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Manual for a vegetable garden

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Manual for a vegetable garden

This manual seeks to generate support material for the families of Monteverde in order to strengthen diversification and value the contributions that the orchards generate in the food security of the area. These productive systems provide immediate benefits to the food, health and economy of the families and their communities where they are located. The manual describes the different stages of the preparation, establishment and handling /care of the vegetables that are planted in the garden.

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Cultivation Methods

Productive beds

It is a method that is widely used in organic agriculture. Several techniques are used that include double excavation, the association of crops is used. The importance of this method is that it increases agricultural production in small spaces.

Materials

- Measuring tape
- Wooden stakes
- Rope to mark the ground
- Wooden board 90-120 cms long x 30 cm wide
- Rake used to level the bed
- Gardener Vieldo that is used to loosen the soil
- Paddle or shovel to loosen the soil
- Wooden triangle for planting

Vegetables suitable for growing in productive beds because they require greater depth: Carrots, potatoes, hemstitches, cherry tomato

Steps to make a productive bed

1. Mark the terrain. In general, the width of a round bed is between 90-120 cm and the length can vary depending on the availability of space. The bed should not be very wide because it is important to have easy access to the center of the bed from both sides to be able to work the soil well and to give easy maintenance to the garden. With the tape measure the width is measured and wooden stakes are placed to mark the 4 corners of the bed. Later with the rope the entire area is delimited.
2. The land is cleaned. Proceed to remove herbs that are in the land for example, remove the grass or remove crop debris with a machete or with the help of other gardening implements and by hand.
3. Place the board that is as long as the width of the bed to put it on the bed to stand on it while preparing the soil. The board helps to maintain the weight of the person and thus reduce the level of compaction of the soil. Once the land is clean and marked, we are going to place the board on the beginning of the bed to begin with the double excavation. We are going to locate the board approximately 30 cm from the edge of the bed. It is more or less the length of the shovel. With the shovel we remove the first layer of soil (30 cm deep which is the same distance as the length of the head of the shovel). Once the layer is removed, we proceed with the pitchfork, it will deepen another 30 cm and move to loosen the soil without removing it. The board is moved back 30 cm, and the soil from the first layer of soil is passed towards the front of the bed. The procedure is repeated until reaching the end of the bed. Once finished, the bed is leveled with the rake.
4. Once we have the double bed excavated, we proceed to put the earth that was removed at the beginning to put it at the end of the bed. Double digging is not done every time you are going to sow. It is advisable to do it every year or every year and a half. The already worked bed (after double digging) is very soft and fluffy.

Double digging is important so that the soil is loose so that microorganisms can easily enter, it is easier to store the nutrients so that the plant can develop a good root system and improve the filtration of water in the soil.

5. If you have enough compost, mix the compost into the soil by turning the soil. In soils or in organic matter, no less than 5 kilos of organic fertilizer per square meter should be applied with a rake, arrange the soil so that the Surface is as even as possible.
6. Proceed to sow either by direct sowing (seeds to the ground) or by transplanting.
7. Keep the bed no more than 1 m wide. This makes it easier to control herbs.
8. In areas like Monteverde where there is a lot of rain, the highest beds are prepared so that the excess water drains and does not damage the roots of the crops.



Productive boxes

A productive box is a production method by which different types of containers are used for the production of vegetables. It is a practical method for those people who do not have much space available to cultivate on the ground. This system also seeks to reuse different types of containers that can be reused for the production of vegetables.

Materials

- A plastic box (plastic vegetable boxes work well)
- Black Sarán
- Scissors

- Shovel
- Watering can

Crops suitable for growing lettuce, chives, cilantro castilla, and radish in productive beds

Steps to build the productive bed

1. Select a type of container. Plastic boxes used to transport vegetables generally work well. Just remember that any container you choose should have holes in the base that are going to be important for draining the water. The container you select should be the right size for the type of plant you want to grow.
2. Cut a piece of black saran with scissors to cover the box / container. The saran should cover the bottom of the container and the sides. Saran is a permeable material which helps keep the soil in the container.
3. Using a shovel, fill the box up to $\frac{3}{4}$ full with soil, then $\frac{1}{4}$ full of compost (black soil) and with your hands, thoroughly stir the soil and compost.
4. In case of direct sowing, make a small hole in the soil with a depth of about 1 cm and place the seeds in the hole. Try to make the holes taking advantage of the edges of the box at a distance of 8 inches between plants and 4 inches between rows. In the case of lettuce, place 2 seeds per hole and in the case of cilantro or cebollin, place 3 seeds per hole. Place lettuce in one row, cilantro in another row, and cebollin or radish in another row.
5. Water the soil every day (in the dry season) preferably in the afternoons after 4:00 pm. The amount of water will depend on how dry the soil looks. For this, it is best to put your finger in the ground about 1 cm and check that the ground still remains wet. The germination process lasts approximately 10 days.
6. Once the lettuce has germinated, remove one, and leave the lettuce in the best condition and let it grow until it is time to harvest. For

cilantro, cebollino or radish, it is not necessary to remove the additional plants.

