

# **Organic and Biodynamic Agriculture in Brazil**

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## **Introduction**

There is a growing interest in natural farming methods worldwide because of the potential impacts of agricultural chemicals on food quality and human health, and the adverse effects of chemical-based, conventional agriculture on environmental quality. An increasing number of scientists in many countries have expressed their concern on these issues and have engaged in research to develop farming systems that can avoid or greatly reduce the use of chemical fertilizers and pesticides, and at the same time can be productive, profitable and protect the environment.

In some developed countries, particularly western Europe, the United States and Japan, natural farming or nature farming is being actively promoted to overcome the economic, environmental and health-related problems associated with high technology, conventional agricultural systems. In this regard, there have been some important and significant developments. For example, (a) the Netherlands now has farm advisors (i.e., agricultural extension officers) who offer technical services to farmers on alternative methods, including organic and biodynamic agriculture, (b) Denmark provides subsidies to cover the expenses farmers might incur when converting from conventional agriculture to organic farming, (c) Sweden has levied taxes on the sale of chemical fertilizers and pesticides; the proceeds of which are used to support research and to develop self-sustaining agricultural technologies, including organic farming, (d) the European Common Market has developed certification standards for the production and marketing of organically-grown foods, while such standards have been authorized by the U.S. Congress and will soon be issued by the U.S. Department of Agriculture (USDA). Many of the state governments in the USA have already established laws to certify the production and marketing of organically-grown foods, (e) a number of universities in Germany, the Netherlands, Sweden, and the USA have recently established departments and facilities for research, teaching and extension of alternative, organic, and sustainable agriculture, (f) in 1985 the USDA established a program of low-input/sustainable agriculture (LISA) to develop farming systems that would reduce the dependency of farmers on chemical fertilizers and pesticides, and (g) the International Nature Farming Research Center and Sekai Kyusei Kyo in Japan are sponsoring conferences worldwide, such as the one we are attending today, to advance the concept, principles, and practical application of Kyusei Nature Farming.

The International Federation of Organic Agriculture Movements (IFOAM) has estimated that certified organic produce will comprise 10 to 20 percent of the market by the year 2000.

Non-governmental organizations (NGO's) have been particularly effective in bringing new and appropriate technologies to small, subsistence-level farmers. This has allowed the farmer to adopt useful and affordable technologies and combine them with his traditional methods and practices. Often this has resulted in a significant increase in the yield and quality of his crops. A number of large multi-national corporations have also recently begun to direct research toward technologies that are compatible with organic agriculture. However, their main focus still remains that of developing technologies that can be exported and sold to farmers engaged in chemical-based, conventional production agriculture.

## **Organic Agriculture in Brazil**

There has never been, to my knowledge, a compilation of past and present organic agricultural and education projects conducted in Brazil. This information is urgently needed if we are to develop meaningful and effective programs for the future. Such a listing of projects and programs is now being conducted by the special Secretary of the Environment (SEMAM). This includes the following:

- Organic Agriculture Associations. Currently we know of five such groups which function in the states of Rio Grande do Sul, São Paulo, Brasília, Belo Horizonte, and Rio de Janeiro.

- Non-Governmental Organizations. At a recent meeting sponsored by SEMAM in Brasilia more than 70 NGO's were represented. They were mainly involved in assessing the problems and needs of small farmers and developing methods and technologies to enhance organic farming. It is estimated that there are more than 200 NGO's now operating in Brazil.
- Small Farmer's Groups. Because of their prior association with NGO's, small farmers have begun to organize themselves into groups to exchange ideas, methods, and technologies on organic farming, and to discuss common problems and solutions.
- Private Farm Enterprises. Some farmers, after accumulating a broad knowledge of practical organic farming, become affiliated with organic farmers associations or cooperatives and help to develop agricultural production systems for local, regional and international export markets.
- Agricultural Universities. A number of our state universities have started to offer students at least an introductory course and some practical knowledge on organic farming, It is likely that such efforts will expand in the future because of increasing concern for food safety, natural resource degradation, and environmental quality.

It is virtually impossible to know exactly how many farms in Brazil today are practicing organic farming. However, an estimate by the Biodynamic Institute indicates that there are probably about 250 farms of all sizes currently involved in organic agriculture. In August 1991, the Editora Abril issued the Manual de Agricultura Organica which described some farmer's experiences with organic farming. This publication is not a complete listing of projects on organic farming, but it describes only those projects that have been well-publicized at the national level. The fact is that a wide range of products are being produced organically in Brazil today (i.e., without the application of chemical fertilizers and pesticides) both on a small and large scale, including grapes, potatoes, tomatoes, cereals, spices, cocoa and coffee. Nevertheless, many technical problems still exist and must be solved.

