

## Biodynamic Farming: A sustainable Farming Method

Bordoloi, A.<sup>1</sup> and Hazarika, D. N.<sup>2</sup>

<sup>1</sup>M.Sc. (Agri) Student and <sup>2</sup>Professor, Department of Horticulture, Biswanath College of Agriculture, Assam Agricultural University, Biswanath Chariali, Assam

### SUMMARY

The biodynamic method of agriculture started very slowly but has been becoming popular in the last few decades throughout the world. This farming system treats soil fertility, plant growth and livestock care as ecologically interrelated tasks, emphasizing spiritual and mystical perspectives. By encompassing the natural environment in its overall vision, biodynamic agriculture aims to produce the best possible in ways that allow future generations to obtain the same – or even better – results. The soil itself is a key in this type of agriculture, because it is ultimately dirt on which all life on earth depends. Biodynamic agriculture focuses on ensuring self-sustainability of the soil, by using special manures and herbal preparations to enhance soil health, integrating plants and animals and encouraging biodiversity.

### INTRODUCTION

Biodynamic agriculture is a form of alternative agriculture very similar to organic farming, but it includes various esoteric concepts drawn from the ideas of Rudolf Steiner. Biodynamics is a holistic, ecological, and ethical approach to farming, gardening, food, and nutrition. It considers the farm as an autonomous and living organism and structure. The concept is as the word itself would suggest: a combination of biological and dynamic practices, "bio" means life and "dyn" means force. The practice and philosophy of the biodynamic methods are based on the worldview of Anthroposophy. It uses management practices that are intended to "restore, maintain and enhance ecological harmony" (Lotter, 2003). Growing of only one crop in a farm causes a decrease in the soil nutrients. Therefore, biodynamics mainly focuses on crop diversification or growing different crops instead of going with monoculture (Reddy, 2019). Each biodynamic farm is considered as an integrated, whole, living organism and this organism is made up of many interdependent elements such as fields, forests, plants, animals, soils, compost, people and the spirit of the place and biodynamic farmers work to nurture these elements, managing them in a holistic and dynamic way to keep up the health and vitality of the whole. India is probably the only place where the principles of biodynamic farming, which began in Germany over 90 years ago are culturally accepted without questioning. This type of agriculture, which remains rather idealistic for the majority of agriculturalists, is drawing more and more followers, farmers who are coming to recognise the negative impacts of conventional agriculture and seeking out methods that are more in tune with nature than with the synthetic fertilisers lobby.

### Importance of Biodynamic Farming

- Each biodynamic farm is an integrated, whole, living organism. This organism is made up of many interdependent elements: fields, forests, plants, animals, compost, people, and the spirit of the place.
- The main goal of biodynamic farming is to maintain the soil fertility which in turn helps us to get back to the previous environment (Reddy, 2019).
- Biodynamics strives to maintain the habitats and diversity of the plants and animals in the region.
- Growing of only one crop in a farm causes a decrease in the soil nutrients. Therefore biodynamics mainly focuses on crop diversification or growing different crops instead of going with monoculture (Reddy, 2019).
- Biodynamic farming avoids the use of chemicals and off-farm inputs in the farm. Biodynamic farms aspire to generate their own fertility through composting, integrating animals, cover cropping, green manuring and crop rotation.
- Disease and pest control method is followed with the things available at the farm.
- Attention to factors such as light penetration and airflow, timing of planting and understanding predator habitats can help with natural pest control in biodynamic farming.
- The control of weeds also done with proper planning, understanding the weed life cycle and making a few adjustments in terms of fertility of the soil (Reddy, 2019).

- Water conservation and biodynamic feed for livestock are other key features of this approach to farming.

### Principles of Biodynamic Farming

Central principles of biodynamic farming include crop diversification, crop rotation, animal husbandry, composting, homeopathic solutions and life forces (Cahill, and Georgaklis, 2009).

