

Organic Plant Culture

Lesson 1

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Introduction

Lesson Aim

Explain the concepts and principles of organic growing, including the common techniques used in organic growing systems (Part A).

ORGANIC GROWING

Organic plant growing is the production of plants without the addition of artificial inputs such as chemicals that have been artificially manufactured or processed. This includes herbicides, pesticides and fertilisers.

Organic growing has increased in popularity over the past ten years due to the increasing awareness of safety in the garden and on the farm and the desire to produce food that is free from chemical inputs. For decades, farmers and growers have relied upon chemicals to control pests and diseases in order to produce crops for sale. Unfortunately, it is only recently that we have become aware that many of those chemicals can sometimes cause health problems to humans, as well as long-term damage to the environment such as soil degradation, imbalances in pest-predator populations can also sometimes occur. As public concern grows, these issues are becoming increasingly important. However, the organic grower or gardener should understand that not all organic practices always guarantee a healthy environment, over-cultivation for example can also lead to soil damage. Organic growing practices should aim to ensure quality of both the environment in which we live and of the produce we grow in our gardens and on our farms.

A growing interest in more environmentally sustainable gardening methods offers the chance to provide the general public the quickest, safest and most enjoyable organic garden practices. This course will lead you through these practices and guide you to develop and maintain your plot, large or small.

Organic growing of plants works with nature, rather than against it. It recognises the fact that nature is complex and accordingly endeavours to understand interactions between plants, animals and insects. It therefore encourages the gardener for example to learn about the life-cycle of pests and to use this knowledge to control them. It also recognises that the use of chemicals has to be replaced with labour and management. Organic gardeners/growers have to manage pests rather than eliminate them. They need to be vigilant and have the ability to recognise problems and act quickly to minimise the spread of both pests and disease. They may also need to accept some insect damage to the plants they grow as inevitable. How to manage pest and disease problems in an organic system is covered in detail later in the course.

Definitions of Organic Growing

Organic gardening and farming has been given a variety of names over the years - biological farming, sustainable agriculture, alternative agriculture, to name a few. Definitions of what is and isn't 'organic' are also extremely varied. Some of the most important features of organic production, as recognised by the International Federation of Organic Agriculture Movements (IFOAM), include:

- Promoting existing biological cycles, from micro-organisms in the soil, to the plants and animals living on the soil.
- Maintaining the environmental resources locally, using them carefully and efficiently and re-using materials as much as possible.
- Not relying heavily on external resources on a continuous basis.
- Minimising any pollution both on-site and leaving the site.
- Maintaining the genetic diversity of the area.

Practices which are typical for organic systems are composting, intercropping, crop rotation, fallowing, mechanical, hand weeding or heat-based weed control, green manure crops and the use of legumes to increase soil fertility. Pests and diseases are tackled with environmentally acceptable, sprays that have little environmental impact and biological controls (eg. predatory mites). Organic gardeners should avoid the use of inorganic (soluble) fertilisers, super-phosphate for example should not be used because it contains sulphuric acid, rock-phosphate however is the acceptable alternative. Synthetic chemical herbicides, growth hormones and pesticides should also be avoided.

One of the foundations of organic gardening and farming, linking many other principles together, is composting. By combining different materials, balancing carbon and nitrogen levels, coarse and fine ingredients, bacteria and worms act to break down the waste products. Composting produces a valuable fertiliser that can be returned to improve the soil. Natural biological cycles are promoted, 'wastes' are re-used and the need for external supplies of fertiliser are reduced or cut altogether.

Following are some further definitions of organic gardening:

"Organic Gardening is a method of growing vegetables, trees, shrubs, flowers and even lawns, without chemical fertilisers or poison sprays. You need not dig the soil, and yet you can still grow superior crops - organic means 'like organism'. Gardening organically means treating the soil as if it is a living organism needing food, water, shelter and proper conditions. From Organic Gardening in Australia, by Roads.

