

# Expansion Status of Nature Farming and EM Technology in Japan

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**Abstract:** *Organic farming systems are expanding rapidly in all parts of the world. This phenomenon is also being experienced in Japan. Amongst the many systems of Nature Farming being adopted, Kyusei Nature Farming, which was advocated by Mokichi Okada in 1935, is being widely used as a means of developing sustainable agriculture systems. This was fortified with the technology of Effective Micro-organisms in the early 1980's, developed by Professor Dr. Teruo Higa of the University of the Ryukyus, Okinawa. At present, it is one of the most widely extended programs among organic farming organizations in Japan, and is actively promoted by the International Nature Farming Research Center in Atami.*

*Nature Farming in Japan is extended through individuals, local bodies, agricultural co-operatives and many other organizations. Thus counting the actual numbers practicing Kyusei Nature Farming is difficult. However, there are nine extension centers and over 700 technical contact farmers in Japan, practicing this technology. The INFRC attempts to utilize the contact farmers for expanding the program on Kyusei Nature Farming, primarily to make it a way of life as advocated by Mokichi Okada. Local communities are activated into adopting the technology to increase production, preserve the natural environment and respect nature and life.*

*There are many programs on Kyusei Nature Farming in Japan. Amongst these yield increases along with weed control in rice is a prominent project. Upland crops, both vegetables and fruit are cultivated in many regions with EM. Animal units use EM in feeding and odor control. Composting is being undertaken with EM very successfully. Thus the Ministry of Agriculture, Forestry and Fisheries has interest in active research projects on Kyusei Nature Farming.*

*Environmental management also plays a key role in Kyusei Nature Farming. Thus kitchen garbage is being composted at household level in over 2 million houses in Japan. Many Municipalities are using this system and it is gaining popularity.*

*The INFRC also organizes the certification of Kyusei Nature Farming products. This has activated many producers into using EM and Kyusei Nature Farming. This presentation highlights the development of Kyusei Nature Farming and EM in Japan on the basis of the programs undertaken by the INFRC.*

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In last decade or two, organic agriculture has spread throughout the world and has become the trends of this modern time. Kyusei Nature Farming (KNF) with longest history in organic farming is the main pillar of the movement. It is one of the large-scale operations found in the world. Mokichi Okada was the originator of the farming method and his disciples took it to their hearts and created this sustainable movement. Since its inception in 1931, sixty-eight years has past. There were many trials and tribulations; however, it has attained its peak with EM Technology.

In Japan, Nature Farming Method has not expanded throughout the Japanese Isles. Due to warm and humid weather and climate, it is a breeding ground for diseases, pests, and insects. In addition, weed problems are rampant through the isles. The

farmers have become dependant upon chemicals to deal with the immediate issues. No wonder the cost of chemicals is going up! Right now, Japan is far behind in comparison to European and American agricultural policy even though, it is written in the agricultural policy to adopt environmentally sound farming and organic practices.

The certified organic farmers who have followed the guidelines of the Ministry of Agriculture are very few in numbers. It is estimated that 5 percent of rice growers, 5 percent of orchardists, and 1 percent of upland crop farmers are following the Ministry's guideline practicing environmentally sound farming with reduced chemical inputs. Then, there are farmers who are not certified but practice environmentally sound farming. It is estimated that the 10 percent of rice growers, 10 percent of the orchardists, and 2 percent of upland crop farmers are committed to production in above manner. This reflects a combined total of certified and uncertified organic farmers.

However, the International Nature Farming Research Center (INFRC) does not have the actual figures on how many farmers in Japan are KNF practitioners. The INFRC has 9 KNF extension stations and 700 collaborative farmers throughout the isles. This 700 is the core group.

According to Fukui Prefectural rural survey, there are 250 rice farmers out of 37,962 that are KNF practitioners. This indicates that 0.8 percent of the rice farmers are practitioners. In fact, Fukui Prefecture has the highest Kyusei Nature Farmers. In comparison with the national average of one percent (total organic farmers), the above rate is quite high.

In the next few pages, INFRC would like to share EM technology in the field of rice paddy production, upland crops, orchards, and livestock and poultry productions.