### **The Sociopolitical Situation**

Despite our enthusiasm for the successful developments in organic farming in Brazil, many of us in agriculture are deeply concerned about the situation of landless farmers who are driven by desperation to encroach upon lands they do not own and attempt to produce food. Most of us would like to see our government establish policies that would allow the development of a more socially-just agriculture. The best advice we can give to the Brazilian authorities in charge of extension and land occupation programs is:

- Expand the resources reserved for this program so that the situation can be resolved properly and with due consideration for the landless farmers.
- Emphasize the use of organic farming methods and techniques which are less destructive of the environment and less exploitive of soil and water resources. Organic farming would be much more efficient and sustainable for small-scale producers.

In providing assistance to small farmers for establishing an organic farming production system, we must not overlook an important consideration. Such farmers will invariably lack the necessary expertise, resources, and infrastructure for production. In such cases, it is highly advisable to contact the local NGO to provide the farmer with the necessary legal, social, and technical assistance.

### **The Vital Requirement: A Fertile and Productive Soil**

The most important requirement for successful organic farming is to maintain an adequate balance and availability of plant nutrients in the soil. All other considerations are inconsequential, because soil fertility is the vital prerequisite for the health, nutrition, growth and yield of plants. Soils of chemical based, conventional farming systems are almost always in a state of negative nitrogen balance from intensive production of crops with a high N requirement. Thus, despite the application

of chemical N fertilizer there is usually an inadequate supply of available N. On the other hand, the soils on most organic and biodynamic farms are generally in a state of positive N balance because certain crops are grown in rotation that can fix atmospheric N. This is one of the basic differences between these two systems. It is indeed possible to farm successfully without the addition of chemical fertilizers if certain principles are followed. The organic farmer must be knowledgeable about the nitrogen cycle and how it functions. He must realize that his soil N balance at any point in time will be the resultant of (a) N inputs from composts, crop residues, animal manures and N-fixing legumes, and (b) N outputs from the harvest of crops and sale of animals. Soil N losses can also occur from erosion and runoff of excessive rainfall.

Maintaining high levels of soil organic matter is particularly essential to maintaining a positive soil N balance. Maintaining an adequate level and availability of two other macronutrients, i.e., phosphorous (P) and potassium (K), in organically-farmed soils is often difficult. These two nutrients can be supplied only by application of P and K bearing mineral materials (e.g., bone meal, rock phosphate and greensand), and then recycling them in a virtually closed farming system. We need to develop low-cost methods and practices for managing and recycling plant nutrients on organic farms that will enable the farmer to increase the nutrient use efficiency of his production system.

The principle of biological N-fixation by leguminous crops is absolutely vital to organic and biodynamic farming. Some very valuable research has been done by Brazilian scientists in developing methods and technologies for using (a) free living, nitrogen-fixing bacteria, and (b) symbiotic nitrogen-fixing bacteria as legume seed inoculants. Much of the practical knowledge on using these important organisms in organic farming systems has been developed at our Biodynamic Institute.

One of the most important on-farm practices that will help to maintain a productive and stable organic farming operation is that of composting organic wastes from both animal and vegetable sources. Simple and practical composting methods can transform organic wastes into valuable biofertilizers and soil conditioners for improving and maintaining soil fertility and productivity. Farmers need to be instructed in the principles of on-farm composting with proper consideration for those factors that govern the composting process, e.g., the moisture content and carbon to nitrogen (C:N) ratio of the composting biomass. Instructions on composting are available to farmers through local and regional NGO's and the Biodynamic Institute.

### **Future Priorities**

In view of the accumulated indigenous knowledge from traditional agricultural systems, combined with that from more sophisticated laboratory and field research studies, it should be possible to establish organic agriculture on a practical basis anywhere in the world. What is needed is a network of regional institutions where the practical knowledge and scientific research can be developed into sustainable production systems. Our greatest need is for well-trained and dedicated agronomists with a wide understanding of the biological and agronomic interactions of tropical farming systems to promote change.

We also need to create a united education and technology transfer system where students, farmers, and technical experts can come together and share their ideas for improving all of the practical aspects of organic farming systems. This would also provide an opportunity for conventional farmers to learn about the advantages of organic agriculture and the stepwise process for converting to organic methods and practices with minimum risk. Government assistance for planning and implementing these programs is urgently needed and a coalition of organic agriculture organizations should actively seek such support at the earliest possible date.

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