The
SELF-SUFFICIENT
GARDENING
BIBLE
For
BEGINNERS
8 in 1
The complete homestead planning guide
for a self-sufficient lifestyle
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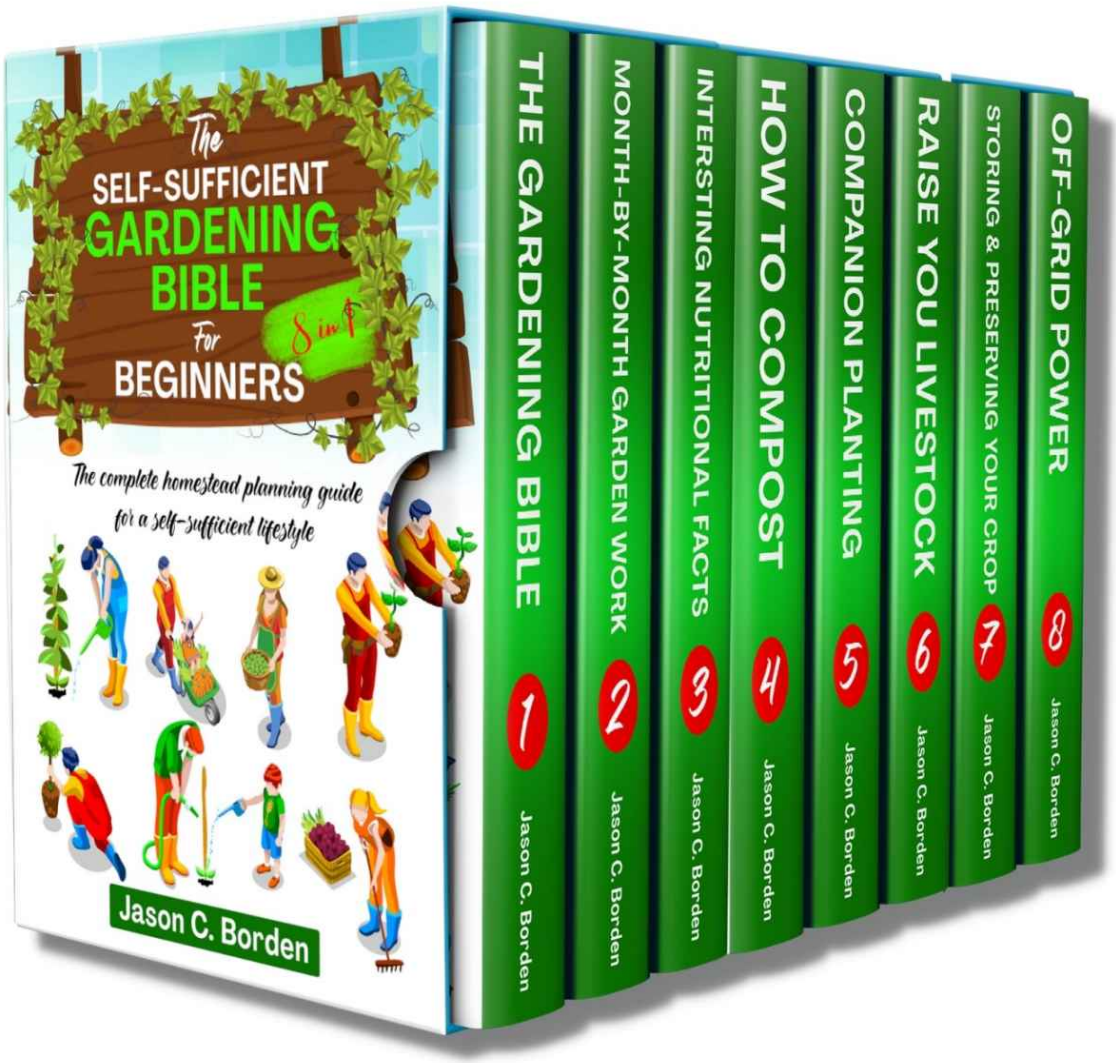
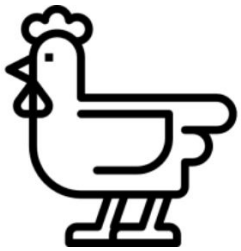


THE SELF-SUFFICIENT GARDENING BIBLE FOR BEGINNERS

The essential homestead planning guide for a self-sufficient lifestyle



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INTRODUCTION

With the prospect of finding work more easily, the world at large has been transformed by the phenomenon of urbanization. The mega-cities resulting from this phenomenon can be interpreted as a botched experiment, considering that the general level of prosperity is declining worldwide. Overpopulation and economic struggle have produced rampant crime, pollution, business misconduct, and competition based on the ideal of " *mors tua vita mea*" that can be characterized as temporary insanity. The current financial downturn has been the final straw for many people.

Self-sufficiency and self-production are two words recurring more and more in recent months. They have given many people the opportunity to cope more preparedly with the emergency unfolding over the past months. A kind of self-made alternative to the prevailing laws of consumerism, of

dependence on sources of supply, a way in which one becomes more self-reliant, saves money and greatly reduces one's impact on the environment. And more and more economists, ecologists, and ordinary citizens are seeing a model for the near future. *But what is meant by food self-sufficiency?*

The word was coined in the 1960s. This term is defined as the ability of a country to produce all the food it needs to feed its population with a special interest in food staples. Over the years, from being a political goal, food self-sufficiency became a personal goal of the inhabitants. The advent of technology and the invasive bombardment of virtuality in everyday reality, rediscovered the pleasure of returning to Nature.

Food is an important aspect of life: from the food we eat, each of us expects that it will adequately support our bodies, providing the energy and nutrients we need to live and work, that it will not harm our health, and that it will taste good. Not least, one would like the purchase of food not to weigh too heavily on the family budget. The food one buys at the supermarket does not always meet all these requirements, especially the economic aspect: industrial processing, packaging and transportation increase, sometimes disproportionately, the cost of products and thus the final price. The alternative is there: self-sufficient food. And in this book we find out everything you need to know to achieve it.

WHY BECOME SELF-RELIANT?

Here are the main reasons for becoming self-sufficient, based on fundamental and structural reasons why undertaking such a life change does not turn out to be a mindless whim, but rather an ongoing resource toward personal independence.

1. **Freedom from market manipulation** - market-dictated investment vehicles are increasingly blatantly controlled by firms.

2. Inflation shield - *have you noticed the prices recently?* Even the most affordable supermarket chains are quietly raising prices. You can choose to buy stocks or gold, but people still have to eat-the current rise in prices of necessities portends hyperinflation that will not abate anytime soon. Moreover, the problem may be complicated exponentially by food shortages.

3. **Health and wellness** - some "organic" products are mislabeled, and several GMO-free brands have been found to be misleading. GMOs lack the nutritional values of foods grown in the home garden. The time has come to do it our way.

4. **Sense of community** - we hear all the time - "I never see my neighbors, let alone know them." . With so little time to interact with our community, it is no wonder we feel disconnected from the rest of the world. In these difficult times, the local community can offer the best support.

5 **. Working autonomously** - work hours are increasing, wages are decreasing, his only increases discontent as one is forced to admit to leading a life bordering on slavery. Even for those who are not employees of a company, it is difficult for working for someone else to be more rewarding than working or engineering for something for which every moment is spent solely for themselves.

6. **More free time -** we have grown up with the idea that living on a farm is an unheard of grind from morning to night to arrive wiped out at the end of the day. But that is no longer the case. Certainly organizing a farm or making oneself self-sufficient is a time-consuming effort. However, new technologies and food production methods allow for low-cost start-ups and

minimal maintenance cost, as these techniques create exceptionally self-sustaining symbiotic systems.

7. **Energy and food security** - Traditional food and energy reserves are being depleted globally. Even industrialized countries are experiencing food shortages due to a dangerous combination of factors such as: climate instability, market forces, genetically modified foods, and the high cost of food harvesting and transportation. And it is an irreversible process. Our oil-dependent lifestyle is threatened by mounting evidence that fossil fuels are running out. To achieve a self-sustainable power grid, we should turn to renewable energies such as wind, solar, geothermal, or wave energy.

8. **Appreciate life more** - by being in contact with nature, we appreciate its processes and mechanisms authentically. Building a garden with one's sweat, choosing the best produce to harvest, and cooking it for one's family and community can be a meaningful experience that can transform us.

9. **Restoring balance** - almost everything is driven to excess in our societies, or results more than ever from unstable balance. We must take the situation into our hands to restore our economic and environmental balance. The way to do this is by reducing excessive consumption.

10. **Becoming producers, not consumers** - this is the greatest way to lower the living cost and increase your self-sufficiency. To reiterate, new technologies are making the production of food and even clothing as viable an avenue as ever. As the saying goes: Freedom has a price. But it sure beats any alternative.

FINAL THOUGHTS

The collapse of the global economy due to the pandemic has been a revelatory experience for many people. The current financial crisis continues to cause unemployment, while the price of basic necessities such as food and energy continues to rise. Soaring prices and the subsequent financial crisis prompted many people to take countermeasures to make themselves more self-sufficient. Recent warnings of food shortages, a weakening dollar and rising oil prices portend a scenario similar to that of 2008. Some have taken the first steps to save energy, reduce expenses and consumption, and others are considering planting a vegetable garden and installing solar panels in their homes. Complete energy self-sufficiency has also become a dominant trend.

Making oneself more self-sufficient is proving to be common sense, both in hard times and otherwise. Who would not want to experience a completely off-grid life without having to sacrifice daily conveniences? Although this is not a realistic prospect for many of us, there are several ways to become self-sufficient, which in theory do not require much effort and are very satisfying. In the course of this reading we will delve into all the elements for self-sufficient living: from tending a vegetable garden to raising animals and other aspects of self-reliance. It only remains for me to wish you good reading and to quote the words of poet and philosopher Ralph Waldo Emerson: *"Do not go where the path may lead, go instead where there is no path and leave a trail."*

Jason C. Borden

BOOK 1

THE GARDENING BIBLE

CHAPTER 1:

How To Set & Run A Garden

Having a green space is great but it also means being able to engage in farming to have healthy, zero-mile produce. Always having fresh vegetables is a great opportunity; that's when it gets important to figure out how to set up a backyard vegetable garden that yields the best results, which is a great way to spend time caring for plants. Dedicating a piece of the garden to vegetables is not difficult; let's see how to plan and implement a home garden.

The first rule to succeed is to find time to devote to the project. This activity requires enthusiasm, care and passion. Also some practical sense to carefully plan each step of the work. If finding the time seems difficult, it is better to give up or try to carve out a moment of the day to devote to yourself and your passion. The other indispensable rule to succeed in this

small undertaking is to have adequate space. The minimum sufficient space to grow vegetables, herbs and edible plants for at least one crop is approximately 10 square meters (107.64 *ft²*). When choosing plants to plant, prefer native species. This will increase the likelihood of success as you will invest your energy in growing plants suited to the natural environment you are in. Plants will grow more easily and need less care. Whether flowers, herbs or vegetables, choose the planting time according to the most suitable time of year for each variety. If you are not an expert, get advice from a nurseryman or a friend more experienced than you who maybe you can involve in the project.This will also create very pleasant and relaxing moments of sharing and socializing for you.

Location and size of the garden

Having a vegetable garden in your backyard depends on the size of your outdoor space. If you have a very large space, you can set aside about 107,64 *ft²* (10 square meters) for cultivation. As for the choice of location, much depends on what you want to grow, but it is essential to have a flat, drained soil rich in organic substances that will ensure the growth of healthy and lush vegetables. It is best to choose a very sunny area because most vegetables need several hours of direct sunlight.

Structure and fencing

Making a vegetable garden is a fun experience, but at the same time it takes time and effort, so protecting it is essential. This should be done especially if we have children in the house or pets such as dogs and cats that will certainly not miss an opportunity to explore. To secure the vegetables, it is a good idea to create a fence with iron stakes spaced about a 39,37 *in* (1 *m*) apart and complement them with a wire mesh that is high enough, but with a small gap for passage. The arrangement of the plants within the vegetable

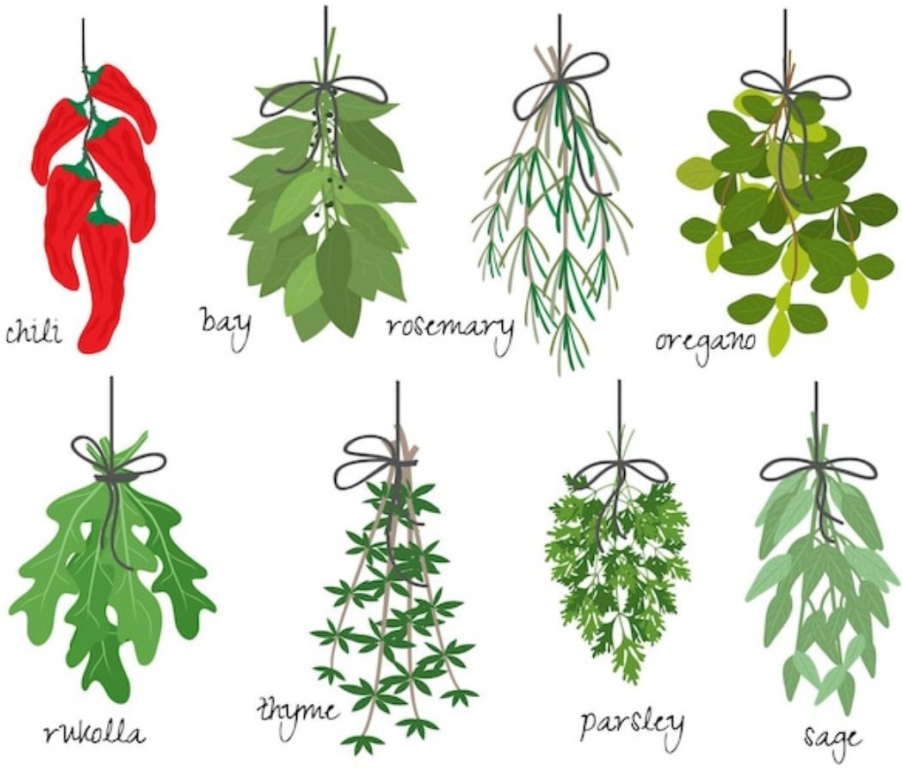
garden also plays an important role because they must be arranged in an orderly manner so that they grow in the best possible way. These should be arranged in aligned rows creating a small corridor to pass and move freely.

How to prepare the soil

Before planting, we need to check the characteristics of the soil. Just feel it and we can understand that if we cannot create a ball, it is still sandy and therefore we need to add organic matter. If, on the other hand, it remains compact, it is too clayey and therefore the organic substances need to rebalance the soil. After being hit hard, the soil is ready for planting when it crumbles. We can proceed with preparing the furrows in which the seeds will be placed. Armed with gloves and shovel, we can loosen the soil by removing stones and leveling it where necessary.

If the soil needs it we can add fertilizer, in any case we must create a level area with the rake. Having done this we need to water generously to get the water in deep, and after a few days we can proceed with planting. Watering should be continued even after planting the vegetables. Through watering cans or a hose connected to the main tap, we should water the vegetable garden in the early morning or late afternoon when the sun is not high to not damage the plants.

Different kinds of Herbs



If herbs are your passion, this is the theme for you. A home herb garden with aromatics is a triumph of scents and flavors within an inch of its life. This green corner will become a valuable 'pantry' and attract many pollinating insects by selecting seedlings according to climate and flowering time. Our advice is to choose 4 of the easiest aromatic plants to grow and suitable for your area's climate. Thanks to their colorful blooms, they will give your garden a touch of color and vibrancy.

Basil. Basil propagation by sowing in the ground is the most recommended technique. Field planting is done starting in April, a time when temperatures are around 59-64,4 °F (15-18 °C). If you live in very hot climatic areas, prefer a bright, airy but not full sun area. Proceed with watering regularly when the bed is dry. As the seedling grows, it will be wise to trim the vegetative apices with regular pruning, remove weeds and any pests. Basil is usually harvested after one month, when the leaves are well developed and deep green.

Parsley. It can be sown in the months from March to July. It likes temperate climates and tolerates little heat and sudden temperature changes. To grow parsley successfully, it is advisable to choose an area in half-shade or not exposed to direct sunlight. The ideal soil is mixed with peat that facilitates water runoff without creating water stagnation.

Thyme. This is a plant that grows wild in dry, sunny soils. Therefore, it will be wise to choose a location in full sun but sheltered from drafts and temperature fluctuations. The ideal soil should be well drained and placed on a bed of expanded clay to protect the roots from waterlogging. Watering should be regular, but never abundant, as the soil should remain fairly dry. The right time for growing thyme from cuttings falls between March, April, May, September, and October.

Oregano. In order to grow strong and lush, oregano needs sunshine and mild temperatures. Since oregano requires very little care, if you make sure that the plant has these conditions, you will have no problems getting a good harvest.It adapts to all kinds of soils, preferring well-drained ones that avoid water stagnation. The right time to start growing oregano is in spring, starting in April. Flowering of oregano occurs from July until September-October.

Sage. Like many other aromatic herbs, sage likes sunny locations, well-drained soils and temperate climates. If you start from seed, you can begin growing sage between October and November, and in a protected environment between April and May. Watering should be regular and the soil very soft and fluffy.

Different kinds of Vegetables

A cascade of freshness, a riot of colors and natural goodness ready to bring to the table. Who hasn't wanted to make an organic, good, wholesome salad with vegetables grown in the garden, raise your hand! To pull it off, you don't have to be an experienced farmer, but you need to have some familiarity with the techniques-basics of growing common vegetables. The vegetable varieties we have selected in this proposal are as easy to care for as they are good and colorful, and will allow you to make a beautiful but also tasty balcony vegetable garden that you can take straight to the table. Tender lettuces, fragrant arugula, spinach and chard in a mix of colors that will delight your senses. Here are practical tips and all the information you need to succeed.

Lettuce. The 'merlot' variety has crisp, reddish or dark green leaves. It prefers rich, cool, well-drained soils. The ideal planting time is from March to September. As with all types of lettuce, you can choose to grow it from mature seedlings or grow a plant from a food waste, such as from the head or simply from seeds. Cultivation done on the same land can be repeated every 3 years, and seeds should be placed away from peas, cabbage, broad beans, endive, and beans. It can be grown in synergy with carrots, onions, celery, tomatoes, courgettes and artichokes.

Romaine lettuce. The 'freckles' type has bright green leaves speckled with red-burgundy. It withstands heat well, is crisp and has a very tasty flavor. It is grown in open ground on fertile, well-worked soil. The best times for planting are spring and fall.

Arugula. Unmistakable for its slightly 'spicy' and bitterish flavor, it adapts easily to any soil type but fears frost, drought, and waterlogging. In general, it adapts well to any soil and can be sown from March to September. Its beauty is that you will see the first leaflets sprouting within a week of sowing, and after a few days, you can start harvesting.

Spinach. It requires very little care and is among the easiest to grow. Just well-drained soil and a cool climate. For this reason, the best time to grow them is in spring or fall. In temperate climate zones, however, they can be grown year-round. They love to share the soil with lettuce, chard, chicory and any variety of cabbage.

Swiss chard. The 'rainbow' variety is named for its leaves' many shades of color, which are always sweet to eat and great to beautify the garden. They are well adapted to a wide range of climatic conditions; these are cold-, wind- and weather-resistant plants adapted to all soils. They require only regular watering and weed-free soil. They can be sown in seedbeds in February-March or in the open ground during spring and 'summer. The color of the ribs is already bright when the plant is still very young. It follows that it can be used as a cutting herb at any time, starting by cutting off the outermost leaves.

Tomatoes. They are climbers, so for growth you will need to insert supports and supports, such as wooden poles, twine and wire. To maintain the right temperature around the plant's roots, mulch with natural materials is often advisable. This will allow you to protect and maintain the right levels of humidity in the soil, avoid sudden changes in temperature and prevent weeds. It will also better protect bush tomatoes from fungal diseases. The most suitable tomato varieties for beginning growers are grape, red beefsteak, cherry, cocktail, roma or any other variety of small tomatoes.

Essential Gardener’s Tools

Take a beautiful sunny day, a garden to relax in, the scents and colors of herbs to get lost in - *what could be better than some fun DIY gardening?* Absolutely nothing! However, to take the best care of the open spaces in your home, you need the right tools: from gloves to rake, hoe to transplanter, spade to watering can, and so on. There are really a lot of indispensable tools for gardening and DIY work in the garden, after all, the tasks to be performed are countless and all different from each other. Below we list a collection of ten of the most important tools for gardening.

Gloves: Let's start with the most useful tool for your health: gloves. This complement will help protect you from minor injuries you may incur while using various tools and from contact with chemicals and irritating plants. Therefore, it is of paramount importance to equip yourself with safe and professional gardening gloves before starting with DIY work in the garden.

Rake: *Who does not know the rake?* It is that tool consisting of a handle usually made of wood, to which is attached a bar - called a comb - which may be made of metal or sturdy plastic, equipped with five or ten elongated, pointed teeth. It is used to level the ground on which you are going to sow seeds, clear the garden of leaves and dry grass, break up smaller clumps, and spread fertilizer.

Hoe: You may have heard of the hoe - It is a tool consisting of a handle, also usually made of wood, ending in a metal (or very hard plastic) blade that forms a right angle to the handle. It is used to tamp and loosen soil, break up clods, and pull out weeds. There are many different types. The main ones are the flat one and the pointed one.

Transplanter: As the name suggests, this tool is used for transplanting plants by hand. It is mainly used when small plants need to be moved from the seedbed to their intended place. It is shaped like a pallet and can be made of metal, wood or plastic.

Shears: Shears in gardening are mainly used for pruning, topping and flower cutting. These are essential operations if one wants to take care of plants in the best possible way. The shears will need to have strong, well-sharpened blades, and depending on the job at hand, there are many different types: larger ones for hedge trimming, smaller ones for shearing the turf of smaller gardens, and the more common ones for pruning plants, topping and cutting flowers.

Saw: Where scissors don't reach, the saw takes care of it, indispensable for pruning very large branches. There are many different types of this tool as well: folding, hand, bow, electric, reciprocating, circular and so on. Clearly, depending on the operation you need to perform, one model will be more suitable than the other.

Pitchfork: Aesthetically resembles the rake, but they fulfill different tasks. If the rake is mainly used to collect leaves and crumbling soil before planting, the pitchfork breaks up clods, moves organic materials, collects manure, and air the soil. The handle can be made of wood or iron and

consists of 2, 3, 4 or 5 prongs (i.e., tines). The latter can be either curved or flat and are usually made of steel.

Automatic watering can: The watering can is undoubtedly indispensable: plants would die without the right amount of water! However, today, there are many more state-of-the-art solutions that replace the classic "hand" watering can and take care of the watering themselves. Depending on the needs and size of the area to be watered, some automatic waterers provide different coverage radii.

Spade: This is an essential tool consisting of a handle, usually made of wood or steel, to which is attached a shield-shaped metal blade with a well-accented tip. In gardening it is used to loosen soil to a depth ranging from 8 *in* to 12 *in* (20 *cm* to 30 *cm*), then to break up the soil by dividing it into clods that are then turned over. But it is also used for planting, breaking up clods, uprooting plants and marking the perimeter of flower beds. It is similar to the shovel, but differs from it in its use: the spade, in fact, is pushed into the ground with the force of the foot and not with that of the arms as is the case with the shovel.

Garden hose and hose reel: Before we conclude, let us tell you about one more method of watering, in addition to the aforementioned hand or automatic watering cans: the good old garden hose, which is also ideal for watering smaller pots. The hose can be of different lengths as needed and can be stored in the hose reel to keep your garden tidy at all times.

Natural Remedies To Protect Your Garden

In this section we will reveal all our tips on how to protect the vegetable garden from insects and pests in a natural way with suggestions of the best remedies for the garden itself. Protecting the garden from insects does not mean that we necessarily have to use insecticides and pests. Nature is perfect and provides many of the remedies we can use if we want to live more naturally and limit our impact on the environment.

First it is necessary, as always after all, to be very patient and let the natural remedy take its course. It should be made clear that it would be absurd to think of keeping insects away from our soil. *And how do we do that?* It is their home. Like it or not, we have to share it. Besides, it is good to know that some insects are valuable helpers. Only the most common insects and pests will be covered to make room for other topics. But let's go in order and start with aphids...

Aphids or plant lice: For example, ladybugs are warriors against aphids, vulgarly known as 'the plant lice.' They are those small, green insects that mostly destroy ornamental plants. Don't worry, no one will force you to hunt ladybugs because, in all honesty, it is a rather tricky sport. Against plant lice, garlic cloves placed in the soil are also effective. Several sites on the Internet sell insects for this purpose, the same sites offer for sale both larvae and adult specimens. Otherwise, there are insects that also fight mite and the annoying red spider mite. Phytoseiid (Phytoseiulus persimilis) is used against it. Once we understand how to limit aphids, it is time now to deal with ants.

Ants: Once you have figured out how to limit aphids, it is time now to deal with ants, which can be harmful to some garden seedlings. A particularly effective remedy can be to put crushed chili pepper on the soil, which has excellent repellent abilities, and then surround the area to be protected with ashes, which the hardworking little ants really don't like. You can still find all more tips on natural ant remedies here.

- **Lemon juice:** Citrus is characterized by an intense odor that while it is pleasant to us and gives a breath of fresh air, for ants it is anything but. The aroma disorients them and thus drives them away from food. To be successful, simply fill a container and spray juice in the trouble spots, and that's it.
- **Mint** : With a strong and fresh taste, mint is an excellent remedy against ants. Just put the leaves at the base of our vegetables and we will never see these insects again. Alternatively, we can spray water

with peppermint essential oil in areas where we have seen ants roaming. In this way, in addition to driving them away, we will have a pleasant aroma. But not only that, laurel, oregano, lavender or marjoram also present themselves as excellent repellents against ants.

- **Coffee grounds:** You will only need to use coffee beans, or the grounds, and place them near the ant hill. If you then add cinnamon, chili pepper and white vinegar to it, they will literally run away with their legs, or rather, aerials up.
- **Cloves:** In addition to being used to flavor dishes, cloves are an excellent repellent for ants, which cannot bear their smell.

Common pests & how to tackle them

Slugs: If your problem is slugs by chance, then there is a very old remedy that consists of taking saucers, putting some beer in them, and waiting for the mass arrival of these cute little animals. They seem to love the taste of malt. Then all you have to do is pick them up and take them elsewhere, away from your vegetable garden.

Gray mold: Gray mold can be removed instead with simple water and baking soda.

