EFFECTIVE MICROORGANISMS

FOR

SUSTAINABLE COMMUNITY DEVELOPMENT

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ABSTRACT: Effective Microorganisms for Sustainable Community Development: A National Case Study of Cooperation and Co-Prosperity in North Korea for the Preservation of Environmental, Agricultural, Economic, and Cultural Integrity

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In 1993 Dr. Teruo Higa (professor of horticulture at Ryukyus University in Japan) published a book titled *An Earth Saving Revolution*, which describes the fundamental theory and philosophy behind the agricultural practices that harness the natural phenomena of effective microorganisms (EM). The understanding, development, and technical application of EM technology evolved as a result of rigorous scientific field trials over the past three decades. EM integrates fundamental relationships of physics, chemistry, biochemistry, and microbiology that are the building blocks of life and therefore, when harnessed can significantly increase the efficiency and productivity of many countries, it has been determined that the implications of this new understanding of natural microbial phenomena is revolutionizing agricultural throughout the world. This revolution will take place on a scale equal to if not greater than that of the green revolution that occurred earlier in the century.

International scientific conferences on the agricultural aspect of EM technology have occurred in Thailand, Brazil, California, Indonesia, and France. International scientific conferences are already planned for the years 1999, 2000, and 2001 in South Africa, North Korea, and the former Soviet Union Respectively. At these conferences, academic, research, and governmental institutions present research and case studies from over 30 countries with representative countries from every continent.

An example of how EM technology will impact future world agricultural trends can be seen by a detailed case study of North Korea. This country has been experiencing serious food shortages throughout this decade as a result of drastic decreases in agricultural productivity that began in the middle 1980s. The North Korean government responded to this situation by sending teams of researchers and diplomats throughout the world to search for technologies and agricultural expertise that would allow them to improve their situation. Nothing they found was working to solve this problem.

Descendants of North Korean families living in Japan read Dr. Higa's book and, in 1994, they approached Dr. Higa to acquire a sample of EM for testing. Their test results were positive. In 1995, with the cooperation of the North Korean government, they began a 2,000 hectares test site at a farm cooperative in North Korea. With positive results, the area of farming land using EM technology was increased to 50,000 hectares in 1996. Currently the government of North Korea is implementing EM technology to 100% of farming practices in the country and using over 100,000 tons of EM/year. In cooperation with the EM Research Organization in Okinawa, Japan, the government of North Korea has built many EM propagation centers, an EM research facility, and an EM technical vocational college. Data on the national agricultural yields over the last decade, before and after EM introduction, will be presented.

The situation in North Korea has not yet been shared with the world because the North Korean government has wanted to continue to be perceived as in need and therefore receive the aid of the world community. However, Dr. Higa and the scientists at the Effective Microorganisms Research Organization have had full access to North Korea and have thoroughly and scientifically documented this situation. The resulting success of EM technology will be seen by the entire world when North Korea hosts the scientific international EM conference, September 25th - 30th, 2000.

As seen by the North Korean case study, the values of cooperation and co-prosperity can be the foundation for the proliferation of sustainable technologies. Private and public sectors must

work together to achieve the transformation from resource depleting systems and technologies to sustainable systems and technologies. Government can actively support sustainability through legislation, funding, and educational programs.

A genuinely sustainable technology must encompass long-term economic viability, natural resource regeneration, environmental aesthetic values, and respect for diverse human cultures while satisfying human food, fiber, dwelling, and educational needs. EM technologies and the philosophies of Dr. Teruo Higa can be used as a model to demonstrate the successful implementation of genuinely sustainable technologies. The infrastructures and organizations that have been created to proliferate this technology integrate education, production, recycling, and economic viability to ensure sustainable production and distribution systems for the future.

The preservation of cultural and environmental diversity through voluntary human stewardship is necessary to sustain economic, political, and social stability. There is a need for integrity, morals, and responsibility beyond economic growth. This approach can successfully allow the preservation of environment, agricultural, economic, and cultural integrity.

A Brief Introduction to EM

EM stands for effective microorganisms and was coined by Teruo Higa, professor of horticulture at the College of Agriculture, University of the Ryukyus in Okinawa, Japan. EM comes in a liquid form and consists of a wide variety of effective, beneficial and nonpathogenic microorganisms of both aerobic and anaerobic types coexisting. It is produced through a natural process of fermentation and not chemically synthesized or genetically engineered. Professor Higa started his development of EM in 1968 with the first batch of what would eventually be called EM produced in 1982 and thereafter further developed and refined. His intention, at first, was to find an alternative to the use of agricultural chemicals. It has now spread into applications in the environment, industrial and health fields. However, and it is stressed that, it is not a synthetic chemical nor is it a medicine. It is a combination of various naturally occurring microorganisms mostly used or found in foods. EM technology can be considered a natural technology and can be considered a natural technology and has no known adverse effects on plants, animals, humans, or the environment after over a decade of application.

EM is useful in a wide variety of fields. In agriculture, EM has been used to enrich the soil and produce quality, healthy crops at a greater yield with decreases in pest, diseases, and the need for weeding and tilling and without the use of agricultural chemicals. In animal husbandry, EM has been used with noticeable decreases in foul smells, in the appearance of sickness and insect infestations, noticeable increase in fertility from artificial insemination, and increase of the quality of meat, dairy, and eggs. In the environment, EM has been used to clean up polluted waters in ponds, lakes, dams, and seashores, including in the cleanup of oil spills; make possible the recycling of water from sewage facilities into use in general cleaning; and the recycling of organic waste into quality fertilizer. In industrial uses, EM applied to cement mixing gave a measured rise to the cement's strength; and EM has been used in the plastics and metals waste separation facility to reduce the level of toxic fume emissions.

If put in very simple words, EM lives off our waste while we off "their waste". Their waste simply translates to a healthy environment for us. Additionally, EM seems to induce strong antioxidation, that is, it encourages the presence of antioxidants and suppress the action or prevent the proliferation of active oxygen, also known as free radicals. Therefore, the presence of EM seems to help prevent the corrosion of inorganic materials, such as rusting, and help organic matter towards fermentation as opposed to putrefaction. A mutual existence can be enhanced between microorganisms and humanity by the utilization of EM to our environment from agricultural fields to households and in our polluted waters and soils.

EM only creates the condition for best results, that is, the users should nurture the condition and provide the resources for EM to perform optimally. Microorganisms exists naturally throughout the environment from rock crevices to our internal organs. In our present day environment, putrefactive microorganisms, those types responsible for the rotting of organic matter to catalyzing the deterioration of inorganic matter, dominate much of this sphere. It has the potential to create an environment most suitable for the existence, propagation, and prosperity of life not in conflict with what we, humanity, consider healthy and hygienic.

EM is available in a concentrated form. It is mainly diluted in water anywhere from 1:100 to 1: 10,000 depending on use, such as, irrigating farmland, in drinking water for animals, as a household air spray, in general cleaning, in treating waste water, in manufacturing processes, and so forth, EM is also used in mixing cement and in making ceramics, as well as, in treating and recycling plastics. EM is also mixed with organic matter or organic liquids for certain purposes as making fertilizer and treating organic waste. EM is just a liquid of effective microorganisms. It is not a fertilizer nor does it have mineral or nutritional value. It is used to create an advantageous condition, for instance, it is used to inoculate or treat soil to improve its microflora and make organic materials into fertilizers.

All in all, EM is widely applicable product that can make a considerable change for the better, from the land onto which it is applied, to the waters that are influenced by runoffs, to the air affected by industrial emissions, and to human health affected by the foods consumed, the water drank, and air breathed.