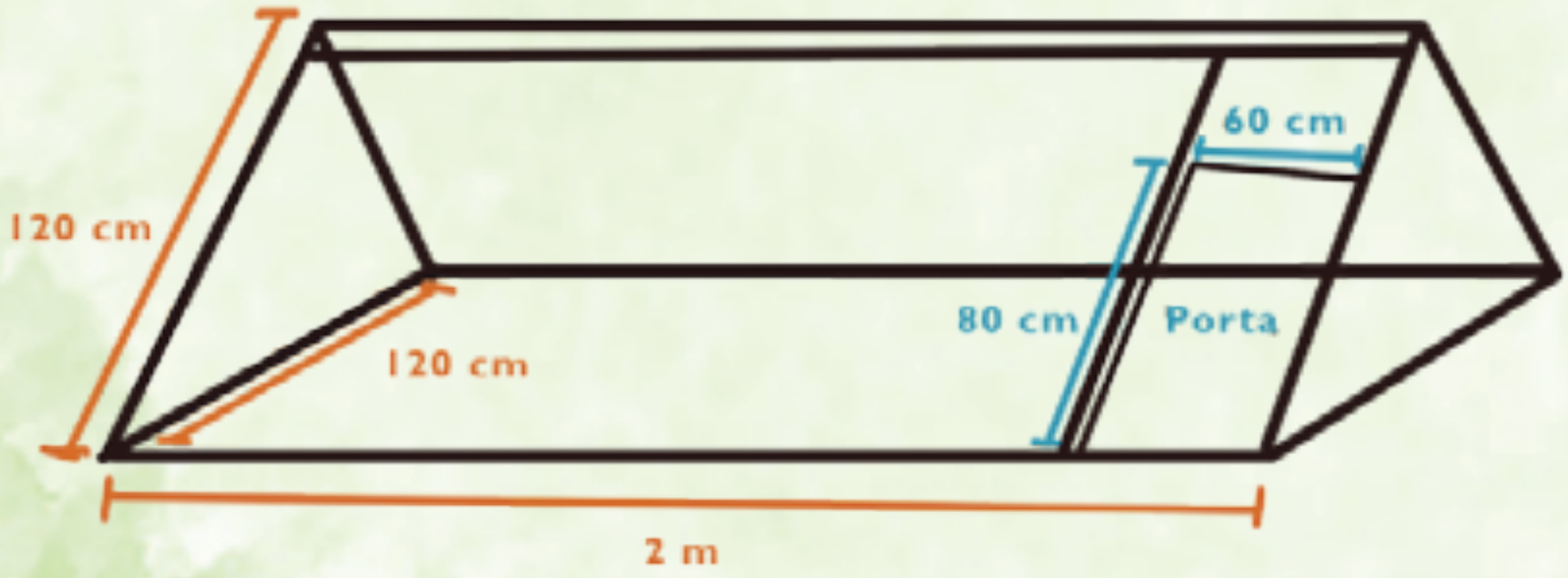
The chickens are raised in a mobile structure, which is installed alternately in different parts of the land, especially where we grow vegetables.

Thus, the chickens help to stir the soil by scratching incessantly, get fed by vegetables (including weed seeds) and fertilize the soil with their droppings.

What material is necessary to make a mobile chicken coop?
To make a chicken coop as the one in the photo - with 2m long, 1m high and 1.20 m wide – it is necessary:

- 4 strips 2 m X 10 cm
- 7 strips 1.4 m X 10 cm
- 2 strips of 30 X 10 cm
- 2 strips of 80 X 10 cm
- 2 strips of 70 X 10 cm
- 6 m of netting wire
- screws 12 1/4 by 8 cm

You can adapt materials, as long as the chicken coop is mobile and comfortable for the chickens!



Swales or Contour-lines

Holding water and preventing erosion

In lands with natural slopes, it is possible to create swales or contour-lines. Basically, channels are dug in the earth, parallel to the existing contour lines in the land. Its function is to create a relief that facilitates the absorption of water by the soil and prevents nutrients to be taken away by rainwater.

In this case, it is recommended to plant, below the ditches species like *crotalaria*, for creating a powerful green cover. Trees should be planted below the relief as well, to use the water retained and help in maintaining the soil.

In the farm, the contour-lines were made with the use of hoes, in zone 3.

Rainwater Reservoir

Capturing rainwater for year-round use

Sometimes it rains much; sometimes it does not rain at all. Therefore, we must seize rainwater and reserve it for domestic use throughout the year.