Thrips: These are small insects of the order Thysanoptera, which can cause serious damage to agriculture. There are several varieties of thrips, one of which is called the "vegetable garden thrips," and the name already lets us know that we can count it among the garden's enemy insects. Besides many vegetable garden plants we also find the insects on orchard trees. The damage that these pests bring is from the stings by which the insect sucks sap from the plant tissues of the plant, usually on the leaves. This causes small spots on the leaves that make the attack recognizable. The collateral damage is that thrips stings are often a vector for virus diseases. Like the whitefly, the thrips thrips also thrives very well in greenhouses, due to the

more constant temperature, and is therefore a particular problem for protected crops.

Controlling thrips can be done in a variety of ways, from the perspective of natural cultivation let's first discuss the easiest to implement and non-toxic methods, namely plant preparations, then let's see what organic insecticides we can use to combat the threat. Finally, organic pest control forms are interesting for those who cultivate professionally, but not within the reach of those with family gardens.

There are a number of plant macerates that can be useful in the organic garden; they are preparations that can be self-produced and are therefore cost-free, plus they have no negative impact on the environment. To combat triffids specifically, some of these macerates can be useful.

- **Nettle macerate:** This is the most "aggressive" of the preparations, a true insecticide that can serve to kill the insects and requires some precautions in its use.
- **Garlic macerate or decoction** . Against garden thrips and other rootworms, garlic has a repellent function.
- **Chili pepper macerate.** Hot pepper, thanks to capsaicin is also undesirable to these small insects, so it can be used to defend the garden without chemistry.
- **Wormwood macerate or decoction.** Periodic treatments with wormwood macerate can serve to prevent thrips on our vegetable garden plants.
- **Macerate or decoction of tanacetum.** Tanacetum has similar properties to wormwood and is a good repellent for thrips.

Bugs: Bugs are insects best known for the stench they release when squashed, but gardeners know that these insects can also be troublesome to the crop, as they go to sting plant leaves and fruit. There are different types of bugs: the green bug is a native insect that we are used to knowing, they

have recently been joined by Asian bugs, accidentally imported causing a real invasion into our ecosystem. Then there are the red-black cabbage bugs, which are another definitely troublesome pest for agriculture. If bugs used to be a negligible nuisance in recent years, they have become a major problem for vegetable gardens and orchards. It is more common to find them in homes, particularly the Asian species. Bedbugs like many other insects are able to reproduce rapidly, which is why if you want to practice effective biological control you should take early action. The best time to do this is in early summer, before this pest can produce new generations, bugs in fact reproduce during the summer at the rate of three or four generations per season. In organic farming, bugs can be combated by aiming to eliminate them, using pyrethrum or neem oil as insecticides, or alternatively making macerates with garlic and chili peppers, which act as repellents, to drive them away. Another system that can be effective is tobacco infusion.

BOOK 2

MONTH-BY-MONTH GARDEN WORK

CHAPTER 2:

Monthly Gardening Chores

The vegetable garden is a school where learning is never finished, with many mysterious aspects. Nature is constantly changing: unknown pests and diseases arrive, the climate is unpredictable. Today's challenge is finding sustainable and affordable solutions to address these issues, getting to grow wholesome vegetables most easily and safely. The directions in this chapter result from years of experience in practical experimentation in the family garden, building on the knowledge gained in the horticulture industry and from daily discussions with many talented growers. Knowing what garden chores to do month by month is really essential, whether you have a real vegetable garden or simply dabble with a

space on your balcony at home. So follow our tips for each month of the year. Having a vegetable garden is a blessing, but you need to know how to cultivate it. Here are some general pointers before you get started with the month-by-month work.

Soil preparation

Winter soil preparation consists of moving the soil to remove pests and oxygenate it, making it friable, and then feeding it with manure. Until spring it can rest to be ready to receive seed or a new seedling. First break up the soil with a spade, turning the clods to remove pre-existing plant roots and weeds, and any stones. Then add nutrients with fertilizer and reduce the larger clods by crumbling them well with the pickaxe and mixing them with the fertilizer. Level everything out and let the soil rest to give it time to mix with the fertilizer. Below are the two interventions to prepare the soil.

Hoeing

Weeding is used to break up sod to remove residual roots and weeds. For gardens, vegetable gardens and cultivated land, it is one of a few essential cleaning and maintenance operations. It is also easy to perform manually with a rake or hoe. Hoeing represents a cultivation technique of working the soil carried out with agricultural machinery or by hand. It concerns the topmost layer, which is stirred up to remove and eliminate any foreign elements. This aims to remove any foreign elements present, particularly old roots and weeds, and encourage plant roots' respiration.

This is especially useful when the layer most exposed to the sun is very compact due to the arid climate and on non-irrigated soils. This also serves to reduce water evaporation to retain moisture. Crop-free soil is allowed to aerate. It is also exposed to a greater extent to the heat of sunlight especially during the winter months. This intervention can be carried out for large soils as well as for the vegetable garden. Some crops turn out to be in

greater need of this superficial soil scraping. In fact, we talk about weeded crops in regard to plants such as corn, beet, potato, legumes, and tobacco. Other plants such as wheat, barley, rice, hemp, etc. are not typical weeded crops.

Operations to weed soils do not necessarily adhere to seasonal cadences. The operation is generally carried out only when necessary and with plants that have already been sown. It tends to be carried out mainly with the appearance of the first shoots or when unwanted weeds to be eradicated are noticed. A first application of the technique is recommended once about four weeks have passed since planting. At later times, it is useful if the soil is too compacted due to prolonged drought. In that case, care should be taken when the plants have already grown. Indeed, there is a risk of compromising the growth of the vegetation or its roots. The best time to carry out these interventions depends on the type of crops and how quickly weeds tend to grow.

Mulching

Enthusiasts of gardening and vegetable garden cultivation will surely be familiar with the mulching technique. It consists of covering the topsoil using different types of material. Since ancient times, farmers have always protected their plants with some organic material, especially straw and manure. Today, the technique has become increasingly refined, although natural substances continue to be the preferred method for those who want to be environmentally friendly. Mulching should be done at least a couple of times a year, specifically in winter and late spring. It is very important to keep to the timing because if this step is performed too early, it can put plant growth at risk. For example, a sudden increase in soil moisture could facilitate root rot. Conversely, if you take action too late, the plants may have already been damaged. Generally you have to wait until the plant has put on at least 4 leaflets, so that it can be strong and hardy enough.

What to sow

Before you start the actual planting, always make a rotation scheme of the different crops by comparing it with the previous year's, so as not to reseed or transplant the same vegetable or vegetable family in the same soil. This is because plants absorb nutrients selectively, so the soil will be deficient in certain substances depending on the plant being grown in it. They also increase the risk of pests and diseases. The elapsed time to put back the same type of vegetable should be 3-4 years, but you can speed up by removing all vegetable remains and fertilizing well with mature manure.

The vegetable seeds should be placed in a furrow, at the right distance from each other, to allow the seedlings to have the right space. Then they should be covered with a layer of soil equal to their height to allow them to germinate. After planting, irrigation is carried out. Water activates germination, so you need to keep the soil moist. The soil should be moist but not soggy, and watering should be done gently and wide jets. It can be sown by scattering (arugula, lettuce), but also in rows (carrots, basil) and in pits (tomatoes, il peperoni, onions) keeping the right distances. Sowing can be done in protected culture or directly in the open field, depending on the characteristics of the vegetable.

Indoor Sowing vs. Outdoor Sowing

Indoor sowing: Sowing done in a seedbed is done directly in a perforated plastic box called a seed box, where the seed is covered with a little soil, which is placed on top of a bench heated to 68°F (20°C), and over which water is then sprayed. Seedbed sowing is suitable for macrothermic vegetables, those that are larger, and those with a long cycle from sowing to harvest, because the seedlings are then transplanted into the open field.

Outdoor Sowing: Sowing directly into the garden soil, i.e., open-field sowing or planting in the field, is suitable for microtherm vegetables, those that are small in size and have a rather short seed-to-harvest cycle, such as lettuce, radishes, spinach, arugula, valerian, carrots, peas, beans, and green beans. It is preferably done in rows to have more space to easily remove weeds, growth will be more uniform and harvesting more practical. We cannot overlook the effects of the moon in the crop cycle, especially for planting.

The choice of seeds is also very important, almost as important as fertilizing the soil. For this reason, we recommend that you choose seeds that are organic and have not undergone any drug treatment, with 'no GMO' labeling. Then pay attention to the seed packets, checking that they are undamaged and do not bear mold or moisture, and above all that the reference year is the one that has just passed.

What to harvest

What varieties of fruits and vegetables can be harvested each month in the garden and orchard? Some seasonalities have now been lost with 'advent of global consumption. In fact, different products ripen in the garden each month. You just need to know which ones to enjoy their flavor at the right time.

Transplanting

When the small seedlings sown indoors are vigorous enough to stand on their own outdoors, they can finally be planted, transplanted into the open field. That will be the permanent home for them, and here they can grow freely. The choice of location is crucial, because nearby plants can help them grow better and fight pests. For this you need to follow some simple rules of intercropping with other varieties. Then simply dig a hole, insert the seedling, and water gently. It is important to give them the right amount

of time to acclimatize, leaving them in pots or in the seedbed brought to the place where transplanting will take place. Equally important is choosing the right time. Transplanting too early risks that the soil will not be warm enough and frost will still come, too late that the plants will already be overgrown and have twisted roots in the pot so they will not take root well.

Soften the soil by watering it lightly first, make a small hole, insert the seedling and spread organic fertilizer. Take care to spread the roots well and let the seedling emerge from the collar. Compress the soil well to give stability and water, avoiding water stagnation. Provide a tarp to slow evaporation if it gets too hot or mulch if it gets too cold.

Prune

Again it is important to be very careful, if pruning is done wrong this may prevent the tree from flowering and bearing fruit. The rules in this regard are simple: do not be insecure, it is better to proceed with a clean and decisive cut; do it at the right distance from the bud; as slanted as possible.

Herbs

Keeping herbs in the garden has a double advantage: you take advantage of the intercropping technique and you can enjoy them in cooking. Their fragrance and flavor add more flavor to dishes, but in the vegetable garden, they are an ancient and effective way to improve the growth and quality of vegetables and protect them from pests. There are herbs that have an odor that is often repellent to insects. If you plant them near some vegetables, they will protect them from their attacks. Basil, for example, repels flies and mosquitoes, and mint keeps away the cabbage bug. Others can keep away harmful animals and rodents such as moles, the farmer's sworn enemies. Then there are the combinations that improve flavor and help vegetable development, for example, carrots with chives, or flax with potatoes, while savory improves the taste of onions and potatoes.

The orchard

The care given to fruit trees is the same as for the vegetable garden. We will give you advice on which plants to prune, which to plant, and which fruits to harvest. You can plant fruit trees after preparing the soil well. Make a hole about 20 *in* (50 cm) deep and just as wide. Lay mature manure on the bottom. Place the plant and cover it well. Cover it with a potting soil made of three parts soil, one part peat and one part earthworm humus.

CHAPTER 3:

WINTER SEASON

January

January's garden chores are not few, although it is still cold. New year, new garden, new toil. Growing plants and vegetables takes time, patience, and good will, but the results repay all the effort. So here are some practical tips for the month of January. In order to have a good yield, a very cold January is needed. It is better that snow falls now and not in the coming months, because it could destroy all our work. Rain, on the other hand, is not very useful at this time. The seed is warm in the soil, and rain would force it to germinate earlier than it should.

If you planted the previous year you need to remove the remnants of old plants left behind. After a good clean-up, feed the soil with good manure, preferably rich in potassium and phosphorus. Mature manure is the best natural fertilizer the earth can know. In the vast supply of manures, horse manure is considered the top, however, its use is not so widespread because of the cost, which is not exactly affordable. Then spade by lifting the soil well to let it breathe, even near the plants.

Sowing outdoors: it is advisable to wait a little longer, when the weather will prevent frost. But it depends a lot on the climate of the region where you live; in some states, it is possible to sow broad beans and peas outdoors as early as January. Onions are generally sown outdoors.

Indoor sowing: in seedbeds sow celery, tomatoes, peppers, cabbage and eggplant. Several late varieties of cabbage, chicory, leeks, spinach, fennel, radishes and arugula can be harvested in this winter month, while kiwifruit, oranges and tangerines are in the orchard.

Transplanting in January: If you have small greenhouses or a covered space January is also a good month to plant already grown seedlings of endive, lettuce, onion and chard, leeks, turnips and dwarf peas.

Pruning in January: In January, plants are also pruned. However, the matter is delicate; sudden frosts could ruin the plant and encourage some bacterial disease. Better to postpone it until February if it is really very cold. As for fruit trees, do a pruning of the apple, pear and kiwi trees. Also, now is the time to collect branches and cuttings from the nursery for grafting in the coming months and put them in a sheltered hole.

Herbs in January: Dig up and fertilize (with manure) the soil. You can harvest fall-sown herbs and perennial herbs: parsley, borage, thyme serpyllum, chives, peppermint and fennel.

The orchard in January: Remember to spade and fertilize the soil with manure.

February

February garden chores, let's remember, are many. In this winter month it is often still cold and there are frosts. This you must take into consideration before you get your hands on the soil with wrong sowings. We continue to follow good old farming traditions: soil is worked and manure is buried at this time. We prune fruit trees carefully and sow seeds for the vegetables we will eat in the spring.

To have a good harvest in February, it is necessary to start preparing the soil. If present, remove the winter mulch, then hoe, level the soil and bury some organic matter to prepare it for planting. Watch out for spading, it must be deep so as to bring up pests that the cold weather will thus destroy. As suggested by ancient farmers, the operation should be done when the moon is most favorable: *"Hump to the west crescent moon; hump to the east waning moon"* : as a famous saying goes. So eyes on the calendar and, above all, on the hump of the moon. It is best to sow leafy vegetables and celery under cover and chard, spinach, lettuce in the ground with the waning moon. With the waxing moon, which is watching us from above, it is preferable to fertilize carrots, radishes and peas outdoors while under cover the aromatic herbs.

Sowing outdoors: Outdoor sowing is done only at the end of the month, when temperatures are milder. Start with carrots, cauliflower, onions, broad beans, lettuces, eggplant, melons, peppers, peas, leeks, parsley, radishes, arugula, spinach, valerian, zucchini.

Sowing under cover: Sow leafy vegetables and celery under cover, plant chard, spinach, lettuce.

What to harvest in February: You can harvest several late-winter and annual vegetables that are still in the garden: lettuce, cabbage, fennel, carrots, chard, several varieties of cabbage, leeks, squash.

Pruning in February: At the first signs of warm weather, you can also begin pruning fruit trees in February; work on kiwi, pear, apple, plum and apricot trees and vines this month.

Herbs in February: Shelter aromatic herbs from frost. Through February find rosemary, sage and bay leaf, the three main winter herbs, in the garden, which are beautiful to look at and essential in cooking.

The orchard in February: Only from late February can you think about new plantings. Continue to prepare the soil with various fertilizers. Young plants need manure, which contains more nitrogen, while mature plants want more wood ash, which contains potassium. Brush the trunks to remove overwintering fungi and grubs.

March

Summer is still a long way off, but to have a good harvest you necessarily have to sow seeds between March and April, and do it thoroughly-this is one of the main jobs of the March garden. This month turns out to be unpredictable in terms of weather, if you sow too early and sudden drops in temperature or excessive rainfall come, you risk losing your entire harvest. That is why it is precisely at this time that work in the vegetable garden becomes harder. The soil needs to be prepared well, and it is good to know that soil that is wet and not properly worked in the previous months cannot be used immediately for sowing; it needs to be renourished and waited for it to dry. Otherwise, soil that is too compact will not aerate, preventing the roots of the seeds from developing optimally.

Indoor sowing: You can sow basil, cucumbers, watermelons, eggplant, tomatoes, squash and zucchini. Toward the end of the month is the time for open-field sowing of vegetables; in the meantime, we will keep them in the ground under a tarp or in a small greenhouse.

Sowing outdoors: You can start with spring harvest vegetables such as zucchini, tomatoes, eggplant, peas and peppers. If you are in an area with mild temperatures, you can start sowing all those vegetables that require temperatures below 50°F (10°C) to germinate such as carrots, chicory, lettuce, radishes, arugula, lettuce and potatoes. An essential condition is to take the utmost care by covering them with a fabric sheet to protect them in case of heavy rains or drops in temperature. If the area is warm, watermelons and melons can be sown as early as March.

In general, this is the time to sow garlic and onions, asparagus, beets, chard, cabbage, cucumbers, turnip greens, broad beans, fennel, endive, peas, leeks, radicchio, arugula, celery and artichokes.

What to harvest in March: In March we can still find the later winter varieties: squash and cauliflower. Also among the vegetables to be harvested are: lettuce, arugula, endive, lettuce, spinach, turnips, radishes,

cabbage, chicory, the various cruciferous vegetables such as cauliflower, broccoli, cabbage, Brussels sprouts, savoy cabbage, as well as garlic, onion and leeks, but also beets, artichokes, celery, carrots and fennel, potatoes and artichokes.

Transplanting in March: Transplanting is nothing more than planting seedlings grown indoors in the open ground. Potatoes, garlic, onions, shallots, lettuce and cabbage can be transplanted in this month.

Pruning in March: This is the time for pruning trees before the spring awakening. It is best not to cut too much, however, but to facilitate the plant's natural shape. Remove inner branches that get little light, starting at the base. The direction of the cut is most important: never sharply but at an angle, with the outside facing upward.This is a good time for citrus fruits and fruits such as kiwi.

Herbs in March: If we sow basil and parsley in mid-March, we will have these fragrant herbs until the end of summer. In this month, which marks the beginning of spring, we can already harvest dandelion, rosemary and valerian.

The orchard in March: In March, winter pruning is completed, saving for last those varieties most affected by frost. Instead, orange and tangerine trees, which have completed their cycle, begin pruning. Crown and split grafting can also be done. This is a delicate time, when the first buds appear, but there is no real flowering yet, and it is now that it is good to intervene with pesticides, weed the soil around the trees and mulch if necessary.

CHAPTER 4:

SPRING SEASON

April

April garden work is very onerous, and how much effort it costs us! But you want to put the satisfaction of eating absolutely natural products. That alone is worth the entire sacrifice. What to do in the garden in April, the month that marks the beginning of spring? Here are all our tips. In April, if everything has been done properly, the vegetable garden is ready for planting. And we begin to see the fruits of fall and winter labor because Nature finally awakens, offering us many lush seedlings that will come in the following months. Now the bad weeds are quickly beginning to infest the garden and can impair the germination of newly sown vegetables. You must combat them by weeding in the inter-row each week and manually weeding both along the rows and in scatter sowings. Rainfall is frequent this season, which damages seeding. You will need to protect the soil with nonwoven fabric to be spread over the seedbed. These panels do not act as a barrier to watering, but they prevent runoff and stagnation, let light through, and keep the temperature a little higher than the surrounding temperature. Rain-especially heavy rain-can leach the soil of nutrients and fertilizer and turn it into a crust, especially if it dries out quickly.

Indoor sowing: Gone are the risks of a late frost and it is no longer necessary to sow indoors. Temperatures are milder, although they can still reach a few degrees above zero at night in some U.S. states. Where the temperature is still too cold it is better to resort to greenhouses, for

watermelon, melon, peppers and zucchini, tomatoes and cucumbers, otherwise you have to wait until the end of the month, when it will be warmer.

Sowing outdoors: Outdoors, and in warmer areas, tomato, eggplant and cucumber are grown. In fairly soft soil, green beans are grown between April and August. It is recommended to support the delicate seedlings as they grow with special wooden sticks. Abound with water. And wait for nature to take its course. In the open field only at the end of the month comes the time to grow tomatoes. It is best to arrange the seedlings in rows some distance apart, burying them about 1 *in* (1.5 *cm*) deep. They should be supported with some wooden sticks to prevent them from breaking as they grow. The tomato plant does not require too much watering because you run the risk of splitting those delicious red delicacies. Chard can also be planted at this time, as can the late variety of cauliflower. April is also suitable for growing carrots. Those who have not planted them in March still make time. Cutting and leafy vegetables and carrots and onions should be sown early in the month. This is the ideal time to sow garlic cloves harvested in late summer. Arrange them in rows, spaced apart, dipped to a depth of 6 *in* (15 *cm*).

What to harvest in April: Let's make it clear that the work in the vegetable garden hustles and bustles in April, but it's mainly planting and transplanting that takes center stage. Harvest time for spring varieties is May. Now, with winter crops finished and spring crops not yet ready, you can find only annuals, those that can be grown year-round, such as lettuce, arugula, spinach, chicory, and radishes, fava beans, asparagus, onions, etc. It is time for the latest oranges and tangerines and lemons for fruits. Some grapefruit varieties are arriving.

April transplants: Early varieties are ready to be put in the open field. They had been sown as early as February, burying them in the trays for better protection. Start transplanting the tomato, eggplant, bell pepper and celery. Then inspect the young plants weekly for growth retardation, yellowing and signs of prostration that could indicate pest attacks.

Pruning in April: April is a good month to prune plants that have been damaged over the winter and fruit-bearing plants for which you had postponed such an operation to better assess the cuts to be made. Some will need only a trim to the most vigorous shoots, others a complete intervention.

Herbs in April: In April it is possible to sow thyme seedlings. This requires soil that is dry and well sunny. This aromatic plant needs little watering. It will be harvested between May and June by cutting off the flowering stems. In April, in a sunny location and on rich, fresh soil, plant chives. Unlike thyme, it needs a lot of water; therefore, continuous and repeated watering is necessary. You can also transplant chili peppers, basil and other aromatic herbs sown indoors.

Orchard in April: This is the month to do the final plantings of potted plants, watering them periodically. It will only be stone fruit plants (peach, apricot, cherry, olive and plum), citrus and small fruits. In general, spring is the *'golden time'* for grafting. Plants respond well because there is availability of rain, temperatures are mild and there is no risk of a sudden frost. You can also make the last 'crown' and 'split' and 'triangle' grafts, using scions stored in the refrigerator or in holes. With mild weather comes pests, so it is important to start treatments against fungi (scab, powdery mildew) and insects. Fertilization can take place only at the end of flowering.

May

Summer is approaching and May's garden work is getting busy. This month, however, is magnificent for being outdoors in our garden, not only because we are sowing the varieties of vegetables we will eat in the summer, but for the beauty of witnessing the awakening of a Nature that has been sleeping all winter.

At this time the orchard is really blossoming and is ready to receive numerous seedlings, and we can feel satisfied with the labors and time spent spading the soil or pruning tall, sturdy trees. In the orchard, several fruits are coming to maturity. If we have been a little lazy by chance, there is still time to till and fertilize. After that you need to think about planting. But first you must manually remove the weeds that sprout before the vegetables! Do not use natural herbicides. It is continuous and tiring, but necessary work to ensure the best possible conditions for our vegetable garden. In fact, in this season the growth of weeds is continuous and they must be removed quickly. We can help ourselves with a long, narrow-bladed garden trowel to uproot deeply. With the onset of warm weather, one should water daily, without overdoing it in quantity, to encourage germination. The problem of water is very much felt, especially by those who do not have a well and their plot of land is far from a river to supply themselves. *In this case, how do we deal with it?*

For centuries, our ancestors still managed to carry on abundant harvests even in times of severe drought. It would be wise to have capacious reservoirs capable of collecting rainwater and using it to irrigate the field. There would be a lot of discussion on this topic indeed, also because with the problem of water scarcity there are more and more solutions, especially construction, to collect rain. One can build tanks or an integrated stormwater cycle management system. Perhaps the latter case is more expensive but the former is feasible. Think about how much water falls from roofs during rains-this is also a resource, and when you think about your vegetable garden or garden you realize how true that is.

What to sow in May: During this month sowing is mainly done outdoors, directly in the ground.

Sowing seeds indoors: Only Brussels sprouts should be put, starting in early May, in the seedbed. When the seedlings become large after 5 weeks, they are ready to be transferred to the vegetable garden.

Sowing seeds outdoors: In the open field in May among the things we can sow are: beans and green beans, peppers, eggplant, squash and zucchini, as well as melon and watermelon, cucumbers and tomatoes. Sow also plants that are available year-round, such as carrots, spinach, radishes, radicchio and lettuce, thistles, and chard. For those with patience, growing endives will also give satisfaction, but they need more care as they are delicate plants and more prone to attack by all kinds of insects. Summer endive is sown between May and June, and winter endive in early July. Cucumber is also sown in mid-May, which should be watered often and systematically. In May temperatures rise, certainly not close to 30 and more degrees but already high. It is advisable to water in the early morning hours and after sunset to prevent excessive temperature changes from wilting the plant. And watch out for moles!

What to harvest in May: All vegetables sown and transplanted in the months now are ready to be harvested: garlic, asparagus, carrots, cucumbers, beets, onions, spring onions, eggplant, peas, radishes, arugula and tomatoes, celery and zucchini, lettuce and arugula. With winter fruit finished, summer fruit begins. We will have the first cherries in warmer areas at the end of the month, but apricots and raspberries are already available throughout June. Grapefruits and lemons are also ready. Always check the plants for ripe fruit. Because it is very delicate, it should be laid in small containers by removing damaged or moldy ones right away, which will quickly compromise all nearby fruit.

Transplanting in May: There are few varieties to transplant in May that are not already sown in the open field. Remember to choose already developed, strong, sturdy seedlings from those sown early in pots or

greenhouses or purchased from gardens. We can plant squash and zucchini, melons and watermelons, cucumbers and tomatoes. May is also too late for planting new fruit plants: the heat does not allow them to take root in the open field. One must wait until the fall period for new plantings.

Pruning in May: This month fruit trees, both those that have yet to give harvest (apricot, peach, plum, cherry) and those where it has already happened (orange, tangerine, clementine). Apple and pear trees need to be trimmed and adjusted. This is not the time for grafting, however. On the other hand, espaliers and braces in general deserve a separate discussion. There are plants that need supports to grow vertically, such as tomato, eggplant and cucumber. These braces need to be checked every month because if they do not support it properly, the whole plant can die. This operation is important from May onward throughout the summer when production reaches its peak. Provision must be made to plant these supports at the appropriate time for at least 10-12 *in* (25-30 *cm*), with a height of up to five feet above ground for plants with a significant load.

Herbs in May: In pots or in the vegetable garden you can pick fragrant savory, the ever-present rosemary, sage and thyme, as well as borage with beautiful blue flowers, classic parsley and rosemary that is now in bloom.

