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Concept, Background, and Feasibility of Organic Agriculture and Biodynamic Agriculture

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Abstract

The natural way of farming goes by several names today – biological agriculture, biodynamic agriculture, organic agriculture, organic-biological agriculture, and ecological agriculture. The natural way of farming comprises two major components or inputs: (1) organic matter, which is transformed by the macro- or micro-organisms in the soil, resulting in the release of plant nutrients; and (2) cosmic energy, which makes the zodiacal constellations influence both the living and the non-living. An agricultural production that harnesses cosmic energy with the organic inputs should obviously be called the natural way of farming. Clearly, no other system as close to nature could be more sustainable. While there is no doubt about the influence of organic matter and cosmic energy on the quality and quantity of production, one needs to assess the extent of the influences as well as the feasibility of the system. It has been estimated that organic farming results in 20–30% lower yield compared with modern agriculture. The question, therefore, is whether organic farming can meet the food demands of an increasing population. This article reviews some major scientific facts of organic/biodynamic agriculture and attempts to clear the misconceptions and to assess its feasibility.

The advent of modern agriculture necessitated several major inputs such as fertilizer, insecticides, pesticides, and farm operations using heavy machinery (developed by the middle of the 20th century in Europe and USA). In India, modern agriculture reached a peak during the Green Revolution in the late 1960s and 1970s. In European countries, the high levels of fertilizer (N, P_2O_5, and K_2O) consumption (500 kg ha^{-1}) triggered serious environmental problems such as nitrate enrichment in groundwater, eutrophication of lakes and release of substantial amounts of ammonia into the atmosphere, salinization, pesticide contamination of groundwater, genetic and soil erosion, etc. (Dahama, 1997). People began to realize that organically grown food was in no way inferior to food produced with fertilizer inputs. The problems and issues surrounding the extensive use of artificial inputs drew the attention of the scientific community, so much so that, by the end of the 20th century, organically produced

agricultural products were once again the center of global attention.

The global market for organically produced food was about US$ 26 billion in 2003, and it is estimated to reach US$ 102 billion by the year 2020. India's share in this market for organic food was 0.76% in 2003 (Anonymous, 2004). In order to give this sector an agribusiness edge, the Indian Government constituted a Task Force on Organic Farming under the chairmanship of Dr Kunwarji Bhai Yadav, former Director of Agriculture, Gujarat. The committee placed emphasis on the consolidation of information on organic farming and its benefits. One of the steering committees constituted by the Task Force under the chairmanship of Dr M S Swaminathan (Chairman, National Commission on Agriculture, Government of India) suggested taking up of organic farming as a challenging task and as a thrust area under the Tenth Plan. Madhya Pradesh, and subsequently Uttaranchal, took an early lead by declaring themselves as organic states. However, under the present scenario, organic yields are 20–30% lower than those obtained with modern farming – a gap that needs to be bridged. During 2002–03, the country exported Rs 3416540 million worth of agricultural products, of which organic farming accounted for only Rs 890 million. This share could be increased by widening the area under organic agriculture (Prasad, 2006).

Natural way of farming – the advent of organic farming

Soil is composed of physical and chemical matter, biological mass, and biological population, which together form what is called the 'natural soil environment'. We often speak of 'producing food', but farmers do not produce the food of life. Nature alone has the power to produce something from nothing; we merely assist nature. Modern agriculture is just another processing industry that uses oil energy (in the form of fertilizer, insecticides, pesticides, and machinery) to manufacture 'synthetic' food products, which are poor imitations of natural food.

The farmer today has become a hired hand of industrialized society. He is trying to make money at farming with synthetic chemicals. Natural farming is the true and original form of agriculture – the '*methodless*' method of agriculture – the unmoving way of Bodhidharma. Although it appears fragile and vulnerable, natural farming is potent, for it brings victory without a fight. This Buddhist way of farming is boundless and yielding, and leaves the soil, the plant, and the insect world to themselves. Natural farming is self-sustaining, but it cannot easily meet the requirement of feeding a vast and ever-increasing population. On the other hand, chemical farming ensures high yields, but poses serious problems for the soil, the environment, and human health.

