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Advances in Organic Farming

Volume - 1

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Chapter - 7

Bio-dynamics in Organic Agriculture

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Introduction

A comprehensive, ecological, and moral approach to farming, gardening, food, and nutrition is known as biodynamics. Dr. Rudolf Steiner, a scientist and philosopher, is the founder of biodynamics. His 1924 lectures to farmers pioneered a new approach to fusing scientific knowledge with an appreciation of spirit in nature. Since the 1920s, biodynamics has advanced and changed as a result of the cooperation of numerous farmers and scientists (Steiner, 1992). Thousands of flourishing gardens, farms, vineyards, ranches, and orchards all around the world are practicing biodynamics. Anywhere food is cultivated, biodynamic principles and methods can be used with careful consideration for scale, landscape, climate, and culture. Anthroposophy, also known as the wisdom (knowledge) of the human being, was created as a result of this impact and his own research:

Anthropos=human being Sophia=wisdom

Recognizing that the human being (Manushya) is a spiritual entity is at the core of anthroposophy (Purusha). Steiner responded to the farmers' need for assistance during the early days of chemical farming in Europe when they saw the soil quality, produce quality, and seed viability rapidly deteriorating. A general decline in vitality had been apparent to them. Steiner then offered an alternative perspective on farming and the planet as a whole, demonstrating the links and interdependence of all living things.

Bios=life dynamic=energy

He demonstrated how contemporary science, and hence chemical agriculture, was founded on the observation of living nature and the intricate linkages that were continually changing within it, as opposed to the study of dead things in laboratories. He mentioned how, in the past, farmers had an innate understanding of how the motion of the planets and stars affected the lives of plants, animals, and people. He also included the universe with its moving planets and stars in this web of life. To understand how to coexist with nature most effectively as modern humans, we must rediscover this relationship, but this time in a very aware, quantifiable way.

Biodynamics is especially interested in the higher forces, the finer energies, and how they affect plants, animals, and people. Life is a study of energy from the coarse to the fine. The soil, and by extension, everything that grows there and every living thing that consumes those plants, is balanced and healed as a result of this awareness and interaction with the life energies.

1. History

The foundation of human life is agriculture. Simply put, we need to cultivate food in order to eat every day and to maintain our bodies, brains, souls, and spirits! One can see that throughout human history, our songs, artwork, crafts, and tools have all evolved from our work on the earth. But we have lost touch with our source of life over the past 100 years, and the pace has accelerated during the last few decades. Chemical farming is a byproduct of the World Wars, when it was discovered that the leftover chemicals from weaponry and fighting could be utilized as fertilizers and pesticides. Fossil fuel from the Earth, which is unsustainable and will eventually run out, is the source of agricultural chemicals.

Hybrid seeds, which are unable to create their own seeds once grown and instead depend on hybrid seed businesses, were also developed during the Green Revolution in the 1960s and 1970s. Additionally, the plants grown from these hybrid seeds are substantially weaker and require larger dosages of fertilizer and insecticides. The most current threat to the equilibrium and wellbeing of not only the Earth but also of us as humans is the recent introduction of genetically modified (GM) seeds (which go hand in hand with specialized herbicides, insecticides, and fertilizers). Due to the significant economic benefits associated with GM seeds, developing nations are unavoidably under pressure to adopt and legalize the usage of these seeds.

Today, we are acutely aware of the negative impacts of chemical farming on our health, farmers' livelihoods, soil health, and the welfare of all living things. In many areas, the soil is becoming harder and less able to replenish itself, requiring increasing amounts of chemical fertilizers to grow crops and piling up enormous debts for the farmers. Unknown diseases and disorders affecting both humans and animals are also emerging, along with new pests and diseases those are resistant to chemical pesticides. Many people are becoming aware that we are in the midst of a worldwide catastrophe. The biodynamic farming approach took a much delayed start but has gained popularity across the globe in recent decades. Farmer and gardener associations that practice biodynamic farming as well as certification organizations that guarantee the produce supplied by granting a Demeter certificate exist.

DEMETER=Greek goddess of the Earth

Using biodynamic techniques, a living soil is created that is in harmony with the planetary and cosmic rhythms. The intelligence and consciousness of the person caring for this area of the planet—the "ordering principle"—lie at the core of this endeavor. This profound understanding is founded on observation, a relationship with the land, Nature and love.

