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Biodynamic Farming

Sreeremya .S
Assistant Professor
Department of Biotechnology
Sree Narayana Guru College, Coimbatore, Tamil Nadu
Corresponding author's email id: *sreeremyasasi@gmail.com*

Abstract

Biodynamic farms and gardens mainly mimic the biodiversity of natural ecosystems, amplifying the health and resilience of the farm organism. Annual and perennial vegetables, herbs, flowers, berries, fruits, nuts, grains, pasture, forage, native plants, and pollinator hedgerows can very much contribute to plant diversity. Diversity in livestock is much beneficial, as each animal species brings a different relationship to the land and unique quality of manure. The diversity of plant and animal life can be mainly developed over time, starting with a few primary crops and one or two species of livestock (even as small as earthworms or honeybees), and adding more species as the farm organism matures.

Keywords: *Biodynamics, Ecosystem Diversity, Plants, animals*

INTRODUCTION

The Biodynamic Preparations

A distinguishing characteristic of biodynamic farming is the use of nine biodynamic preparations described by Steiner for the purpose of enhancing soil quality and stimulating plant life. They comprise of mineral, plant, or animal manure extracts, usually fermented and applied in typically small proportions to compost, manures, the soil, or directly onto plants, after dilution and stirring procedures called dynamizations. The original biodynamic (BD) preparations are numbered 500−508 (Remer et al., 1995). The BD 500 preparation (horn-manure) is mainly made from cow manure (fermented in a cow horn that is buried in the soil for six months through autumn and winter) and is availed as a soil spray to stimulate root growth and humus formation. The BD 501 preparation (horn-silica) is made from

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finely powdered quartz(packed inside a cow horn and buried in the soilfor six months through spring and summer) and applied as a foliar spray to simulate and regulategrowth. The next six preparations, BD 502−507,are used in making compost(Proctor et al.,1997). In the last step there is BD preparation 508 which isprepared from the silica-rich horsetail plant(Equisetum arvense) and used as a foliar spray tosuppress fungal diseases in plants.

The BD compost preparations are listed below:

- No. 502 Yarrow blossoms (Achilleamillefolium)
- No. 503 Chamomile blossoms (Chamomilla officinalis)
- No. 504 Stinging nettle (whole plant in full bloom) (Urticadioca)
- No. 505 Oak bark (Quercusrobur)
- No. 506 Dandelion flowers (Taraxacumofficinale)
- No. 507 Valerian flowers (Valerianaofficinalis)

Biodynamic preparations are intended to aid moderate and regulate biological processes as well as enhance and strengthen the life (etheric) forces on the farm. The preparations are availed inhomeopathic quantities, meaning them producean effect in extremely diluted amounts. As anexample, just 1/16th ounce ,a level tea spoon of each compost preparation is added to seven- to ten-ton piles of compost(Podolinsky et al.,1989).

BIODYNAMIC COMPOST

Biodynamic compost is a fundamental and basic component of the biodynamic method; it serves as a way to recycle animal manures and organic wastes, stabilize nitrogen, and build soil humus and enhance soil health. Biodynamic compost is unique because it is majorly made with BD preparations502−507. Along with the BD preparations and BD compost may be considered the cornerstone of biodynamics. Here again, “biological” and “dynamic” qualities are complementary: biodynamic compost garners as a source of humus in managing soil health and biodynamic compost emanates energetic frequencies tovitalize the farm(Podolinsky et al.,1985). Biodynamic farming is an advanced organic farming system that is gaining increased attention for its emphasis on food quality and soil health. Biodynamic farming is developed by Rudolf Steiner in 1924. A basic principle of biodynamic farming is that food raised dynamically is nutrionally superior and tastes better than foods produced by conventional methods.