Organic farming offers a path in between the two, with a broad aim – to create integrated, humane, environmentally and economically sustainable agricultural production systems, which maximize reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop,

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livestock, and human nutrition, protection from pests and diseases, and an appropriate return to the human and other resources employed (Lampkin, 1990; Neuerburg and Padel, 1992). Lampkin (1994) includes the following key characteristics in organic farming:

1. Protecting the long-term fertility of the soil by maintaining organic matter levels, fostering soil biological activity, and through careful mechanical intervention.
2. Providing crop nutrients indirectly by using relatively insoluble nutrient sources, which are made available to the plant by the action of soil microorganisms.
3. Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock waste.
4. Weed, disease, and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties, limited and biological and chemical intervention. The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioral needs and animal welfare issues with respect to nutrition, housing, health, breeding, and rearing.
5. Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats.

Concept and principles of biodynamic farming

The concept of biodynamic farming was first developed in 1922 by Rudolf Steiner, an Austrian philosopher known for his world-view called *anthroposophy* ('wisdom of man'). Inspired by Steiner's views, farmers called the new method 'biodynamic', which refers to working with energies that create and maintain life. The term is derived from the Greek *bios* (life) and *dynamis* (energy). In 1924, Steiner emphasized the importance of the trace elements other than the macro and secondary nutrients, which are important for the growth and development of the plant and ultimately the quality of the produce (Steiner, 1924). During the third and fourth decades of the 20th century, agriculture was dominated by the theory of the major fertilizing elements, based on the German chemist Justus von Liebig's (1803–73) research on the chemical constituents of plants (Pfeiffer, 2003). In biodynamic farming, there are four ways in which etheric forces or life forces operate: (1) effect of heat; (2) effect of light and air; (3) effect of liquids; and (4) effect of solid matter (minerals).

The practical application of biodynamic farming secures healthy soil and plants, which in turn produce healthy food for people

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and their livestock. The basic principles of biodynamic farming are given below:

1. Enrich the soil's organic matter content, in order to retain the fertility in the form of humus.
2. Enhance and maintain the living system by increasing the macro and microbial activity in the soil.
3. Improve soil organic matter in terms of quantity, but also use it skillfully as the basic factor of soil life.
4. Restore the balance in the system, and function with the living and the non-living (humus, trace elements, etc.).
5. Advocate greater attention to the importance and role of hormones and enzymes in the system, in addition to major mineral elements and trace elements.
6. In order to restore and maintain the balance in the soil, ensure proper crop rotation with exhausting and fertility-restoring crops. Also consider the use of cover crops, green manuring, and mulching.
7. Focus on water balance and control of soil erosion, deforestation, and industrial product pollution.
8. Soil is not only a chemical, mineral, or organic system, but it also has a physical structure. The maintenance of a crumbly, deep, well-aerated structure is an absolute must for good soil fertility.

Inception of organic farming in the Indian perspective

Organic farming is not a new concept in India. The philosophy of sustainable agriculture was expounded millennia ago in the Vedas, the ancient Hindu scriptures – (i) humans are a part of the complex universe, and the intimacy of humans with nature is a matter of great joy; (ii) humans should live in harmony with natural forces, and ensure that harmony with the different natural forces [(earth, water, air, fire, and *akash* (ether)] is not disturbed; (iii) humans should respect and show gratitude to useful objects, inanimate or animate; and (iv) organic matter should be recycled (Nene, 2004).

The Rigveda (c. 8000 BC), the Atharvaveda (c. 1000 AD), and also the Holy Quran specify that at least one-third of what we take out from the soil must be returned to it – the recycling of postharvest residues. The noted Gandhian Acharya Vinoba Bhave experimented with a method at his Paunar Ashram (Wardha, Maharashtra) that involved tillage with bare hands just as our ancient *rishis* did to meet their requirements

of food. Vinoba Bhave later relented, and allowed the use of bullocks to till the land. However, this approach of 'do nothing for agriculture' was far from successful and had to be abandoned.

Vishwanath (1937) emphasized that organic manure is the life of the soil; if it is neglected, the fertility would not be maintained. The organic movement in India was led by Albert Howard (1940) who believed that any shift from nature's method of crop production to a newer method would lead to loss of soil fertility. He suggested the use of compost and other organic sources of plant nutrients and discouraged chemical fertilizers.