Orchard in May: It is good to protect cherry trees from birds, greedy for their fruit, with protective nets, also useful against hail. Check and take action against aphids and other pests, which proliferate this season, attacking the nearly ripe fruit. Also keep an eye out for fungal diseases such as powdery mildew and scab, which attack both fruit-bearing plants and those that have already produced.

June

June garden work is really a lot, but this is another one of those months when you can do a lot of beautiful in your garden. At this time growing the vegetable garden is enjoyable and relaxing. Both because the days are much longer and so you can stay late. Both because the heat is not as grueling as it will be in later months. The perspective changes if you live in particularly hot areas. In most U.S. states, greenhouse effect permitting, the weather is still mild: so this really is a month when it is good to take advantage of contact with your garden and spend quite a bit of time outdoors. This is the decisive month for next months' harvest. If it is cold and rainy, the plants will not be able to harden up sufficiently; if it is too hot, they may have delayed development.

At this time the first round of vegetables has already been harvested. It is necessary to rid the soil of their vegetable waste, leaves and roots, and hoe it to oxygenate it. These waste materials can become compost to fertilize the soil. Before getting to harvest, then, it is best to support the final growing cycle with light fertilization to be spread on the soil. Only after harvest is it a good idea to turn the soil quickly by adding manure or compost to be buried, before sowing the second round of vegetables, or sowing vegetables that do not need much nutrition. Control weeds, which may not be as numerous in June as in the previous month, but always be vigilant because summer weeds will be arriving shortly. Set up the supports, which may be simple bamboo canes or stakes up to 59 *in* (150 *cm*) high depending on the vegetable to be supported. The plants grow upward and the fruit will be clean and less prone to waterlogging rot on the soil, also reducing disease. Also check the ties that secure the branches to the supports, because the weight of the vegetable increases as it begins to ripen. Another tip is to water the vegetable garden in the late afternoon or early morning. Heavy watering risks the fruit growing with splits in the skin. Severe drought, on the other hand, would jeopardize its entire production. Be consistent, therefore, in giving water and never overdo it. If you do not

have a river nearby or a well collect rain. You will realize how useful it will be in dry periods.

Indoor sowing: Indoor sowing is not appropriate during this period of the year. This is the best season for outdoor sowing.

Sowing outdoors: It is important to sow seeds at this time to also have a fall harvest, thinking about sowing late varieties of spring and summer vegetables, such as tomatoes and zucchini. One can sow virtually anything one wants. The following are grown: eggplant, peppers, green beans, zucchini, peas, the late varieties of carrots. Between the end of the month and even the first weeks of July, you can sow fennel. Aromatic plants, such as basil and parsley, should also be planted in this month. If cycled regularly, they last until September. Small fruits, such as raspberries and strawberries, can also be sown.

What to harvest in June: In June the harvest will be rich, because so many of the seedlings transplanted and seeds left to germinate have produced the coveted vegetables. Tomatoes, green beans, cucumbers, celery, zucchini, beets, beans, peas, garlic, onions, eggplant and peppers. Strawberries, blueberries, currants and other small fruits are also ripe, ready to be enjoyed. If there has been warm weather, cherry, plum and apricot trees will also bear their first fruits. To determine when to pick the fruit, check that the flesh is slightly yielding, has the typical size of that variety, and the color is uniform.

Transplanting in June: To begin, tomato seedlings can be transplanted in the open field. They should be arranged in rows, no less than 8 *in* (20 *cm*) apart, and when they are taller they should be attached to a wooden or bamboo pole or any support. It will help them not to fall over during the growth phase. Then they need to be watered. Depending on the variety of tomato chosen, harvesting can take place between 40 and 50 days after transplanting, up to a maximum of 120 days. Another important job in June is to properly protect the plants from the sun. Newly transplanted young

crops in particular can be damaged by it. It can get very hot in the middle hours of the day, and if seedlings are not well protected, they can take on a dry look, only to recover with watering or when the temperature drops in the late afternoon and evening. The same goes for newly sown soil. In fact, at temperatures above 66,2 °F19° some vegetables fail to germinate.

Pruning in June: Some vegetables, such as solanaceae, need minor pruning of the upper parts and topping of the side shoots, which in June are only a nuisance to the productive parts of the plant, because they compete for water, and ensure riper, fuller fruit. Fruit trees also need to be pruned, both those that have already fruited, such as apple, pear, orange, and clementine trees, and those that are ripening, such as peach, plum, and cherry trees, as well as those that are already in the harvest stage, such as lemon and apricot. This is not the time for grafting; grafting is only possible on chestnut, persimmon and walnut trees.

Aromatic herbs in June: Various herbs, from parsley to basil, can be harvested to flavor various dishes.

Orchard in June: Many plants are in full bloom at this time. Some, will need extra watering if it gets too hot. Pest control is also critical in June, and you need to hurry because with the heat their reproduction begins. Treatments are timed, some already started the previous months, others should be done now and continued through the summer months. The main plants that need to be treated are many, it is good to remember that some treatments have already started in the past months and must be continued until the end of this month, while others will only start now depending on the area.

CHAPTER 5:

SUMMER SEASON

July

July garden chores consist of continuous watering, especially if temperatures are very high, and clearing out weeds and shrubs that prevent plants from growing freely. Let's look at them in detail. In July, despite the high temperatures, the harvest is definitely abundant. However, there is still work to be done to support the ripening of summer vegetables and organize the fall harvest. Zucchini, tomatoes, peppers and eggplants are about to be harvested, but they need to be helped with frequent and abundant watering, light surface fertilization and weeding around the foot of the plants. Then there is the need to remove weeds that continue to proliferate in hot weather, check the rootstocks and contain the plant by pruning the new shoots that continually sprout. In addition, it is necessary to check for rot, and the plants are not attacked by pests and fungi. Therefore, it is important to harvest vegetables quickly as soon as they are ready. In addition, eggplant, celery, zucchini, onions, cardoons, and cabbage should be tamped down with some soil put on the roots. This will help keep them healthy and protect them especially during periods of severe drought. With the high temperatures this season, it is good to water the soil daily. When the weather is particularly hot, and in more southern regions, it may be necessary to do this twice a day, without letting the soil dry out completely. If you plan to be away for a few days, it is best to water well and thoroughly before leaving.

Transplanting in July: Plants sown in previous months in seedbeds are transplanted in July: cauliflower, cabbage, fennel.

Pruning in July: Although in July much of our energy is spent on harvesting activities, it is good not to neglect all other activities. For example, it is very important, to encourage the growth of tomatoes, to proceed with the removal of the main shoot of the plant. A lot of patience and restraint is needed in doing this work, otherwise you run the risk of removing too many shoots to the detriment of the final harvest. At the end of the day, it is still a small pruning, and the plants can become traumatized, so it is best to go easy. According to some, this procedure is not suitable for cherry tomatoes. After the summer harvest, many plants need to be pruned with drastic cuts to the shoots, until only the stem and main branches are left, watered well and fertilized. This will enable them to fruit again in the fall.

Herbs in July: The harvest of herbs in July will be rich and abundant. In fact, almost all of them are ready to be used for consumption.

Orchard in July: Among the garden chores in July are pruning. Fruit plants will also need to be adjusted, both those in training and those that are well developed. The most suitable cuts for this period are those on the dormant bud, and action can be taken on apple, pear and citrus trees, as well as cherry, plum, apricot, peach and loquat trees. July's garden chores also include fighting pests and fungi, which are not hindered by the heat of this time of year, on the contrary. This is the time to make the most suitable treatments to keep insects and diseases under control, but also to prevent them.

Powdery mildew and gray mold are fought with sulfur products, red spider mites are fought with some entomophages, aplidia are removed with pyrethrum, mealybugs with pheromone traps. This is also the time to think about new fruit plants, so you can start working the whole soil and not just digging the hole, so as to promote root establishment, accelerate plant development and fruiting. It is important to check plants and fruits-especially soft-fleshed ones-after a hailstorm. Some types of fruit trees if watered lightly during the warm months may decrease their ability to absorb water from the soil. This is the bruson and can be recognized by the

leaves drying up, first the inner and then the outer ones. At the end of harvest, it is advisable to gently suspend irrigation to avoid overgrowth. Since many fruit trees are in full production or beginning to ripen, it is not necessary to fertilize them.

August

August garden work is very strenuous: you have to water continuously, remove the weeds that have grown around the plants, harvest the ripe fruits and vegetables, not to mention starting to engage in the fall crops. let's see in detail. It is known that the work in the garden never ends and that you never go on vacation, not even in August! However, this is a month when production is low, due to the heat and drought, which even good irrigation does not compensate for. In August, the land must also be prepared for the fall months' crops. It is necessary to spade the soil, fertilize it with humus and organic material. *In short, in the vegetable garden there is always work to be done...*

Another important operation in these months of intense heat is to protect the seedlings and the newly sown field from the sun with reed shades. Just remove them gradually temporarily during cooler hours, then on cloudy days, finally completely, to avoid having the seedlings 'boil'. Another operation to consider in August is the protection of the vegetable garden from hailstorms. This is precisely the month when sudden rains can occur. This causes damage to both plants and vegetables, due to the subsequent heat of the sun rotting the dents and tears caused by hail. Simply secure a sheet of nonwoven fabric over the most valuable crops, harvest vegetables close to maturity, and cut leafy greens and then water and fertilize them.

Pay attention to pests and rodents such as moles, which are attracted to the moist soil rich in insects and earthworms, and slugs, which are greedy for the tender leaflets of garden vegetables. Grasshoppers are also a threat to the vegetable garden because they destroy the green, tender tissues of growing vegetables. To deal with these enemies there are various natural methods, but they are not always effective. On the other hand, it is not a good idea to resort to poison, which would poison other harmless animals and leave traces on vegetables. To ward off moles there are repellent baits, for rodents special traps, while slugs must be removed by hand.

What to sow in August: Sowing can still be done during this summer period to have successive harvest cycles after the first one.

Indoor sowing: This is not a suitable time for sowing seeds in a greenhouse or generally indoors.

Sowing outdoors: In the last weeks of the month, weather and climate zone permitting, you can continue to grow early cabbage, cutting vegetables, spinach, eggplant, peppers, cucumbers and potatoes.

What to harvest in August: Many summer vegetables, those in the second crop cycle that have now reached maturity, can also be harvested at this time. Eggplant, lettuce, tomatoes, lettuces, cucumbers, zucchini, cabbage, chard, cabbage, chicory, peppers, beans and green beans continue to be harvested. Re-flowering varieties of strawberries can still be found, which must be harvested in steps, every day, because the heat and light takes them very quickly from ideal ripeness to overripe (soft flesh, dull, loaded color, no fragrance).

This is the month of watermelon. However, the right time must be identified, not too ripe, for the flesh to be crisp. If you wait it will be sweeter, but will have less firm flesh. To tell if a watermelon is ripe, it should make a dull sound when struck. It will keep at room temperature for up to 3 weeks and in the refrigerator at 6-8°it will reach over a month. Late oranges and early varieties of apples and pears also ripen in August. The first figs also begin to arrive, which must be harvested in stages, detaching them by twisting the stem slightly.

Transplanting in August: August garden chores also include transplanting vegetables sown in the seedbed, including cabbage, chicory, fennel and leek. The orchard, on the other hand, does not need new transplants.

Pruning in August: This is not the time to do major pruning; it is better to top plants and herbs that tend to increase in volume for a bumper crop and cut back branches of those that have already fruited, followed by watering

and fertilizing to encourage a new fall harvest cycle. Trees that fruit in winter, on the other hand, should be pruned during this season. Small fruits need pruning immediately after the last harvest.

Herbs in August: In August the basket is also filled with chilies and herbs of all kinds.

Orchard in August: Among the garden work in August, watering is the most important. Seasonal fruit is ripe and ready to be harvested. The only grafting that can be done now on apricot, plum, pear and apple trees is by dormant bud, while on cherry and plum trees it is by vegetative bud.

This is not the time to fertilize, an operation that should be done more in the cooler months, or at the time of vegetative regrowth in spring. Decisions can be made on how to organize the soil between the rows of fruit trees: plant short-cycle vegetables, let grass grow, or keep it free of crops. If grass is planned, it is better to cut it every so often and leave it on the ground to better fertilize the fruit trees. If you leave the soil between the trees free, it is necessary to work it to prevent crusting and splitting. If you want to start with an olive grove, now is the time to work the soil.

September

What to do in one's vegetable garden once summer is over? Simply prepare the soil for winter crops and continue planting if the weather permits. Remember that it is still hot in September, albeit with less intensity, so never forget to water with some frequency. Let's find out more about what to do. If you have nothing left to harvest, the vegetable garden should be cleaned and prepared for spading in September. As the crops finish their life cycle take care to weed them out of the ground.

Sowing outdoors: Plant outdoors and indoors towards the end of the month. Outdoors and using a seedbed grow cabbage and onions, turnip greens, carrots, endives, lettuces, escarole, spinach. Remember that they should be transplanted between November and December.

Sowing fennel in the seedbed, on the other hand, requires a wait of 30 and even 40 days. After that when they have reached 4-6 *in* (10-15 *cm*) in height they can be planted in the open field. Seedlings should be placed 8 *in* (20 *cm*) apart in the row, leaving a space of 24-28 *in* (60-70 *cm*) between rows. The seedbed is a really useful tool for those who want a 100 percent natural product for the uninitiated. No one can stop you from building a real seedbed at home worthy of the best farmers. Some people buy it pre-prepared from those who sell farm products; but others engineer it differently. Such as those who use an egg carton, puncture it at the lowest end and fill it with fertile soil. But once planted, the little seeds always proceed with watering, never overdoing it.

Also on the use of seeds be careful, lest you run the risk of eating genetically modified products. Then there are those almost abandoned crops that are in danger of extinction if something is not done to protect them. Perhaps in our own small garden, if soil characteristics permit, we could grow those lost varieties to make way for more intensive crops.

What to harvest in September: Keep harvesting the fruits from summer plants and vegetables that still keeps growing.

Transplanting in September: Chicories, radishes, lettuces, spinach, carrots, turnips and kale can be planted at this time.

CHAPTER 6:

FALL SEASON

October

October's vegetable garden work is quite a commitment: you have to clean up thoroughly from all the summer crops that are now finished, weed the plants, spade the soil, fertilize. Let's find out in detail what needs to be done in the early fall months. Summer is over, the midday sun is still hot but the air is already getting crisp. October marks the arrival of autumn, although some areas still have mild temperatures, the rains and cold weather are now here. This is the time to clean up the garden for good from all the summer crops that are now finished. Grub out the plants, dig up the soil, fertilize it with good compost and proceed with planting the new seedlings.

Let's clear the field of doubt right away: in small vegetable gardens, if well composted and fertilized, letting the soil rest becomes superfluous. Just clear it of summer crops and start the winter ones, which will bear fruit in spring. So remove all the old plants, leaving no old roots in the soil, till the soil and then compost. Light weeding also eliminates weeds that threaten fall crops, aerates the soil and prevents waterlogging. Then spread manure and tamp the feet of crops whose roots you want to protect from the cold. October garden work also includes a good mulch. It will keep the soil cooler in summer and warmer in winter. Better to do it now that the soil is not yet cold and wet, otherwise you will have the opposite effect, delaying the warming and drying process. At this time check the soil and plants and carry out treatments that will prevent plant (scab, powdery mildew, leaf dryness, blister and coryneal) and animal pests from taking root. In the

winter months, plants are dormant and pests are immobile (dormant state), thus enhancing the action of the pesticide.

As organic pesticides, potassium-based plant soaps can be used to 'grease' the foliage, horsetail extract or macerate to eradicate fungi, bitter cassia extract against aphids, nettle extract against mites, and pine oil against mealybug. Also to be considered for integrated pest management are neem oil for aphids and mealybug and as fungicide, sulfur and copper against most of the common fungal diseases, and finally bicarbonate, which is used against powdery mildew, botrytis and mold. Finally, we begin to think about what cover crop to use for the colder months.

This is sowing month, so cover the soil with good humus and proceed to sow the new seedlings. Depending on the area and climate zone you live in (you can arm yourself with a sowing chart), this time is perfect for garlic, asparagus, carrots, turnip greens and fava beans, lettuce, peas and parsley, radishes and arugula. Keep in mind that some need waning moons others need rising moons. Beware that each vegetable has its own minimum germination temperature, so best to pay attention to the peak in your area, (the highest temperature), usually the afternoon, and compare it with that on the seedling chart. Then, to grow, the seedling will need another temperature, the average growing temperature, which we might define as an average between the nighttime minimum and the daytime maximum. By following these simple steps, you will be able to choose the vegetables and fruits to grow that are best suited to your climate zone. And which will give the greatest satisfaction.

Always consider that not all varieties grow in all environments; many crops are affected by climate and exposure. Learn the exact location of your vegetable garden and read many books about growing native varieties. Perhaps you are lucky enough to be in a suitable place to grow a rare variety. Think of the famous Pantelleria lentils, with their unique and unrepeatable taste.

Indoor sowing: Remember that you can still harvest some summer vegetables sown May or June (tomatoes and peppers) while those sown early are already drying out.

Sowing outdoors: In October you can sow beets, lettuces, radishes, radicchio, turnip greens, peas, parsley, arugula, fava beans, spinach, carrots. Garlic and onion bulbs can also be transplanted in this month. The advice is to plant them with their tunics about 3-4 *in* (8-10 *cm*) deep and with the tips pointing upward. The temperature is still mild, but it will not be for long. Make sure you have cellophane sheeting to shelter your seedlings. And replace tarps that are too dull; they have had their day.

What to harvest in October: October's garden works also include picking apples and pears, persimmons and chestnuts, as well as some late varieties of raspberries and blackberries, and in some areas figs. October is also olive harvest month. The first naveline oranges, clementines, and tangerines arrive, and lemons continue.

Among vegetables, some late summer varieties can still be harvested. In particular zucchini, tomatoes, peppers, cucumbers and eggplant, as long as the plants receive enough water and are 'leafed out' to receive maximum sunshine. Select only the perfect fruits, to channel the plant's energies to these alone. You can also harvest kale, arugula and lamb's lettuce, spinach and radishes. For those with vineyard land, October corresponds to harvest time. The grapes must have the right ripeness, that is, have the maximum degree of sugar: sometimes it only takes a few days to ruin everything... In the north it is good to wait for the hours when vines and grapes are dry; in the south it is better to harvest in the evening or when the temperature is low, to achieve delayed fermentation. Those who follow the lunar calendar associate harvest operations with the last 3 days of the waning moon, which will be followed by the delicate phase of must fermentation. Thus after intensive natural processing the wine will be ready for bottling and resting in the cellar.

Transplanting in October: New plants should not be planted in October, while it is important to work the soil to prepare it for new plantings. Plants sown in previous months in seedbeds are transplanted in October. Vegetables to transplant are: onion and garlic, chard, cabbage and cauliflower, chicory and fennel, strawberries and spinach.

For bulb vegetables, such as white onion and garlic, plant bulbils in soil planted with plants that need manuring (e.g., tomatoes and zucchini) to retain good residual fertility.

Pruning in October: This is the time for pruning peach, apricot and plum trees, which, after summer fruiting, are about to enter their resting period.

Orchard in October: On the other hand, it is not necessary to water frequently, given the lower temperatures and increased rainfall, always adjusting based on rainfall. This is not the case for planting the fruit tree you wanted, but if you really want to, spread plenty of animal manure (35-40 quintals per hectare) and plant your chosen tree.

Among the tasks that are never lacking among October's garden chores are pesticide treatments to ensure a good harvest. After cleaning, removing broken and dry branches, and those affected by diseases, it is advisable to take action. You can do the cleaning of the main branches, with an iron or fiber brush.

November

November's vegetable garden chores are not few, even in cold weather. As you may have guessed, tilling the soil is hard work that lasts all year long even when the ground seems bare and gray to us. Among the November vegetable garden work are several activities to prepare the soil for winter planting. This is also the planning stage of the new vegetable garden, with the choice of future bed divisions and the plants you want to sow.

You need to clean up fall plant debris and remove summer braces and supports, and then begin to rearrange the vegetable garden in preparation for winter and spring sowing. Among the various preparation activities is deep tillage of the soil, abundant fertilization that must be made to penetrate well through vigorous spading. Cold protection activities also begin for vegetables still in the open field (thistles and artichokes, cabbage and cauliflower), with the reestablishment of cold tunnels and the use of non-woven fabric because sudden rains and frosts happen more often and the number of vegetables that can withstand them outdoors is getting smaller and smaller. At this time, remember not to water the vegetable garden too often because the soil is wetter than usual.

Once all the work of weeding and harvesting summer vegetables has been completed and the soil has been drained, we are ready for planting.

Indoor sowing: By the end of the month we will need to have finished sowing under cover crops of radicchio, arugula and radishes, as well as chicory and songino, plus kale, the king of frost! In the seedbed, winter lettuces are fine.

Sowing outdoors: Broad beans, peas, chicory, radicchios, radishes and spinach are sown in the open ground. Shallots are a vegetable with a milder and less pungent flavor than onions and garlic. It does not need special care, the only caution is to avoid planting bulbs for two consecutive years on the same soil and then let it rest for four or five years. It is advisable to plant

the bulbs at a distance of at least 6 *in* (15 *cm*) and at a depth equal to twice their length.

What to harvest in November: In November, fruits rich in vitamin C are harvested. In particular, kiwifruit are harvested unripe and wait for them to ripen gradually. A little trick to anticipate their ripening is to arrange them next to ripe apples. The same method also applies to unripe bananas. Try it to believe.

Although it is not native-it originated in China-the kiwi has acclimated very well in the hottest regions of the States. It contains a lot of vitamin C, amounting to 85 mg per 100 g, an even higher amount than oranges.

Transplanting in November: November's garden chores also include transplanting: particularly spring cabbage, garlic, onions and shallots.

Pruning in November: Garden work in November includes pruning, but let's rely on experienced pruners otherwise we risk killing the plant.

Herbs in November: Before the cold weather arrives, it is necessary to prepare aromatic plants to face winter with appropriate protection.

Orchard in November: Now is the time to think about protecting more delicate trees such as citrus trees from the cold with specific tarps. This is a very suitable month for those who want to plant fruit trees instead. Of course, you always have to consider where you live. In northern zones, where the cold weather arrives earlier, the transplanting of fruit trees is done between September and October, while in the south the period becomes longer. Before buying any sapling identify the most suitable place to place it because the plants have their own ideal habitat.

Having decided on the arrangement, dig a wide enough and deep enough hole by mixing in some compost to make it more fertile. We bury all the plant roots, being careful not to overdo it. The plant must be able to breathe.

December

December's garden work is few and far between because of the cold weather, and the garden is taking 'break' period. Tilling and fertilizing the soil to prepare it for new crops is the main effort in the vegetable garden in this first month of winter, when the cold weather begins to bite and frosts often arrive. The use of appropriate cold protection for winter crops is widely recommended. Cold tunnels and nonwoven fabric are mainly used.

Nonwoven fabric: This is an unshrinkable fabric even when buried or wet, but at the same time allows air and water and some light to pass through. It resists temperature changes, sunlight and is lightweight and reusable. It cuts easily and does not tear. Last but not least, it is inexpensive compared to mulch. It should be applied to small seedlings, and when they are larger and self-contained, it should be removed.

Cold tunnel: It is used to shelter already sown crops that are already growing and the soil in which you will be sowing in the cold months, already properly prepared. This small horizontal unheated greenhouse must be set up with supports to make it stable in case of snowfall. For this, the bows that support the tarp should be planted in the ground at least 5,91 *in* (15 centimeters) and remain upright. A perfectly taut tarp is placed on top, secured with elastic ties and stakes. The problem with the cold tunnel is the formation of condensation, which can be avoided by wetting only during the hottest hours of the day to promote air exchange. Condensation is dangerous because it drips onto vegetables and leads to rot and fungal development in the closed tunnel.

Soil preparation in December: In this month it is good practice to treat the soil and plants with fungicide and insecticide treatments that are as natural as possible. Mulching with straw or peat is always recommended during this period because, among other things, it prevents weed growth and maintains moisture in the soil. It is useful to distribute snail products so as to avoid damage caused by slugs, which is typical after heavy December

rains. In addition to treating, spading and watering the soil make sure it has not been depleted by all the cultivation undergone during the year.

In this case, fertilizing with good quality ecological compost is almost a must. Remember that good fertilizer activity helps restore the biochemical balance of the soil and better prepares it for sowing and transplanting. In short, in December the main agricultural activity is trying to keep the soil healthy. An activity that requires some commitment and a lot of patience. But patience always pays off in the end. In fact, winter vegetables need properly prepared soil for planting whether in the cold tunnel or in the open field. For this one has to clean up well from plant residues and roots from previous crops and dig deep so as to aerate and raise the level at least 3,94 *in* (10 centimeters) above the previous one.

Consider which vegetables are best suited to withstand the coldest temperatures in the open field.

Indoor sowing: In contrast, winter vegetables such as radishes, arugula, chard and broccoli, and parsley are less hardy and therefore must first be sown indoors under tunnels and then transplanted later.

Sowing outdoors: Vegetables that are most resistant to low temperatures and frost, with any work to protect them with nonwoven fabric, are: spinach, leeks, savoy cabbage, the various types of cabbage, turnips, radicchio and chicory, as well as bulbaceous plants such as garlic, onion and shallots.

What to harvest in December: The December harvest is mostly limited to artichokes, thistles, cabbage, cauliflower, carrots, turnip greens, endive, lettuces for cutting, parsley, turnip, arugula, valerian, escarole, celery and spinach. For fruits we will have: oranges, clementines, kiwis, tangerines and table grapes.

Transplanting in December: In the open field, on the other hand, asparagus, garlic, onion, leek and shallot are transplanted. While in a

protected environment, lettuces, radicchio, radish and arugula are planted. Also in December, some late varieties of potatoes and artichokes are planted. The latter like rich, deep soils, but they also do well on clay or lime soils. Unlike other crops, artichokes are perennials, and it is good to identify exactly what portion of the soil to devote to them. If you live in an area prone to frost, remember to cover the plant with a tarp; you will prevent it from burning.

Pruning in December: There are not many fruit trees to prune. Work should be limited to those that fruited last in the fall.

Herbs in December: The December harvest of herbs is poor. Herbaceous varieties (mint, chives) are now dead, so residues must be removed from the soil. The woody ones, such as lavender, thyme, and rosemary, resist, but special care must be taken to protect them from the cold. The foot of the plant, unprotected by branches, is the part most exposed to frost. For this, tamping with good quality soil and mulching with straw mixed with chopped leaves and hay, or mature manure, should be done to increase soil fertility. This is then covered with wire mesh. Pruning the woody parts and not the branches is also recommended to reduce vegetation.