- **Crop diversification:** It is a method of keeping soil healthy by allowing a variety of plants to grow on uncultivated land; it's enhanced by mixing crops so plants work in support of each other (if one plant depletes a certain nutrient in the soil, a companion plant releases the required nutrients or the loss one into the soil).
- **Crop rotation:** Cultivation of single crop in most of the conventional farming lead to loss of nutrients from the soil, making it dry and infertile. Crop rotation helps in the use of lands in perfect way, encourages healthy soil, and reduces parasites and controls weeds and pests.
- **Animal husbandry:** One of the main principles of biodynamic farming is the involvement of livestock in farming. Through the introduction of livestock into the farming, there would be an integration of the crops and animals which would help each other reducing the usage of any inputs from the external environment of the farm. The waste produced by the animals can be applied to plants as manures instead of applying chemical fertilizers and the plants can be used as feed for the livestock.
- **Composting:** Composting is also one of the principles in biodynamic farming. The recycled manures and organic waste in the compost pile create humus, which is the source of healthy soil in the farm. When spread on fields, the humus stabilizes nitrogen in the soil, vital to crop productivity.
- **Homeopathic solutions:** There are nine homeopathic preparations based on extracts from animal, plant and mineral manure, each diluted into sprays and used sparingly to homeopathically treat compost, soil and plants in a process called dynamization.
- **Life forces:** Life forces are the principle that separates biodynamic farming from other methods of agriculture. Because it ensures that in addition to earthly influences (biology, physics, chemistry), cosmic forces (moon phases, celestial and seasonal cycles) play an important role in the life of the farm (Reddy, 2019).