2. Main effects of using biodynamic agriculture

- To boost the nutritional value of food
- To replenish natural resources like the soil (by reintroducing organic matter), the seeds, and the water
- To establish a personal connection with the environment we live in, with Nature, which we are a part of, and to learn how to cooperate
- By supporting nature when it is weak due to continual use, most importantly, to serve the Earth and its inhabitants

3. Principles

The following categories are taken into account in order to create a system that balances all elements necessary for life:

Substance and Energy

Chemicals alone cannot sustain life; it requires the interaction of matter and energy. For instance, for plants to flourish, they require earth and water as well as sunshine and warmth. A balanced system is created by the interaction of matter and energy. We need to eat food that will supply the energy because we require both substance and energy to survive. Only plants

that have developed in a balanced soil can provide us with both substance and energy (via trace minerals, enzymes, and growth hormones).

Soil

One must focus primarily on the composition and vitality of the soil, including its nutrients, trace elements, microbes, worms, and other animals, in order to grow healthy, vital plants. The soil is basically a living network of connections and relationships. The plants that grow there will be stronger, healthier, and of higher quality if the soil is balanced in its life forces. No chemicals are needed. To be productive, the soil's structure must be crumbly, friable, properly aerated, and deep.

Organic matter

Effective usage of organic matter is necessary to develop this healthy, living soil. Building compost piles and utilizing biodynamic compost preparations are two ways to accomplish this.

Humus

This enigmatic, mystical element provides energy for life and transports all the nutrients plants require to flourish. It retains water and holds the soil's fertility in a steady manner. Rich, black, moist, and smelling fresh, humus is entirely digested raw organic matter. When converting to biodynamic farming, promoting the creation of the soil should be the top priority because this is the foundation for building it up.

Cow Manure

This is a very special substance that the holy animal Cow gave to us and is necessary for a healthy soil ecosystem. The lengthy digesting process of the cow adds a lot of good bacteria to the feces, making cow dung unique. It is utilized as a starter for compost heaps, for its nitrogen concentration, and in the creation of biodynamic preparations.

Cosmic Forces

Utilizing the preparations and adhering to the sowing calendar to recognize and work with the effects of celestial bodies on plant growth.

4. Features Of Biodynamic Farming

A Biodynamic Farm is a Living Organism

Every biodynamic farm or garden is a complete, integrated organism. Fields, forests, plants, animals, soils, compost, people, and the spirit of the area are just a few of the interrelated components that make up this

organism. In order to enhance the wellbeing and vitality of the whole, biodynamic farmers and gardeners strive to nourish and harmonize these elements. In order to establish and evolve their farm as a distinctive individuality, biodynamic practitioners also make an effort to listen to the soil and perceive any potential emerging needs.

Biodynamics Promotes Biodiversity

The diversity of natural ecosystems and the distinctiveness of each terrain serve as inspiration for biodynamic farms and gardens. Plant diversity can be increased by using a variety of crops, including annual and perennial vegetables, herbs, flowers, berries, fruits, nuts, cereals, pasture, fodder, native plants, and pollinator hedgerows. The diversity of domestic animals is also advantageous since each species has a particular relationship to the land and produces manure with a distinct composition. It is possible to gradually increase the variety of plant and animal life by beginning with a modest number of primary crops and one or two animal species (even tiny ones like earthworms or honeybees), and then adding more as the farm organism develops.

Plants and Animals Come Together in Biodynamics

Animals and plants coexist in natural ecosystems to fulfill complementary functions in the web of life. Many conventional and organic farms solely produce cattle or only grow crops, which, while in some ways more efficient, can lead to unbalances such as nutritional deficiencies in plants or pollution from excess manure (if only raising animals). Plants, animals, and soil are brought together in biodynamic farms and gardens through deliberate, living connections so that they all contribute to and balance the total.

Biodynamics Generates On-Farm Fertility

With the use of chemical fertilizer or hydroponic growing, biodynamic plants are grown in the ground in living soil, which offers a level of nutrition and health that is unattainable. By using cover crops, composting, integrating animals, and crop rotation, biodynamic farms hope to create their own fertility. Composting creates a harmonious relationship between soil, plant matter, and animal manures, transforming them into a rich source of strength and fertility for the farm organism. Including a variety of animals improves the soil's fertility by aiding in the cycling of nutrients. In addition to increasing plant diversity and providing the soil with oxygen and nitrogen, cover crops help improve soil fertility on farms. Crop rotation promotes variation in the soil's creative expression while balancing each crop's needs.