Note. In case of transplant, place 1 lettuce plant, cilantro, cebollinos 8 inches apart between plants and 4-8 inches between rows depending on the size of the container. See photo to see its distribution.

Soil preparation

Soil preparation is perhaps the most important stage in vegetable production. The formation of healthy soils should be promoted to ensure healthy and healthier plants. If the garden area does not have a soil that is very rich in nutrients, it is necessary to start incorporating organic fertilizers to build a looser soil that allows better root development and greater water infiltration

Materials to make compost

- Wooden or plastic box (one of those to carry fruits)
- Cloth
- Paperboard
- Rice
- Molasses
- Dry leaves

How to make organic compost?

1. Select food scraps

¡Si!	¡No!
Rice and Grains Fruits and Vegetables Eggshell The tea bag	Oils and butter Meat nor fish Dairy Meat bones

Coffee brush The flower Cooked or raw foods	Cooked foods without dairy, oil, or meat
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2. Find a wooden or plastic container with a lid to store food scraps.
3. Find a place for your compost outside. * if you don't have space, you can always give your food scraps to someone who does, like Justin Welch*
4. Organic compost ingredients: Browns are important because they allow water to flow, and air to flow, something called aeration. That will ensure that the microorganisms can do their job.

“Vegetables” → Nitrogen Food scraps and grass clippings	“The browns” → Carbon Egg boxes, newspaper, dry leaves and straw
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5. Layering compost ingredients: You always want more browns than greens. Start with browns, then greens, etc.
6. Wait and air: Remember to turn the pile with a stick. It's ready when it's fluffy and earthy. It should not smell bad. When you're ready, mix it in with your soil and start sowing!

General considerations for planting and caring for vegetables

Location

It is important to take advantage of all the available spaces for planting and caring for the vegetables, but for this it is important that the selected sites receive sufficient sunlight (minimum 6 hours and that the morning sun can be used if possible) and that also have water availability. It is important that a member of the family is in charge of the care and maintenance of the garden and that the place where it is established does not receive a lot of wind. If this is the case, it is advisable to plant plants / trees that act as windbreaks.

Seedbeds or seedlings

Some vegetables are sown directly in the field, while for others it is necessary to prepare a seedbed to germinate seeds and after a few weeks transplant the seedling to the field. The objective of the seedlings is to create a space for the plant to grow as healthy as possible (optimal conditions) before putting it in the ground. Crops that require seedlings usually include **tomato, carrot, lettuce seeds**. Vegetables that can be sown directly include **cilantro castilla, radish, potato**.

Seedlings can be made from many recycled materials, such as cut plastic bottles, egg cartons, egg shells, newspaper cups, etc. The best containers are those that allow the seedling to be removed without mistreating it or the biodegradable containers that can be sown directly into the ground and degrade over time like seedlings made in eggs and in newspaper cups. The newspaper seedbed is made by taking a cardboard glass and wrapping a newspaper around it, so that the glass can be removed later and the glass is ready to sow. For sowing in the seedbed, put a seed every 8 to 10 cm. Do not sow the seeds too deep. Cover the seeds with a thin layer of soil.

Requirements for growing vegetables for the Monteverde area

Vegetables to sow in productive beds

Potato (*Solanum tuberosum*)

<p>Nutritional properties: high level of carbohydrates, starches and sugars</p>
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1. Soil preparation consists of plowing and forming ridges where the sowing will take place.
2. Type of sowing: direct sowing, requires soft, but well-drained soils.
3. Time to sow: It can be done throughout the year. It works best to sow before the beginning of the rainy season (April-May) and in Crescent Moon.
4. Distance between grooves: 70 cms
5. Distance between plants in the same row: 30 cms
6. Harvest time: 120 days from sowing
7. Irrigation: Twice a day during the summer (before 8:00 am and after 4: 00pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded). Enough water is applied to moisten the seeds or seedlings that have been sown.

Green beans (*Phaseolus vulgaris* L.)

Nutritional properties: high content of protein and minerals, especially calcium and magnesium

Cultivation method: in beds, requires well-drained soils with a good content of organic matter.

1. Soil preparation consists of plowing and forming loins where the seeds will be sown.
2. Type of sowing: direct sowing, requires soft, but well-drained soils.
3. Time to sow: It can be done throughout the year. It works best to sow before the start of the rainy season (April-May).
4. Germination stage: 5-12 days.
5. Distance between plants: 10 cms
6. Distance between grooves: 40-45 cms

7. Harvest: 45-50 days after sowing the seeds.
8. Irrigation: Twice a day during the summer (before 8:00 am and after 4:00 pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded). Enough water is applied to moisten the seeds or seedlings that have been sown.

Carrots (*Daucus carota* L.)