Orchard in December: In the drupaceous fruit family, which includes peach, plum, apricot, almond and cherry trees, it is recommended to add treatments against coryneus and blister, two fungal diseases. Also do copper treatments to prevent the occurrence of fungal diseases such as copper cankers. It is also useful to protect fruit trees from rodents, with rigid plastic at the base, and from the cold, with tarpaulins. Cold protection is especially necessary for the lemon tree and for all plants (such as kiwi, medlar or pomegranate) that are very sensitive to drops in temperature.

BOOK 3

INTERSTING NUTRITIONAL FACTS

Low in calories but rich in nutrients and antioxidants, vegetables are an integral part of a balanced diet. In this paragraph, we will take a closer look at their nutritional characteristics and find out what properties make them so important for our bodies. With the exception of seeds and tubers, vegetables boast a low energy intake (on average, about 20-30 kcal per 100 g of produce). Their calorie content is almost entirely accounted for by simple carbohydrates, while protein and fat play only a marginal role. *But what nutritional values do vegetables and greens have?* Did you know, for example, that 100g. of cucumbers provide 10% of the

daily requirement of vitamins of groups B and C? While 130g. of peas or alternatively 100g. of radishes cover the daily requirement of vitamin C? In contrast, zucchini is a strong source of potassium (10%), vitamin A (5/10%), vitamin B9/folic acid (10%). A real powerhouse! Our body, in order to regenerate and produce new cells, needs vitamins and minerals, which it is unable to produce; therefore, it must take in through food these elements, in which vegetables are rich.

In general, vegetables have a high water content, a fair amount of dietary fiber, little protein of low biological value, little fat, and starches in unappreciable amounts except for tubers (potatoes are very rich in starch). It is well known that vegetables are an important source of vitamins and minerals that vary in quality and quantity according to different species. We recall Vitamin A and carotene (e.g., carrot, pumpkin and yellow-orange colored vegetables), Vitamin C (green leafy and sometimes slightly acidic vegetables) and in some varieties also B vitamins. The most abundant minerals are: *potassium*, *magnesium*, *phosphorus*, *sodium*, *iron and calcium.*

You should also know that vegetables are good digestive aids due to the trace presence of organic acids (e.g.malic acid, citric acid) and effective diuretics due to their water content. Fiber provides a stimulating function in peristalsis contraction of intestinal smooth muscle and helps fight constipation. Vegetables in general help to provide a sense of satiety without affecting the overall dietary intake considerably. Some may be indigestible due to individual intolerance to certain substances as of the case with peppers, garlic, onions, broccoli, radishes, leeks, etc.Vegetables may contain antinutritional factors such as:

- Oxalates and phytates, which reduce calcium and iron absorption;
- Solanine, an alkaloid in solanaceae that is toxic at high doses (in tubers);
- Nitrates and nitrites, which in the presence of amines form nitrosamines, substances considered carcinogens, the concentration of

which varies depending on the fertilizers used.

Vegetables are also an excellent source of antioxidants that counteract the action of free radicals , potentially dangerous molecules in that being very reactive they can damage DNA and thus kill healthy cells. The importance of β-carotene in fighting the onset of certain types of cancer should be noted. Some recent studies have identified in vegetables, useful cancer-fighting substances such as:

- Indoles (in arugula);
- Allicin (garlic, chives;
- Isothiocyanates (cabbage);
- Flavonoids (various vegetables and fruits).

Overall, vegetables are considered to be foods with a predominantly protective function because of their good content of antioxidants and dietary fiber, and therefore they should be included in the daily diet.

CHAPTER 7:

THE PROPERTIES OF FRUITS AND VEGETABLES BY COLOR

Yellow, red, purple, orange, white, green - *are you sure to eat all these colors?* Associating a color with what you eat can be helpful in remembering and understanding what our bodies need on a daily basis to live healthily. Fruits and vegetables are an important source of nutrition, in fact both bring significant benefits including vitamins, minerals and more. Learning how to bring them to the table by color even becomes fun! In

fruits and vegetables there are bioactive substances of vegetable origin called phytochemicals. Some of them possess interesting characteristics because, in addition to possessing certain nutritional qualities, they impart particular colors to foods. So let's find out in the next few lines what is hidden among the pulp, leaves and under the colored peels!

Green as strength

The compounds responsible for the green color in plants are glucosinolates. These are derivatives of sulfur-containing amino acids. These compounds are known for their anti-cancer effect and have a protective action against free radicals. Dark green is also the color of iron: spinach, chard, and chard contain it in good quantities. They also possess folic acid and vitamin C, which helps absorb it. These vegetables also include broccoli, cauliflower, Brussels sprouts, cabbage, asparagus, basil, beets, artichokes, cucumbers, chicory, turnip greens, endive, lettuce, parsley, arugula, and zucchini. And among fruits, the absolute greenest is the kiwi.

Growth is orange and yellow

There are several orange-colored vegetables among which are melon, orange, peach, apricot, squash, bell pepper, carrot, mango, persimmon and papaya. Carotenoids A and B are phytochemicals that cause the orange coloring of these fruits and vegetables. These substances are very important for hormone synthesis, in the processes of cell differentiation and growth, and in the immune response. Flavonoids are, together with b-cryptosanthin, responsible for the light orange to yellow color. Noted are their antiviral, anti-inflammatory and antioxidant properties; they also prevent oxidation of bad cholesterol and help in the prevention of diseases such as Alzheimer's and Parkinson's.

Red protects

The red color of fruits and vegetables is given by lycopene, also belonging to the carotenoids, such as A and B carotenes. It is found in tomatoes, watermelon, grapefruit. But also in peppers, beets, cherries, radicchio, pomegranate, strawberries, red fruits, berries, currants, radishes, and red salad. The color red has remarkable antioxidant properties, plays an important role in cellular communication, and there is evidence for its effectiveness against prostate cancer, cardiovascular disease, and damage from exposure to ultraviolet rays and smoking.

Purple For Anti-Aging

The purple color of grapes, blackberries, plums, figs, and blueberries, on the other hand, can be attributed to anthocyanins. Flavonoids are substances that belong to the largest group of phenolic compounds. Anthocyanins possess remarkable antioxidant properties. Vegetables that possess this blue, purplish color include eggplant, kale, and radicchio.

White is Multitask

White vegetables are rich in quercetin, an antioxidant and anti-allergic substance. These vegetables are excellent health allies, lowering cholesterol levels and strengthening bones and lungs. They are onions, garlic and leeks, apples, pears, mushrooms and cauliflower. Garlic and leeks contain allisulfide, which thins the blood and protects the body from thromboembolic events. Selenium, a trace element found in small amounts in foods, is present in mushrooms and prevents high blood pressure, anemia, as well as numerous forms of cancer.

BOOK 4

HOW TO COMPOST

CHAPTER 8:

The Art Of Recycling Waste

Reducing waste is a pressing need in our consumerist society. The high costs associated with waste and the pollution produced by disposal and recovery operations dictate this. According to statistics, the average citizen contributes about 22,00 lb (10Kg) of organic waste every day. This conspicuous amount of waste could be reduced if each of us took care on our own to transform compost into natural fertilizer, instead of sending it to separate waste collection. An environmentally friendly, cost-effective choice. Which would also result in less reliance on chemical fertilizers. *But do you really know how to compost?* First, however, let's do a little background on compost.

Compost: what is it and all the different types

Compost is what remains after you have started a home composting procedure. That is, the process of decomposition and humification on organic matter residues, such as leaves from your garden, grass clippings from the lawn etc. Depending on the composting method you have adopted you will get a different type of compost but basically they can be categorized into 3 types:

- Fresh compost(2 to 4 months in the case of composting with the heap) is still being processed. Since it is still rich in nutrients, it is excellent as a fertilizer and for plant growth. Be, however, careful about applying it directly to the roots because this compost is still not very stable.
- Ready compost (5 to 8 months) is stable because the decomposition process no longer produces heat. On the other hand, it is less suitable for use as compost. We recommend using it in vegetable gardens or vegetable gardens as a fertilizer before planting or transplanting.
- Mature compost (12/18 or 24 months) is the absolute most stable. So, it is the least suitable as a fertilizer. It is perfect in direct contact with roots or seeds and as a potting soil for potted plants or even when reseeding and replanting lawns.

Now let's see how to get it with a process that is easy to understand and execute.

How to make compost

We said that by compost we mean the product of the decomposition, accelerated and controlled by man, of organic substances. These include kitchen scraps. Mainly vegetable remains, fruit peels, coffee and tea

grounds, egg shells, fireplace ashes etc. But also from gardening. For example, pruning clippings, lawn mowing, dried leaves, wilted flowers, garden waste. Home composting can be accomplished by purchasing special composters that are not overly expensive. Those for indoor use range from 50 to 100 dollars, others for outdoor use from 200 to 300, also being equipped with temperature control and automatic stirring.

The benefits of composting

Home composting allows for a number of advantages. First of all, it ensures proper closure of the waste cycle, since organic waste constitutes about one-third of the total household garbage. Do-it-yourself composting avoids landfill or incinerator disposal, thus decreasing related costs. At the end of the home composting procedure, then, we will have a natural organic fertilizer at our disposal. This will be usable in the vegetable garden, or for potted plants instead of polluting chemical fertilizers. We will thus save money by limiting the purchase of potting soils, substrates and organic fertilizers. And at the same time we will reduce the air pollution produced by burning these wastes, as well as avoiding leachate infiltration into the soil. Compost, as a natural organic fertilizer, gradually releases into the soil the elements essential for plant development, such as nitrogen, phosphorus, potassium and trace elements.

What can become compost and what cannot

Those who want to proceed with home composting must first pay attention to what to place in the composter. Kitchen and gardening scraps mentioned above are fine, as well as other biodegradable materials. These include uncoated paper, cardboard, sawdust and shavings from untreated wood. But beware, all glass, plastic and metal items, synthetic fabrics, chemicals, expired medications, coated paper and dog and cat litter should be avoided

at all costs. With great caution, leftover food of animal origin and small amounts of cooked food can then also be added. Same caveat for leaves of degradation-resistant plants (magnolia, beech, chestnut, conifer needles, etc.).

How to compost: heap composting

We now come to the various forms of composting. The most common is definitely heap composting. Here we will have to choose places that are practicable all year round, irrigable and that are in the shade of trees that lose their leaves in winter. In winter we need to allow sunlight, while in summer the sunlight should be mitigated. Placing shredded wood under the mound 4-6 *in* (10-15 *cm*) is another good practice to prevent sludge formation in the winter months. The minimum height of the mound should be 20-24 *in* (50-60 *cm*), in order to retain heat and ensure microbial activity. However, 51-59 *in* (1.3-1.5 m) should not be exceeded, otherwise the material is likely to compact under its own weight. The best shape in summer is trapezoidal. It allows adequate absorption of rainfall and replacement of evaporated water. In winter, on the contrary, it is a good idea to use the triangular one, to avoid excessive accumulation of rain inside the pile, given the poorer evaporation.

Secrets to making good compost

The secret to successful composting then lies in the proper mixing of the waste. This activity is essential to allow the right activity of microorganisms and avoid the onset of putrefaction phenomena, with the consequent bad odors. In practice, proper stratification must be achieved, alternating the wetter and more nitrogenous wastes (grass clippings and kitchen residues), with the drier and more carbonaceous ones (shredded twigs, broken cardboard, wood shavings, dry leaves, straw, etc.), which ensure good porosity and proper oxygen supply to the pile. The initial water content should be between 45 and 65 percent, while as for the proper nitrogen-

carbon ratio, it is good to know that for every gram of the former you need 20 or 30 of the latter.

To ensure proper moisture supply, the pile can be covered during rainy periods with materials such as non-woven fabric, jute sheets or 2-4 *in* (5-10 *cm*) layers of leaves and straw. This way we can retain water without affecting air circulation. The cover can also be useful in protecting against excessive drying during the summer months.

Another point that should not be overlooked for successful composting is proper oxygenation. It is essential for the bacteria that operate biodegradation under aerobic conditions. Therefore, for proper air exchange, it is necessary not to compress the heap material and to turn it periodically with a pitchfork, an operation to be repeated frequently if the heap is not very porous.

The Compost Heap

An alternative to the heap can be the compost heap. It consists of a hole dug in the ground where organic waste can be accumulated. In this case, however, problems may be encountered due to the tendency to accumulate too much water, especially in the case of an impermeable bottom.

Another typical problem is insufficient oxygen exchange with the outside world by the materials deposited on the bottom. Those who choose such a system will therefore have to take certain precautions. These include the insertion of drainage pipes, a layer of gravel or a pallet under the organic material placed in the hole. The same pallets can also be used to separate the waste from the wall of the pit to ensure good air exchange.

How to make compost using a composter

As can be guessed, composting is particularly suitable for those who reside in homes with large gardens that produce large amounts of brushwood and green waste. Plastic, wood or mesh composters, on the other hand, are more useful for those citizens with small and medium-sized gardens that originate less waste. They are containers of varying volumes 52,83 - 264,17 gal (from 200 to 1000 l), with various types of openings. Their use makes it possible to limit the visual impact of decaying materials, ensuring their sanitation and being less affected by weather conditions.

However, difficulties may be encountered in turning the material over if they cannot be opened on one side. If you are intent on purchasing a plastic composter, prefer those that have systems in the inner walls that promote air circulation. *But how does a composter work?* The operation of these tools is very simple.

1. Do the composting
2. Place a layer of coarse twigs at the base of the composter
3. Alternately add layers of nitrogenous and carbonaceous waste
4. After 3-4 months, the plant waste should be turned over and then placed back into the composter
5. After a period of 5-6 months, the lower part of the waste, brown in color and similar to the humus of the underbrush, will have produced a homogeneous compost that is already available for use.
6. This fraction will need to be sieved for a few days.
7. Woody waste that has not yet been processed, on the other hand, must be reintroduced into the composter

Of course, the use of these do-it-yourself tools implies the same adoption of good practices envisaged for traditional composting. First of all, you have to ensure proper mixing through alternating nitrogen and carbon layers. Then it is necessary to ensure good air circulation through the inclusion of coarse twigs and turning the material once every 6 months. Finally, optimum moisture (55-60%) must be maintained, which promotes the

reproduction of aerobic microorganisms. Generally, compost is ready after about 12-20 weeks in winter and 10-15 in summer. The completion of its degradation is evident both by its appearance and characteristic odor.

How To Build a DIY Composter?

There is also the possibility to build your own composter. All you need to do is buy 118,11 *in* (3 *m*) of 1 x 2 *in* (2.5 x 5 *cm*) mesh galvanized wire mesh and 39,37 *in* (1 *m*) high, and then build a cylinder in it that is stopped at two points with wire or "S" hooks. The latter should be covered on the outside with 28 *in* (70 *cm*) high jute fabric, secured again with wire or "S" hooks and finally covered with a waterproof fabric. Et voila, if you comply with our guide to how to compost by the book, you can truly boast the title of 100 percent home recyclers! Your compost can be used as a fertilizer and manure for reseeding and replanting degraded turf, as a partial or even total replacement for peat soils, as an organic fertilizer and as plant food.

Odor-free compost with Japanese fermentation

Let's close this chapter with a curiosity, which may become important in the future. A Japanese researcher has produced a mixture of bacteria that can increase agricultural yields naturally by helping in the prevention of world hunger. It is called EM *(Effective Microorganisms).* It is a collection of bacteria and other microorganisms that can increase the breakdown of food and agricultural remains. This is a special type of compost that has existed in Japan for hundreds of years; it is called *“bokashi”* .

Unlike ordinary compost, EM is an odorless compost that can therefore be developed in small environments, even in an apartment. Not only that, it can also process meat or dairy products, normally excluded from "classic" systems. Made for Japanese gardens and farms, EM can incorporate

bacteria and microorganisms from all over the World. *But what Japanese fermentation can be used for?*

Its goal is ambitious. It was developed to support food production, medical care, energy supply, and environmental preservation. In a broader sense, its ultimate goal is to promote world peace. Indeed, its use during some environmental and humanitarian disasters has been positive. Indeed, it has helped restore fertility to rice fields swept by the 2011 tsunami in Sendai, Japan, as well as in Fukushima.

The basis of EM is brewer's yeast, commonly used in bread and beer production. It is capable of initiating the fermentation process by breaking down complex sugars. The key organisms, however, are microbes that use sunlight to break down organic remains and create nutrients needed to promote plant development. The addition of lactic acid bacteria, on the other hand, prevents the proliferation of harmful fungi.

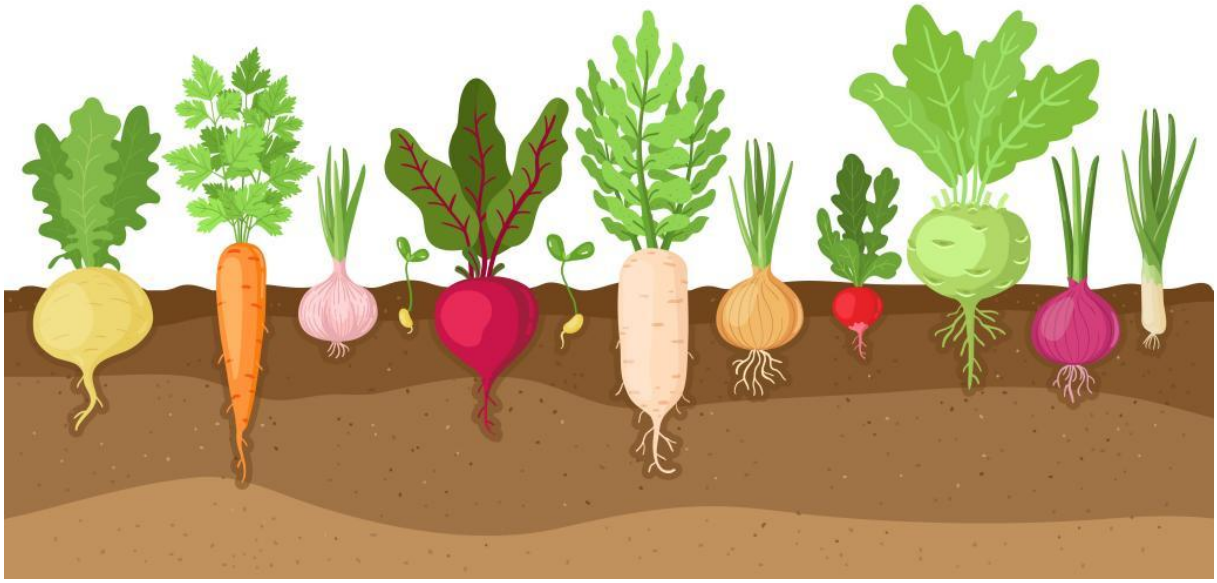
Within an EM package there are also more than 80 species of microbes. They are all studied for their ability to assimilate waste and turn it into food for ecological agriculture, all to have an odor-free compost. Again we are dealing with a technological solution, the result of years of research and experimentation, working with Nature to solve problems caused by human beings.

BOOK 5

COMPANION PLANTING

CHAPTER 9:

NATURAL SYNERGISM



Garden associations, one of the oldest agricultural practices, which involves growing several different species on the same land in order for one to benefit the other. Let's learn about the benefits of this technique and some examples of the main vegetable and ornamental plant associations. The simultaneous cultivation of different plant species that are grown on the same soil, juxtaposed with each other can cause them to help each other. Plants, in fact, interact with each other and the surrounding soil in a variety of ways: *exchanging nutrients, attracting or driving away insects, making more or less shade.* It is a very ancient agricultural practice that 'mimics' the function of nature. In its spontaneous state, in fact, it is plant biodiversity itself that behaves in ways that keep the environment healthy.

Companion Planting Advantages

There are many advantages of applying intercropping in the vegetable garden by cultivation method you use. Let's see in detail:

- Optimization of production: Two species whose roots dig at different depths and do not have the same growth rate can be grown together
- Removal of pests
- Improvement of nutrients
- Increased soil fertility
- Saving of space
- Improvement in product quality
- Preventing the spread of disease
- Protection from pest attack
- Possibility of shading specific areas that need a screen from the sun's rays
- Maximum utilization of the vegetable garden by alternating slow-growing species with fast-growing varieties

The Synergic Garden

The synergistic garden is a new way of growing vegetables based on the soil's self-fertility mechanisms. It is a Japanese technique created by Masanobu Fukuoka in the 1970s and later spread to the Western world. It is based on the idea that Soil is an autonomous organism, capable of regenerating itself as long as its different elements are in balance. Therefore, it is necessary to transform the vegetable garden into an eco-system, where it is the plants themselves that fertilize the soil, thanks to their organic residues and the small animals that naturally inhabit it (bacteria, insects, fungi and earthworms). For this reason, it is essential in

the synergistic garden to follow certain plant pairings so as to achieve maximum results. Such combinations of plants are summarized in intercropping tables that in fact, summarize the relationships between plants at a glance. Below is a list of all the different vegetable associations:

- **Garlic and onion:** they look good with zucchini, beets, tomatoes, lettuce and strawberries. Planted near herbs, garlic enhances its power to protect against fungi and pests; it also contributes to the growth of roses
- **Asparagus:** goes well with tomatoes, basil and parsley
- **Beets:** good with onions, radishes, turnips and cabbage
- **Carrots:** good with onions, radishes, peas, lettuce, leeks, sage and rosemary
- **Cabbage:** good with beets, strawberries, lettuce, tomatoes, mint, peas, spinach, celery, sage, and leeks. Specifically, celery, tomato and aromatics ward off cabbage, mint increases yield and quality, sage tenderizes it, and tomato protects it from beetles.
- **Beans** : perfect with potatoes, cabbage and carrots. Savory keeps away aphids, improves growth and taste, while petunia drives away insects.
- **Fennel:** good with chicory, lettuce and peas. Wild ones, however, are not consociable
- **Strawberries:** perfect with radishes, lettuce, cabbage and spinach. Chives protect them from mite and Botrytis attacks.
- **Lettuce:** goes well with chicory, cabbage, carrots, radishes, strawberries, fennel and cucumbers
- **Eggplant:** ideal with beans, nasturtium, ornamental tobacco, marigold, carnation
- **Potatoes:** go well next to eggplant, beans, and marigold

- **Peas:** go together with fennel, carrots, cruciferous vegetables, zucchini, celery, and lettuce
- **Tomatoes** : go together with carrots, cabbage, onions, parsley and basil (the latter improves taste and development, and keeps flies and mosquitoes away).
- **Leeks:** good with cabbage, onions, celery and carrots.
- Parsley: green light with radishes, asparagus and tomatoes.
- **Turnip:** perfect with peas and spearmint, which keeps away the altica
- **Radishes:** way to go with cabbage, beets, strawberries, lettuce, chervil, peas, tomatoes, parsley
- **Celery:** goes well with leek and cabbage; and also with horseradish, which protects it from insects and rust, and with tomato, which stimulates its growth.
- **Spinach:** good along with cabbage, strawberries and carnation that keeps aphids away.
- **Squash:** to go with climbing beans, corn, nasturtium, mint, thyme, sage, carnation, marigold.
- **Zucchini:** should be near onions and basil (the latter protects them from powdery mildew).

Garden Associations To Avoid

Of course, the opposite also applies: not all species look good next to each other, on the contrary. In fact, there are plants that compete with each other, taking away useful substances from each other or releasing essences undesirable to each other. As a general rule, it is not recommended to place plants belonging to the same botanical family near each other. However, here is a list in which we review in detail the consociations to avoid.

- **Wormwood:** best to keep it away from most vegetables as it hinders their development
- **Garlic:** no along with broccoli, cabbage, cauliflower, peas and beans
- **Red beets:** best away from potatoes, leeks and corn
- **Beets** : do not like the proximity of climbing beans
- **Broccoli:** do not like the proximity of garlic, onions, strawberries and fennel
- **Carrots:** away from celery and parsley
- **Cabbage:** never together with garlic, dill, potatoes and onions
- **Cucumber:** not good together with tomatoes, potatoes, squash and radishes
- **Onion:** no to broccoli, cabbage, cauliflower, peas and beans
- **Fennel:** never near broccoli, cumin, cauliflower, strawberries and climbing beans
- **Strawberries:** best away from broccoli, fennel, cauliflower, potatoes and tomatoes
- **Lettuce:** no to nearby parsley and celeriac
- **Eggplant:** do not like the proximity of tomatoes and parsley
- **Potatoes:** never near red beet, cabbage in general, cucumber, strawberries, sunflower, peas, raspberries, leek, tomato, parsley, celeriac, pumpkin
- **Peppers:** does not like the proximity of beans and tomatoes
- **Peas** : best away from garlic, onion, climbing beans, tomatoes, potatoes, leeks and parsley
- **Tomatoes:** best away from cucumbers, fennel, potatoes and peas
- **Leeks:** no together with red beets, climbing beans and peas
- **Celeriac:** never together with lettuce, corn and potatoes

The Importance Of Herbs

All herbs are a positive presence for the vegetable garden. As is the case in many cases for the human organism, their essential oils are in fact also very useful for the ecosystem. Therefore, it is recommended not to create a flower bed or a special area in the vegetable garden set aside for aromatic herbs, but to plant the herbs scattered throughout the vegetable garden in order to encourage associations. Below are some herbs that particularly stand out and whose cultivation is highly recommended.