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This is a very common thread in alternative agriculture; because other ecological farming systems make similar claims for their products. Biodynamic farming was the prime ecological farming systems to develop as a grassroots alternative to chemical agriculture. Biodynamic farming is an alternative variant where the chemical fertilizers are totally replaced by microbial (biological) nutrient givers such as bacteria, algae, fungi, mycorrhiza and actinomycetes (Pfeiffer et al., 1984). A basic ecological principle of biodynamics is to conceive of the farm as an organism, a self contained entity. Emphasis is given on the integration of crops and livestock, recycling of nutrients maintenance of soil, and the health and wellbeing of crops and animals; the farmer too is part of the whole. There are nine biodynamic preparations for the purpose of enhancing and nourishing soil quality and stimulating plant life(Pfeiffer et al.,1985). They comprise of mineral, plant or animal manure extracts, usually fermented and applied in small proportions to compost, manures, the soil or directly on to plants, after dilution and stirring procedures termed dynamizations. Biodynamic compost is a fundamental component of biodynamic method; it serves as a way to recycle animal manures and organic waste, stabilize nitrogen and build soil humus and enhance soil health. Biodynamic compost is very much unique because it is made with BD preparations 502-507. Biodynamic compost serves as a source of humus in managing soil health and biodynamic compost emanates energetic frequencies to vitalize the farm. After the compost, preparations 502-506 are strategically placed 507 feet apart inside the pie, in holes poked about 20 inches deep. Preparation no 507 are liquid valerian, is applied to the outside layer of the compost by spraying or hand watering. Valerian (507) is mixed into liquid; a portion is typically poured into one hole, and the rest is sprinkled over the top of the compost pie (Pfeiffer et al., 1983).

Lunar and astrological cycles play a pivotal role in the timing of biodynamic practices, such as the making of BD preparations and when to plant and cultivate. Recognition of celestial influences on plant growth is main part of the biodynamic awareness that subtle the energy forces affect biological systems. For pest attacks herbal extracts should be availed only as a final remedy after utilizing and practising all the above control methods (Wood, 1935). The fact remains that biodynamic farming is practiced on a commercial scale in many

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of the developed and developing countries and gaining wider recognitions for its contributions to organic farming, food quality, and community supported agriculture, qualitative tests for soils and composts. From a practical point of view biodynamics has typically proved to be productive and to yield nutritious, high quality foods (Goulden et al., 1985).

ORIGINS OF BIODYNAMIC FARMING

In the year 1930's a group of German farmers were concerned with the modernizing ways of agriculture. Artificial fertilizer, pre Green revolution, was beginning to be applied in the field of agriculture. Farmers, like this group, were concerned with soil infertility and food quality. They turned to Austrian born philosopher, scientist, botanists, and founder of anthroposophy, Rudolf Steiner, for help. In the summer of 1934 in Koberwitz, Germany, Rudolf Steiner gave eight lectures on agriculture that became the beginning and foundation of Biodynamic farming (Whicher, 1977). The name "Biodynamic" ("bios" for life and 'dynamis" for energy).Mainly refers to farming with the energies which create and maintain life. Steiner believed that the use of external, artificial and chemical inputs, along with business of modern farming, was removing agriculture from its spiritual and physiological link to the earth. Steiner said, "In the case of this material age of ours, we lost the knowledge of what it takes to continue to care for the natural world. Bio-dynamic farming is an alternative variant where the chemical fertilizers are totally replaced by microbial (biological) nutrient like bacteria, algae, fungi, mycorhiza, actinomycetes. Biological Pest management of crops is undertaken by employing predators, parasites and other plethora of natural enemies of pests, in addition to all the rest of option that aid to avoid resorting to chemical pesticides (Dornach, 1989). These agents could be augmented into farms or promoted through such activities that favour their flourished activities. Composting, Green manuring, crop rotations,. Intercropping, mixed cropping etc. as well as bird perches, trap crops also promote such biological activities. Although interpreted differently by various proponents, organic farming, biological farming, regenerative farming, bio-dynamic farming. Low external input sustainable agriculture (LEISA), low input sustainable agriculture (LISA) and sustainable agriculture account the same ideology that provide integrated efforts to maintain agro ecosystems with futurism(Wachsmuth,1929). Organic