The system for capturing rainwater is simple. Through gutters on the roof of the house, the rain that falls will be stored in a 16,000 liters water tank. To prevent dust from the roof to be stored in the box, the system discards the first water drops which wash the way.

With this capability, the reservoir can supply a family of six during the dry season. Its use should be moderate and conscious.

Other than the rainwater reservoir in the farm, which ensures domestic supply for people who work and live there, there are other reservoirs scattered throughout many communities in Araçuaí. They are carefully built by joint effort, made of concrete slabs and beautifully painted in local colors with earth ink.

Purification filter

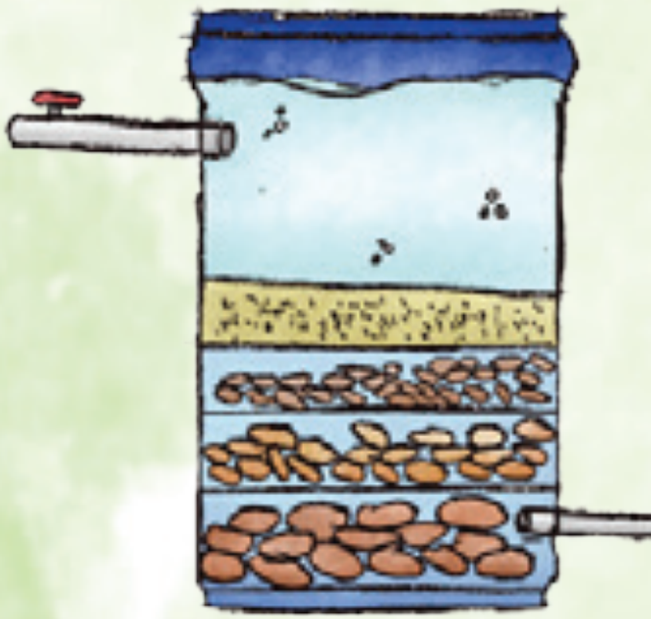
Cleansing and purifying water

Using river pebbles, gravel, crushed stones, sand and charcoal to purify water is an attractive alternative, especially in places where it doesn't rain much, under the logic of permaculture. Everything is useful!

The natural purification filter is made from a sequence of physical filters which clean the water little by little through its way until a final destination.

The pores found in gravels and in river pebbles (and even in charcoal, common in conventional filters) will retain the water residues.

In the Wonder Farm, there is next to the rainwater reservoir, a drum connected to the gutters which receives the first rainwater, which is discharged. From this drum, the water runs to a purification filter, made with sand and stones that hold the impurities of the water. This is done not to waste a single drop of water captured by this system, in a simple way.



Banana Tree Circle

Banana Trees as natural filters

The banana tree circle is a quite interesting practice for reusing the water from the house and keeping the banana trees in a propitious environment for their development.

In the same area where you would have one banana tree, you can fit from five to six families of different qualities, if planted in circle!

When you collect the banana, the waste is put inside the circle, generating even more organic material. The straw put in the center of the circle attracts many animals, which produce manure for the trees!

The banana trees like moisture and soil rich in organic material. You can fully achieve these conditions by channelizing the grey water (from the sink and shower, for instance) to a circle with banana trees around.