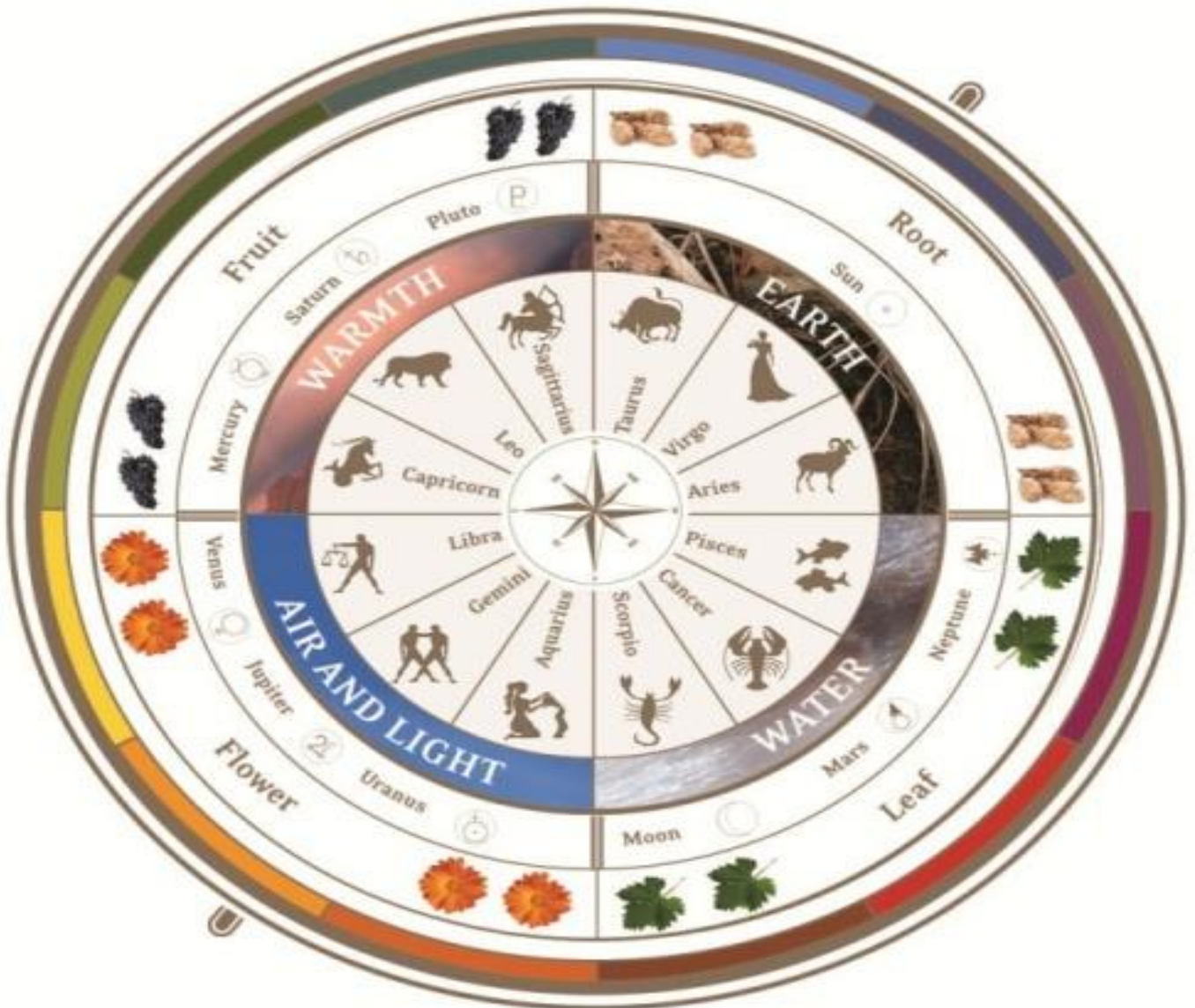
### Biodynamic Pillars

Some biodynamic practices are considered as biodynamic pillars, such as lunar and cultural calendar synchronisation, the use of preparations (for the crops and/or the compost) made from medicinal plants, cow dung and quartz. The dynamization of slurries by stirring the preparation is another one.

### Biodynamic Calendar

After 40 years of research by Maria and Matthias Thun and others on the influences of the moon, planets and constellations on plant growth, published an annual astronomic calendar, *The Maria Thun Biodynamic Calendar* which is used by biodynamic farmers, growers, gardeners and others to determine auspicious sowing, planting, cultivating and harvesting times of crops. Biodynamic provide detailed astronomical information and indications of optimal times for sowing, transplanting, cultivating, harvesting, and using the biodynamic preparations.

Each month the moon moves through all twelve constellations of the zodiac in turn. This is referred to as the moon's sidereal cycle and forms the basis of the biodynamic calendar. Since ancient times the twelve zodiac constellations have been associated with the each of the four elements: earth, water, air, and light. Three constellations are connected to each element, and each element is related to a part of the plant: thus, Earth – root; water – leaf; air – flower; fire – fruit. For example, for sowing or harvesting carrots an earth – root day should be chosen; for lettuce – a water – leaf day; for beans and apples – a fire – fruit day; and for cut flowers and broccoli – an air – flower day.

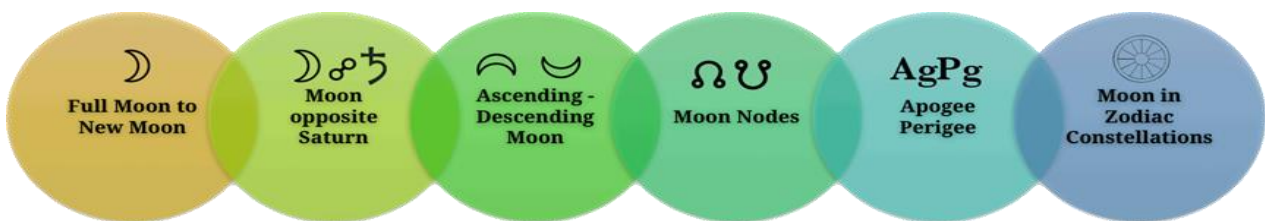


**Fig : Maria Thun biodynamic calendar**

*Source: Thun, M., Gardening of life*

Astronomy scientists can calculate the exact time the Moon passes through each constellation. These times are given in the Planting Calendar.

The biodynamic farmer works primarily with 6 different moon rhythms that recur every 27 to 29 days. The Planting Calendar indicates the important days for farming activities during these 6 different rhythmic cycles each month.



**Fig. : 6 moon rhythms**

A biodynamic calendar is prepared every year by almost every country by considering both the positive and negative impacts of the rhythmic cycles.

**Preparations (for the crops and/or the compost) made from medicinal plants**

There are nine homeopathic preparations based on extracts from animal, plant and mineral manure, each diluted into sprays and used sparingly to homeopathically treat compost, soil and plants in a process called dynamization. Each preparation is numbered, 500 to 508 in which six are very important for composting, two are used to stimulate humus and one is used to suppress fungal disease on crops.