"The organic movement has its inception in the ideas and experiments of Sir Albert Howard - he noticed Indian farmers did not make use of artificial fertilisers - Sir Albert decided to use the methods of the natives, but with scientific management, to devise ways to recycle nutrients; to combine rough weeds and crop wastes in layers with high nitrogen manure making a pile which heated - resulting in multiplication of bacteria - to preserve the cycle of life by returning wastes to the soil. From Encyclopaedia of Organic Gardening, by Rodale Press.

"Organic gardening is a collection of skills tempered with the ecological wisdom borne of experience and observation, which when applied, enhances and encourages the laws and rhythms of nature and so produce food of the highest quality". - From Organic Gardening, by Peter Bennett.

INFLUENTIAL PEOPLE OF THE ORGANIC MOVEMENT

Lady Eve Balfour – farmer and organic farming pioneer. Born in the U.K. in 1899 she was one of the first women to study agriculture and at the age of 21 started farming in Suffolk England. For the next 70 years she worked as an educator, researcher (The Haughley Experiment – scientific experiment into organics) promoted organic farming, and published books, such as 'The Living Soil' in 1942. She co-founded the Soil Association in 1946 – an organisation that promoted sustainable agriculture and organic methods. This organisation still flourishes today and is one of the principle bodies dealing with inspections of, and awarding certificates to, organic farms and small-holdings in the UK.

Sir Albert Howard – Born in the U.K. in 1873 studied botany and became a principle figure in the organic movement. He is often referred to as the ‘father of modern organic agriculture’. He worked in Asia and India as an agriculture consultant and also developed and documented organic techniques that he also promoted throughout Europe. He wrote *An Agricultural Testament* – a classic organic farming text and published in 1940.

Jerome Irving Rodale born in 1878 in the USA was one of the first advocates of organic and sustainable farming in that country. Initially an accountant who set up an electrical firm, Rodale was later so influenced by the work of Sir Albert Howard that he bought a farm to test Sir Albert’s ideas. From then on he actively promoted an ‘organic life-style’ and also popularised the term ‘Organic Farming’.

With Sir Albert as associate editor JI Rodale published (by Rodale Press, Inc.) the first edition of *Organic Farming and Gardening* in 1942 in order, to promote organic approaches to agriculture.

Rodale believed that the health of the soil and the plants living in it depended on introduction of organic matter in the form of de-composed animal and plant waste. He was also convinced that the use of chemical pesticides destroyed soil micro-organisms. These are the very organisms that are needed to breakdown plant and animal waste into useable nutrients, that promotes healthy plant growth. Rodale too is still flourishing today in the USA.

DIFFERENT WAYS TO GARDEN ORGANICALLY

Although this course focuses mainly on ‘organic gardening’ the following concepts also follow organic principles. Permaculture, in extremely simple terms, uses a complex set of principles to develop a self-sustaining system, with a low environmental impact. The biodynamic approach is extremely specialised, and is an area that requires a great deal of study in its own right. Following are some brief outlines of the two concepts.

Permaculture

In its strictest sense, permaculture is a system of production based on perennial, or self-perpetuating, plant and animal species, which is useful to people. In a broader context, permaculture is a philosophy which encompasses the establishment of environments which are highly productive and stable, and which provide food, shelter, energy, etc., as well as supportive social and economic infrastructures. In comparison to modern farming techniques practised in Western civilisations, the key elements of permaculture are low energy and high diversity inputs. The design of the landscape, whether on a suburban block or a large farm, is based on these elements.

A permaculture system can be developed on virtually any type of site, though the plants selected and used will be restricted by the site’s suitability to the needs of the varieties used. Establishing a permaculture system requires a reasonable amount of pre-planning and designing. Factors such as climate, landform, soils, existing vegetation and water availability need to be considered. Observing patterns in the natural environment can give clues to matters which may become a problem later or which may be beneficial.