Organic agriculture discourages the use of synthetic fertilizers, pesticides, chemical growth regulators, genetically modified crops, and livestock feed additives. In order to maintain the productivity of the soil, this farming system solely depends on the use of crop residues, animal manures, green manures, off-farm organic wastes, crop rotation incorporating legumes, and biological pest control (Palaniappan and Annadurai, 1999). The philosophy is to feed the soil rather than the crop, to maintain soil health and as a means of giving back to nature whatever is taken from it (Funtilana, 1990). *Agnihotra* (ashes left after a *yagna* is performed) is often touted as a complete plant food (Pathak and Ram, 2003), yet it contains largely potash. However, we have to exercise caution against the extremism of organic farming – rightly termed as 'ecological fundamentalism' – that leads to total exclusion of synthetic chemicals in farming (Hedge *et al.*, 1995).

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Major components of organic farming

The major components of organic farming are: green manure and farmyard manure; city and farm waste compost; vermi-compost and vermi-wash; crop residue management; cover crops and mulching; concentrated manures such as oilcake, meat and blood, fish, horn and hoof meal, etc.; microbial fertilizers; and crop rotations and crop management.

All the above soil inputs are major sources of organic matter, which provide the humus in the soil after decomposition. The decomposition of organic matter helps in the alteration of the physical, chemical (Aishwath *et al.*, 2003a), and biological properties of the soil (Pettersson *et al.*, 1992). It provides the substrate to the microbial population as well as the improved habitat for macro fauna (worms, millipedes, spiders, etc.), which helps in soil aeration. The improved physical conditions alter the inoculum's potential (density and capacity) of pathogens and host. The improvement in the physico-chemical properties promotes root growth (Chandra *et al.*, 2003) and nutrient absorption of crop plants. These conditions make the plant vigorous and develop the capacity to avoid or tolerate disease. Ultimately, better yields mask the effect of disease.

Green manuring crops are important where sufficient water is available for raising them. These are generally leguminous crops, which help in tapping atmospheric nitrogen and in restoring nitrogen in the soil, and also in enhancing the availability of other nutrients. The nutrients lying beneath the surface soil also come out on the surface and are utilized by the crop.

Vermi-compost is an integral part of organic farming, helping improve the physical (bulk density, water-holding capacity, aeration, etc.), chemical (nutrient availability, electrolyte concentration, pH, etc.) and biological (flora, fauna, microbial population, and their activity) properties of the soil. It also reduces the number of fecal *coli* forms, salmonella, enteric virus, helminthic ova, etc., with the resultant reduction in disease infestation. Vermi-wash is rich in nutrients and gives better results in foliar application diluted with water.

In bulky organic manures, some decomposition products or metabolites are directly toxic to the pathogens, such as organic sulfur, which is produced after the decomposition of cruciferous plant leaves and is toxic to some fungi and nematodes. Some substances have a stimulatory effect on the germination of fungal spores and hatching of eggs of nematodes. These germinated spores and hatched eggs die due to the absence of hosts. Some substances produced during the decomposition of organic matter are absorbed by the roots, which are precursors of phenolic compounds in the plant, and induce biochemical resistance in the plant. Organic compounds stimulate the activity of some organisms like *Trichoderma* spp., *Penicillium* spp., *Bacillus* spp., etc., which are considered to be sources of antimicrobial metabolites. Some of the organic amendments such as oilcake and *Calotropis* leaves, neem leaves and cakes, paddy husk, castor cake, *karonji* leaves and cakes, and *Sesbania* sp. have the potential to reduce plant parasitic nematodes. Volatile fatty acids (formic, acetic, propionic, and butyric acids), ammonia, and hydrogen sulfide released during the decomposition are directly toxic to nematodes (Cannayane and Jonathan, 2003).

Some of the microbes are useful as biological nitrogen fixation agents. These are of two types: (1) symbiotic nitrogen fixers such as *Rhizobium* spp.; and (2) non-symbiotic nitrogen fixers such as *Azotobacter*, *Azospirillum*, *Clostridium*, blue green algae, and *Azolla*. Tricalcium phosphate, which is water insoluble, could be solubilized by phospho-bacteria by the excreting organic acids. *Bacillus siliceous* degrades silicate minerals and makes potassium available to plants. Some other microbes affect the solubility of boron, sulfur, iron, etc., and make them available to the crops. Aishwath *et al.* (2003b) found that *Azotobacter* and *Azospirillum* performed better with farmyard manure (FYM) than with higher chemical fertilizers with respect to yields and uptake of nutrients in wheat. These bacterial fertilizers improve not only the yield of the crop but also nutrient use efficiency (Aishwath and Dravid, 2001).

