

# **Kyusei Nature Farming: Historical Perspective, Present Status, and Prospects for Future Development with EM Technology**

H. Okubo

International Nature Farming Research Center, Atami, Japan

## **Historical Perspective**

Kyusei Nature Farming is a method of farming without the use of synthetic chemicals. It is based on the ideals and principles of nature farming that were advocated by Mokichi Okada (1882-1955), a Japanese naturalist and philosopher and founder of Sekai Kyusei Kyo. In 1931, Okada was inspired toward his ultimate goal, i.e., “to create paradise on earth by eradicating disease, poverty and conflict.” He believed that nature farming could contribute significantly toward this goal.

Mokichi Okada was neither a farmer nor did he come from a farm background. He was, however, greatly concerned about the hardships suffered by farmers and farm villages of Northeast Japan, especially during the unseasonably cold weather from 1932 to 1934. From his writings, it is evident that Okada was convinced nature farming was a method that could vastly improve the welfare of poor farmers. It was this conviction that inspired him to advocate the principles of nature farming. In 1936 Okada acquired land in the city of Tokyo and began to experiment with the cultivation of vegetables, flowers and grapes; in 1942 he began to experiment with rice cultivation. This, then, was the beginning of nature farming as practiced by Mokichi Okada.

Now, after almost six decades, Kyusei Nature Farming is attracting worldwide attention as a sustainable farming method that can conserve natural resources, protect the environment, and produce healthy and nutritious food. The word “Kyusei” in Japanese means saving, and broadly interpreted Kyusei Nature Farming implies that the world can be saved through Kyusei Nature Farming methods (Matsumoto, 1994) . According to the teachings of Mokichi Okada, Kyusei Nature Farming must fulfill five important requirements:

1. It must produce high quality food to enhance human health.
2. It must be economically and spiritually beneficial to both farmers and consumers.
3. It must be sustainable and easily practiced.
4. It must conform to nature and protect the environment.
5. It must produce sufficient food for the world population.

The following is a summary of the chronological events concerned with the principles, practice and research on nature farming:

- 1935 - The basic concept and principles of nature farming were developed by Mokichi Okada.
- 1948 - Paper entitled “Cultivation Without Fertilizer” was published.
- 1949 - Paper entitled “Victory of Cultivation Without Fertilizer” was published.
- 1953 - Nature Farming Promotion Association was established (dissolved in 1969).
- 1982 - International Nature Farming Development Center (INFDC) was established.
- 1983 - Preliminary experiments with EM technology were initiated.
- 1985 - INFDC was reorganized as the International Nature Farming Research Center (INFRC) to promote research, development, and the practice of nature farming worldwide.
- 1986 - Promotion of practical EM technology was initiated.
- 1989 - The First International Conference on Kyusei Nature Farming was held in Thailand.
- 1991 - The Second International Conference on Kyusei Nature Farming was held in Brazil.
- 1993 - The Third International Conference on Kyusei Nature Farming was held in the United States.

## **Kyusei Nature Farming and EM Technology**

An added dimension to Kyusei Nature Farming is the use of Effective Microorganisms (EM) on which preliminary experiments began in 1983. EM technology was developed by Professor Teruo Higa, a scientist at the University of the Ryukyus, Okinawa, Japan. EM formulations consist of mixed cultures of beneficial, naturally-occurring microorganisms that are applied as microbial

inoculants to soils and plants (Higa, 1991). Extensive research on EM technology has been conducted in Japan and throughout the Asia-Pacific Region, Brazil, and the United States; the research shows that EM enhances the diversity of beneficial soil microorganisms, and improves soil quality and the growth, yield and protection of crops. A number of these reports have been published in the Proceedings of the 1989 and 1991 International Conferences on Kyusei Nature Farming and in other scientific publications as well (Higa and Parr, 1995).