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farming could then focus and signify all such farming practices. Shri Kapil Shah indicated that a Organic farming is a philosophy for sustainable rural development and a not a technological market or commercialization option alone. This is quiet significant because organic farming cannot be viewed in isolation as for export market, but also could be a way of life in the Indian rural context. Therefore, organic farming can be defined as socially just, environment friendly and economically viable alternative to chemical oriented farming (Wachsmuth, 1926). An alternative system is termed Eco-technological farming, has often been equated to organic and bio-dynamic farming in the Indian context. This system is an effective bend to traditional practices of wisdom with appropriate modern advances of science. Integrated nutrient management (INM), integrated pest management (IPM), Chemigation (Sreeremya, 2017a) and fertigation (Sreeremya, 2017b) with optimum use of inorganic inputs is advocated. In fact, organic and bio-dynamic farming signify the synthesis of a kind of chemical residue-free organic labelled products to sensitive consumers. Organic is a 'process claim' rather than a 'product claim'. This is because the agricultural products such as cereals, pulses, grams, fruits, spices or cotton cannot be distinguished into organic type or inorganic type. Several different countries and multitude of private certification organizations have defined in similar ways organic farming as agriculture (Vreede, 1929). There were wide differences initially that the demand for constituency by multinational traders has led to great uniformity. Internationally networked non-governmental organization, called International Federation of Organic Agriculture Movement (IFOAM), has permitted the use of certain products for soil conditioning and for pest and crop growth management. The basic rates of organic production are that natural inputs are approved and synthetic inputs are prohibited). The Hanoi declaration of IFOAM (1994) emphasizes that the Asian history of agriculture spanning to thousands of years, is in deep connection with cultural and ecological diversity (von Keyserlingk, 1999). The decades old colonial rule as well as misdirected policies has undermined this balance. The aggrandized food production in certain countries also paid for the cost of degradation of traditional diversity of crops and animals. Other international movements are Commission on Sustainable Development (CSD), Society for International Development (SID), International Union for Conservation of

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Nature (IUCN) and Bread for the world. The Codex Committee of World Health Organisation on Food Labelling has been guiding the approval of certain specific products (von Pilasch, 1928). The broad definition of organic agriculture recommended by Codex Alimentarius Commission is much useful for practical purposes under Indian situation. “Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasized the use of typical management practices in preference to the use of ‘off-farm’ inputs, taking into account the regional conditions require locally adapted systems. This is achieved by availing where possible agronomic, biological and mechanical methods, as opposed to using any synthetic materials to fulfill any specific function within the system.

PROMOTION OF ORGANIC FARMING BY ICAR AND DEPARTMENT OF AGRICULTURE AND COOPERATION

The seeds of commercial Indian "Organic cotton" cultivation were sown for the first time in Maharashtra in the early 1980s. Some progressive farmers, distressed by the negative effects of pesticides for insect suppression in cotton crop, reduced the chemical inputs and increased the use of organic manure, developed their own techniques systematically to optimise resources in order to develop sustainable farm. The pioneers, in this field, are M.V. Wankhede, S.P. Wankhede, R.S. Wankhede (from 1978 onwards) of Amaravati dist., AnantraoSubhedar, Om PrakashMor and Tukaram Bhimsingh Jadhav of Yavatmal dist. (from 1990 onwards, after being introduced to the "Fukuoka" type of farming to them by Shri Dabholkar of Pune), or Shri Jain (for at least 60 last years) of Karanja-Lad who has a historical cultivation background of a few decades. They tested the `Fukuoka' principles of farming, and stabilised their farms due to their ingenuous approaches (Forest et al.,1927). A team of CICR scientists visited the Yavatmal farms in 1991 crop season to analyse their package of practices. Similar efforts of promotion of organic farming have been made in many states. Efforts have been made by the NGOs to study organic farming in Gujarat, Madhya Pradesh, Kerala, Karnataka, Tamil Nadu. Agricultural Universities organised workshops, Group meetings. Seminars and Conferences on this topic drew much attention of scientists to the need of research in this area. The use of biofertilizers, biopestides,

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vermicompost, Farmyard manure, green manure, crop residues have been based on long experimentation (Rudolf Steiner,1922). A number of farmers, NGOs and even some Universities/Institutions are practising organic farming, using traditional sources and methods of nutrient supplies to the crops and non-chemical forms of plant protection measures with varying degree of success. The technology adopted and methods followed are not well-documented (Forest, 2004). There has been a good suggestion from ShriKapil Shah who emphatically proposed that the Universities and institutions that are undertaking organic farming trials should not only go about INM and IPM. It is extremely essential that the philosophy of organic farming is percolated to them properly. It is for the researchers, basically to evolve separate protocols for the conduct of organic farming trials. A distinction is necessary at this stage between the trials of organic farming and biodynamic farming typically including the eco-technological approach wherein the organic inputs approved by the certifying agencies are tested in replicated or large-plot trials instead of combining INM and IPM(Rudolf Steiner,1902).