Organic farming is also a kind of habitat management – providing or altering the habitat to improve the availability of resources to the natural enemies for optimal performance. This also helps in crop protection by supporting predators of

harmful insects. Habitat management through crops has tremendous importance for agriculture. It has been reported that inter-planted ryegrass (*Lolium multiflorum*) in seed maize (*Zea mays*) reduces the soil surface temperature and thus increases the survival of released *Trichogramma brurrecae*. The wild vegetation that grows on the borders with the crop provides the natural enemies of crop pests (Altieri, 1994). It has been reported that tachinid and ichneumoid parasites attacking *Mamestra brassicae* and *Plutella xylostella* were more effective in the cabbage field when they were grown near flowering *umbelliferous* plants (Huffaker and Messenger, 1976). Manures and straw increase the numbers of the carabid *Bembidion lampros*, an egg predator of the cabbage root fly *Delia radicum*. Crop rotations manage the soil fertility and conservation of soil water and soil loss.

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Biodynamic preparations and calendar

1. Biodynamic field spray

- BD–500 – horn manure
- BD–501 – silica manure

2. Biodynamic compost preparation

- BD–502 – fermented yarrow flowers (*Achillea millefolium*)
- BD–503 – fermented heads of German chamomile (*Chamomilla officinalis*)
- BD–504 – stinging nettle (*Urtica dioica*) fermented in the soil
- BD–505 – fermented oak bark (*Quercus robur*)
- BD–506 – fermented flower head of dandelion (*Taraxacum officinale*)
- BD–507 – valerian flower (*Valeriana officinalis*) juice

3. Other BD preparations

- Cow Pat Pit (CPP) or soil shampoo
- Liquid manure or plant tea
- Biodynamic compost heap
- Peppering (process of biodynamic insect/pest/weed control)

4. Biodynamic calendar (time of agriculture operations with zodiacal constellation)

The biodynamic preparations BD–500 and BD–501 are also known as horn manure. The horn of a cow is filled with fresh cow dung and buried in the soil during the descending moon period (October–November). It is left to decompose for 6 months, after which the horn is taken out during the descending moon period (March–April). The dung is completely decomposed and vitalized by the cosmic energy. The decomposed dung is diluted with water, stirred to create a vortex in clockwise and anticlockwise directions, and sprayed on the crop during the descending moon period. The treatment enhances seed germination, root formation, and root development, and vitalizes the soil. For the BD–501

preparation, the cow horn is filled with powder of silica and buried during the ascending moon period (March–April). It is taken out from the soil after 6 months during the ascending moon period (October–November). This preparation is also used as a spray and helps in the photosynthetic process of plants. It encourages the development of fruits and seeds, and improves their quality.

BD–502 is associated with the influence of the planet Venus, and permits plants to attract trace elements in extremely dilute quantities for their best nutrition. BD–503 (associated with planet Mercury) stabilizes nitrogen within the compost and increases the soil life so as to stimulate plant growth. BD–504 (associated with the planet Mars) stimulates soil health with the individual nutrition and is rich in iron. The sign of BD–505 is the moon, and it provides the healing force to combat against harmful diseases. BD–506 (associated with the planet Jupiter) stimulates the relation between silica and potassium, which attracts the cosmic forces to the soil. BD–507 stimulates the compost so that the phosphorus component is properly available in the soil and used by the plant (Pathak and Ram, 2002).

Cow Pat Pit is prepared by mixing fresh cow dung with bentonite and egg shell powder. It is used as a soil conditioner, and helps improve the structure of the soil. It promotes rooting in cut/grafted plants, and seed germination and plant resistance to disease. Liquid manures are prepared using different materials – liquid fish manure, liquid seaweed manure, and liquid plant manure. These manures are inoculated with two sets of BD preparations during fermentation. The manure is ready in 8–10 weeks and could be applied by sprinkling/spraying two or three times on crops. Biodynamic compost conditions the soil and provides the nutrients to plants. This is aerobic decomposed plant material obtained from farm waste. It is activated/vitalized by applying two sets of BD–502 to BD–507 during decomposition. "Peppering" is an important biodynamic practice of pest control. It consists in burning insect pests at a certain time depending on the zodiacal constellation, and applying a preparation of the ashy remains to the affected area. Different preparations are used to control the various stages of the insects. For example, application of peppering during the Aries period controls the larvae of insects.