- **Wormwood:** keeps rodents and other animals away but should be kept well away from horticultural plants
- **Chamomile:** promotes the growth of onions, mint and cabbage
- **Cumin:** makes the soil softer
- **Tarragon:** has no special specificity but is useful for the whole vegetable garden
- **Lovage:** stimulates the robustness of plants
- **Rosemary:** keeps away several pests, especially those that attack legumes and umbellifers (carrots, celery fennel)
- **Sage:** attracts bees useful for pollination and other positive insects as they prey on garden pests
- **Thyme and cilantro:** unwelcome to some pests of the lepidopteran genus, however, they attract ladybugs, which are very useful for chasing away aphids
- **Valerian:** stimulates phosphorus uptake by neighboring plants and attracts earthworms, thus increasing garden fertility

Winter Garden Associations

If you think that growing fruits and vegetables in the vegetable garden is the exclusive preserve of the warm season, you are wrong. The synergistic vegetable garden is also winter. In the cold season, each plot of land should generally include 3 types of plants:

- A legume, for example, broad beans, which they sow from october to november
- An aromatic herb, which generally withstand the cold well and keep harmful insects away (rosemary, thyme, chives may do well)
- A variety that is particularly resistant to low temperatures, such as cabbage, savoy cabbage or thistle

Golden Rules & Tips

Consulting the above lists for defining your vegetable garden is essential to achieve natural protection for your crops. However, there are also some general rules to take into account. Let's look at them together:

- Never grow in the same area species belonging to the same family (e.g., watermelon and melon, peas and beans, potatoes and eggplant) because, needing the same nutrients, they deplete the soil with the risk of entering into water-food competition and thus attracting pests to which they are most vulnerable
- Avoid placing plants close together that use the soil in the same way, i.e., that develop roots in a similar way
- Mix (or alternate on a rotating basis) plants that act as fertilizer (legumes, alfalfa, clover...) with vegetables that need a rich substrate (e.g., tomatoes)
- Include plants that keep pests away from others or that attract useful predatory and pollinating insects to their neighbors

- Match fast-growing plants with slower-growing species so they do not compete for space and light
- Arrange nearby plants with similar watering requirements
- Isolate toxic-acting species such as wormwood and walnut plant
- Plant flowers in the vegetable garden since, some attract useful pollinating insects, while others keep pests away

BOOK 6

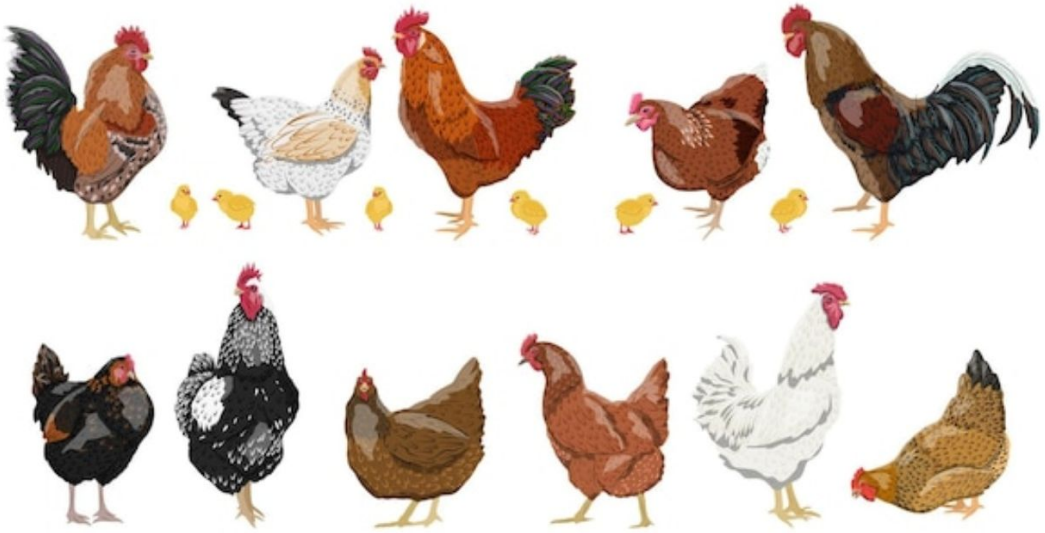
RAISE YOU LIVESTOCK

CHAPTER 10:

Backyard Animals

Backyard animals, which for ages have lived alongside humans, feeding them, keeping them company, evidence a social and productive evolution that we still do not know where it is taking us. *Or do we? Who knows?* It is true, however, that with the return to agriculture of the new generations, who have made it somewhat "4.0," there is also a slight return to farm animals. The return to tradition, to the land. The flight from the cities to the provinces. These are two trends recorded in the last decade that coincide with the return in vogue of farm animals. Dogs and cats are on the rise as guests in the home and garden, but alongside them we also find less common animals. For example, rabbits and chickens, cows and horses whenever possible. And if we have a little farm also pigs, sheep, goats. With a pond, even ducks. In this chapter we will look at what they are and what characteristics they have. And also how to "house" them.

HENS



If you have a small green space, it might be a good idea to take advantage of it to raise chickens. A small chicken farm will allow you to eat fresh eggs compared to those we buy at the supermarket, even if they undoubtedly have an expiration date. Raising hens is super easy, it just takes a little patience, especially to get the hens used to laying eggs in the same place all the time! To get started, you will need a chicken coop, which you can buy in specialty stores or build with your own hands. At the end of this section you will find a step-by-step guide to building your own chicken coop from scratch. For now, let's start with the rearing of the livestock.

Which Hens Lay The Most Eggs

We often talk about hens - *but which ones can produce the most eggs?* These are hens "designed" for the production of a good number of eggs,

they are short in stature and therefore suitable for small chicken coops and gardens.

Isabrown and Hy-line type hens can produce at least 240/250 eggs per year weighing between 2.12 and 2.3 *oz* (60 and 65 grams). It is advisable to buy these hens, choosing specimens of around 20/25 weeks.If you are interested in a more sustainable context, you can choose native breeds, that is, chicken breeds typical of your area. These include the ancient Pilgrim Fowl, recognized as one of America's historic poultry heritage breeds or the Wyandotte, among the smallest in the world. These animals, being more rustic, have a lower productivity and consequently supply less than 200 eggs per year with an average specific weight of about 2.12 *oz* (60 g.).

What is needed to raise chickens outdoors

First of all, we should point out that it is possible to raise hens in the garden but it is essential that the hens have their own shelter. The hens should have a chicken coop (covered shelter) and a grazing area (your garden). In the chicken coop you will need to arrange nests where the hens should be accustomed to laying eggs. Here is what you need to raise hens in your garden.

- 4-month-old hens.
- Chicken coop, shelter or otherwise a cage that is large enough. If you plan to buy one, I recommend choosing one that is at least 32,29 *ft²* (3 m^2) by 21,53 *ft²* (2 m^2) high.
- Water troughs.
- Plastic crates.
- Straw.

Chicken coops that generally have 3 hens inside must measure at least 59 *in* (150 *cm*) and be equipped with perches, a nest for collecting the eggs, a drinking trough and a manger.

What hens eat

The hens' diet should vary according to the time of year. The hens' diet should vary according to the time of year. We can say that hens can also eat your kitchen scraps (vegetable scraps, stale bread, rice, pasta...). Here is what hens eat:

- Cracked corn
- Wheat
- Vegetables
- Fruit
- Hard bread
- Bran

CAUTION: Before deciding on the amount of hens to purchase you will need to assess the space you have available so that the hens can roam freely. Ideally you should have at least 21,53 *ft²* (2 m²) of land for each hen. Also, at the time of purchase, the hens should be found to be already vaccinated.

How to raise hens outdoors

If your garden is too large, faces a busy street or is roughly divided from your neighbor's garden, then you will need a fence. Before placing the coop, you will need to build a fence with the ground possibly covered with grass. To do this, you will simply drive wooden stakes into the ground on which the wire mesh will rest. Having done this, you will be finally able to place the cage.

Cage arrangement

- Plastic boxes, filled with straw, should be placed in the cage: each box will serve as a bed for the hen, which will deposit its egg in it

- The watering troughs preferably equipped with a drip tray and the plastic trays to put the hens' food in should be placed
- Once this is done, you can place your hens

Useful recommendations for raising hens in the garden

- The trays should be filled periodically: make sure that the hens never run out of food. Feeding should be corn, wheat, wet bran, but also hard bread and occasionally fruits and vegetables
- During the day let the hens roam in the open air, consequently take advantage of their absence in the coop to clean it: Clean the outdoor area as well, to prevent droppings from accumulating
- During the night lock the hens inside the coop.
- When the hens are 6 months old, they will begin to lay their first eggs.

By following these directions, you will have laying hens that will lay 1 egg per day for about 19 months.

How To Build a DIY Chicken Coop

Building a chicken coop does not involve much expense, it just takes patience and good craftsmanship. The work will then be rewarded by the hens giving you fresh eggs every day! In the next few lines we will show you how to build a chicken coop simply and safely, using bricks and concrete or some wood.

The most important thing before proceeding is to evaluate the location of the chicken coop. This is a very reasoned choice to avoid bad disappointments. The chicken coop should be built in an area that is very well exposed to the sun: the heat promotes egg laying and the sun prevents disease. The size should be calculated according to the amount of chickens that will be housed there, keeping in mind that they need to be comfortable

and have plenty of space. In the ideal, each chicken or hen would need 10,76 *ft²* (one square meter) in the covered shelter and 21,53 *ft²* (2 square meters) of grazing area. Chickens actually adapt well to smaller spaces so much so that even amateur breeders devote 10,76 ft² (1 square meter) of indoor space for every 4 head to hens.

How to build a chicken coop with bricks and concrete

1. Dig the foundation - quietly, a depth of 12 *in* (30 *cm*) will suffice for your DIY chicken coop.
2. Then fill the foundation with gravel, cover with a pour of cement and wait for it to dry before proceeding to build the walls of the chicken coop.
3. With perfectly dry cement, raise the chicken coop walls on the foundation by at least 51 *in* (130 *cm*) if you only need a chicken house, by about 6,56 *ft* (2 meters) if you want to make the coop accessible to humans. For 3,28 *ft* (one-meter) chicken coops, you will need to provide an opening in the sheet metal roof that will allow you to collect eggs. In any case, you will need perforated bricks for both the walls and the base.
4. Place, on top of the chicken coop, a roofing sheet to be fastened with the appropriate nails. The slabs, made of insulated sheet metal, are fastened with special nails, since they have a plastic part that follows the wave so that water does not penetrate.
5. The wall should provide an opening that will be the door for the hens to enter (as well as for humans in the case of larger chicken coops).
6. Inside the chicken coop should be placed, at a height of at least 19,69 *in* (fifty centimeters) above the ground, baskets or boxes with hay to allow the hens to lay eggs.
7. At the same height should be placed the stations to allow the hens to sleep. Higher up goes the rooster station, which tends to always be

higher than the hens.

Chickens and hens can graze in your garden but they will need to be well protected. To protect chickens from wild animals, it is best to build a fence at least 6,56 *ft* (2 meters) high and anchored in the ground about 11,81 *in* (30 centimeters), to prevent wild animals from getting through by digging underneath. The entire perimeter of the area designated for chickens is sufficient for fencing. There's your chicken coop, all that's left to do is put the chickens in it and take care of them.

TURKEY

Those lucky enough to live in the countryside cannot miss the opportunity to raise turkeys in a natural way, among pastures and rustic shelters where these tackeys can shelter from the weather. The turkey is at least as loyal an animal as the dog, by which we do not mean that you can take turkeys on a leash but simply that they are easy to raise outdoors, do not run away and no fencing is needed. In this section we will discover all the characteristics of this extraordinary animal and understand how to take advantage of them to raise it in the best possible way. Let's start by learning more about its anatomy and behavior.

The turkey is an animal of the genus Meleagris native to North America and belonging to the family Gallinacea. Specimens are usually slender, with long legs and relatively short wings and tail. The upper part of the turkey,

that is, the head and neck, are lumpy. The beak, on the other hand, is short and arched in shape; in male specimens there is an outgrowth that can take a conical or flaccid shape depending on the state of the animal. The turkey's wings are rounded in shape while its tail is composed of 18 feathers that takes on the characteristic "wheel-like" shape at the time of courtship.

The turkey is a gregarious animal that generally spends a lot of time in large groups. Despite being equipped with wings, the turkey spends much of its existence on the ground, roaming the woods. The flock of birds is surprisingly hierarchical, in fact it is led by an older individual who regulates and disciplines every movement. In case there is a sudden obstacle on the path taken, for example, it will be the leader of the flock who will tell the others what to do and whether to take flight to cross it. A turkey's diet is not complex and it feeds on:

- Herbs
- Vegetables
- Berries
- Nuts
- Small insects

Reproduction

In February during the turkey breeding season, the males and females separate. When a female emits a signal, the males rush toward her and begin the courtship phase, challenging each other with the wheels mentioned above and with characteristic cries.

Typically, the female lays between 10 and 20 eggs, once a year. The nest built for egg-laying is quite bare and consists of few feathers; they are usually assembled around April and are located in hidden, easily defensible areas. *But so how are turkeys raised?*

Raising Turkeys

Having made a quick overview of the most important characteristics of the turkey, it is good to start the part concerning its breeding by making a small clarification about the existing breeds. If you are thinking of concentrating your breeding on a particular breed, unfortunately, you will have to change your mind: the specimens for sale are the result of a great many crosses aimed at creating specimens with excellent characteristics that, in general, are distinguished by size and weight. We will therefore have 3 different types of turkeys:

- Light
- Medium
- Heavy

Turkeys can be raised in two ways, indoors and outdoors; the first mode is used by professional breeders, while those who want to try their hand at this practice on an amateur level can also opt for free-range. Turkeys are animals that always know how to find their food by simply roosting.

Because these are animals with a pronounced propensity for grazing, turkeys will never be raised individually, but in groups. To raise between 15 and 20 animals, 5.381,96 *ft²* (500 square meters) of land will suffice; the choice on fencing depends on whether or not there are predatory animals nearby. This is not, in fact, a measure to contain the animal, but to protect it: turkeys are very territorial animals that do not leave their territory mail. If you have other animals such as chickens or chickens, do not join the various flocks: the turkey, in fact, could contract quite serious diseases such as entero-hepatitis.

The ideal ratio according to which to organize the space used for turkeys is 5 birds per square foot (meter). As is the case with laying hens, it will be necessary for the space to have so-called perches, which should occupy a

large part of the surface area and provide good shelter for the animals. Salvaged materials can also be used to build the space that will house the turkeys.

If you have a hatching farm, it will be necessary to arrange spaces where the turkeys can hatch their eggs in serenity; since they will never leave the nest with the chicks it will be necessary to let them find everything they need (food and water) nearby after the eggs hatch. The time required for the eggs to open is a maximum of 28 days, and thereafter the chicks will always have to stay with their mother. To make this happen, a brood kit should be set up in which the chicks can all stay together and the mother can move away to feed and quench her thirst without difficulty.

Space heating and cooling

To ensure that the chicks grow up healthy and strong, you need to make sure that the temperature of the room is warm enough; installing adjustable heaters is therefore a priority. In small flocks, hot hoods are generally used that will warm a particular group of chicks. For adulthood, on the other hand, it will be essential to place at least one drinking trough and shaded areas in the enclosure that are essential to combat the heat of the summer period.

Diet

In the first 3 weeks of life, it is essential to make sure that the turkeys have plenty of food at their disposal and, for this, feeders must be constantly full; thereafter, should you want to put the animals up for fattening, you will have to feed a mixture only in the middle of the day. In the remaining time, turkeys will raze and graze by finding their own food on their own, as explained in the previous lines. To grow and reach the appropriate weight, male turkeys need about 150 days, while females will be 180.

PIGS

Let's start by stating that raising pigs will not be possible in a small backyard or in an overly small garden. Those who live in the open country may consider raising pigs outdoors by taking advantage of hybrids and breeds best suited for such breeding.

Those with a smaller space may decide to build a small pigsty intended for raising pigs for self-consumption. A fenced arrangement of about 215,28 ft^2 (20 square meters) will suffice to raise a couple of pigs. A covered, masonry shelter will have to be provided in this setting to allow shelter for the pigs. An enclosed shelter will need to be about 43,06 ft^2 (4 square meters) in case of 2 pigs or 64,58 ft^2 (6 square meters) if you want to raise three pigs. I do not recommend raising a single pig: pigs can be considered pets, and a single pig may suffer from loneliness and stress. March is the perfect month to start raising pigs; you can buy pigs born in the previous fall that by early spring will have reached an ideal average weight of 66,14 (30) to 77,16 lb (35 kg).

The area designated for pigs can then be fenced off with an electrified net or a strong fence. The area designated for the animal's grazing will need to have a feeder and watering trough. To make them you can use old sinks or buy special pots. The pig constantly needs clean water so, when building the pigpen, keep in mind that water mains must reach it to avoid a stampede with buckets full of water.

How to raise pigs in the backyard

After preparing the living space for the small domestic pig farm, you can choose the breed of pig you prefer. In summary you need:

- A covered, masonry shelter with a sloping floor.
- Straw/hay for bedding.
- Feed trough and drinking trough.
- An area designated for grazing.
- A well-defined perimeter with a very strong fence or electrified net.

The pig should be fed thoughtfully: only an adult pig can be fed complex mixtures. Younger pigs do not have a developed digestive system and therefore feeding will have to be done with specific mixtures but...don't worry, they are not at all expensive! There is also room in the feed for leftover food, bacon fruit, old vegetables and especially dry bread.

To start breeding, choose a 14-18 week old pig. Avoid choosing larger pigs especially if they come from intensive breeding. A 14- to 18-week-old pig generally weighs about 66,14 to 77,16 lb (30-35 kg).

GOATS

In this section you will discover what you need to know about starting and running a goat farm, from selection to feeding, from common diseases to breeding your goats. Whether you own a farm or want to start a dairy business, you need to know that goats can be a starting point or a game changer for the business. If well managed, goat farming can become an excellent form of livelihood, as well as a very profitable business.

How to select Goats

To choose goats we must first know that there are three types: females (called doe), uncastrated males and castrated males (called Wether). In a goat farm, even one uncastrated male is enough for 20-25 female goats. One uncastrated male is sufficient for breeding goats in a herd of this size. If you are just starting out, in truth, it is not recommended to put an uncastrated male inside your herd right away: these require a lot of care, need to be separated from the rest of the herd during the day and can

become aggressive. That is why, to begin with, you can buy only female specimens and ask to borrow an uncastrated male for mating.

Wethers, on the other hand, are excellent companion animals, even for females: goats like to be in each other's company, and with Wethers there is no risk of uncontrolled pregnancies or excessive aggression. On the age of goats, especially if in the early stages of breeding, one must tread carefully: goats must reach at least two years of age in order to mate, so it is not recommended to buy specimens that are too young.

Some breeders sell goats that are already mated, to start milk production sooner. There is also the possibility of buying older goats, which can still breed, but in this case the risk of giving up quality for a cheap price is very high.

Reproduction And Gestation

Under favorable climatic conditions, goats can reproduce all year round. The breeding season usually starts from September to April. Around eight months of age, in what is called the post-pubertal phase, the young become more prone to mating. Gestation in a goat lasts 135 to 155 days. Under normal goat conditions, with proper nutrition and in favorable climates, births usually occur earlier for female goats and somewhat later if the offspring are male. Childbirth is divided into three phases: labor, dilating phase and expulsive phase. The front legs of the kid appear first and after about 30 minutes the whole body is expelled. During this last phase it is normal to notice how the animal lies down to give more strength to the thrusts. It is very important to get the kids to take their mother's milk immediately, in order not to run serious risks. Two hours after birth, the kids are able to walk independently.

Feeding

Goat feeding is a very important aspect for any farmer. First and foremost, it is important to distinguish the type of goat breeding that you intend to support: dairy goats, kids for slaughter, pregnant or replacement goats, and kids. Each type of breeding corresponds to a different type of nutrition.

Another element to be taken into account when trying to define proper goat nutrition is related to temporality: the season, the presence of fresh grass, the need to supplement the pasture with a suitable goat feed. Before analyzing all these factors, let's start with a quick review of how goats eat and the anatomy of their digestive system.

We all know that the goat is a ruminant, and due to physical characteristics developed over the centuries it has the ability to take on a very flexible diet. To explain further, it is appropriate to differentiate the goat from other ruminants such as grazers (cattle and sheep) and grazers (deer and roe deer). Unlike these other ruminant groups, the goat has developed a great ability to adapt to the territory, even reaching for food that is less palatable or more difficult to retrieve-remember that they live mainly in the mountains. Not only that, even qualitatively scarcer plant resources can still manage to meet the nutritional needs of goats. In essence, goats have adapted to the territories in which they live by being able to both grab the most hidden and complicated-to-reach weeds and to draw nutrients even when these are scarce.

For pasture goats, food selection begins with the most palatable grasses, consumed first, and then moves on to those that are somewhat less palatable, which are still consumed by the goats to supplement their diet. More than half of their meal consists of grasses, i.e., hay, wheat, and grains; mixed, uncultivated grasses follow, and only a small portion is reserved for legumes, which provide the protein in the goats' diet.

Dairy goat farms are among the most common, more so than slaughter goats, because the demand for goat milk and dairy products is very high indeed. This demand is mainly due to the better digestibility, by humans, of goat milk. It goes without saying that milk production and the amount of

food are closely related: the more a goat has to produce, the more it has to eat. It should not, of course, be fed continuously: the quality of the milk depends mainly on the type of feed the goat receives. That is why it is important to follow the goat's life process and change its diet according to its health condition.

Goat's Most Common Diseases

When a goat becomes ill, in addition to the emotional involvement, the greatest risk is that it will infect part of the herd, leading to a chain loss of herd members. For this reason, it is important to have a trusted breeder or veterinarian who is an expert in these animals close by, or to inform yourself as best you can to be prepared for any eventuality.

One of the most widespread and feared diseases is contagious agalactia, which occurs mainly during the lactation period and leads to a net decrease in milk production, directly affecting the udders as well as the joints and eyesight.

Brucellosis and tuberculosis are equally dangerous, especially because of the possibility of contagion to humans. Therefore, it is always important to purchase and import goats only from certified farms. Finally, goats are susceptible to lice and tick attack, salmonellosis, mastitis and chlamydia, the latter a frequent cause of abortions.

SHEEP

To start a sheep farm you must first consider several factors: your motivation for starting this activity and whether you have enough time and money to devote the right amount of attention to it. You must take into account that a small herd generally contains 10 female ewes and one ram. Then determine where the pasture is to be located, obviously that it is close enough to the shelter. Also make sure that the latter is solid and spacious enough and has all the necessary facilities to house your animals.

Choosing the breed

At this point your decision is made, you have considered everything you need and are ready to choose which breed of sheep to buy. There are actually many breeds of this animal species, but we will name the main ones, depending on the purpose your breeding will have. If you desire a

sheep exclusively to produce wool, the breeds that are right for you are the Merino or the Ramboullet.

Different are if you want to start a meat sheep farm, in which case you will have to rely on either the North County Cheviot or the Southdown, but also the Dorset or Hempshire, Suffolk or Texel. There are also sheep that can fulfill both roles, these breeds are: the Columbia, Corriedale, Polypay and Targee. The price of the sheep varies according to its age, if you choose a young ewe it will cost you between $300 and $350, while if you choose a lamb its price will range between $100 and $180.

What is needed to raise sheep

First thing to have in raising sheep is definitely a warm place in which they can sleep; therefore, it is necessary to make use of a straw bedding to be placed in the shelter. The straw for the bedding will go up and down depending on how much time the sheep are expected to spend in the shed; also, in the colder seasons it is better for the bedding to be made of hay, a stronger material than straw.

There should be a fan or at least an object in the shelter that promotes air exchange, so that the barn is always kept in excellent hygienic conditions. A fence running around the entire perimeter of the field will then be needed, so that the sheep cannot escape and in order to protect them from predators. It will then be important to obtain panels to separate sick and healthy sheep. Of course, proper components will be needed to feed your sheep in the best way possible, and salt blocks will be needed from which the sheep will get the minerals they need.

Grazing area and shelter

The area set aside for grazing is certainly among the most important as it will be useful for your sheep to feed during the seasons devoted to this activity. If you plan to start a herd consisting of a small flock, then you will need a reserved grazing area of about 119,6 x 109,36 yd (100 x 100 m). This area, moreover, will need to be organized into intermediate plots so that rotation takes place.

The shelter is another important space for your sheep where you can offer them hospitality and love. It will need to be designed as a barn with a shed measuring 5,47 x 5,47 yd (5 meters).

You can also use an old structure to build a shelter, equipping it appropriately and having a canopy at least 1,64 yd (1.5 meters) high from the ground. The system of feeders to be placed inside will have to ensure 16 *in* (40 *cm*) for each head, so as to leave enough space for the sheep to feed themselves with proper peace of mind.

Sheep feeding

It should be considered that the sheep is a ruminant animal, so it has a system of four stomachs suitable for digesting foods such as hay or grass. For an excellent daily diet, the sheep should be offered top-quality hay to form the basic component of the diet. A mix of high-quality grain and corn silage can be added to the hay. Also very important is water, as this animal consumes 3,96 to 5,28 *gal* (15 to 20 liters) per day, depending on the season, so it is by no means to be lacking.

Mating

Sexual maturity is reached by the female sheep between 5 and 10 months of age, while it occurs earlier for male specimens, more precisely between 3 and 6 months of age. In fact, it is advisable to wait until 8 months of age for

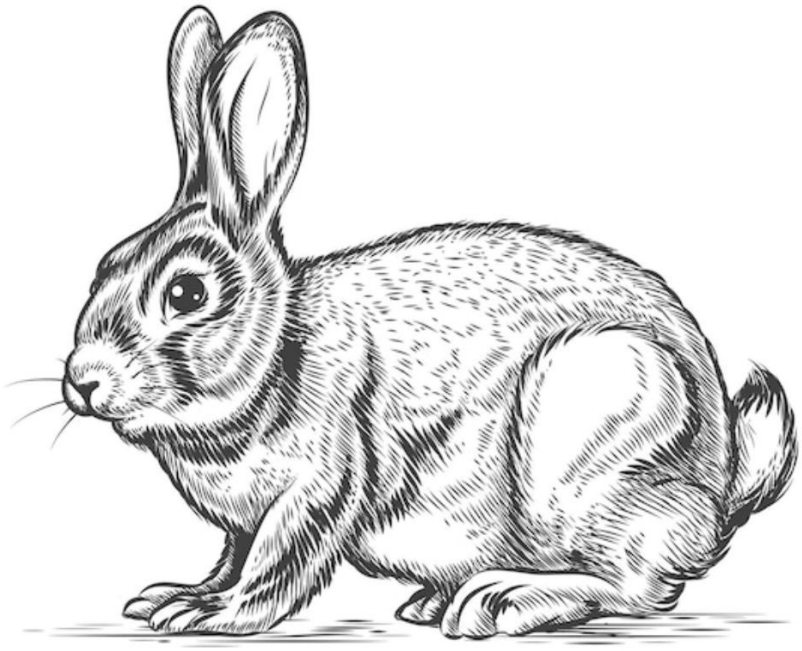
the first mating. For mating, of course, one must wait for estrous cycle of the female. Estrous cycles depend on the different seasons. In addition, the ewe's reproductive cycle is influenced by several factors: type of feeding, environmental temperature and the presence of males. Once mating has taken place, pregnancy lasts about five months; during this period it is important to improve the animal's diet.

Shearing

Sheep shearing is to be done mainly for two reasons: to sell the wool and to prevent the sheep from being overheated in summer. First, the most appropriate time to shear the sheep must be identified, as this can vary from sheep to sheep, and the option of calling in an experienced shearer must be considered as one could run the risk of injuring the sheep.