**Table : Biodynamic preparations along with its uses**

BD Set	Base material	Use	Connected with
BD-500	Cow manure	Field spray	Soil biological activity
BD-501	Silica	Field spray	Plant resilience
BD-502	Fermented flower heads of Yarrow ( <i>Achillea millefolium</i> )	Compost preparation/ inoculant	K & S process
BD-503	Fermented chamomile blossom ( <i>Matricaria recutita</i> )	Compost preparation/ inoculant	K & Ca process
BD-504	Whole shoot of stinging nettle with flower ( <i>Urtica dioica</i> ) fermented in the soil	Compost preparation/ inoculant	N management
BD-505	Fermented Oak bark ( <i>Quercus robur</i> )	Compost preparation/inoculant	Ca processes
BD-506	Fermented flower heads of dandelion ( <i>Taraxacum officinale</i> )	Compost preparation/inoculant	Si management
BD-507	Valerian flower extract ( <i>Valeriana officinalis</i> )	Field spray, Compost preparation/inoculant	P and warmth process



**Fig. : Preparation and burying of cow horn manure (BD-500)**



**Fig. : Silica crystals for preparation of cow horn silica and its application (BD-501)**

The BD sets are used in the Cow Pat Pit (CPP), BD- compost, Biodynamic liquid manure, and Biodynamic liquid pesticides. These work to regulate the composting process and enable the different elements (calcium, nitrogen,

phosphorus) needed for healthy plant growth to be present in a living way (Pathak and Ram, 2004). Biodynamic preparations strengthen the quality of the compost by stabilizing Nitrogen and other nutrients, multiplying microbial diversity, and bringing more sensitivity to the composting process (Carpenter *et al.*, 2000).

### Application of Biodynamic compost

Biodynamic compost is a fundamental component of the biodynamic method. It serves as a way to recycle animal manures and organic wastes and enhance soil health. Biodynamic compost is unique because it is made with BD preparations 502-507. Five deep holes should be made in the side of the compost heap and 1g each of the BD502-506 preparations should be put as 1BD/hole. 10t compost/acre should be applied (Indhirajith and Pillai, 2020).

### Cow Pat Pit (CPP):

Cow Pat Pit (CPP) is a specialized type of compost refers to cow manure mixed with crushed eggshell and basalt dust, then put into a 12 inch deep pit lined with bricks. The dung is fermented to gather with the preparation BD502-507 for a period of three to four months. It is applied in the evenings during the cooler months. It is a biodynamic field preparation and is also called as soil shampoo. CPP is a soil conditioner and it enhances germination, promotes rooting in cutting and grafts, improves soil texture, provides resistant to plants against pests and diseases (Indhirajith and Pillai, 2020).

### Pests and Disease Management:

Biodynamic pesticides prepared from cow urine, neem, karanj (*Pongamia glabra*), *Caliotropis* sp., castor, *Thevtia nerrifoli*, *Vitex* spp. leaves is sprayed for management of pests and diseases. Two sprays of BD-501 should be done at flowering and fruit development stages. Biodynamic tree cow dung paste should be applied for the control of gummosis and dieback. Spraying of horsetail (*Equisetum arvensis*)/Casuarina leaves extract should be done for the control of fungal diseases in ascending moon period (Pathak and Ram, 2004).

### CONCLUSION

Growing concerns about the multifaceted harmful effects of conventional agriculture have led many farmers and consumers to seek alternative practices and systems, such as organic and biodynamic farming systems, that promote to improve the soil and product quality and will make agriculture more sustainable. Biodynamic farming is practiced on a commercial scale in many countries and is gaining wider recognition for its contributions to organic farming, food quality, community supported agriculture, and qualitative tests for soils and composts. Biodynamic farming is important and alternative method that could provide more sustainable farming system.

### REFERENCES

- Cahill, E. and Georgaklis, G.A. (2009) Creating a viable farming model for local food system. Biodynamic. <https://www.biodynamics.com/creating-a-viable-farming-model>
- Carpenter, B.L.; Reganold, J.P.; Kennedy, A.C. (2000). Effects of biodynamic preparations on compost development. *Biol. Agric. Hortic.* **17**:313–328
- Indhirajith, S. and Pillai, S. C. (2020). Biodynamic Farming, Research Gate, <https://www.researchgate.net/publication/341179816>
- Lotter, D.N. (2003). Organic Agriculture. *J. Sustain. Agric.* **21**(4):59-128.
- Pathak, R.K. and Ram, R.A. (2004). Organic farming systems prevalent in India. Research Gate. <https://www.researchgate.net/publication/265600962>
- Reddy, J. (2019). Biodynamic Farming Principles, Preparations and Advantages. Agrifarming. January 4, 2019. <https://www.agrifarming.in/biodynamic-farming-principles-preparations-advantages>
- Thun, M., (2000). Gardening for Life- The Biodynamic Way: A Practical Introduction to a New Art of Gardening, Sowing, Planting, Harvesting, *Harrington Press*, ISBN 13: 9781869890322, pp. 123.