In the biodynamic system, agricultural practices such as tillage, sowing, manuring, and harvesting are performed to harness the beneficial influence of zodiac constellations/moon phases with the help of the biodynamic calendar. As a thumb rule, when the moon is waxing (ascending period), plants develop their aboveground system (leaves); when the moon in waning (descending period), plants develop their root system. Therefore, sowing of leafy crops should be done during the waxing moon, and root crops during the waning moon, for better results on yield and quality. The other operations are also

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specified with various calendar dates for crop production harnessing the beneficial influence of natural forces.

Some viewpoints about organic farming

Quality and quantity of food

It is emphasized that organic manures promote quality, while mineral fertilizers promote quantity (Schuphan, 1974). Plants absorb the same forms of ions (ammonia, nitrates, phosphates, potassium, etc.) whether these come from an organic source or from a mineral source. After the absorption of the nutrients, plants synthesize them into compounds. If these nutrients are balanced in the plant, then it will have enhanced shelf-life, flavor, and taste as a food. Nowadays, taste and flavor are psychological dogma among people who are pro-organic. However, they are dependent on the species or variety of the crop plant, each of which has a specific genetic make-up. Old/traditional varieties have their genetic make-up to withstand various conditions, and accordingly they have their peculiar taste and flavor. In the field of plant nutrition, the cry of 'only natural' has no justification or scientific basis to claim that the nutritive value of organically grown food is superior to that grown using inorganic fertilizers (Woese *et al.*, 1997). Organic matter obtained from sewage/sludge generally contains heavy metals and toxic substances, including *Salmonella*, *Escherichia coli*, and *Taenia soleum*, which contaminate the soil and ultimately the food received from the soil. They also pollute potable water by introduction into the groundwater (Mikkelsen and Gilliam, 1995).

Eco-friendliness versus environment pollution

Emission of greenhouse gases is responsible for global warming and climate change. These greenhouse gases – carbon dioxide, methane, and nitrous oxide – are associated with agriculture. Among them, the major emission of carbon dioxide is from the industry. Methane is the most important greenhouse gas, and it originates predominantly from cattle manure and cattle dung, which is an integral part of organic manure. There is no evidence to prove that nitrates or nitrous oxide are more toxic and mobile when released from chemical fertilizers than when released from organic matter decomposition. Organic matter ultimately pollutes the groundwater and excessive concentrations of nitrates in drinking water can cause methemoglobinemia. Nitrous oxide escapes into the atmosphere and affects the ozone layer. However, the noticeable amount of nitrate found in groundwater is increasing with time (Aishwath, 2005a) under less precipitated conditions. Higher nitrate content was observed in heavily fertilized areas where the groundwater is recycled for irrigation, when compared with less-fertilized sites or sites irrigated with canal water (Aishwath, 2005b; Yadav and Tomar, 2006).

Soil fertility and nutrition potential

It is often advised that partially decomposed organic matter should be applied to the soil, which produces organic acid during decomposition and helps in killing pathogenic nematodes, and harmful insects. However,

partially decomposed organic materials generally have a wide C:N ratio (beyond 40), which temporarily immobilizes the nutrients, resulting in poor performance of crops due to temporal nutrient deficiency or malnutrition. Recently, Trewavas (2001) reported in the journal Nature that manures vary in composition, and therefore plant nutrition, yield, and quality of the produce are unpredictable. He pointed out that reliance on organic sources of nutrients for crop production could not be synchronized throughout the growing season. *Agnihotra* was believed to be a complete food for crops, but since its major component is potassium, it can hardly be called a complete food.