## **Status of Kyusei Nature Farming in Japan**

### **Agricultural Development**

Interest in Kyusei Nature Farming as an alternative method of agricultural production without the use of synthetic chemicals, especially pesticides, has increased dramatically throughout Japan in recent years. Prefectural and municipal governments, local branches of the Agricultural Cooperative Association (a national organization of farmers), and consumer and environmental groups now consider nature farming as the best means of correcting the problems caused by modern agricultural technology (i.e., soil erosion, water pollution, environmental degradation, and chemical contamination of food). The trend toward organic farming and nature farming in Japan for production of vegetable and fruit crops, as well as paddy rice, has gained considerable momentum since the early 1980's (Parr, 1980).

Recently, EM has been shown to be effective in suppressing odors of animal wastes in dairy, swine and poultry enterprises. There is some evidence that the incidence of diseases in these operations, as well as in aquaculture and fisheries, is also decreased by use of EM.

### **Recycling of Municipal Wastes**

There is a strong national movement in Japan today to promote the recycling of kitchen garbage as an organic resource for agricultural use. This is being accomplished largely, and very successfully, by treating kitchen garbage with EM-fermented compost, a product consisting mainly of EM and rice bran. The EM cultures accelerate the conversion of the garbage into compost and malodors are suppressed in the process. The finished compost is an excellent organic amendment that can be used safely and beneficially as a soil conditioner and organic fertilizer.

The kitchen garbage recycling movement began in 1989 in Kani City, Gifu Prefecture where today some 6000 citizens are participating in this program. Consequently, a substantial amount of kitchen garbage that was previously incinerated in Kani City is now converted into a valuable agricultural resource. This has resulted in a considerable savings to the Kani City government; this year, the city has established a fund to provide its citizens with EM-fermented compost at no cost.

The kitchen garbage recycling movement, which began in Kani City, has now been adopted by most prefectures in Japan. The movement is now being organized as a national network called "Society for Promoting Environmental Purification." It is expected that EM will play a very important role in the conversion of this municipal waste into a valuable resource.

### **Wastewater Treatment and Purification**

Another application of EM technology has been in the field of wastewater treatment and purification. When the Gushikawa municipal library was constructed in Okinawa Prefecture five years ago, the library director requested technical advice from Professor Teruo Higa at the University of the Ryukyus who is the innovator of EM technology. A wastewater treatment/purification system was constructed using EM which has produced excellent results. The biochemical oxygen demand (BOD) and suspended solids (SS) levels of the treated wastewater upon discharge have been maintained at 3.7 ppm and 1.6 ppm, respectively. These values are well below the maximum allowable municipal water quality standards for treated wastewater of 20 ppm for BOD and 50 ppm for SS. It is evident that the system is functioning efficiently because in five years of operation it has not been necessary to remove sludge from the sedimentation tank. Moreover, the actual cost of operating the system has been only about 5 percent of the estimated cost that was budgeted to operate and maintain the system.

### **Prospects for Future Development**

Kyusei Nature Farming is being widely accepted in Japan and in many other countries around the world as a method of farming without synthetic chemicals that can improve soil quality, crop growth and yield, and food quality, and can preserve the environment. When practiced in conjunction with EM technology these benefits are often significantly enhanced. Future research needs to focus on the exact mechanisms whereby EM can elicit these beneficial effects on the soil-plant ecosystem. This would provide more precise knowledge on the proper method, time, rate and frequency of EM application for greatest benefit.

Feasibility studies are now in progress to consider the use of EM technology in large-scale sewage treatment facilities in Japan. Also, there have been many requests for the use of EM to help improve the quality of water in polluted ponds and lakes, including Lake Biwa in the Kansai Area (Osaka) where 10 million inhabitants depend on this lake for their domestic water supply.

An increasing amount of land in the urban sectors of many countries is being dedicated to recreational areas such as parks and golf courses. Traditionally, these areas have been managed by extensive use of chemical fertilizers and pesticides which have often resulted in environmental pollution. Presently, some 30 golf courses in the Kanto area are being managed with the use of EM technology and with minimum use of pesticides. The results of this study are being carefully monitored and will be reported in the near future.

EM technology was first applied to agriculture and thereafter to environmental protection. Great efforts are now being made to study the applicability of EM technology in many other facets of human life. These preliminary studies will be reported in due course when the technology has been proven scientifically.

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