Due to indiscriminate use of hazardous insecticides for regulating cotton pests, the resistance of insects against the insecticide hiked up and in turn compelled the use of more number of sprays, and thus a vicious cycle is created, escalating cost of cultivation. Organic farming will aid in reversing this trend. Evidences on poorer choice of multiplication rate of pests on organically grown cotton are encouraging factors to pursue this protocol Bio Dynamic Compost

BIODYNAMIC PRACTICES

The principles of biodynamics have been much practiced all over the world. Farming with biodynamics requires a sacred heart to have much wisdom and knowledge in effective farming, like organic farming, biodynamic farming also promotes biological diversity. Different types of crops bearing products from the root, leaf, flower and fruit are much planted in the same area. Animals are integrated in the farm. Crop rotation or sequencing is also practiced as part of biodiversity for farming system. Planting of crops is fundamentally based on the BD sowing calendar that is based on the lunar and zodiac influences. Diversity of crops decreases insect damage and disease infestation and increases land productivity. Nutrient cycling is promoted by the

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different nutrient pumping levels of the plants depending on the depth of its roots in composting is crucial in the process (Steiner,1923). Diversity also balances the different energy since different plants are governed by certain predominating cosmic forces such that the presence of the other balances the whole system.

The following are some of the biodynamic practices that enhance diversity:

1. Choice of crops and varieties. Species and varieties cultivated should, as far as possible, be resistant to pests and diseases, tolerant to much adverse climatic conditions and adaptable to soil and general environmental conditions. Local crops and varieties are far superior To imported or exotic ones.

2. Organic seeds and plant materials used should be from certified organic production or from the same farm. Seeds to be planted should be produced organically free from chemical fertilizers and pesticides and grown biodynamically in the area for at least two years. Species is important but within species cropping should also involve several varieties or cultivars (genetic diversity).When certified organic seeds and plant materials are not available, chemically untreated conventional materials may be used for a start (Routledge,2013)

3. ***Genetic diversity-*** Multi cropping and the integration of different crops and different varieties in the fields prevent genetic erosion and control pests and diseases infestation. Enhancing soil health and productivity much includes composting, green manuring, crop rotation and mulching. Chemical fertilizers destroy the life and other properties of the soil. Composting is done with the plant residues found in the farm. The compost also improves soil structure, aeration, water holding capacity, and cation exchange capacity. It elates organic matter content of the soil and promotes activities and proliferation of soil microorganisms. The Biodynamic Preparations are the corner stone of Biodynamics An enlarged view of Life and Nature has led to the elaboration and use of a series of catalytic substances which are a key part of Biodynamics. By improving the soil life and fertility they act on various essential processes at work in Nature, notably those related to key elements in agriculture, such as Silica, Lime,

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Potash, Phosphorus, Sodium, Nitrogen, Hydrogen, Oxygen, Carbon and Sulphur. These biodynamic preparations are added to compost heaps , pile or liquid manure to improve the quality of the fermentation and recycling process, or, stirred in water (potentised), are sprayed on the soil and on plants. The several preparations which are derived from the plant, animal and mineral realms, specifically from quartz, cow manure and certain medicinal plants, stimulate the life and organizational forces of plants and soil (Sponsel, et al.,2012). Biodynamics also proposes a much series of innovative methods and remedies that aim at reducing weeds and pests. Moreover the biodynamic preparations which already help in this respect, they include substances derived from these potential trouble makers as well as an attempt to typically organize the work schedule in harmony with solar, lunar and planetary influences as referenced in the biodynamic calendar. The methods and strategies for making the biodynamic preparations are in the public domain and are not subject to the drawbacks of commercial secret or exorbitant costs. They can be purchased or made individually or collectively by joining a group of biodynamic practitioners. For optimum results, they should be of much good quality and be associated with solid agricultural practices such as low till cultivation techniques, minimum soil compaction by heavy machinery, agro forestry and sound crop rotations including companion cropping, cover crops, multi-species green manures, perennial crops and long term pastures. Moreover, the presence of livestock on the farm, in particular a herd of cattle, is a great asset for achieving an optimum economical and ecological balance(Scollan et al.,2006).

CONCLUSION

Biodynamic farming is an alternative method which can be implemented to conserve the natural ecosystem. In a way a biodynamic preparation includes the adapted techniques from integrated techniques from herbigation and chemigation too.

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