Yield sustainability

Organic farming is believed to offer higher yields and improve the organic matter in the soil. However, results on long-term fertilizer trials reveal that fertilizer application not only sustains the yield potential of the crops, but also improves the organic matter in the soil (Swarup and Wanjari, 2000). The world over, results in terms of productivity have been obtained with the conjoint use of organic and chemical fertilizers, while the use of organic inputs alone tend to result in lower productivity, with lower gross margins. Aishwath and Dravid (2001) also obtained better results with the conjoint use of mineral fertilizers and organic manure and bio-fertilizers. Yadav *et al.* (2000) reported that 50% substitution of recommended doses of NPK (nitrogen-phosphorus-potassium) (through chemical fertilizers) with FYM, crop residue, and green manuring significantly reduces rice grain yield. In many cases, the residual effect of fertilizers

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is better than that of organic manures. The residual effect of phosphorus application was better than that of FYM on pigeonpea (Aishwath and Dravid, 2002). Field experiments conducted on a piece of land having uniform fertility, and isabgol (*Plantago ovata*) sown with biodynamic calendar sowing dates, did not show any significant effect on growth, physiology, disease development, and yield. However, liquid manure/*panchagavya* gave significant results on the seed yield (Anonymous, 2005).

Feasibility of organic and biodynamic farming

In the years ahead, can organic matter meet the nutrient demand to sustain the present level of crop production? Tandon (1997) projected that the NPK requirement of 7.75 million t will be met by the end of 2025. However, Katyal (2001) reported that the crop removal of NPK up to 2020 would be 37.46 million t, and that the additional input from all fertilizer sources would be 29.60 million t, which would leave a deficit of 7.86 million t. In India, large amounts of animal excreta are used as energy sources in rural areas. This will continue until alternative sources of fuel are made available. The

shrinking total agricultural land – due to increasing urbanization – will not be able to fulfill the food requirements of the growing population. A radical move to organic farming would only further compromise food security. Green manuring areas are also shrinking, with no compromise over one crop a year and irrigation input. The other source of nutrients is sewage sludge, which could provide only 0.54 million t of NPK annually, while its use is restricted to some areas (Chhonkar *et al.*, 2000a; 2000b).

It has been proven beyond doubt that, on a long-term basis, the conjoint application of organic fertilizers along with various other nutrient sources are capable of sustaining higher crop productivity, and improving soil quality and soil productivity (Swarup and Wanjari, 2000). In areas where soil pH is below the neutral level, organic inputs further deteriorate the soil quality. For example, China imposed organic farming in 1959, and ultimately suffered a famine with 30 million starvation deaths in 1959–60, and still had 200 million malnourished people by the late 1970s. The application of nutrients – approximately 70% of which was through mineral fertilizer – helped improve this situation by 2000 (Lin Bao and Tiwari, 2003). Organic farming will lead to income and yield variability and risk of crop failures, and also market fluctuations. Recently, Nobel Laureate Dr Norman Borlaug (2002) quoted that "Switching over food production to organic would lower crop yield; we can use all the organic that is available, but we are not going to feed six billion people with organic fertilizers." Similarly, biodynamic has its own scope, with the limitation that cosmic influences are not solely responsible for the desirable crop production. The packages and practices of organic/biodynamic agriculture, alone or in combination with inorganic methods, need to be standardized for crops and cropping systems. Beliefs have tremendous significance in religions, whereas they have no relevance without proven fact in the sciences or agricultural sciences. Thus, Nene (2004) emphasized that we should go ahead with both commercial and family-oriented farming, and farming must be done in harmony with nature.

The packages and practices of organic/biodynamic agriculture, alone or in combination with inorganic methods, need to be standardized for crops and cropping systems.

Conclusion

In the Indian perspective, switching from modern farming solely to organic farming is not feasible. It is better to choose the middle path by integrating other types of farming in order to feed the vast population of the Indian subcontinent. However, organic farming would be more feasible and would give significant results in less-populated countries. The philosophy of organic farming should not become a fad. Cosmic energy could be harnessed depending on the magnitude of its influence on plant growth and yield. But, one must remember that zodiacal constellations are not solely responsible for plant growth and development. Other factors such as soil type,

soil nutrient availability, soil moisture, aeration, and the environment wield a greater influence on the development of plants, and should therefore be given greater priority. For the purpose of agri-business, the area under organic farming could be expanded in keeping with the demand for organic food, with an eye on the cost/benefit ratio. Organic farming and biodynamic farming are not two entirely different types of farming. Both systems focus on the harnessing of cosmic energy, and on its natural interaction with earth matter and organic matter for an ecological balance, in order to sustain agricultural production and food quality.

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