

Biodynamic, Organic, Biological vs Conventional Agriculture



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Conventional:

This is the traditional form of European agriculture carried out in Australia during the past 231 years. Prior to that there were extensive, sustainable/regenerative agricultural practices carried out for eons by the First Nation people.

Conventional practices have changed since colonisation. Today's conventional farming is often referred to as industrial agriculture because the farming system includes wide and sustained use of synthetic inputs and unnatural interventions - herbicides, pesticides, fungicides, insecticides and genetically modified organisms. Feed lot operations, heavy irrigation users as in the cotton and almond industry, monoculture cropping and intensive tillage have destroyed soil structure and led to the loss of soil carbon. Rationale for this method of agriculture, usually in broad acres, is explained in terms of export dollars and an increasing human and animal population to be fed.

In a nutshell, this method of agriculture has led in increasing synthetic inputs with diminishing returns in production while presenting parallel damage to soil structure and fertility. Many of the chemicals used have finite lives in application and effectiveness. Increasing resistance to pesticides and herbicides is leaving farmers in a perilous position into the future. Unacceptable amounts of greenhouse gases are released, erosion is increasing, and available water is being polluted all of which leads to impacts on the environment and human health.

This method of agriculture is not sustainable in the long term as climate change impacts on when and how rainfall is received and increasing temperatures occur over longer periods in the year. Industrial agriculture requires a huge amount of energy to produce and then often transport to far-away markets.

Consider the results of the 30 year Rodale Institute trials comparing conventional with organic with biological farming <https://rodaleinstitute.org/wp-content/uploads/fst-30-year-report.pdf>

By way of contrast with conventional farming, organic, biodynamic, and biological farming practices consider plant, soil, animal and human health, diversity, environmental welfare and care of Mother Earth. The Rodale Institute 30-year trial is relevant to the following farming paradigms.

Organic:

IFOAM – International Federation of Organic Agriculture Movements – has 4 principles – Health, Ecology, Fairness and Care.

Health includes all aspects of the living system from microbes to humans - and everything in between.

Organic farming fits and adapts to the rhythm of natural order and diversity within the *ecological* systems.

Fairness emphasises the need to consider all participants so that all have a quality of life through equity in distribution and accessibility to good quality food and water.

Care means consideration of the planet and its resources so that efficiency can be enhanced, productivity can be increased without jeopardising health of the individual or resources.

There is less deep ploughing of the soil; more considered use of water and more recycling and use of composting.

Organic farming does, however, allow the use of copper and sulphur as fungicides. Both these inorganic chemical elements occur naturally as copper sulphate, for example. Copper sulphate is very toxic to aquatic life, birds, mammals, and soil biology, in particular the fungal components of the soil food web. It has been a component of Bordeaux mixture since 1885 along with hydrated lime and water and used for the control of the Protista, downy mildew and the fungus, powdery mildew.

Copper in all its forms is used as a protectant meaning it has no curative or systemic action. Widespread copper use has led to resistant strains of fungi and has shown up as a problem residue in wines.

Sulphur is available naturally as gypsum, langbeinite or sulphate of potash. Animal manures are also a good source of sulphur. Sulphur is one of the 17 essential plant nutrients. It is used to lower pH in highly alkaline and salty soils. It has a role as a miticide in agriculture and as an antifungal agent.

As both copper and sulphur are antifungal agents, they have no place in biological agriculture.

Organic farming, with or without certification, is an increasingly popular method of food production requested by the buying public. Productivity is consistent during wet and dry years because higher soil organic matter increases soil water holding capacity (see Rodale report). Organic production is more nutrient dense and leads to improved gut biota. Macro-elements

are similar to those in conventional agriculture but the levels of antioxidants, vitamins and minerals are orders of magnitude higher in non-conventionally grown produce.

Biodynamic:

Biodynamics is a system of farming that encompasses a holistic approach to soil and plant health and operates on a closed system of farming using the lunar and cosmic cycles in its practices. Although organic allows the use of copper and sulphur, biodynamic does not use any synthetic chemistry and uses different principles to establish and maintain plant vitality.

Preparations that are made by very specific methods consist of plant extracts and animal manures activating minerals from the soil. They are numbered 500-508. Rudolf Steiner (1861-1925) developed this method which was the first of the organic agricultural movements.

Biodynamics is based on a lunar calendar where the moon moving through the constellations over the course of the month influences planting, cultivating, weeding and harvesting activities. In a closed system, the biology of the farm is used in all processes to maintain a stability and diversity that is particular to that farm.

There is an extensive philosophy that revolves around the Steiner principles, but it can be used on different levels. Those proponents of the Steiner method improve their quality of life, productivity and product quality while improving the soil and environment on their enterprises. There are certified biodynamic vineyards, orchards, vegetable growing and some grazing properties in Australia.

Biological:

Biological/regenerative agriculture aims to be a synthetic chemical and physical soil disturbance free method of agriculture. The focus is on improving and utilising the whole soil food web to increase soil and plant health leading to sustainable, long term productivity of crops. Soil biology drives soil chemistry in which the plant derives nutrients. Application of biological farming methods allows easier management of climate change impacts, drought-proofing by managed use of water and improving soil carbon content using this age-old carbon sequestration method.

Biological farming works together with nature as it aims to balance physical properties, chemical nutrients and biology of the soil leading to improved organic carbon content. It is possible to place biodynamics and most of organic farming in this system.

This method of farming utilises the all-important soil microbe-plant root relationship to manage the nutrient requirements of plants. Maximising photosynthesis to feed the soil food web via root exudates provides more pest and disease tolerance. Through increased protection by this natural defense mechanism, the plant has the potential to grow with greater nutrient density in its tissue and produce.

Biological farming principles and practices must include minimal disturbance to the soil, maximising diversity in the soil food web and any ground covering vegetation. While the biological farmer's mantra is 100% soil cover 100% of the time as one element of biomimicry, this is managed by a suite of methods. Rotational cropping, mixed and intercropping, green manuring and water harvesting by increased soil organic matter are just some. In any biological farming system, there is no waste. All plant material if not decomposing in-situ is a resource to be composted and reintroduced to the growing system.

Biological farming & regenerative agriculture can feed the world's population of humans and animals. At the same time, this soundly principled system of land management protects the environment while future-proofing the land against climate change impacts.

Organic, biodynamic and biological agriculture together could replace synthetic chemical conventional agriculture in a short time period if the will was there to do it.

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and many more.