First of all, rice (paddy) production is center of the Japanese agriculture. In order to convert conventional rice growers, there must be a technology available to deal with massive weed problems. If this is resolved, rice will grow by leaps and bounds. Through EM Technology, KNF practitioners have solved the problem. The following are examples of practice of EM Technology:

- Use of EM Bokashi on the surface soil causes biological pasteurization; however, subsurface area is oxygenated. The fermentation of the surface soil damages and suppresses the roots of the germinating weeds. For the rice, subsurface soil is permeated with oxygen for the root system.
- The presence of inorganic nitrogen in the surface soil inhibits rooting of weeds.
- The suspended muddy layer surface (of the rice paddy) causes suppression of weeds.
- The earthworms are the culprits who cause this muddy layer surface (in the rice paddy).
- The rice growth looks good and the condition of the soil inhibits weed growth.
- Organic matter and inorganic nitrogen released from the soil are reflecting these conditions.
- Puddling and leveling of the soil will release inorganic nitrogen into the immediate environment.

The rural survey has confirmed that, on Nature Farming farms, 2-3 cm from the surface, with 30mg N/kg of soil, inorganic nitrogen suppresses the weeds efficiently. Therefore, it is important to increase the surface fertility of the soil using EM Bokashi. In some areas of Japan, the Nature Farming rice paddy production is either similar or even higher than the conventional yield.

Recently, this system was introduced to Shonai Region of Yamagata Prefecture and produced results in 150 ha of rice paddy production. Next year, farmers want to turn over 500 ha into Nature Farming. In terms of yield, the Mamuro River Band Region (near Shonai) had 1,080 kg/a of rice harvest. This is twice the harvest rice grown with conventional means in this area.

The next subject matter is use of EM technology in upland crops. Two biggest problems for organic farmers are pest control and weed control. The pest control within the greenhouse is the most complicated, and the great varieties of weeds complicate the weed control measures. Despite these problems, some advanced greenhouses are succeeding with Nature Farming Methods in their year round operations. In upland crop farming, many Nature Farming practitioners are increasing and they have many success stories to tell. There is one successful representative group. The **Kitaura Mitsuba Group**, an authorized organic product distributor group in Tokyo Prefecture, is a productive group whose revenue is three billion yen per year. They have EM brand named products. In addition, they have captured 90 percent of the market in Tokyo.

The third example in Nature Farming in Japan is orchard or fruit production with the use of EM technology. Due to climate and weather, fruit production is not that favorable in Japan. Currently, Nature Farming has been introduced into Japanese representative fruits like apples, pears and grapes. International Nature Farming Research Center (INFRC) is working in collaboration with some of the advanced farms where representative Japanese fruits are produced. Right now, 13 ha of apple orchards are managed with Nature Farming Method at famous Mr. Oyamada's orchards.

The fourth example in Nature Farming is the livestock and poultry operations using EM Technology. EM Technology has made great strides in this industry. EM abates odor, controls diseases, and promotes growth of animals and birds than any other technologies available. One example of many available, **Agri-Foods** (funded by Japan Agriculture Co-op) is a success story for EM Technology. Also, **Gifu Economic League**, on their own farms and contracted farms, has utilized EM Technology for 2,700,000 birds (broilers) since 1997. Also, their eggs are marketed as EM brand goods. In addition, **Mino Healthy Pork Brand** is challenging the hog producers to produce healthy hogs.

EM is also utilized in composting projects around the country. The Ministry of Agriculture is supporting composting projects as well. The groups like **Gifu Farmers' Cooperative** is helping to achieve environmental purification by composting, although it is quite tangent to EM utilization for composting.

In tune with the use of EM for environmental purification, **Earth Environment Coexistence Network (chaired by Dr. Teruo Higa)**, **National EM Expansion Association** (also chaired by Dr. Teruo Higa with citizen EM campaign groups, businesses, agricultural groups, individual members, and others), and various other

networks and associations are engaged in recycling raw kitchen garbage through EM technology. There are over two million households using this technology to recycle raw kitchen garbage in to family vegetable gardens. This technology is used in composting city and private raw garbage and teaching composting in school education. Think of the fact that 4.6 percent of the total household (43,900,000) in Japan is using this technology.