Before shearing, it is a must to divide the sheep into a pen and sort them into categories. It is then important to keep them fasting the day before to avoid emissions during the action and to keep the floor clean. Then place the sheep on their backs, making sure that their bellies are exposed. Make the sheep comfortable to prevent it from wriggling. Start shearing from the belly, then move down over the crotch, continue on the back and finish on the chest and neck area.

RABBITS



A rabbit farm can be an excellent asset to raise in your backyard. Anyone can easily start a rabbit farm for self-consumption of meat, as long as the animal's welfare is ensured until the time of slaughter. Depending on the intended use of the rabbits, there are various housing boxes on the market. Let's start with these. To raise rabbits you will need to provide:

- Set up a shelter that is more than just a cage
- Ensure proper nutrition for the rabbit according to its growth stages
- Help the rabbits with breeding and nest setup

Rabbit breeding: housing box or cage

When buying a rabbit cage you should keep in mind that the rabbit is an animal that breeds easily, so favor boxes that incorporate removable nests.

Spare no expense: choose boxes that are large enough and appropriately sized. For a small breeding unit, you can choose a cage measuring 59x39 *in* (150 x 100 *cm*), 39 *in* (100 *cm*) high with a 12 *in* (30 *cm*) floor elevation. The total footprint of such a cage can vary depending on the model, up to 98x39x51 *in* (250 x 100 x 130 *cm*), this is because rabbit boxes can have one or more nests. Choose a gabbai with wooden nests that are removable and controllable from the outside. In addition to the presence of the nest, when buying a box to start a rabbit breeding farm, it is important to consider maintenance and cleaning work. In this regard, some cages provide a removable bottom to facilitate cleaning. Alternatively, you can choose a mesh bottom with loose enough mesh to allow waste materials, to flow to the ground and then be removed with a rake. You will be comforted to know that rabbit droppings tend to be dry and low in litter.

Raising rabbits: feeding

Rabbit feeding can vary depending on the time of year. Between March and April, when the rabbit is in full reproduction, 10% barley grain may be added to the hay and pelleted feeds. From the dry feed of the winter period, in spring and summer, the rabbit can be fed green and fresh foods. So, can fresh grass be given to rabbits? Sure, but in moderation. New grass is very rich in vegetation water, so nursing females should be given it in smaller doses to avoid the onset of diarrhea and loss of fluids. The transition from winter to summer feeding is done gradually. Basically, the rabbit must get used to switching from dehydrated and pelleted foods to fresh foods such as field grass. *So how to do it?* To begin, administer dried grass. Let the grass wilt for three days and then administer it to the rabbits. Then let the grass wilt for only two days and feed it to the rabbits...finally, let the grass wilt for only one day and then feed it to the rabbits, until you also give them some fresh grass.

Raising rabbits: breeding and mating

Rabbits can be reproduced fairly easily but leave nothing to chance. In the fall, rabbit breeding includes both old daughters (who are 2 or 3 years old) and younger females breeding for the first time. Daughters one year young, are more prone to trigger false pregnancy, in that, even following mating, fertilization does not occur. In this case, the false pregnancy lasts 2-3 weeks, during which time the rabbit will have to be left alone. Only after an additional 20 days can the rabbit be reintroduced for re-mating.

After fertilization, the female takes care of preparing the nest with her fur. Within the first week after giving birth, check the nest and verify the number of new hatchlings and the presence of any dead ones. Remove dead hatchlings and, if you have mated multiple rabbits, perform brood balancing. What this means. That you must distribute the bunnies among the lactating rabbits making sure that each lactating female has eight bunnies since eight is the number of active nipples.

During lactation, it is recommended to feed the females flaked cereals in addition to the classical feed. As stated above, pregnant, mating or lactating females should consume fresh food (including fresh grass) in extreme moderation.

Rabbit nesting

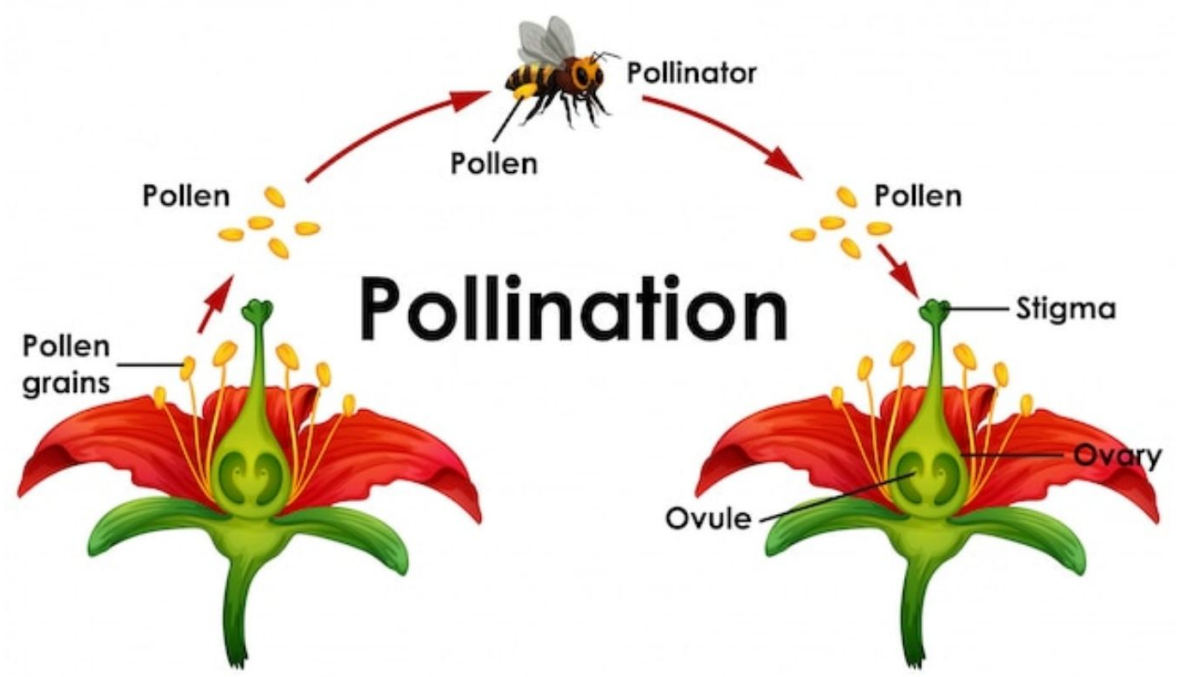
To complete a successful rabbit breeding, females must have a suitable nest available. If the female has failed to prepare a nest with her fur, this deficiency can be filled manually. Without delay, stroke the female's chest and manually remove the fur and then arrange it in the nest.

What to do if the female eats the offspring?

To prevent this from occurring you must play it by ear. Cannibalism is a phenomenon present in rabbits, especially in young females nesting for the first time. At the time of birth (and even before), clean water should never be missing. The nursing rabbit consumes about 0,26 *gal* (one liter) of water each day. In the absence of water, females eat the offspring because the newly hatched young are rich in water. Newborns can be weaned after 5 weeks. After 5 weeks, the rabbit will need to be transferred to another cage. After 3 to 4 days, she will be ready for re-mating and can be placed in the cage with the male.

CHAPTER 11:

POLLINATOR ANIMALS



To conclude this chapter on farm animals, it is worth mentioning those involved in facilitating plant pollination. In the following lines we will discuss all those insects and birds that will promote the prosperity of the garden by naturally facilitating pollen exchange. Pollination of plants by animals represents an ecosystem service of great value to humankind, both economically and for the benefit on wild and cultivated plants. More than 75 percent of major agricultural crops and about 90 percent of wild plants rely on bees, wasps, butterflies, ladybugs, spiders, reptiles, birds and mammals, and pollinators in general to transfer pollen from one flower to another and to reproduce.

By enabling so many plants to reproduce, animal pollination is the fundamental basis for the ecology of species and the functioning of ecosystems, the conservation of habitats, and the provision of a wide range

of important and vital human services and benefits, including the production of food, fiber, timber, and other tangible products. In summary, primarily entomophilous pollination is the basis of biodiversity and thus our existence. *So let's start with pollination, what exactly is it?*

Pollination is that indispensable process of plant reproduction that is the basis of the very survival of many species on Earth, including humans. Thanks to atmospheric agents and especially to the incessant work of pollinating insects, pollen is transported from one plant to another making possible the fertilization of a plant essence of the same species and the subsequent production of seeds and fruits. This great little "magic" is thanks to birds, bats, small mammals, insects, water and wind that transport pollen even for thousands of miles contributing to the perfect functioning of the reproductive mechanism of plants.

In botany, pollination is defined as that process of transporting pollen from the male and female parts of the reproductive apparatus of plants. Sex organs are contained in the cones or flowers of most plant species and serve to enable the fertilization and reproduction of Gymnosperms and Angiosperms. There are mainly 2 types of pollination:

- Self-pollination *(also called autogamous)*
- Cross-pollination *(or heterogamous)*

Self-pollination: It consists of the direct passage of pollen from the anther of a flower to the stigma of the same flower. In this case, the pollen falls on the stigma and succeeds in fertilizing it as the plant is hermaphroditic or autogamous.

Cross-pollination: Fertilization depends on the transport of pollen from one plant to another belonging to the same species. Plants that rely in nature on cross-pollination or heterogamous pollination are called allogamous and depend essentially on the action of pollinating agents and external factors

that act as actual "vectors" assigned to move pollen from flower to flower. The main pollinating agents are:

- insects
- reptiles
- birds
- bats (I. chiropterogama)
- marsupials and mammals
- mollusks
- wind
- water (I. hydrophilic)
- humans (artificial pollination)

Depending on the factor involved, the specific name of pollination also changes. In the case of insects it is called entomogamous I.; when it comes to reptiles and marsupials it is zoogamous, while pollination by birds is called ornithological. Through the evolution of living species and their extraordinary ability to adapt to the cycles of nature, plants and animals have developed an increasingly refined ability to coordinate harmoniously to ensure interbreeding and fertilization between different plants. In the next few lines we will focus on the work done by insects and other animals to better understand how they contribute to plant growth.

Entomophilic pollination

When an insect is responsible for collecting and transporting the valuable pollen load, it is called entomophilous or entomogamous pollination. This is the work done by bees, butterflies, moths, dipterans and beetles. It corresponds to a reproductive mechanism so well-trodden and honed by

nature that plants have developed specific adaptations to make the task easier for their little flying allies. This is why the flowers have acquired a welcoming calyx shape, are fragrant and colorful. Not to mention nectar, a very sweet and delicious food that plants offer insects in exchange for their "services." Without the work of pollinating insects, even agriculture would not be possible, which is why humans have learned to breed them. Their role is fundamental to the balance of terrestrial ecosystems, the diversity of botanical varieties and their distribution, but chemicals increasingly used in agricultural activities are seriously threatening their survival.

Pollination by other animals

Not only bees and butterflies, other small animals are also important natural pollinators. In a study conducted by an international team of researchers *(Global importance of vertebrate pollinators for plant reproductive success)* , the importance of vertebrate pollinators for plant reproduction was analyzed. The research looked at 126 instances of pollination by vertebrates and insects and determined that pistrels and birds are responsible for producing a large amount of the fruits and seeds we eat. The study also evaluated the role of some small mammals in the process of plant pollination, particularly lemurs, mice, opossums, squirrels and lizards, as well as 920 species of birds (hummingbirds, nectarinids, meliphagids and parrots) that serve as pollinators.

BOOK 7

STORING & PRESERVING YOUR CROP

CHAPTER 12:

The Techniques For Preserving Vegetables

We employ sweat and tears to cultivate our garden, and once we have harvested the fruits of our hard work, it is important to know how best to preserve them for consumption. Indeed, proper storage allows the nutritional qualities of foods to remain unchanged, enabling us to enjoy their beneficial effects throughout the year. If you don't know where to start, this chapter will explain everything you need to know about keeping your garden produce fresh and intact.

Techniques for preserving vegetables are necessary to safeguard the quality and organoleptic properties of the freshly harvested, normally developed,

intact and ripe produce, which is easily perishable and fast deteriorating to the point of putrefaction. The preservation of vegetables therefore exploits various procedures designed to protect against high temperatures and the presence of light that accelerate metabolic and microbial processes in the vegetable, which first wilts faster by degrading the vitamins it contains and, after a certain period of time, begins to degrade due to the development of mold and rot that making the product no longer edible and therefore to be discarded. Immediately after harvesting carried out in the garden with due care, vegetables should be handled gently and removed from sun exposure so as not to jeopardize their storability. Vegetables that are not washed, drained and immediately used should be stored as soon as possible respecting the most suitable storage conditions in order to optimize their deferred distribution with a view to future consumption.

Except for some specific cases in prolonged storage (e.g., potatoes) in the dark in crates placed in a pantry or cool cellar, storing vegetables at home requires the use of suitable physical means such as to guarantee surplus and edible stocks for a longer or shorter period.

To keep vegetables intact through post-harvest refrigeration, they should be enclosed in sealed containers or perforated plastic food bags to be kept in the refrigerator in the vegetable compartment or drawer 41-50°F (5-10°C) or to be housed in the freezer for months. Brief directions on conditions and shelf life to succeed in storing the most common vegetables:

- Fruiting vegetables (watermelon, cucumber, eggplant, melon, bell bell pepper, tomato, zucchini): Out of the refrigerator, 1-3 weeks
- Potatoes: Dark aerated place, 12 months
- Leafy vegetables (salad greens, chard, spinach): Refrigerator, 1-2 weeks
- Root vegetables (beet, carrot, turnip, radish): Refrigerator, 1 month
- Cabbage, leeks: Refrigerator, 2 months
- Cooked vegetables: Refrigerator, 1-2 days

- Homemade frozen vegetables: Freezer -0,4° F (-18 °c), 6-12 months

Perfect Preservation Conditions Out Of The Refrigerator

Tomatoes must be stored at room temperature otherwise the cold temperature will alter their flavor and texture. When the fruits have remained green at the end of the season, they can be left to ripen in the dark for 3-5 weeks in temperate rooms inside a brown paper bag, although their final quality will not match those that have ripened in the sun. Ripe watermelon will keep for 1 week at room temperature, refrigerated for 2-3 weeks.

Peppers that are still green or streaked with yellow and orange continue to ripen after harvest by changing coloring to a sweeter-tasting red if kept at room temperature, otherwise they remain as they are once refrigerated. They can be kept in the refrigerator for 2-3 weeks or frozen after being washed, cut into strips and blanched in boiling water.

Fennel will keep 3- 4 weeks laid in a single layer in wooden crates kept in cool cellars.

Handling the squash without taking it by the petiole (a weak point that induces spoilage if broken), it should be laid on a shelf in a single layer to have air around it circulating and avoid rot.

Eventually brushed, but not rinsed, bulb vegetables to be stored after harvesting should dry outdoors: garlic in the sun for a few days, onions in a sheltered, warm, ventilated place for 1-2 weeks. Hanging in bunches with the dried leaves braided or keeping only the bulbs in mesh bags, garlic and onion should be hung in the dark in a ventilated, cool and dry room.

Vegetables from climbing plants (carrots, beets, etc.) can be stored in the refrigerator without foliage or laid on a tarp in a shady, protected area for up to a couple of days, then stored dark and dry for up to 4 months.

Harvested potatoes, left to dry on the ground outdoors for a few hours and sorted, should be spread out on paper at room temperature in a sheltered, airy place for 1 to 2 weeks, then remain stored (except early potatoes to be eaten immediately) for up to a year within boxes or bags in a cool, dark, dry place to prevent mold or sprouting.

In The Refrigerator

Lettuce is most fragrant eaten freshly picked, but will keep cold in the refrigerator for 1-2 weeks, the iceberg variety even 3 weeks, likewise endive scarola, and other leafy greens (chard) and green onions for 2 weeks. Parsley can remain 1 week in the refrigerator, while herb leaves (chervil, cilantro, chives, estragon, mint, oregano, thyme, etc.) are usually frozen in cubes with water or chopped (basil), otherwise left to dry (rosemary) and stored in airtight jars.

Green beans, cucumbers, and eggplant are not suitable for long storage; they should be refrigerated for no more than 1 week. The same goes for asparagus, even better by placing the bunch standing upright to soak in a few inches of water, taking care not to get the tips wet, otherwise they will rot. Shelled peas are kept for up to a week in wastepaper (brown) bags, after which you seal the whole thing in a special plastic one.

At room temperature, melons continue to ripen for a couple more days after harvesting, then in the refrigerator they might remain 7-10 days or you proceed to freeze the pulp blended or cut into pieces. Ripe watermelon will keep for 1 week at room temperature, refrigerated for 2-3 weeks.

Bean pods keep unaltered for up to 2 weeks in the refrigerator wrapped in plastic food bags or freeze.

Flowering vegetables such as broccoli keep for a week in the refrigerator, cauliflower for 2 weeks, Brussels sprouts for 3 weeks, kohlrabi stripped of stem, leaves and roots 2-4 weeks, cabbage even a couple of months. Radishes, stripped of roots, stem and leaves, will keep in the refrigerator for up to a month.

Preserving vegetables: Long-term storage

Certain types of fresh vegetables can be properly processed in the home kitchen by following certain precise procedures to be able to safely store them for an extended period of time. Most vegetables can be subjected to freezing, usually after being blanched in boiling salted water followed by immersion in ice water and quick drying with a tea towel. Vegetable preserves include tomato sauce prepared at home using the sterilization technique: cooking at a temperature of 248° F (120° C) inactivates microbial forms and enzymes, keeping the product in a food-safe condition.

Other vegetable preserves that can be prepared at home are those in brine, pickled and pickled in oil, according to a practice of ancient origin to maintain their edibility and pleasantness determined by their organoleptic characteristics (aroma, color, texture, etc.) over the long term, preserving them from any kind of harmful alteration.

Pickled vegetables are preserves prepared from fresh vegetables (carrots, cauliflower, cucumbers, spring onions, peppers, turnips, celery, etc.) reduced to pieces placed in saline solutions to exert an inhibiting effect on microorganisms in the tissues. They are intended for direct consumption or as semi-finished products for the preparation of pickled and pickled vegetables.

The production of pickled vegetables is a procedure for preserving individual fresh vegetables (gherkins, spring onions, peppers, etc.) in chunks (or desalted brine under running water) or in the mix of the classic seven-species giardiniera (carrots, cauliflower, cucumbers, spring onions, peppers, turnips, celery) potted and sterilized in white wine vinegar (with

germicidal preservative effect due to the presence of acetic acid) possibly flavored with herbs and spices. To preserve sweet and sour vegetables, i.e., sweet pickles, sugar is added to the preserving liquid represented by vinegar.

Also ready for consumption are canned vegetables in oil (artichokes, eggplants, peppers in strips, tomatoes, giardiniera, etc.) prepared from fresh chopped or semi-processed brined vegetables desalted under running water, blanched and acidified with white wine vinegar, covered with olive oil or extra virgin olive oil (to insulate from air) and sterilized in glass containers.

Homemade jams of watermelon, carrot, melon, sweet potato, tomato, pumpkin, etc., are prepared by mixing and cooking the pulp or puree of one or more species of these fruits with sugar and water for storage in airtight glass jars.

The tomato fruits, cut in two lengthwise and sprinkled with salt, can be spread on trellises protected with a veil under the hot sun for 5-10 whole days, withdrawing them at night. In this way, the natural heat source allows the drying process, so dehydration and concentration of the component organic matter succeeds in blocking the proliferation of microorganisms. The dried tomatoes thus obtained, 3,53 ounce from 2,2 lb (100 gr. from 1 kg.) of fresh product, must be rinsed quickly to remove the salt, then placed back in the sun to dry for another day. Once dry, these dried tomatoes are ready for direct consumption or, in the long run, to be stored in airtight containers or to be prepared for preserving in oil. The same treatment applies to obtaining dried chilies or in oil, which will become spicy. Bean seeds, shelled easily from pods that are almost completely dried on the plant, will keep for up to a year locked in airtight jars stored in a cool place.

How To Can Fresh Food, Fruits & Vegetables

Would you like to make fruit and vegetable canned foods but don't know where to start? You may find some useful tips and tricks in this section. *Who hasn't had this happen before?* You've produced a bountiful harvest, and now the delicious fruits and vegetables you've grown are going bad in the refrigerator because you can't eat them all fast enough. To prevent this from happening, you can make canned goods, just like in grandma's day! This way, not only will you not have to throw away foods, but they will last several months in the pantry. Here are some pointers on how to go about it.

Why it works

The principle is very simple: in order to prepare canned foods, the least amount of bacteria and fungi must come in contact with the cooked foods. This is achieved by boiling foods and placing them in sterilized, hermetically sealed containers. In this way the foods will last much longer.

Types of canning

Preserving food in containers of various kinds has a tradition that is lost in the mists of time, so it is not surprising that many different methods of preservation have emerged over time. The various types of preservation vary according to taste, the type of food and the raw materials available. Broadly speaking, there are four different types of preservation:

- **Sweet:** a classic method with which we are all familiar, such as classic homemade jams. Preservation is done through sugar: sugar acts as a gelling agent, is heated along with the ingredients, and the mixture is then put into jars or bottles. This method is not only suitable for fruits, such as jams, fruits in syrup or fruit syrups, but also for liquors, for example.
- **Acidic:** food is preserved by means of an acidic agent, usually vinegar. This type of preservation is perfect for vegetables, such as gherkins, peppers, zucchini, and so on.

- **Salty:** In this case, salt acts as a preservative. Ingredients are placed in a salty solution, brine, which is often flavored with spices or herbs.
- **Aromatic:** a typical preservation method in the Mediterranean area, which is why olive oil or other vegetable oils are mainly used. The oil seals the ingredients and preserves their flavors; herbs and spices are also usually added to make the food more flavorful. This type of preservation is perfect for tomatoes, zucchini or peppers.

Preserving jars

Glass jars feature fairly thick and sturdy glass. This allows them to better withstand sudden changes in temperature (such as when boiling liquid is poured into them) and they are also more resistant to shocks. There are basically three different types of jars:

- Screw-top: like the classic jars found in the supermarket. The advantage of these jars is that they can be resealed after opening, which is why they are used for jams and the like.
- Hermetic: These traditional jars, in use for more than 100 years, have a rubber ring seal and metal clips to secure them. The clips can be removed after cooling as a vacuum forms inside the container.
- With mechanical closure: here the lid is attached to the glass by a metal cage. All that is needed is a rubber ring seal between the glass and the lid; the metal wire keeps the lid closed under pressure.

Always sterilize

Before food can be placed inside the jars, it is imperative to make sure that the jars are sterile. Otherwise bacteria and fungi can easily proliferate. There are several ways to sterilize jars: placing them in the oven at 356° F (180°C) for ten minutes, or boiling them for 10 minutes.

The process of canning

Canning is not a complicated process.

We have already sterilized the jars.

1. While the jars are cooling, we can prepare the ingredients. The ingredients are simply washed to remove any impurities, then cut into pieces of the desired size. Very hard vegetables (carrots, kohlrabi ...) can also be blanched briefly in salted water.
2. Filling the jars. Foods are placed in layers in the desired container and then covered with the hot brine, or oil or vinegar. Or, as in the case of jam, you can boil the ingredients and fill the jars while the mixture is still boiling.
3. After filling, you must hermetically seal the jars and then boil them in a water bath. The heat kills all microorganisms, and the expansion of air during cooling creates a vacuum inside the jar. This prevents the survival of any microorganisms. The duration of this sterilization step varies depending on the ingredients used. In any case, it is important to leave the jars to boil for at least 10 minutes.
4. Store the jars away from light in a cool, dry place.
5. That way you can enjoy the flavor of summer vegetables and fruits even in winter!

Making Perfect Canned Foods Step-By-Step

Preserves bring back memories of busy old housewives, dedicated to home and kitchen, but in fact for some time now there has been a sort of return to the past, people are looking for everything healthy and wholesome, including home preserves. In fact, more and more people are deciding to devote themselves to the preparation of preserves, to preserve the flavors of seasonal fruits and vegetables, keeping them on hand all year round: green light, then, to preserves in oil and homemade jams of all kinds.

First of all, whether zucchini, mushrooms, tomatoes, apples or whatever else, choose fruits and vegetables that are well firm and absolutely in season, so as to preserve taste and nutritional values at their peak. Whether preserving vegetables or jams, the first important step is sterilization. In fact, it is essential to use only well-sterilized glass jars.

Another important premise concerns safety. It is good, for example, to choose the most suitable preservation method so as to prevent the development of microorganisms and pathogens, which could lead from simple deterioration of nutritional properties to real health risks. Many people, in particular, fear the botulinum risk. We will see, however, that with the addition of simple natural ingredients (salt, vinegar, sugar) and the right methods, we can safely prepare our preserves. Finally, before you start prepare all the utensils to be used and get the adhesive labels to put on the jars.

How to make canned vegetables in oil

After the vegetables have been chosen, washed, cleaned and cut, they should be blanched for a few minutes (they should just begin to soften, as they will have a chance to soften further during the preservation period) in a solution of equal parts water and vinegar, so that they are partially cooked and, more importantly, acidified, ensuring safer preservation.

1. If spices or herbs are to be added, they should also be blanched in water and vinegar.
2. Once cooked they should be drained and left to cool and dry on a clean cloth.
3. Once completely dry they should be placed in jars, filling all the space but not crushing them.
4. Then you can cover them completely with oil, being careful not to leave any air bubbles.
5. Place a plastic spacer and close the jar.
6. Then proceed with the pasteurization.
7. Once cooled, you can finally store your canning jars in the pantry. During the first 10 to 15 days it is a good idea to check the jars to make sure that the vegetables have not absorbed oil, decreasing their level, and that the jars have not lost their vacuum. In the first case you should refill, in both cases you should repeat pasteurization.
8. On the other hand, if you should detect signs of alteration (e.g., air bubbles rising from the bottom towards the cap), it is an indication that the preserve has altered and it is prudent to discard it without tasting it.
9. To appreciate the taste at its best, you should wait at least 2-3 months before tasting your preserves.

How to make pickled vegetable preserves

Unlike canned vegetables in oil, pickles do not strictly require the cooking step (you certainly do not need to acidify them, since they will be preserved with vinegar). You can then decide to use them raw, or blanch them, depending on how crisp you want them to remain. Again, this starts with choosing and washing the vegetables, then eventually cooking them, followed by the drying phase.