Círculo de bananeiras

Green Roof

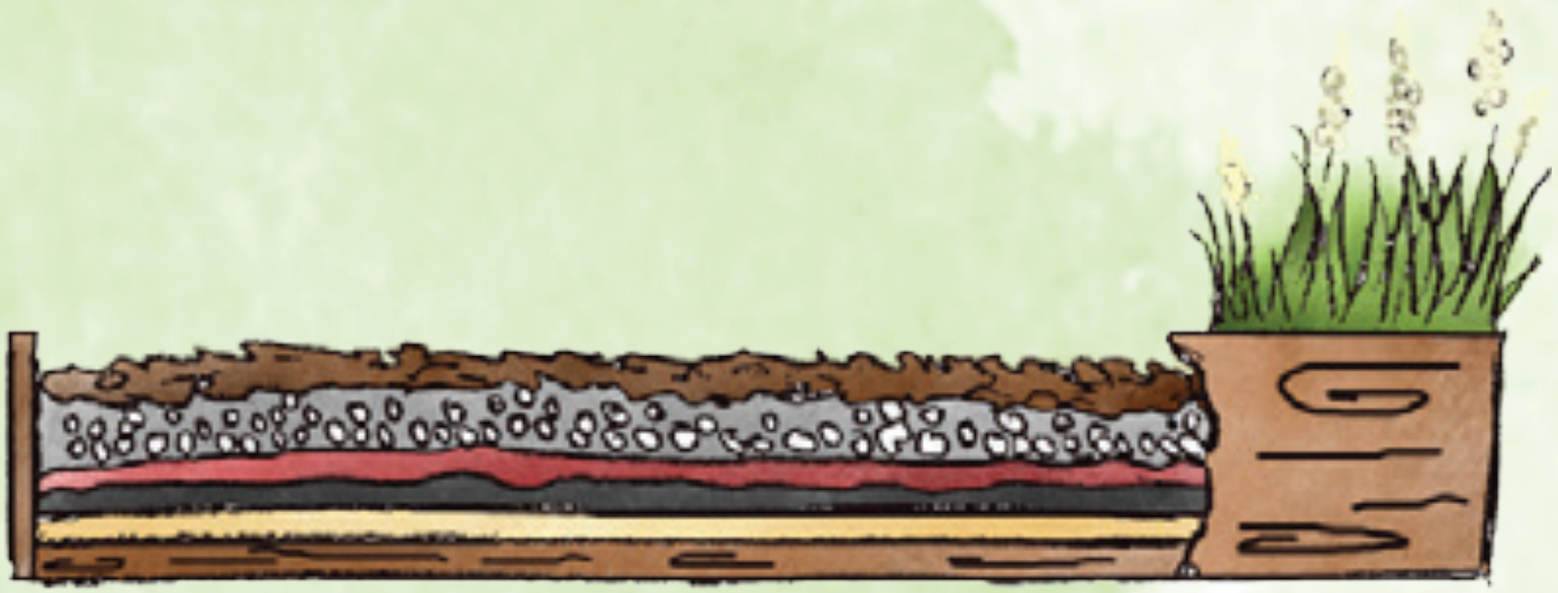
Hanging Gardens...

The green roof mitigates the temperature and gives the building a nicer look.

It is very welcome everywhere we think harmonically man's relationship with the environment. Placing earth and vegetation on the roof of buildings decreases the temperature range in homes, nurseries, seed houses and other buildings, other than extending the green space and increasing the beautiful scenery.

To make a green roof some care is necessary: waterproof the roof to avoid infiltration and keep constant maintenance for the covering plants.

In the farm, the roof was made from a good wooden structure that supports the weight. Then it was placed a *madeirite* (poor quality wood) coverage. Above it, there is a good and sturdy piece of canvas, covered by a blanket of felt, then some gravel, and just after that, soil for planting.



Herb Spiral

Little space and many herbs! At hand reach.

The spirals are a steadily shape observed in nature, found in shells, the constellations ...This design can be helpful in gardens, vegetable gardens and herbs plantings.

In the Wonder farm, we used construction scrap to build beds in spiral shape, for growing herbs. It's also worth the use of stones, brick, wood and bamboo that are left.

In a spiral bed it is possible to have areas with different moisture levels, which is favorable to plants with diverse needs. At the top there are the plants which like the heat and less water. In the curved spots, where there is shade, are those that ask for more moisture and shade.

The Herb Spirals are about 1 m high and 1.6 m in diameter to facilitate handling. They should be placed next to the kitchen door so the herbs are "at hand" at any time (in the kitchen or as medicine).

Here are some tips for herbs and the humidity levels that each of them prefers:
• Sun: rosemary, garlic, rue, artemisia, aloe, *boldo* (Indian Coleus), lemon balm, chives, comfrey, fennel, *guaco* (micania glomerata), balm mint, pepper, parsley, sage;
• Light shade: tarragon, wormwood;
• Shade: basil, arnica, broom, horsetail, coriander, ginger, mint, mauve, basil, pennyroyal, thyme.

Mandala Gardens

We are stronger together

A circular patch of different vegetables is one of the best known practices of permaculture. It facilitates the management of plants, water retention and drainage, saves human energy and reduces competition among plants because of its edges. It also prevents strong incidence of sunlight and birds attack.

Production can be larger and better this way.

The mandala should be planted at the time of seed germination.

In the Farm, the mandalas are everywhere. We plant garlic, beets, carrots, peppers, cabbage, radish, onion, rockets, cucumber, lettuce, etc on them.