A well designed permaculture garden will fulfil the following criteria:

- Upon maturity it forms a balanced, self-sustaining ecosystem where the relationships between the different plants and animals do not compete strongly to the detriment of each other. The garden only undergoes subtle changes from year to year.
- It replenishes itself: The plants and animals in the garden feed each other, with only minimal (if any) input (eg. natural fertilisers, feed) introduced from the outside.
- Minimal work is required to maintain the garden once it is established: weeds, diseases and pests are kept to a minimum through bio-diversity (of plant insect and animal life). Companion planting and insect attraction are an integral part of this ecosystem for the beneficial effect they have on each other.
- It is productive: food or other useful produce can be harvested from the garden continually.
- Intensive land use: a lot is achieved from a small area. A common design format used is the 'Mandala Garden' based on a series of circles within each other, with very few pathways and easy, efficient watering.
- There is a diversity of plant varieties; this spreads cropping over the whole year so that there is no time when a "lot" is being taken out of the system. This also means that the nutrients extracted (which differ according to each type of plant or animal) are "evened out". For example, iron-hungry plants are grown next to plants requiring little iron, in order that the soil does not become iron-deficient. . The diversity of species acts as a buffer.
- It can adapt to different slopes, soil types and microclimates.
- It develops through an evolutionary process changing rapidly at first, but this becomes more gradual over a long period perhaps never becoming totally stable. The biggest challenge for the designer is to foresee these on-going long term changes.

Structure of a Permaculture System

- Large trees dominate the system. The trees used will affect everything else they create shade: reduce temperature fluctuations below (create insulation): reduce light intensities below: reduce water loss from the ground surface: act as a wind barrier, etc.
- In any system, there should also be areas without large trees, but will include shrubs and lower growing plants. The "edge" between a treed and non-treed area will have a different environment to the areas with and without trees. These "edges" provide conditions for growing things which won't grow fully in the open or in the treed area. The north edge of a treed area (in the southern hemisphere) is sunny but sheltered while the south edge is cold but still sheltered more than in the open. This is reversed in the northern hemisphere. "Edges" are an example of microclimates: small areas within a larger site that have special conditions which favour certain species which will also grow well elsewhere.
- Pioneer plants are used initially in a permaculture system to provide vegetation and aid the development of other plants which take much longer to establish. For example, many legumes grow fast and fix nitrogen (raise nitrogen levels in the soil) and thus increase nutrients available to nut trees growing beside them. Over time the nuts will become firmly established and the legumes will die out. Pioneer plants are frequently short lived (but not always).

The Development of Permaculture

Bill Mollison

The concept of 'Permaculture' was developed by Bill Mollison, Australia.

Born in 1928 Mollison is often called the 'Father of Permaculture'. With David Holmgren he co-developed an integrated system of design. This encompasses agriculture, horticulture, ecology, strategies on land access, architecture, as well as financial and legal management of businesses and communities.

Masanobu Fukuoka

Bioo

Biod

farming and gardening is a practice that developed from a series of lectures given by Rudolf Steiner in 1924. It has many things in common with other forms of non-standard growing, but it also has a number of characteristics which are unique.

It views the farm or garden as a "whole" organism and attempts to develop a sustainable system, where all of the components of the living system have a respected and proper place.

There is a limited amount of scientific evidence available which relates to biodynamics. Some of what is available suggests biodynamic methods do in fact work! It will, however, take a great deal more research for mainstream farmers to become convinced widely of the effectiveness of these techniques; or in fact for the relative effectiveness of different biodynamic techniques to be properly identified.

RESOURCES

There is a wealth of resources available for those interested in organic horticulture and organic agriculture, both as a movement and as an industry. The aim of this section is not to give you a list of contacts, but provide you with background information that will assist you in finding contacts specific to your particular area of interest. Areas you may want to investigate include the following.

1. Reference Books

Visit a bookshop or library, and see what books you can find on the group of plants you are studying. Internet based booksellers are a valuable source of special books if your local bookshops or libraries are deficient. Likewise, specialty booksellers can often be located via the internet. Telephone directories can also provide this information. Please note that some of these books may be out of print.

Authors you might be interested in looking for include: Sir Albert Howard; Nicholas Lampkin; Rudolf Steiner; Alex Podalinsky; Masanobu Fukuoka; Miguel Altieri; F. H. King; Lawrence Hills.