1. Once the vegetables are potted, they should be covered with vinegar.

2. Warning: not all types of vinegar are the same!
3. If you use white wine vinegar with an acidity level of 6 percent or more, you can dilute it half with water or wine.
4. However, if you use sail vinegar or a vinegar with a lower acidity level, it cannot be diluted.
5. Once the air bubbles have been removed and the spacers inserted, you can proceed with pasteurization.

How to make tomato preserves

Whether pureed, peeled or concentrated, one of the most popular vegetable preserves is tomato-based. How to make peeled tomatoes: after selecting and washing the tomatoes, you need to lightly incise the skin, then blanch them for a couple of minutes, drain, peel and jar them. Then proceed with pasteurization.

1. **How to make tomato puree:** after selecting and washing the tomatoes, you have to chop and puree them (so that the skins and seeds are removed), then fill the bottles, close and pasteurize.
2. **Warning:** in domestic tomato puree, after pasteurization the pulp often sinks, leaving the liquid, yellowish part on top. You do not need to worry; this is perfectly normal. When you want to use your passata, once the vacuum is removed you just need to shake the bottle well (with the cap closed).
3. **How to make tomato paste:** after selecting and washing the tomatoes, you must first proceed as for the passata, chopping and pureeing the tomatoes. Then you will have to remove the excess water, first by straining the passata with a clean linen cloth, then by cooking it for a couple of hours over medium-low heat, without a lid. Finally you can proceed with pasteurization.
4. **Tip:** If the tomatoes are very sweet, you can add lemon juice or vinegar to ensure the right degree of acidity. For one liter of tomato juice, a

couple of tablespoons of lemon juice is enough, while I do not recommend vinegar as it may alter the taste of the final product.

How to make fruit preserves

The main fruit preserves are jams and marmalades, but there is also the possibility of making fruit in syrup or in spirit and fruit juices.

First, let's clarify the difference between jam and marmalade. Although many people use them as synonyms, the difference lies in the fact that, just as in the English language, the former indicates fruit preserves in general, the latter refers only to a citrus-based preserve.

Fruit preserves, on the other hand, are preserves in which the sugar content is less than that of classic jam. In this case, shelf life must be ensured by acidification, adding lemon juice to the preserve.

In any case, to make a jam (or marmalade), after choosing, washing and cutting the fruit (usually the core and seeds are removed, the peel is sometimes left), you have to put it in the pot adding the sugar and any other ingredients provided (e.g., spices, flavorings or pectin). It is then brought to a boil, stirring continuously. Should foam form on the surface, you must remove it with a skimmer.

When the mixture begins to thicken, it will be good to lower the flame so that the sugar does not caramelize, darkening the product.

Once the cooking is finished, you can jar the preserve, then close the jars, turn them upside down and let them cool in this position.

Note: Pectin is a natural substance found mainly in the skin and seeds of fruit that tends to turn into gelatin when cooked, thickening the preserve. Not all fruits contain it in equal amounts: apples and oranges are particularly rich in it and can be added in small amounts to make preserves from, for example, kiwifruit, melons or other low-pectin fruits. Alternatively, commercially available pectin can be used.

Important: If low-acid fruits are used, I recommend adding lemon juice in order to acidify them.

As for sugar content, one should not go below 700 g of sugar per kg of fruit.

Fruit jelly is made from fruit juice and sugar, usually with a proportion of 1:1.

To make the juice, cut the fruit without peeling it, put it in a pot, cover it with water and cook until pureed. Strain first through a fine-mesh sieve and then through a gauze until the juice is clear. Add lemon juice to acidify, then add sugar and cook, skimming if necessary, until the right consistency is obtained. Jar, close the lids, and invert, as for jams.

Fruit in syrup is 30 percent sugar (for every kilogram of fruit in syrup, 700 g will consist of fruit, 300 g will be sugar).

Fruit juices often need to be acidified with lemon.

Both of these preparations should be pasteurized.

Fruit in spirits should be prepared with 90-degree alcohol or high alcohol dry liquors, such as grappa and brandy. It does not require pasteurization.

Canning Safety Tips & Tricks

From grandma's historic jam to sauces made from the produce of a passionately tended garden, there are many people who try their hand at home canning during the warm season. Unfortunately, however, it can turn out to be a rather dangerous practice if one does not know the correct procedures to ward off the development of bacteria, mold and especially botulinum. For this reason, I thought I would compile for you a vademecum for the safe preparation of canned food at home.

As we have seen, preserves are food preparations packaged in airtight containers that have undergone heat treatment such that they can be stabilized and stored for long periods at room temperature. The group includes both canned foods sold on supermarket shelves such as tuna, giardiniera, peeled tomatoes or anchovies in oil, pesto, and ready-made sauces, and those prepared at home such as tomato puree, pickles, and jams. Some, as in the case of tuna, pesto or canned meat, must be sterilized and processing can only be done industrially. Others, however, such as jams, pickles, pickled foods, and pickles, can also be made at home because pasteurization (a milder heat treatment than sterilization) is accompanied by treatments with vinegar, sugar, or salt that negate the risk of botulism. All jars, jars or canned goods should be stored at room temperature for periods ranging from 1 to 4-5 years in dry, well-ventilated places. After opening, however, it is necessary to keep the jars in the refrigerator at all times.

Washing hands with soap combined with proper scrubbing removes most of the microorganisms from the skin and should be done before starting food handling, when changing preparations, after eating, smoking, coughing or sneezing, after being in the bathroom, and after touching or handling any potential source of contamination (eggs, raw food, pets, garbage, etc.). Dishes should be washed with detergent and rinsed. Tea towels and sponges pose the greatest danger of spreading microorganisms and therefore need frequent disinfection and replacement.

Glass is the best material: it does not absorb odors, can be used several times, and is easily washed. It should be kept away from light, however. The transparency of glass allows immediate inspection, and checking for anomalies without opening the jar. Prefer jars with a maximum capacity of half a liter and a wide neck, which facilitate filling operations. Choose jars with screw-on metal capsules, although glass jars with rubber seals and metal hook for "hinged" closure are fine. Capsules and gaskets, unlike jars, should be replaced each time to ensure an airtight seal. In any case, metal capsules and lids that show deformation, dents, signs of rust or corrosion should not be used. Containers and lids must be perfectly clean and dry. Pans for cooking food should be made of stainless steel. Those made of aluminum or copper should not be used, especially if acidic preserves are made; in fact, acidity could cause metal releases in the product. Pots used for bain-marie heat treatment of canning jars should be large and of a capacity commensurate with the number and size of containers. It is important to consider that the water level should be at least 2 inches above the top of the jars.

Ingredients: to obtain canned fruits and vegetables that keep the flavors, aromas, and fragrances of the raw materials intact, it is ideal to choose local (perhaps zero-mile) and seasonal products, because they are richer in minerals, vitamins, and nutrients, even better if they are organic. Vegetables should be properly ripened and similarly sized, removing any parts that have bruises, blemishes, and rot. If using produce from the home garden, it is advisable to prepare preserves within 6-12 hours of harvesting. Otherwise, the raw materials should be kept in the refrigerator. Vinegar should be wine vinegar, preferably white, because it imparts a more natural color to vegetables, while red vinegar contains substances, called anthocyanins, that oxidize easily. Essential when choosing vinegar is the acidity (indicated on the label), which should be 6 percent or more. When using oil it is best to go for extra virgin olive oil. For sugar, it is advisable to use white or semolina cane sugar because it does not alter the flavor and

aroma of the fruit, or sugar for jams that also contains pectin, sold in stores. For salted preserves, sea salt is best.

Washing: wash the raw materials under running water and leave a few minutes in water and baking soda to reduce traces of pesticides from the outer surface. After drying them thoroughly, remove any damaged parts, cores, pits and, as appropriate, the peel.

Blanching: This practice involves heating vegetables in boiling water or steam for a short time. The operation is essential for all vegetables intended to be frozen to block the action of enzymes that can cause loss of flavor, color and texture as well as delay the loss of vitamins. Treatment time is crucial; it should be calculated from the time the water boils and varies with the type of vegetable and according to size. The right ratio is 5 liters of water per 500 grams of vegetables, which should be put into the water when boiling begins, taking care to cover the pot with a lid. Treatment by steaming is recommended only for some produce such as broccoli, squash, and sweet potatoes and requires more time. On the other hand, using the microwave is not recommended. When blanching is complete, vegetables should be cooled quickly by immersing them in cold water, or in water and ice *(use an amount of ice equal to that of the produce)* and immediately drained to avoid loss of mineral salts.

Filling : containers should never be filled to the brim, but an empty space should be left. In the case of jams and marmalades, the operation is done hot, leaving a headspace of one centimeter. Afterwards, the jar is closed without further treatment. For preserves that require heat treatment (pasteurization) after sealing, such as tomato puree and pickles, the headspace should be 2 inches. The foods, once in the jars, should be completely submerged in the liquid (oil, vinegar, syrup), for one centimeter. Commercially available plastic spacers are used to aid this operation. Another expedient is to remove any air bubbles formed during the addition of the liquid, using a plastic spatula. Once the filling operations are finished, the neck of the container should be thoroughly cleaned with paper towels or a lint-free cloth before closing.

Pasteurization: the treatment should be carried out by completely submerging the jars in the pots filled with water and at least 10 cm taller than the containers. Cover the pot with the lid and boil continuously, evenly, vigorously and without interruption. When the water level drops just top up with boiling water being careful not to pour it directly on the jars. The time required for proper pasteurization depends on the type of preserve, the type of container and its size. This time should be measured from the moment the water reaches a boil. After 5-10 minutes from the completion of pasteurization, the containers can be left to cool in water, or removed from the pot and wrapped in a woolen blanket. After 12 to 24 hours, the jars should be inspected to assess the tightness of the closure and whether a vacuum has been reached. Metal caps should appear slightly curved inward, and pressing them with your finger should not hear *"click clack."* For containers equipped with hinged caps and rubber gasket, the airtightness and vacuum check is done by removing the safety catch and trying to open the lid by applying light pressure. If the lid does not resist, it means that the preserve is not vacuum-sealed. Jars in which a vacuum has not been created can be pasteurized again, taking care, however, to replace the cap or gasket. Alternatively, they should be kept in the refrigerator and consumed within a week. Suitable jars are kept in a pantry or in a sufficiently cool, dry, ventilated and dark room. If you notice air bubbles rising to the top or any spillage the preserves should not be consumed or tasted at all.

Before opening: check for liquid spillage, loss of vacuum, or the presence of air bubbles rising to the top. In all these cases the preserve should not be tasted or consumed. If everything looks normal on appearance, but upon opening the product shows unnatural color or odor, it means it is altered and should be thrown away. In the cases described above, there could be botulinum toxins, so it is necessary to detoxify the jar by immersing it completely in a pot containing water and boiling it for about thirty minutes. When it has cooled, discard both the contents and the jar.

After opening: once opened, preserves should be stored in the refrigerator and consumed as soon as possible: depending on the product, times range

from 4-5 days (sauces, flavored oils and fruit juices), one week for jams, preserves and tomato puree, up to two months for acidic or acidified preserves and pickled vegetables.

Under oil: After vegetables have been selected, washed and possibly cut, they should be blanched for a few minutes in a solution of equal parts water and vinegar. In this way, in addition to cooking, they will be acidified and preserved safely. The same applies if spices and herbs are used for flavoring. Following this cooking process, which should leave them "al dente," the vegetables should be drained, allowed to cool and dry on a clean, dry cloth, then placed in the container, taking care to fill all the spaces, but without squeezing too much. At this point, cover completely with the oil and remove any trapped air by helping with a spatula. Then proceed with pasteurization after which let the preserves rest for at least half a day before placing them in the pantry. They may in fact absorb oil and thus may need to be topped up; in this case they need to be pasteurized again. Over the next 10 to 15 days, the jar should show no signs of alteration such as air bubbles or opalescence of the oil. To better appreciate their taste, preserves, should be consumed at least 2-3 months after preparation. If the preparation methods have been carried out correctly, the storage time can be very long, even a year and a half.

Pickled : vegetables can be either blanched in water or left raw. Again, cooking should not be overdone to maintain a good texture. Once the jar is filled, vinegar is added, spacer, and pasteurized afterwards. It is preferable to use a 50/50 mixture of white wine vinegar (with acidity level of 6 percent or more) and water or, alternatively wine. Those who prefer apple cider vinegar should not dilute it with water because it has a lower acidity level.

Semi-preserves: let's talk about semi-preserves, food preparations that should be kept in the refrigerator. We are talking about soups, minestrone or vegetable purees, ready-made sauces such as pesto or amatriciana that can be found in the refrigerated counters of all supermarkets. These semi-preserves undergo a heat treatment of pasteurization in boiling water, but this is unable to destroy some heat-resistant pathogenic microbial forms

such as the dangerous botulinum spores. They generally have an expiration date of 60 days, but it is best to consume them within a month. Our advice is to carefully read the directions on the label regarding how to use them, and as for minestrone and vegetable purees, boil for at least 4 minutes. The group of semi-preserves also includes some products that can be made at home, such as pesto, sauces, etc. In this case immediately after preparation, sauces and gravies should be portioned and frozen in the freezer and consumed within 4 to 8 months.

Preserved vegetables au naturel, preserved meat, preserved fish: these preparations are unsafe when made at home because they are low in acid or non-acidic, and therefore botulinum risk. At home, meat and fish can be preserved for longer or shorter times only by freezing. Cold, in fact, stops microbial activity by preventing the growth of microorganisms and greatly slows down enzyme activity. Some types of microorganisms, if frozen for long periods may be damaged or even die. Storage times for frozen foods vary depending on the product and the type of freezer. Recommended storage times for different categories of food are given in the freezer instruction booklet.

How to Build The Perfect Pantry

I have a real passion for my pantry: in our house we are lucky enough to have a small closet with wooden shelving on two sides, and it is my treasure. There is probably some genetic mutation inside me like those who stockpile for armageddon: I do. I like my pantry to be well stocked, and I always make sure I don't run out of my favorite products. This is also because I don't always have time to do my daily 'fresh' grocery shopping, so I often find myself cooking with stored foods, so they are a real certainty for me. However, if you can, always choose organic products: even canned, they are better than many non-organic ones.

If you are fortunate enough to have a closet or storage room, you can buy more packages on offer-always without overdoing it they expire! - and then have a nicely stocked pantry, including spices, preserves, condiments, legumes and flours. At this point you can also carve out an area of the pantry for laundry detergents, cleaning supplies, toilet paper and tissues. If, on the other hand, you are short on space, buy wisely so that you are not stocked up, but neither are you left without all the basic ingredients for your kitchen. So buy with what you really use in mind when you don't have fresh ingredients on hand, and don't hoard anything else: you can take the rest from day to day. To organize the pantry well, I recommend solid shelves, easily cleaned with a rag, anchored to the walls: especially if you have children in the house, NEVER leave furniture and shelves resting on the walls without securing them with a dowel. All it takes is for a child to cling to them for very serious consequences to happen.

1. Also get used to labeling everything

As soon as you buy a new product, immediately put it in the pantry by sticking a somewhat visible label with the expiration date on it. It is true that expiration dates are already on the jars, but if we rewrite it on the label it is much more visible and we don't have to turn the jar over in our hands a thousand times to find it.

2. In front, expiring jars

Store in the front, on the shelves, the products that expire first. At the back, place those that expire later. This way you will hardly have expired foods that you have to throw away, because you will consume them at the right times.

3. An up-to-date inventory

Although it takes some time, take some kind of inventory of what your pantry contains, so that you always know what you already have and what you are missing. It will be very useful for when you go grocery shopping and run the risk of coming home with a few duplicates, but without the ingredient you really needed.

How to store food in your pantry: glass is the best container: it is durable, does not catch odors, does not suffer from cold or heat, and is healthier because it does not release harmful substances into food. So if you still have to think about buying containers for your home, choose them made of glass. They cost slightly more, but they last a lifetime. And even if you wash them often in the dishwasher, they will spoil less than plastic containers.

How to store herbs and spices: whether you buy bagged spices or bulk spices, which are more convenient, you can remove them from their plastic bag and put them directly into glass jars. Just remember two reminders: write the expiration date and contents on the cap, or on a sticker label.

How to store dry or bulk products: the same is true with other bulk products, such as dried legumes, pasta, dried fruits: do you want to put the convenience of buying bulk products, with a much lower cost per pound than supermarket products? Besides the fact that, often, bulk products are also organic.

Keep fresh produce in jars as well: for example, if you divide your cereal and oatmeal into disposable jars, you can also make breakfast to take to work. Just prepare 5 jars, one for each workday, with some muesli, organic oatmeal, hazelnuts or walnuts or almonds inside, and then vary each day with prunes, dehydrated blueberries, dates, coconut flakes, dark chocolate chunks, dehydrated mango and papaya. Close the jars and leave them in the pantry-no need to refrigerate them. Take one each morning, fill it with milk or yogurt, and breakfast is ready right away, to be eaten at home or at the office.

How to store pasta and rice: pasta and rice can also be stored in glass. In fact, it's much better to keep them closed in airtight glass jars than to leave them in packs that aren't sealed properly. In this way we avoid the formation of moths, the obnoxious little butterflies that no one would want in the house, but also the proliferation of insects, cockroaches, gnats, molds, and who knows how many other filthy things! I'll let you in on my grandmother's secret to never again having butterflies around the house or

bugs in the pantry: put 2-3 bay leaves in the jars. Of course, the leaves must have been washed well and dried thoroughly. They do not change the flavor of the food in the jars, but they keep the bugs away. On the jars write not only the expiration date, but also the minutes the pasta was cooked: that way you don't risk shaking it, or eating it all while tasting it to figure out the degree of cooking.

Herbs and spices: herbs and spices also keep much better in glass jars-I buy them in large bags, pour them into jars and seal them tightly. Leaving them in the bags steals a lot of space and causes some of their aroma to dissipate. Among my favorite spices, the ones that are never in short supply in the house: curry powder, turmeric, cumin!, fresh oregano, garam masala mixture, crushed chili peppers, black pepper to be freshly ground. And I must say that I really use them often to make recipes more original and less obvious. Even spices have an expiration date: put it back on the jars! If you can, create a nice little shelf to store all the jars, near the kitchen, so it is more convenient to cook.

Dried legumes: I know it is a pain to cook dried legumes because they take hours and hours, but it is very convenient. Buying dried legumes, especially those in bulk or large packages, really saves us money. To speed up the cooking of dried legumes, you can add a tip of a teaspoon of baking soda to the soaking water: soak them overnight in fresh water with a little baking soda, then rinse them well and cook them normally. of boiling, or use the pressure cooker. Do not add more baking soda than this, otherwise it will alter the flavor of the dish and then you will not like the end result.

Flours: if you use a lot of it, especially for baking with homemade sourdough, buy flour in 5-pound bags and then divide it into glass jars. Be sure not to leave it in the pantry of paper bags, because that is like opening the door wide to insects. Inside the glass, which must have a seal or be airtight, insert the usual three well-cleaned bay leaves.

Homemade preserves: these can be of two types: those for immediate consumption, and sterilized and vacuum-packed ones that we can also store

in the pantry for six months. If you have plenty of fresh fruits or vegetables and do not want to waste them, cook them immediately and put them in glass jars for immediate consumption.You can keep them in the refrigerator two days, with a drizzle of oil on top, or freeze them directly in the freezer.

If, on the other hand, you want to make homemade tomato sauce, homemade jams and vegetable preserves, then always vacuum-pack and sterilize not only the jars, but also the closed jar after filling: place a clean tea towel at the bottom of a large pot. Lay the newly filled jars on top, fill the pot with cold water and bring to a boil.

From the time the water boils, let it boil vigorously for at least 20-25 minutes. Then turn it off, let the jars cool in their water, and finally dry them and put them in the pantry covered with a towel. After a few days check to see if the vacuum has held and place them well back on the shelves, without covering them any more.

What is needed in a well-stocked pantry? Each of us has our own list of ingredients that we love, that we cook often, that we prefer. I have mine, too. However, in a family pantry, I recommend that we always have a small supply of staples-which we can supplement with more special ones that allow us to cook even without grocery shopping. Basic pantry, the list of what to store:

- 1-2 packages of legumes, your choice of chickpeas, beans or lentils;
- 1 bottle of tomato sauce;
- 2 cans of good quality organic peeled tomatoes;
- 1 package of medium quality canned tuna, for recipes that involve cooking;
- 1 jar of pitted taggiasca olives;
- 1 jar of pickles, your choice of grilled zucchini, pepperoni, artichokes, eggplant;
- 2 bottles of extra virgin olive oil;

- 2 packages of short pasta and 2 packages of long pasta;
- 1 package of carnaroli or arborio rice;
- 1 package of basmati rice;
- 1 package of whole wheat couscous;
- 2 packages of cooking cream;
- 1 lb. coarse salt;
- 1 lb of fine salt;
- 1 lb. sugar;
- 2 gallons of long-life milk.

This is my basic list, the one I try to keep in my pantry. To clean, use nonaggressive, possibly environmentally friendly, products so that if they accidentally come in contact with food they are not harmful. Choose a pantry or wall unit that is located in an area away from direct light and heat. Never consume foods that have not maintained the vacuum in the jars, or that have mold or strange bubbles on the surface, as if they were frying: mold and bacteria of this kind can be very dangerous, especially for children.

Advice On Taking In And Storing Garden Produce

Harvesting, bringing to the table or storing garden produce is a pleasure that gives you the security of having wholesome and sustainable food products that arrive in your kitchen at zero miles. Here are some useful tips.

- If the garden and orchard are well cared for, there will come a time when you are likely to be overwhelmed with vegetables, herbs and fruits. Harvesting should be done at the right point of ripeness:

overgrown vegetables risk having fibrous flesh or showing beginnings of rot.

- A case in point is zucchini: just forget about them for two or three days and they become oversized, gigantic and less flavorful than small, tender ones. You can still consume them by cutting them into slices for frying or grilling and topping them like a pizzetta, with cheese and tomato sauce, or serve them stuffed with a meatball-like mixture, after hollowing out and removing the overly seeded core.
- If the harvest is plentiful, in addition to giving the fresh surplus as a gift to relatives, friends and neighbors, it is essential to preserve and process the surplus in order to benefit from the flavors of summer during winter when it will be a pleasure to remember, even with the palate, the result of the work done in the garden. Whichever preservation system you choose, you must be scrupulous in cleaning the vegetables, in the hygiene of the jars used and in the cooking methods, to prevent the product from deteriorating, posing health risks.
- Keep vegetables fresh: vegetables intended for fresh consumption can be stored for 3-10 days depending on the type, in the refrigerator during the summer or in a cool, preferably dark room in other seasons.
- Fruit vegetables (including tomatoes) and root vegetables, once well dried, can be spread out in wooden or plastic crates in a cool place. Well-ripened tomatoes are perfect for fresh consumption and for making sauces. Leafy vegetables are sprayed with a little water and wrapped in a damp cloth, not in plastic bags that accelerate spoilage (maximum shelf life 3-4 days). Celery, leek, thistle, cabbage, carrots, turnips, and radishes can be kept for up to a month by placing the base of the vegetable in moistened sand in a dark, cool cellar. Squash should be dried in an aerated place (not in the sun), then stored in the cellar, turning them often to check condition.
- Harvest well done = better storage

- Harvesting tools include, for vegetables, a pair of shears, a pair of long, narrow-bladed scissors, a knife, and wicker baskets. Tools should always be in perfect condition, sharp and clean.
- The best time in summer is in the early morning hours, when the dew has dried but fruits and vegetables are not yet warm from the sun. Never harvest fruits and vegetables wet from rain or irrigation. Root vegetables are pulled out by pulling at the base of the plant's leaves; leaf vegetables are cut at the base with a knife; in fruit vegetables, cut off the fruit stalk with scissors or a knife. Green beans can also be cut off with the fingers. Vegetables should be cleaned up in the vegetable garden, bringing them into the house already stripped of most of the soil and foliage if inedible.

CHAPTER 13:

How To Sell Your Goods

Have you heard about direct sale of agricultural products but don't know how to do it? Do you love this activity but don't know where to start? Don't worry, after reading this chapter you will know what all the requirements are to be able to sell your agricultural products successfully. Deciding to start a direct product sales business is certainly an excellent livelihood opportunity for the passionate vegetable farmer.

It is now common knowledge that the end consumer prefers to buy directly from the source of production, in this case private individuals, as a guarantee of product quality and authenticity. As a first thing we can say that the direct sale of agricultural products by the grower does not require special licenses, but certainly must follow certain rules. Let's see together what they are and go into a little more detail.

WHAT DOES THE MARKET APPRECIATE?

It may seem trivial that a section about how to conduct direct sales of agricultural products starts with this very question, but it is not at all! When we want to sell something, we must first respond to market demands. If, for example, we wanted to grow vegetables, we need to find out which ones are the best sellers, at least in our area. Or which ones are those whose sales are slowly increasing. In business jargon we say, "they have a positive trend (tendency)." Responding to market demands is the basis for getting off to a great start! I can produce even the best product in the world, but if I don't sell it how do I make money? If no one wants it, how do I make a living myself? Those who have studied economics received these notions in the first lecture of the course, entitled *"Supply and Demand."* As demand increases, in fact, supply increases. That is the way the market goes. And the farmer who wishes to sell his products is nothing more than a small business producing goods to derive, of course, an economic return.

THE RIGHT SALES CHANNELS

At this point, another question may arise before we get into the nitty-gritty of direct selling of agricultural products: *even if I know what to grow, to whom do I sell my products?* Thus another topic arises. Before starting the business, it is good to already have clear in our heads (and maybe even in writing) to whom we sell our products. There are many companies, small or

large, to whom to sell fruit and vegetable or animal-derived products (milk, eggs, cheese, etc.). *But which are the best ones?*

Many might answer, *"the ones that pay the best!"* Good point, but that is not enough. The best companies are also the ones that assure you of buying your products for a longer period of time. Imagine for a moment that your eggs or tomatoes are bought from the company "Agros" for only one month a year. *The remaining 11 months what do you do? Who do you sell them to?* Thus arises the need to create for ourselves a "plan B" (or even C and D) and to do special market research to understand who would be interested in buying our products. I also often suggest that we take action ourselves first. I mean, for example, selling the products on the farm (so as not to incur transportation costs), selling the products over the counter at some local market, etc. So the more sales channels you have, the more chances you have to sell your products. As long as these channels are strong and concrete. This is where the central topic of this chapter comes from: *the direct sale of agricultural products.*

WHY SHOULD I BUY YOUR PRODUCT?