Together, these techniques help the farm progress toward equilibrium and resilience by reducing or eliminating the requirement for imported fertilizers.

Compost is Enlivened with Biodynamic Preparations

Six preparations prepared from yarrow, chamomile, stinging nettle, oak bark, dandelion, and valerian are used to enrich and animate biodynamic compost. Each of these healing plants goes through a distinct transformation process that connects it to the land, the seasons, and the animal life. Combining these compounds enhances their therapeutic effects, promotes the development of helpful bacteria and fungi, and produces highly concentrated ingredients that direct the compost's development. Just after the compost pile is constructed and again after it has been turned, a small amount of each preparation is added. By stabilizing nitrogen and other nutrients, increasing microbial diversity, and increasing the composting process' sensitivity, biodynamic preparations improve the quality of the compost. Compost made using biodynamic principles increases soil life and stable organic matter while adjusting the soil to the overall farm organism and external stimuli (Carpenter, *et. al.*, 2000). Additionally, biodynamic compost increases the amount of carbon in the living world, aiding in the rebalancing of the climate.

Biodynamic Sprays Enhance Soil and Plant Health

Several biodynamic preparations are used as poetized liquid sprays in addition to the compost preparations to provide healing, vigor, and sensitivity to the farm and garden. Horn manure, which is created by burying cow manure within a cow horn over the winter, improves the life of the soil and the interaction between soil and plants (Spaccini, *et al.* 2012) Horn silica is made from pulverized quartz crystals that are buried in a cow horn over the summer. It accelerates photosynthesis, increases ripening, and increases plant immunity. Horsetail tea balances the watery element in plants and soil and aids in the prevention of fungus illnesses. In order to help plants grow in a healthy and balanced manner, access the full spectrum of nutrients they require, and become more resistant to pests, diseases, and extreme climate conditions, biodynamic spray and compost preparations work together to bring plants into a dynamic relationship with soil, water, air, warmth, and cosmos (Fritz, 2014) .

Biodynamic Farmers Cultivate Awareness

The practice of biodynamic agriculture encourages us to engage in mindful and original dialogue with nature. We grow close relationships with our particular farm creatures and increase our capacity for perception,

introspection, and imagination by paying attention to, feeling, and listening to the land. A set recipe or prescription is not what biodynamics is. Developing awareness makes it easier for us to express the full vibrancy of the farm organism and work creatively with the dynamics of the land and larger bioregion.

Biodynamics Supports Integrity and Diversity in Seeds and Breeds

Heirloom, open-pollinated, non-GMO seeds and heritage breeds of animals are preferred by biodynamic farmers and gardeners. In order to create distinctive, locally-adapted, and sensitive plants and animals with excellent nutrition and flavor as well as resistance to pests and diseases, biodynamic farms strive to produce seed and animal stocks from within the farm. When this is not possible, selection and breeding are incorporated into farm activities. In developing plants and animals that may live in the present and contribute to the health of the farm and community, earthly and cosmic factors are taken into account, just as they are in other parts of biodynamics.

Earth and the Cosmos Move in Time with Biodynamics

The rhythms and cycles of the earth, sun, moon, stars, and planets are observed by biodynamic farmers and gardeners, who also try to comprehend the subtle ways that the environment and larger cosmos affect the growth and development of plants and animals. Detailed astronomical data and recommendations for the best times to sow, transplant, cultivate, harvest, and use biodynamic preparations are provided by biodynamic calendars, which aid in this awareness and understanding.

Biodynamics Treats Animals with Respect

Domesticated animals are cared for by biodynamic farmers in ways that promote their innate wellness and the full expression of their nature. Animals are never fed animal byproducts; instead, they are always provided food that is suitable for their digestive systems. Kids, lambs, and calves are raised on herd milk rather than milk substitute. Both cows and chickens maintain their horns because each portion of the animal serves a crucial natural purpose. All animals have access to the outside, free range foraging, as well as lots of room to roam.

Biodynamics Approaches Pests and Diseases Holistically

The main goals of biodynamics are to provide balanced nutrition, promote strong immunity, and foster the best possible circumstances for soil, plant, and animal health. Pests and diseases have few places to grow when farms and gardens use a wide variety of plants and animals and provide

habitat for natural predators. It might be argued that when a disease or pest manifests itself, it frequently indicates an imbalance in the farm organism and is nature's attempt to repair the imbalance. Biological controls can be applied in the event of an outbreak, but a biodynamic farmer also seeks to identify the underlying imbalance and determines how to modify management procedures to restore the farm organism to higher health.