In the garden area, it was necessary a recovery of the soil, which had been very exposed to the sun without any protection. Also, the cane bagasse has given a great result in the conservation of soil moisture. We are also doing the cover with coconut straw, leaves and dry grass.

How to make the Mandala beds?

To make the mandala, it takes a string or wire, two wooden stakes and a measure tape! Follow this step-by-step:

1) To draw it on the ground, mark the exact center of the mandala on the ground.
2) Attach the wooden stake in this place and attach a wire or string, so that it can rotate freely.
3) Determine the measure of the radius of the mandala and tie the 2nd stake at the other end of the string / wire.
4) Turn, getting the circle of the desired size. Do it according to the diagram on the side.

It is possible to construct a mandala with stones, pieces of wood, plastic bottles, used tiles, bricks and bamboo (in our experience, bamboo has less durability than other materials).

Weeding Control

Friends of the woods

Bushes are there not only to demand work, but to protect the birds attack to the vegetable gardens, to avoid pests, and also to prevent evaporation of water.

Therefore, we do not hoe everything. We leave a bit of bush in the garden. It decorates along with our mandalas!

This logic also applies to the banana plantation in the farm, which is scuffed (not weeded!) twice a year to preserve the roots and plant nutrients. It is important to keep the roots of plants, to ensure a green protective covering for the soil.

The key is to control the height of bush, brushing or wiping without pulling it out completely. The drying process of mowing land takes much longer than when it's weeded.

Windbreak

Natural Protection

In the farm, for sheltering plantations from wind, we plant trees in line to avoid the direct action of wind onto the most fragile or lighter plants. One plant protects the other.

Some of the trees that form the windbreak are: annatto, *ipê* (Brazilian flowery tree) - purple and yellow, Indian neem, guanandi, mofumbo, leucaena and mesquite. Mesquite is also good for supplying firewood and it gives a dry flowering where bees can collect pollen.

They were planted on the high areas of the land and near the fence.

This strategy contains the wind and its effect on some fragile plants, which are in the inner areas of the property.


Aracuaí
sustentável
Quebra-vento
Barreira de árvores plantadas em linhas. Evita fortes ventos nas plantações.

Repellent plants

Natural protection against pests

Marigold, pepper, sesame, Indian neem... These plants frighten mosquitoes and pests, and help us to perceive a threat to the health of gardens, fruits and herbs. Beside mandalas and spirals, repellent plants are allies of good production!

In the farm we planted pepper, sesame, Indian neem because they act as insect repellents. The marigold and pepper are planted between beds. Sesame, which controls ants, is a bit further away from the vegetable garden.

In addition to that, there are several recipes that natural repellents may be placed on the ground before planting to prevent pests.

For more information about repellents check the Sustainable Recipes Booklet, available on the following websites: www.projetocaminhodasaguas.org.br | www.cpcd.org.br

Drum Oven and Tin Hob

Permaculture in the kitchen

The drum oven is made from a drum inside the wall, surrounded by a "shirt" of bricks. The drum is built-in and the fire is placed between it and the brick structure.

Put sand inside the drum to control the heating. It demands small quantities of logs and other material such as sawdust, corn cobs, wood chips and cardboard. This is its advantage.

The tin hob is a mini version of the drum oven.

It is not built in, but made with a large tin, which saves flammable material such as coal, sawdust, corn cob.

The firing space is very small and only serves to heat a pan or pot (a lunchbox, for example).

REFERENCES

Community of Araçuaí

CPCD team, especially Celso Souza, Eliane Almeida, João Paulo Lopes, José Nascimento Teixeira dos Santos, Luciana Prates, Manoel dos Passos Vieira (Passim), Regina Poluceno, Rodrigo de Oliveira, Valdinéia Miranda Oliveira Silva (Jana), Viviane Neiva.

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Sítio Maravilha **(WONDER FARM)**

Directions

by car

BR 367 - approximately 25 miles from downtown Araçuaí-MG, entrance at km 18 (between the towns of Araçuaí and Itaobim-MG).

by bus

Rio Doce Intercity bus - line Itaobim x Araçuaí – Wonder Farm stop. From the stop, there are 4.3 km walking to the farm.

You may go on a guided tour or attend workshops about the Wonder Farm Technologies. isits must be scheduled with us.
Please contact us by email jequitinhonha@cpcd.org.br
To learn more, visit www.projetocaminhodasaguas.org.br

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Sponsorship:

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