Now that we have decided what to produce and who to sell our products to, let's move on to the third and final question, which is the same question that might arise spontaneously in our customers' heads: "Why is your product better than another? And why should I buy it from you specifically?"

This is, perhaps, the most challenging question to answer. Certainly, one product is better than another when its quality is higher. But what is the quality of an agricultural product? Quality is the set of characteristics of a product that fully satisfy consumer tastes and cravings. Making fine products that are organic or registered with quality marks is definitely an added value for our product and for us who are its creators. This translates into more money. More quality = more money. It's as simple as that. It is certain, however, that marketing helps a lot in this respect.

Sometimes we buy items or food products of lower quality than others precisely because we have been "well influenced" by good marketing. Or by the very attractive price. But surely we would never buy a poor product at a high price: we would be fools.

OBLIGATIONS

The only obligations you necessarily have to comply with, if you decide to start a direct sale of agricultural products activity, concern compliance and compliance with sanitary and hygiene regulations. The direct sale of agricultural products is among the normal activities of agricultural enterprises and can be carried out by entrepreneurs registered in the business register, who carry out their activities individually or in an associated form (cooperatives, Ltd., entities, etc.). Conversely, on the other hand, anyone with convictions concerning hygiene, health and food fraud cannot carry out direct sales activities (the absence of such offenses must be certified at the time of starting the activity). In addition, the direct sale of agricultural products does not exclude third-party products, as long as they do not exceed 49 percent of the total sold.

BOOK 8

OFF-GRID POWER

CHAPTER 14 :

How Off Grid Photovoltaics Works

We often hear about "off grid photovoltaics." Many people talk about it, but few know what it actually is and what its actual advantages are over "on grid" PV. To be clear: off grid PV is PV that does not feed any kilowatts into the grid. It is a system that is not connected to the local public grid, and because of this it always remains relatively autonomous from the electricity authority's constant regulatory and tax hassles. "On-grid" photovoltaics, on the other hand, is the "classic" grid-connected system. It is typically connected to the grid with a "spot exchange" contract signed with one' own Energy Services Provider. With this mechanism, the surplus energy produced is fed into the grid and is "paid" by the provider as a partial refund of the bills paid.

Off-grid PV, on the other hand, is a "stand-alone" system, not connected to the public grid, that produces energy only for the consumers to which it is

directly connected. Beware, however: the plant is not connected, but the house is. The house, when the plant is not supplying energy, continues to draw the electricity it needs from the public grid. The homeowner, therefore, for this energy drawn from the grid, pays normal utility bills as he has always done. For off-grid PV, the main "problem" that arises is how to use all the energy produced for one's home, without feeding it into the grid. If the PV system can achieve 100% self-consumption, then the system is much cheaper than the traditional "on grid" system under "on-site exchange." To achieve 100% self-consumption, the off-grid PV system often "needs" storage batteries that "collect" the surplus energy produced during the day and make it available at various times of the day.

A system to call itself such must be able to deliver electricity at any time it is required by the 'user or the various utilities in the house. Recall that photovoltaic panels are only able to produce electricity during the day, and production is greater the more insolation there is.

So the system must be able to "store" electricity during the day, when the modules produce energy, and deliver it all the time. So during the day we have "real-time production" and storage in the batteries. At night we use only that produced during the day that is "stored" in solar storage systems. It is therefore necessary to have a very good system design so that we never run out of electricity, but at the same time be at maximum efficiency to try to consume electricity when it is being produced, that is, during the day.

So we should use the appliances that consume the most during the day, i.e., washing machines, electric boilers, air conditioners, dishwashers, hair dryers. At night, on the other hand, we should be more righteous and consume less.

CALCULATING THE SIZE OF A SOLAR SYSTEM

The second option is to undertake a comprehensive load assessment to determine how much power is needed.

1. Calculate the total quantity of power necessary.

Begin by generating a list of all the equipment you want to use. You may compute the energy consumption of each gadget separately as well as the total energy consumption over the course of a day using this approach. Knowing how many kWh you will consume in a day can help you size your solar panel array and solar battery storage.

2. Determine the required instantaneous load.

Aside from that, you'll need to determine how many devices you'll be able to operate concurrently. This will help you understand how to calculate your immediate energy needs to properly size your inverter.

3. Determine the quantity of battery storage space needed.

The quantity of storage required will be determined next. Do you want to be able to cover your consumption for a single day, or do you want extra backup capacity? In general, when it comes to solar battery backup, it is recommended that you have adequate storage space for at least 2 or 3 days during your solar system's busiest period of year.

4. Design a system depending on the number you selected in stages 1-3.

In general, solar equipment manufacturers have enough information to create a complete off-grid kit merely by knowing the sizes of these three important components: inverter, solar panels, and battery.

COMPONENTS OF AN OFF GRID SOLAR SYSTEM

To create a solar system that is totally independent from the power grid, we will require the following components:

Photovoltaic panels

The PV system's production capacity is determined by the module, its size, efficiency, power, and exposure to the sun. As a result, we must determine the available insolation in the area as well as the acceptable roof space for module placement.

Batteries for photovoltaic storage

A solar battery is required to store and make available the energy generated throughout the day. As the solar panels create surplus power, the solar storage device charges throughout the day. Rather of wasting all available solar energy, a battery allows it to be stored for later use. Depending on the energy requirements, a single battery or even a battery bank may be employed. The charge controller is the gadget that can "manage" the battery's charge by preventing spikes and total discharges that would destroy it. The solar panel batteries utilized are lithium-ion, similar to those seen in electrical devices. Lead-acid batteries, similar to those used in vehicles, are employed in some circumstances.

Inverters for solar power

The solar power system requires a solar inverter, also known as a solar converter or photovoltaic inverter, to convert the direct current received by the solar panel array to alternating current for the operation of most typical household appliances and gadgets. Use a stand-alone inverter for an off-grid installation.

Sources of alternative energy

It may be worthwhile to investigate a backup power supply for the system. This is necessary during the winter months when sun generation is at its lowest. Many households who use off-grid devices pair them with a generator to meet their electricity demands. They may run on petrol or biofuel.

OFF-GRID PHOTOVOLTAIC BENEFITS

Off-grid solar energy offers several advantages. Over 300,000 houses will rely on off-grid energy sources to satisfy their energy demands. Some of the reasons why individuals want to live off-grid are as follows.

Freedom from the electricity grid: This is why off-grid solar power systems are appealing to those who live in areas prone to blackouts. When you are linked to the grid, you must rely on a third party for all of your energy demands and needs: the utility company. When the power grid fails, the power supply fails as well. Those who have experienced blackouts may confirm that it is only when faced with blackouts and power outages that you understand how dependent you have grown.

Environmentally friendly: Living off-grid has the extra benefit of lowering carbon emissions. Because the great majority of power transmitted through the grid is generated by the combustion of fossil fuels, producing electricity from renewable resources (wind, solar, and hydro) may significantly lower your carbon footprint.

Encourage individuals to have a more ecologically conscious lifestyle: When you're linked to the grid, it's difficult to keep track of your energy usage habits: you consume power, you pay a bill every time it comes in, and that's the end of energy use. It disconnects you from the source of electricity

as well as the location where it is consumed. Living off the grid affects your outlook on power and makes you more resourceful. Maintain tight control over energy production while reevaluating and justifying your energy consumption to prevent running out of power.

When trying to run a facility in a distant place, such as a cabin tucked in the woods, there is a strong risk that you will not be able to connect to a power grid. When you call the utility provider to inquire about a connection, you will very certainly be informed that you are outside of their service region. Alternatively, they can build wires to link you to the grid, but only at a high expense. As a result, you'll have to generate your own power. A backup generator might be utilized, but fuel is expensive, and renewable energy sources like hydropower and wind power are not widely accessible. As a result, solar power is the only viable off-grid power generating alternative.

CHAPTER 15:

RAINWATER HARVESTING

Forecasts for the coming decades leave no doubt: water is set to become the most valuable commodity, to the point of deserving the nickname "blue gold." Deciding to invest in rainwater harvesting is a sustainable choice with numerous advantages. In this chapter we will address the issue of rainwater recycling: issues related to recovery, filtration and purification processes, costs and savings. Just as solar panels are installed in areas where the sun has the upper hand, and just as wind farms are preferred in windy areas, why not harness rainwater in extremely rainy areas? The idea is to harness rainwater to cover a large percentage, almost half, of domestic water needs. The economic benefits would be considerable, with reduced

costs for water disposal and purification. Recycling rainwater makes possible several uses, including watering the garden and domestic hygiene, i.e., cleaning of sanitary ware, washing machines and dishwashers, which would enjoy the use of less calcareous water and, therefore, a longer life cycle.

Installing a rainwater harvesting system is a choice that provides several advantages, both environmental and economic. In fact, as mentioned in the opening of the article, water is a precious resource, and harvesting systems make it possible to reduce the consumption of potable water, which is thus allocated only to those uses where it is really necessary to rely on water of a certain quality. The collected water is specially filtered and treated so that it is safe for its intended purposes. It also does not contain limestone, which has several benefits for those who decide to use it for home appliances. Reducing one's water consumption not only reduces one's environmental impact as fewer natural resources are used, but also saves money on utility bills.

Once collected and treated, rainwater can become a valuable resource for use at home. In fact, thanks to the recovery system, it can be used for all outdoor uses, such as watering the garden, washing cars, the pavement, or the house in general. Depending on the system that is made, then, its use can be extended to indoor uses and cover, for example, toilet flushing, washing machine or even the operation of some systems, such as air conditioners. Regulations, however, prohibit the use of harvested rainwater for food purposes. In addition, if used indoors for the above uses, a specific secondary network must still be ensured, so that mixing with drinking water is avoided in any case.

RAINWATER HARVESTING SYSTEM: ELEMENTS

A rainwater recovery system usually consists of 4 elements:

- A collection surface (in the most classic situation this is a roof)

- A conveyance system (usually consisting of a gutter)
- A drainage pipe that conducts the recovered rainwater
- A storage container that receives the recovered rainwater.

Classic rainwater recovery gutters are available in a multitude of materials, the most common being galvanized steel, PVC, or bamboo. Once recovered, rainwater can be used for domestic use, garden care, toilets... more rarely, recovered rainwater is transformed into drinking water after undergoing further treatment. Rainwater recovery stands as a solution to the increasingly likely and imminent water crisis in much of our planet. Rainwater recovery systems are relatively cheap, the only limitation is the capacity of the storage tank and the collection area which determines its efficiency.

There are a wide variety of tanks on the market: from underground ones to anchor-shaped ones to be placed near the walls of the house, near the eaves. When you want to take advantage of a gutter for rainwater harvesting, you need to consider a few factors:

- Obstructive factors
- Destructive factors

Trees, with seeds and leaves can obstruct the gutter conveyance system while tree roots risk damaging both the foundation and the underground tank lining causing cracks and leaks. A second consideration should be made with the type of soil in mind: it is best to bury the tank near rocky, hard or compacted soil. Hard soil will tend to limit the damage of any cracks while limiting leakage to a minimum. Rocky soil may even shrink cracks; conversely, soft soil may expand them.

In order to construct a rainwater recovery system, it is necessary to locate at least one of the building's downspout pipes and then convey it to the collection tank, which, depending on one's needs, can be buried or integrated into the garden furniture. To the tank will have to come the water recovery pipes while from it will have to go the various collaterals for the

re-distribution of rainwater; in this regard, a distribution system for irrigation and a distribution system in the household *(to provide for the water needs of toilet flushing, washing machine, floor cleaning...)* may be necessary. The circuit made by DIY can be supplied by natural fall or by pressure through a pump.

DIY RAINWATER HARVESTING

Building your own do-it-yourself rainwater harvesting system is a great way to reduce water consumption. Did you know that the average person wastes around 5,28 *gal* (20 liters) of water a day? Imagine being able to save at least a third of your water consumption. A rainwater harvesting system really is a great way to recycle water during the hot summer months when water usage is most needed. Rainwater harvesting has been practiced for centuries and is now making a comeback. So let's see how to make a do-it-yourself rainwater harvesting system for your home.

1. The first step is to get a large water bin and drill a hole in the top of it into which water from the gutter can flow. As a reservoir, you can use a single bin or several bins connected to each other with pipes, so that when the first one is full it fills by overflow and drop the second one and so on. You can also use one bin for each gutter.
2. Standing water can be a haven for mosquitoes, so we want to keep the water safe from these intruders by sealing it properly. Place a strainer in the gutter opening on the roof. This will prevent large debris from making its way to the tank leading to potential clogging of the gutters or fittings to the tank.
3. If you use rainwater for garden irrigation, you do not need additional water filtration and purification systems. However, there is a growing interest in using rainwater for drinking and other indoor uses. In that case, installing filtration and purification equipment can remove

contaminants, however, the risk of catching life-threatening diseases is high.

4. Even the best filtration systems will allow unwanted particles to end up in a rainwater tank. These will tend to settle at the bottom of your tank, and it is best not to disturb them by not drawing water from the bottom of the tank. Rather, use a floating filter, which draws water out of the center of the tank, leaving the sediment undisturbed.

How to choose a rainwater harvesting system

Affordable, environmentally friendly, easy to install and convenient, the rainwater harvesting system is indispensable for those who want to recycle rainwater without seeing their utility bills rise. Connected to the gutter, with an external tank or an underground cistern, it can hold up to 50,000 gallons.

Modern life leads us to consume more and more drinking water. The average consumption of a person is estimated at 150 gallons per day! About 50 percent of this water is used for different purposes that do not necessarily require potability such as, for example, operating the flush toilet, washing machine, for various cleaning tasks, etc. Even watering the garden and watering the vegetable garden require a lot of water consumption, not to mention the swimming pool or washing the car. So many liters of drinking water end up in the sewer, and so many euros leave in bills!

Leaving aside the purely economic criterion, we must also consider that water is a precious and limited commodity. For the past 30 years or so, the average groundwater level has been dropping significantly. Being able to ensure drinking water for the entire population has become an increasingly difficult task for governments to sustain. These are all good reasons that should prompt you to reduce your water consumption by installing a rainwater harvesting system.

Recovery system with external tank

Generally, this system is not used to supply water to household plumbing fixtures. Because of the small volume of its tank, it is mostly used for watering, irrigating, or washing the lawn mower or car. It is very easy to install and does not require major work on existing drainage systems. Through a manifold to be mounted on the gutter drain, water is piped into the tank. The overflow of the tank is connected directly to the downspout drain. The capacity of external tanks varies from 52.8344 to 528.34 gal. (200 to 2000 l); they are usually made of polyethylene, a rather lightweight material. A coarse-mesh filter must be installed upstream of the collector. A simple suction filter is usually enough to prevent leaves and insects from entering the tank. To distribute the water you can simply rely on gravity by placing a tap at the bottom of the tank. Alternatively, you can use an immersion pump placed at the bottom of the tank. These types of pumps have a float switch that is used to stop pumping when the water is at the minimum level. You can connect a garden hose or a high-pressure washer to it. The power and flow rate of the pump should be chosen according to the capacity of the tank.

Recovery system with underground tank

If you decide to install this type of cistern, you will be able to use the reclaimed rainwater for your garden or to wash your car but also to feed the plumbing (flush, washing machine, non-potable water point). Indeed, the large capacity of these cisterns ensures a certain comfort of use and good autonomy. Their volume ranges from 396.26 to more that 1320.86 gal. (1500 to more than 5000 l) and they are made of polyethylene or concrete. Installation is more complex because excavation will be required to install the cistern near the downspout and distribution pipe of the domestic system. You will need a coarse-mesh filter at the downspout inlet to limit finer impurities that might come from the roof. You will also need to connect an overflow to the downspout pipe. For distribution you will have to install a pump that can have different modes of operation:

- Manual start/stop operation with an immersion pump at the bottom of the cistern, for outdoor use only (irrigation, car washing, etc.);
- Pressure operation with a pump outside the tank that automatically starts when the water opens (vacuum). The pump can be located outside (watering, washing, etc.) or inside the house (toilet flushing, washing machine, etc.).

What capacity to choose for the tank

For an outdoor installation consider a minimum capacity of 1500 l as a starting point. If you own a plot of more than 100 sq. ft. consider that you will need at least 15 L/sq. ft. For sanitary use, for 5 people you will need at least 5000 l. Add 1000 l for each additional person. For combined outdoor-sanitary use you simply have to add up the volumes.

Capacity calculation example: for a 5-person dwelling with a 150 sq. ft. plot you will need at least a volume of: 5000 + (15 x 150) = 7250 l, i.e., a 7500 l tank (upper available volume). In addition, you will have to install a specific system in the house to distribute the reclaimed water.

Example of consumption calculation: t o calculate the volume of water you need you can base on the following data:

- Watering a garden or vegetable garden requires 15 l/sq m;
- Washing a car consumes about 200 l;
- A high-pressure washer consumes about 350 l/h.

Note: You will also need to set up a specific distribution network in the house for reclaimed water.

Maintenance tips

- If you want to enjoy the benefits of the rainwater harvesting cistern for a long time, empty it and clean it thoroughly at least once a year.

- If you are using the system to feed your toilets, remember to clean the various filters in the system regularly to prevent them from clogging, making pumping difficult or impossible.
- If you have installed a pump remember to clean the suction filter regularly (at least once or twice a year).
- Also remember to check and clean, if necessary, gutters of moss or leaves that might clog them.
- If you live in a particularly cold area remember to empty the tank in the winter months to prevent frost damage.

HOW TO BUILD THE PERFECT RAINWATER TANK

Carrying water (from the kitchen to the terrace) for the many plants becomes tiring on hot summer days. Water consumption also weighs on the environment and your wallet. In our estate, we found suitable barrels to make our DIY rainwater tank. If you have an old unused barrel at home, this will be perfect for the upcycling project. If you are using a used barrel, however, it is important to know what it contained before so as to ensure environmental sustainability. We will also make a lid so that no mosquito "breeding" takes place in the stagnant water.

Equipment

- 100-liter metal bin
- Faucet
- Reducer
- Set of rubber and silicone gaskets
- Trolley with wheels
- Wooden plywood
- Screws

- 10 mm drill bit and 20 mm drill bit
- File, permanent marker and tape measure
- 1-meter hemp rope
- Watering can
- Ear protection
- Safety glasses
- Gloves
- Drill
- Jigsaw with blades

Step 1: Take the measurement for the tap and drill the hole

So that the barrel remains mobile and can be moved easily, we place it on the cart with casters. It is best and most convenient to buy a cart with casters already assembled. Of course, it is also possible to make it with some wood and 4 casters. Due to the weight of the water and the barrel, it is not necessary to fix it further.

Once you put the barrel on the cart, you can place the faucet at the proper height and draw the hole that will be drilled later. Our faucet has a ½ inch thread, which is roughly equivalent to a 20 mm drill bit.

With the right drill bit, the hole is soon made. Warning: don't forget your ear protection and goggles. When drilling metal, it can get very hot. You can wear gloves for safety. Also, all cut edges are very sharp and it is easy to cut yourself. Therefore, we recommend that you blunt the edges with a file right away.

Step 2: Install the faucet

The gasket set contains rubber gaskets of different diameters. We take two that slightly exceed the threads of the faucet. We thread one onto the faucet.

Then we thread the thread through the hole. From inside the barrel we now thread the second gasket onto the faucet and screw the reducer on. Now all we need to do is screw it on tightly, but making sure that the gaskets stay in place.

Step 3: Draw and saw the lid.

We want the lid to fit snugly over the barrel. To do this in the wood panel we saw two circular elements: a smaller one, which must be able to fit into the barrel without jamming, and a slightly larger one, which will rest on the barrel. In the next step these two circular elements will be screwed to each other and the edges painted, to provide better weather resistance.

Tip for perfect disks: lay the barrel directly on the wooden panel and with the marker draw a circle following the edge of the barrel. For the second circle, measure 1 cm inward so that it finds a place in the barrel. To draw the circle, the easiest thing is to take a string and pen and use them as compasses.

If you have the option of placing the rainwater tank directly under a gutter, the lid should have a corresponding opening. For this purpose, determine the exact location, draw the shape of the opening and saw it out.

Step 4: Install cover and rope

If necessary, the edges of the lid can be beveled slightly. Then the two elements should be placed on top of each other, arranged and screwed together. Four screws should be enough.

To allow easy opening of the lid, we create a handle with hemp rope.

The chosen hemp rope should be able to be threaded through a 10 mm hole.

We mark the position of the holes, which will be opposite and equidistant from the center, and proceed to drill the two discs.

Now we knot the ends of the rope on the two sides of the holes and cut the rest.

Step 5: Test and there you have it

The rainwater barrel is ready, all that's missing is a practical test to check its airtightness. It's a piece of cake: place the barrel outside, fill it with water and check for leaks from the seal. If this occurs, check that the gaskets are tightened properly (not too much but not too little either). If there continue to be leaks, empty the barrel, let it dry, and seal along the outer gasket with silicone sealant mass. When it rains, we will briefly open the lid of our rainwater tank so that it can fill up. That way we too will be ready for a long, hot summer. And thanks to the journey saved during watering, we also have more time to enjoy the terrace together.

How to make rainwater potable

Today's rain contains many more toxins, and we are more conscious of the dangers of drinking rainwater. We already know that E. coli and other hazardous bacteria may contaminate untreated water. Many scientists, on the other hand, regard rainwater collecting as a partial solution to the issues caused by water shortages, such as drought and desertification. In industrialized countries, rainwater is mostly used for irrigation. However, there is increased interest in harvesting rainwater for drinking and other household use. More than half of home water is consumed inside; bringing rainwater indoors would save money and reduce environmental expenses associated with water treatment and transportation.

Contaminants can be removed by installing filter and purifying equipment. First, filters at the end of the eaves should be used to keep foreign materials out of incoming rainwater before it reaches the conveyance system. Using such filters reduces maintenance and extends the life of the filtration/purification system. Even the most sophisticated filtering systems

will enable undesirable particles to enter a rainwater tank. These will tend to settle at the bottom of your tank, so avoid disturbing them by not taking water from the bottom. Rather, utilize a floating filter, which draws water from the middle of the tank while leaving the sediment alone.

Filtration removes debris from water. The subsequent disinfection or purification, on the other hand, destroys pollutants and eliminates any dangerous compounds that may be present. To decide which sort of system is required, the stormwater must first be examined at a credible laboratory; otherwise, you will waste money on equipment that does not provide clean water. Filtration is included into every system, including simple irrigation systems. Filtration systems include mesh filters, paper filters, and carbon filters. Almost every system employs many filters. A system may, for example, incorporate two in-line filters of increasing fineness, a carbon filter and a UV light filter, following the gutter and/or an initial discharge device. The filters are evaluated according to the size of the smallest particles they can filter, with diameters specified in microns. Sand is around 100 to 1,000 microns in size, a human hair is approximately 100 microns broad, a dust particle is approximately 1 micron wide, and a virus may be smaller than 0.01 micron in size. Cartridge filters are the initial filters in a system. They are used in series, for example, a 20-micron filter followed by a 5-micron filter.

To remove sand and bigger particles from wells and drainage systems, a larger filter (e.g., 50-micron) should be employed first. This filter should be easily accessed and cleaned at least once a year. Following that, a 20- or 10-micron filter should be used, followed by a 10- or 5-micron filter. This should be done at least once a year. Filters cannot remove all pollutants from water. When creating drinking water, filtration is always followed by disinfection. As a result, disinfectants are added to public water systems to eliminate microorganisms that might cause human and animal illness. This is also essential for rainfall, which cannot be eaten without it.

Microorganisms abound in rainwater. The vast majority of them are not harmful to people. Others, on the other hand, are deadly. These must be

removed from the water. Chlorination, ozonation, ultraviolet (UV), and membrane filtration are all types of disinfection. When comparing different disinfection procedures, keep in mind that some produce harmful byproducts that must be treated further. The success of rainwater disinfection is determined by checking for an indicator microbe that, if present, signals the presence of other, more dangerous infections. Essentially, they have water analysis performed in the laboratory to analyze the criterion "total coliform bacteria," which, if present, suggests the presence of additional diseases.

For the majority of the last century, chlorine has been employed as a disinfectant in public water systems. Waterborne illnesses like as cholera, typhoid, dysentery, and hepatitis were almost eliminated with the introduction of chlorine to disinfect water, saving millions of lives. However, it is frequently vilified due to dubious side effects. An activated carbon filter, also known as a charcoal filter, can remove chlorine odor and taste.

CONCLUSION

Dear reader, this book has come to an end. I would like to take this opportunity to thank you for coming along on our journey of exploring food self-sufficiency through backyard homesteading. Throughout this book we have seen how to grow a vegetable garden and all the related work month by month. Having covered the topic in detail we moved on into the chapter dedicated to creating compost by discovering how to recycle our waste scraps for feeding a thriving vegetable garden. Finally, in the closing part, we saw how to raise the commonest farm livestock by gaining awareness about their needs and how to fully meet them. Before breaking up, I want to share with you one last cosinderation about the importance of nature. Because it is clear how the relationship between man and nature has changed over the years. In ancient times, nature was respected enough to be worshiped through the gods and was praised by many poets and writers. Today, however, man exploits nature, to the extent that he considers it a means to improve his living conditions, causing climate change and causing damage that over time can corrode the human population. These damages are mainly caused by gases released by machines and industries. Another disaster is the pollution of groundwater, which is not only a water resource for the soil and the environment, but also for the entire human population. The use of pesticides in agriculture has made insects resistant to such substances and has led the chemical industry to create pesticides that are heavier to have later consequences on humans themselves. Some land disasters, diseases and damages related to crops and livestock, which in the past were attributed to natural causes, are increasingly linked to atmospheric pollution and the exploitation of subsoil resources. Man, out of thirst for wealth, now lives under the illusion that he is more powerful than Nature and intervenes in the environment without any more respect for it. If man continues with this disrespectful attitude, Nature will become more and more aggressive and unpredictable and punish even more this rebellious child of his. *Nature can be compared to a mother;* she is the giver of

everything and, above all, provides us with what we need (food, essential to live; light, essential to see; air, to breathe; soils and other materials, to build). We simply exploit everything it offers us by wasting and ruining the fragile natural balance. Man, with his technological discoveries that have been invented and built to simplify human life, in some cases, create negative effects that affect Nature.

Many people after a catastrophe wonder if there was a chance to stop it, but it is useless to ask these questions when it has happened by now; One way to make these catastrophes less dangerous is that each person should start making small gestures that would surely change things sooner or later as no one can overcome Nature. And it is with the call to return to natural rhythms that I wish you good luck in your adventure of rediscovering what it means to be human.

Greetings,

Jason C. Borden

Thanks for reading this far!
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