

## Plants

### Sustainable agriculture

#### A return to tradition

Sustainable agriculture was established in response to environmental problems caused by the “green revolution” and other production methods having high environmental impacts (intense use of water, pesticides and chemical fertilizers). The world movement in support of sustainable agriculture has been defined “the true green revolution” precisely to highlight the contrast between these two production methods. Farming sustainably means promoting biodiversity, preserving the environment, preferring local productions, ensuring the respect of human rights of workers, safeguarding communities and guaranteeing economical sustainability of the agricultural system without leaving small farmers behind. One of the solutions adopted to control environmental impacts of modern agricultural production and thus to make agriculture more sustainable is the return to traditional methods of crop growing used in the past as, for example, biological agriculture or conservation agriculture. At the same time, the merge between traditional knowledge and new philosophies, from a sustainable perspective, has given birth to new techniques as integrated agriculture and biodynamic agriculture.

#### Biological agriculture

Various methods of sustainable farming can be undertaken and organic farming is one of them: it's a production method defined and disciplined by the common CEE 2092/91 Regulation and, at an international level, by the International Federation of Organic Agriculture Movements – IFOAM.

The organic production method respects the environment as it doesn't resort to synthetic chemical products, as pesticides and fertilizers, but on the contrary, uses products of natural origin against parasites (sulphur, copper, plant extracts) and uses natural compost to fertilize soil. Biological farming products, though, aren't totally devoid of residues of synthetic chemical products due to the presence of polluting agents, coming from crops where these substances are employed, in soil and water. Moreover, the use of elements existing in nature, as copper and fertilizers, doesn't exclude potential damage to the environment but at least it guarantees that inserted substances are recognized by micro-organisms and are biodegraded over time: in nature, in fact, practically all substances can cause damage to living organisms but what allows to identify a substance as toxic is the quantity which causes harmful effects in a given environment. As stated by Paracelsus “It's the right dose which creates a poison” and, until toxic substances introduced in the environment can be assimilated and metabolized by existing organisms, pollution can be contained.

Other characteristics typical of organic farming are: crop rotation, which, on one hand, blocks parasites from finding a favourable environment to proliferate and, on the other hand, employs nutrient substances found in the soil more rationally and less intensively; superficial ploughing; use of useful insects to contrast insects that are harmful for crops; creation of dividing hedges and trees which give hospitality to natural predators of parasites and work as a physical barrier to potential external pollution; the recourse to alternative energy sources; the absence of Genetically Modified Organisms (GMOs); contemporary farming of different crops. Organic farming isn't an innovative system, in fact, before the invention of pesticides and chemical fertilizers, it was the only type of cultivation employed in the world! In many countries of the world where the “green revolution” of the '60s didn't arrive, farming is still totally organic! Let's just think that 80% of farmers in developing countries wouldn't have to change at all their production systems if they wanted to be certified as “organic”! In addition to these countries which produce biologically without certification, organic farming at a global scale is practised by over 120 nations! According to most recent surveys, more than 634 thousand agriculture companies employ organic farming over about 31 million hectares of land. The continent with the greatest extension of organic crops, equivalent to 39% of the world's overall crops, is Oceania; Europe is positioned at the second place (23%), followed by Latin America (19%); in Asia, North America and Africa, organic crops are very widespread. Nations

with greatest areas destined to organic farming are Australia (with a bit less than 12 million hectares), Argentina (3,1 millions), China (2,3 millions), United States (1,6 millions) and Italy (1,07 millions).

## Integrated agriculture

Integrated agriculture aims to guarantee the smallest environmental impact as possible, preserve biodiversity and reduce risks for the health of agricultural workers and consumers, minimizing the use of synthetic chemical substances (as pesticides and fertilizers) and favouring, as an alternative, natural products. This type of agriculture employs a system of integrated fight that envisages the use of various instruments wisely mixed to fight parasite attacks: these methods value natural resources as well as self-regulation mechanisms of ecosystems and use chemical methods that are accurately balanced. The result is a reduction (in comparison to the maximum allowed by law) of phytopharmaceutical residues on products we eat guaranteeing a greater respect for the environment and reducing current causes of agricultural pollution on the environment. This system also tries to employ water rationally preventing erosion and ensuring soil fertility practising crop rotation as well as the "green manure" practice that consists in burying specific crops in the soil to maintain and enhance its fertility.

## Conservation agriculture

Conservation agriculture consists in a set of agronomic practices allowing better soil management, limiting negative effects over its composition and structure, content of its organic matter and erosion process and resulting degradation. Conservation agriculture is characterised by some techniques as, for example, direct seeding in soil that hasn't been ploughed or has been ploughed the least possible and avoiding burning crop residues or ploughing them in the soil. The benefits of this production system are various: ranging from the reduction of energy consumption due to the modest use of farm machinery to the resulting reduction of CO<sub>2</sub> emissions in the atmosphere. Other benefits are also to be found in the lowering of production costs and, from an ethical point of view, in the preservation of the environment and natural resources for future generations.

## Biodynamic agriculture

Biodynamic agriculture is inspired by R. Steiner's "anthroposophy" and is based on the premise that a farming company is truly an independent living organism inserted in a bigger living cosmic organism that influences it. Cosmic rhythms influence planting calendars, growing and gathering. The more employed techniques are crop rotation, biodynamic preparations, composting, non-destructive soil ploughing and quality fertilizing through the use of "green manures" and biodynamic compost fertilizing.