Also, EM has entered purification of polluted rivers, lakes, and marshes. This arena has brought about a unique property for purification purposes. Rice-washing wastewater is mixed with EM to turn potential pollutants into purifying body for the environment. Through the above activity, EM has entered a new arena of purifying the seas. The perfect example is the EM purification of the Seto Inland Sea.

It is said that it would take several decades to refresh the Seto Inland Sea due to more than 700 island national parks and complicated inlet rivers. There is what is known as natural power of purification and all the living creatures benefit by it. However, when environmental pollution exceeds this natural power of purification, it will cause sharp deterioration of the environment. When the present condition of the Seto Inland Sea is observed, there are many issues such as red tide, blue tide, and spread of water borne pollutants. These elements cause the elimination of oyster, pearl oysters, seaweed, jumbo shrimps, and other sea life. Currently, there are twelve prefectures concerned with the environmental purification of the Seto Inland Sea and a network involving 100 governmental agencies, business enterprises, and citizens groups. There are various activities developed by each group. The following examples will give the reader the type of activities developed by prefectural to citizens groups:

1. In the City of Imabari, in Ehime Prefecture, 13,000 m<sup>3</sup> of wastewater discharge daily from fiber dyeing factories not only polluting the rivers but also causing accumulation of sludge. The total discharge represents six local towel fabrication companies. During the summertime, the stench is so horrendous that valley residents complain about the odor and also ask the city to clean up the condition. Consequently, a citizens group was formed. This group decided to pour extended EM into the rivers periodically. Then, without populace knowing about it, the thick layer of sludge faded away as well as the stench. The river water was cleansed and small aquatic life such as small fish and crabs came back to the river. Truly, natural ecosystem is coming back again.
2. For the City of Saijou, EM technology was adopted for purification of the city drainage system. The wastewater quality improved remarkably without the expensive chlorination. Then, Asari and Shimiji (fresh water small clams) conspicuously increased in the area where EM was poured into the drainage system.
3. In recycling effort, the staff of Department of the Environmental Upgrading was so motivated to recycling effort by a local housewife in 1994. Since 1995, this staff has used EM technology to reduce garbage in the city. During the fiscal year of 1996 and 1997, there were 16 percent and 26 percent increases in household using EM, respectively. Also, fermentation of rice-wash waste is contributing to the purification of the seas. The large

septic tank for the community was purified this year and the cost was 6 percent of the total cost for the previous year. Currently, EM application has expanded to 60 percent of the community.

4. In addition, Torigai (Japanese delicacy clam) came back in abundance thereby bringing in high revenue flow for the industry. This area was previously polluted by wastewater flow from a seaweed processing plant. Since 1998, EM has been applied to the wastewater stream.
5. Governor of Ehime Prefecture declared EM as a prefectural policy. He allocated supplementary budget and personnel to act on his policy. This Governor persuaded Governor of Hiroshima Prefecture to begin his prefectural application of EM. Furthermore, through the efforts of Ehime Governor, the prefectural Governors of Hyogo, Nara, and Wakayama have shown understanding of this movement. Now the future of Seto Inland Sea is secured.

In the areas of education, National Education System has adopted EM Technology as a broad base educational tool. Some of the examples are 1) students recycling and EM composting their leftover rice from lunch, then recycling the fermented rice into the class vegetable garden; 2) students recycle their rice wash waste through EM technology, then use it for the purification of ponds and river ways. There are currently 150 schools that are practicing the above, and there are many other schools that are adopting EM technology into their curriculum.

Another area where EM technology has made wide impact was in welfare activity. Since 1994 with the inception of EM Bokashi Network, many physically and mentally challenged youngsters are contributing to the purification of environment by their EM Bokashi production efforts. Currently, there are 200 institutions registered with the Network; however, if the count includes non-registered institutions, there are 350 – 400 institutions involved in the Network today.

One area where International Nature Farming Research Center is not involved in thoroughness is the dioxin bioremediation efforts, especially incinerator fly ash and emissions. EM application enters into many areas of human lives that in near future everyone on this earth is touched by it.