Biodynamic Certification Upholds Agricultural Integrity

Demeter International oversees the Demeter Biodynamic® Standard for certification, which was created in 1928. There are more than 5,000 accredited farms worldwide, covering more than 400,000 acres. Demeter USA (www.demeter-usa.org) oversees biodynamic certification in the United States, which builds on the USDA organic standard while imposing additional standards. Beyond organic certification, the Demeter Biodynamic Farm Standard mandates that the entire farm, not just one crop, must be certified; that crops and livestock be integrated; that animals be treated humanely; that imported fertility be kept to a minimum; that biodynamic preparations be applied regularly; that at least 50% of the feed for livestock be grown on-site; and that at least 10% of the farm's total acreage be set aside for biodiversity and the farm upholds standards of social responsibility.

The Benefits of Biodynamics for Social and Economic Well-being

Biodynamic farmers are motivated by the true needs of people and the planet, and these demands frequently go beyond just growing food. The vast majority of biodynamic initiatives are inspired by Steiner's observations on social, economic, and spiritual life as well as agriculture and strive to demonstrate the triple bottom line principles (ecological, social, and economic sustainability). Biodynamic farmers created community supported agriculture (CSA), and many biodynamic practitioners work with other farms as well as with clinics, spas, social therapy homes, dining establishments, and other enterprises. Biodynamics is both a cutting-edge concept in regenerative agriculture and a potent movement for new theories and practises in all areas of life connected to food and the land.

Future Regenerative Solutions are provided by Biodynamics

Biodynamic farming and living promotes healing for the land, plants, animals, people, and planet. It is a mindful, inclusive, and responsible method of living and farming. Each individual, self-sufficient farm organism generously supports the ecological, economic, social, and spiritual health of its local area as well as the health of the entire living Earth. We can access new capacities in human creativity through biodynamics in order to detect

and respond to the demands of the Earth and to unveil novel solutions in a live and dynamic way.

5. Converting a farm to biodynamics

- The important criterion is to sustain the fertility of a farm that lasts for future. The rules that must be adhered to are
- All water soluble fertiliser short-term manuring for rapid growth is stopped. This results in plants that are nutritionally imbalanced and destroys the soil's structure.
- Put an end to any chemical weed-control techniques that could leave behind harmful residues that would prevent the growth of active soil life.
- The type of livestock kept on the farm is crucial because it has a special impact on the fertility of the soil.
- Promote the growth of earthworms, other soil microorganisms, and legumes. The biodynamic preparations make this better. This increases the soil's microbial life and balances the availability of nutrients. They also have an impact on humus's ongoing development.
- Ample trees are required to offer cover and shade, preserve moisture, guard from wind, and serve as predators.

Biodynamic Preparations

The effects of the planets, silica, and lime on the soil and plants are enhanced by using these straightforward, all-natural homoeopathic remedies. They are also used to speed up the decomposition process and potential life energies in compost piles. In addition to six preparations for composting, Dr. Steiner provided two preparations that could be sprayed directly on the plants or soil.

Crop Rotation

Crop rotation, proper soil cultivation, and other organic farming methods: intelligent planning to let the soil rest after heavy-feeding crops (such as potatoes, tomatoes, cabbage), by sowing green manures (legumes, clover) and covering the soil (grass, clover) so that it can build up its humus content and nitrogen levels; also mulching to improve soil structure, water and temperature balance, and weed control; companion planting to enhance growth and to control weeds; companion planting to enhance growth and to

control pests; using herbal tea sprays, special tree paste for fruit trees, creating raised beds, disturbing the soil as little as possible by shallow digging/ploughing and avoiding stepping on it or working it when wet, especially clay soils.

Peppering

Collecting insects, weed seeds, or dead animal skins and burning them at the right time according to planetary positions can help solve an unbalanced insect, animal pest, or weed problem. The ash can then be made into a homoeopathic remedy and sprayed on the land. This works well as a biodynamic substitute for chemical sprays.

The farm organism

The healthier a farm is, the more self-sufficient it may be. The goal is to have a diverse range of plants and animals, and to bring in something from outside (such as manure or bio-pesticides) only if there is an imbalance that needs to be corrected, such as medicine. The farmer, the human being who observes and has a strong interaction with everything on the farm and makes decisions, is at the heart of the farm organism. Water source and balance are important components of the farm, as are the prevention of soil erosion by planting trees and hedges, which also help with wind protection and provide animal habitat, and being conscious of insect life and balance, which may include looking after honey bees. As a result, the farmer is accountable for many creatures and for establishing proper relationships, and he is the temporary steward of the land rather than the owner.