2. Internet searches

Searching on the internet for organic growing information can be a quick and satisfying way of finding what you want to know. It can also be slow and frustrating if you aren't sure what to look for. Try searches using key-words such as 'organic' 'organic farming' or 'organic agriculture,' to find general information. If you are looking for information on organisations, organic certifiers etc, try key words like 'organic certifier' or 'organic certification' and 'organic symbol holder'. Other useful keywords might include: 'If you are not getting satisfaction from one search engine (or even if you are) try a different search engine and see if they offer a different range of sites.

When you are searching the internet, you will find some sites are valuable and others are not. Always try to determine the age of the website (and the information it contains), and make a judgment about the reliability of the source.

3. Organisations

Organic agricultural and horticultural organisations exist worldwide and there is bound to be one to suit your interest and involvement in organic growing. These organisations include international ones such as the International Federation of Organic Agriculture Movements (IFOAM). Smaller centres of organic expertise include the Rodale Institute (USA); Garden Organic (formerly HDRA – the Organic Organisation) (UK), Elm Farm Research Centre (UK) The Soil Association (UK) OGA - Organic Growers of Australia, National Association for Sustainable Agriculture Australia (NASAA), Organic Food Chain (OFC) (Australia)

Some countries will have a range of national organisations and some countries will also have many small organisations. Most of these will be listed in the IFOAM Directory – an annual publication available from IFOAM. Small local organic producers may often be located via health food stores, farmers' markets, and similar outlets.

Some examples of other organisations that may be of interest to the organic grower include:

Government Departments

Some State and Federal Government departments specialise in certain groups of plants. Departments of Agriculture (or similar government department in your country) have information on organically growing specific crop plants such as fruit, vegetables, nuts,

berries, grain, cut flowers and sometimes nursery plants

Organic Gardening Groups

Organic gardening groups are situated throughout the UK, Australia, USA etc. Groups such as the Canberra Organic Gardening Group in Australia for example encourage members with an interest in backyard organic growing.

4. Magazines and Journals

There is an increasing range of magazines and newspapers focused on organic or sustainable agriculture. Ask your local retailer what they have available or what they could get. Some magazines are only available by subscription. Many scientific journals also exist. These are best suited to academic researchers or field practitioners requiring particular technical information. National libraries, universities etc may keep these kinds of journals.

5. Commercial Organisations

There are many commercial organisations that may provide you with products or information relating to organic and other horticultural products and advice. Below are some examples of such organisations.

Nurseries.

There are specialist nurseries worldwide for every type of plant. Some growers specialise in producing organically grown seedlings etc. You'll find them by looking in magazine advertisements, the telephone book, and other resources.

Seed suppliers

Some seed suppliers specialise in organic and heritage seeds. Seed savers networks are also a source of open pollinated, organic and heritage seeds.

Product suppliers

There are many products available for organic growers on the market today. These products are often available in nurseries, agricultural product outlets, and even supermarkets. Products include things like worm castings, compost, liquid seaweed, fish emulsion, natural pesticides and herbicides, and hand tools. Some companies specialise in the supply of these products. Check your local telephone directory and ask at nurseries etc. to locate such businesses in your country or area.

SET TASK

1. Contact any clubs or societies which you are able to find addresses for who are concerned with organic growing.

Find out what each group you contact is all about. Find out what you can about their meetings, newsletters, publications, services etc?

- Find out all that you can about what they feel organic gardening is about.

2. Using the leads given on the preceding pages, contact as many sources of information and start to collect resources. Make up a list of resources that you might use for information later on.

Arrange these resources into organised groupings in a file (eg. seed companies in one group, nurseries in another, clubs or societies in another, and so on.)

Collect any catalogues/leaflets etc from nurseries, seed companies, organisations, etc. that might be useful in learning more about organics.

3. Carry out research on how to go about certifying produce as being organic.

4. Find a garden that has been designed using permaculture principles. Inspect the garden. Find out all that you can about the intended aims of the gardener.