Nutritional properties: high content of carbohydrates and minerals that include Vitamin A, Vitamin E among others
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Cultivation method: in beds, it requires well-drained soft soils with a good content of organic matter.

1. Soil preparation consists of plowing and forming loins where the seeds will be sown.
2. Type of sowing: direct sowing, requires soft, but well-drained soils.
3. Time to sow: It can be done throughout the year. It works best to sow before the beginning of the rainy season (April – May) and in Crescent Moon.
4. Germination stage: 7-15 days
5. Distance between plants: 15-20 cms
6. Distance between Groove: 20 cms
7. Harvest: 90-95 after sowing
8. Irrigation: Twice a day during the summer (before 8:00 am and after 4: 00 pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded). Enough water is applied to moisten the seeds or seedlings that have been sown.

Vegetables to sow in productive boxes

Lettuce (*Lactuca sativa*)

**Nutritional properties:
Contains vitamins A, E, C, B1,
B2, and B3, as well as calcium,
magnesium, sodium and
potassium**

Cultivation method: in productive boxes...

1. Type of sowing: sowing by transplant, so you have to make a seedbed to germinate the seeds.
2. Time to sow: It can be done throughout the year. It works best to sow before the beginning of the rainy season (April-May), in the rainy season irrigation is not necessary.
3. Germination stage: 5 days
4. Distance between plants: 15-25
5. Distance between grooves: 30-35 cms
6. Transplant: 15-18 days after germination. Or the other option is to buy the seedlings and transplant them straight into the box.
7. Harvest: 60-65 after transplant
8. Irrigation: Twice a day during the summer (before 8:00 am and after 4:00 pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded). Enough water is applied to moisten the seeds or seedlings that have been sown.

Cebollino (*Allium* spp.)

Nutritional properties: It is very rich in minerals and vitamins such as B1, B2, B3 and C. In addition, it contains large amounts of calcium, phosphorus and potassium

Cultivation method: in productive boxes...

1. Soil preparation
2. Type of sowing: sowing by transplantation so a seedbed must be made to germinate the seeds.
3. Germination stage: 10 days
4. Try to maintain a distance between plants of 5 cm and distance between rows: 15 cm.
5. Transplant after 30-35 days after the germinated plant.
6. Harvest: 30 days after transplantation
7. Irrigation: Twice a day during the summer (before 8:00 am and after 4:00 pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded). Enough water is applied to moisten the seeds or seedlings that have been sown.

Cilantro castilla (*Coriandum sativum*)

Nutritional properties: It is very rich in minerals and vitamins such as B1, B2, B3 and C. In addition, it contains large amounts of calcium, phosphorus and potassium

Cultivation method: in productive boxes...

1. ...
2. Sowing type: direct sowing or by transplanting
3. Seed germination stage is 10-17 days
4. The seeds are sown in rows, 30 cm from each other, putting them 1 cm deep.
5. Distance between plants: 20 cms
6. Distance between grooves: 15 cm
7. If the seedlings are transplanted they should be about 7-8 cm high.
8. Harvest: 40-60 after transplant
9. Irrigation: Twice a day during the summer (before 8:00 am and after 4:00 pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded). Enough water is applied to moisten the seeds or seedlings that have been sown.

Radish (*Raphanus sativus*)

Nutritional properties: Contains Vitamin C, potassium and fiber.

Cultivation method: in productive boxes...

1. ...
2. Type of sowing: direct sowing. It can be associated with the cultivation of lettuce, cilantro and / or cebollin.
3. Germination: 11 days
4. Distance between plants: 15-20 cms
5. Distance between grooves: 20 cm
6. Harvest: 45-60 days after transplanting
7. Irrigation: Twice a day during the summer (before 8:00 am and after 4:00 pm). In the rainy season no irrigation is required. If irrigated, ensure that the soils are not over-saturated with water (flooded).

Management of pests and diseases through the use of biocontrollers

“Biocontrollers” can be defined as a living organism (plant, fungus, bacteria, insect) capable of repelling, killing or inhibiting the development of insects, fungi or bacteria that can affect the crops present in a garden. These organisms help us protect plants and is a way of trying to find a balance between beneficial and non-beneficial organisms within the garden. There are different plants that have fungicidal and insecticidal properties.

Plants that have insecticidal properties. Some of these plants are Estrella de anís, reina de la noche, bitter drops. Plants that have fungicidal properties include: oregano, lemon grass. Foliar fertilizer: you can make a Fruit extract with banana, papaya and pineapple along with molasses and water. What molasses and water do is extract the vitamins that the fruits have. It is left to ferment and this liquid is atomized on the leaves of the plants.

You can also generate combined extracts such as M5 that helps control bacteria, fungi and insects present in the garden. It is made from garlic, onion and ginger and alcohol. It carries microorganisms and is fermented to apply in the garden. It is recommended that around the garden, some of these plants be planted and / or the extract applied to better manage some of the pests and diseases.