Weeds, Pests and Diseases

Weeds developing in specific locations indicate a soil shortage, just as pests and illnesses indicate a flaw in agricultural operations. They are indicators that assist us understand where the problem is and aid in the correction of imbalances. They are not enemies, but rather buddies! It is well understood and confirmed that insect pests and illnesses only attack weak plants, therefore balancing the situation and motivating us to be better farmers and gardeners.

6. Practical Application

- Walk around your land every day and become familiar with all of its aspects: minerals, rocks present, type of soil, wild plants growing, types of weeds, insect life, animals present day or night, electric wires crossing over the land, underground streams, presence of water, weather patterns, people living on or using the land.

- Implement environmental controls: plant hedges and trees for wind protection, maintain proper drainage, and be mindful of water quality, use, and collection.
- Introduce soil-protecting crop rotations and cover crops.
- Improve soil cultivation practices.
- Introduce green manuring, carefully plowed or dug under.
- Mulch as much as possible; the Earth wants to be covered and will cover itself with weeds!
- Create compost heaps and treat them with the preparations: do not throw away any organic leftovers and gather everything. Compost manure and all other organic materials first, and then apply when entirely broken down! Any under-com posted pieces can be sieved and re-decomposed. Larger branches than your wrist should be composted separately because they will take much longer to decompose.
- As needed, supplement with Cowpat Pit Preparation, Panchagavya, or natural liquid fertilisers (equisetum tea, fermented nettle manure).

7. Organic Vs Biodynamic

For one thing, biodynamic farming incorporates a few extra substances, such as fermented manure and plant and mineral-based preparations, into the soil, crops, and compost, in addition to all of the approaches utilised in organic farming. These compounds are supposed to stimulate the soil nutrient cycle, the creation of compost, and photosynthesis.

Steiner presented another distinct and crucial aspect of biodynamic farming: the flow of cosmic energy in all aspects of farming. Biodynamic farming is also a well-thought-out and tested strategy that may be applied to farm structures in general. Its primary ideology emphasises the development of a farm that functions holistically as one unit, with its soil, animals, humans, and plants envisioned as diverse "organs of one living organism." The health of the "farm as an organism" is dependent on each of its organs cooperating with the other organs and with the environment. Energies must flow between each organ in tandem with cosmic energy, resulting in the construction of a self-sustaining farm.

To take a step back and look at it more practically, a farm's manure and compost needs can be met by using farm waste, legumes, cover crops, and animal waste. An integral component of biodynamic farming is well-

managed livestock. Weed and pest control is accomplished through mechanical or physical removal, homoeopathy, crop rotation, and other non-chemical methods.

Biodynamic agriculture is a subcategory of organic agriculture in general. It employs several biodynamic soil and plant preparations based on various compost, minerals, plants, and herbs, with all farm activities regulated by the lunar calendar.

8. Positive Impact

Biodynamic preparations influence the soil microbial community both directly and indirectly by altering the environment and boosting microbial development. A change/increase in the microbial community regulates plant diseases and promotes nutrient availability in the soil. Artificial microbe additions are typically short-lived in the absence of a suitable supportive environment. The number and composition of the microbial community are determined by the availability of food and habitat for helpful microbes. Repeated application in conjunction with habitat modification approaches results in long-term changes in the soil microbial community.

Since this agronomic system is based on a holistic approach to the entire farm, the use of preparations alone will not be defined as a biodynamic farming approach. However, the only method to compare the outcomes of different farming systems is to investigate the impact of various preparations on the plant and the soil. Thousands of farms are using biodynamic methods and preparations, indicating that there are substantial benefits.

9. Advantages

- Production of high-quality fruits and vegetables with strong flavors and high nutrient levels (protein and vitamin content)
- Yields that are always above average, higher on average than those produced by organic farming, and consistently high over time, as opposed to chemical farming's falling yields as the soil mineralizes and pest populations become unbalanced and a problem.
- Few problems with livestock and plant diseases
- There is no spread of insect pests and no significant economic damage as a result of their presence: The issue of insect pests is one of balance and control, which can be restored through proper management such as planting shrubs and trees to house natural predators.

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