

The Technology of EM in Nepal – An Update on the Success

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Abstract

Community Welfare and Development Society (CWDS), is a professional development NGO involved in promoting Sustainable Agriculture and Rural Development (SARD) related programs since 1991. CWDS has introduced EM technologies in Nepal since June 1996 in collaboration with APNAN/EMRO/INFRC.

The practical application of EM in Nepal started in July 1996. Several applications on different aspects varying from agriculture, livestock to waste management have been tried out in different parts of the country. The results from a variety of applications, having been tried during the last 15 months, are so much encouraging that the demand for EM stock solution and inquiries in delivering its application techniques are increasing. Regular training programs on EM technologies are organized by CWDS and subsequent follow-up by its functionaries has further enhanced the scope and utility of EM in promoting organic farming and waste management initiatives in Nepal.

EM introductory booklet and EM pocket book in Nepali language published and distributed along with the EM application techniques through training, have been successful training and extension methodologies in expanding EM technologies in different parts of Nepal. At present, CWDS is delivering EM stock solution and technical assistance from three (Kakani, Kathmandu and Biratnagar) locations having its own offices and from Narayanghat through other NGO (ESC). Other important locations and relevant collaborating NGOs are being identified for extending/expanding the EM related activities in other parts of the country.

Through the experiences of the last 15 months, the implication of EM technologies in promoting sustainable/organic agriculture in Nepal has been encouraging. The most impressive users of EM in Nepal are the tea estate owners and ordinary farmers. Few NGOs who are involved in producing compost from city household wastes have also integrated EM technologies in their compost making program. Government organizations like Department of Agriculture and Nepal Agricultural Research Council (NRC) are also coming forward to inquire about EM and its professionals are also participating in EM training programs. Few EM related trials have been initiated by them. These are positive signs of EM importance being realized by different actors involved in development after observing the successes through the applications of EM in different sectors in different parts of the country.

Background

It is an indisputable fact that there is a non-separable relationship between agriculture and environment. A number of factors such as soil type, climate, topography, hydrological and biological conditions together exert major control upon farming operations.

In the early days of human civilization there was harmony between land, water, air, plants, animals, microbes and human beings. External inputs have never been used by them. Low external inputs and sustainable agriculture were traditionally practiced by millions of indigenous people the world over till the Green Revolution caused good agriculture to be equated with high-yielding varieties of seeds, synthetic fertilizers and pesticides.

Today, greater emphasis is being laid on modern agriculture, employing energy intensive inputs like chemical fertilizers, pesticides, machinery and high yielding varieties of seeds to feed the hungry millions. Such modern technologies for crops and livestock are imported from developed countries and being extended to the farmers all over. This scientific effort has also been proved futile and more dangerous efforts in the name of genetic engineering, are being introduced to make the situation the worst from the worse.

Community Welfare and Development Society (CWDS) was established and registered under Social Service Act as a development NGO in June 1990 in Kathmandu-Nepal. CWDS believes that

integrated actions and approaches to promote simultaneous development of education, employment, health, ecology and citizens' participation are vital for total development. CWDS also believes that citizens' participation in Sustainable Agriculture and Rural Development (through allocation of their time, talent and treasure) is crucial to achieve food security and sustain the pace of development in the country.

The major objective of CWDS is to initiate and participate in SARD related programs which aim at enriching the quality and confidence of the people who are incapacitated due to illiteracy, poverty, ill-health, ignorance and ecological deterioration.

Educating the people through development initiatives, instigating their involvement in income generating activities, demonstrating/involving them in local resource base agriculture practices associated with countrywide dissemination of sustainable Agriculture concept/experience through regular publication of a quarterly magazine KISAN (meaning FARMER) and capacity building/group mobilizing through training, workshop, exposure visits, community organizing etc., for social/economical/ecological upliftment are the major working areas CWDS has been concentrating its efforts, to make a significant change in the agrarian development initiatives and more on its sustainability component since 1991. With active involvement in the developmental field as a professional NGO in Nepal during the last 7 years, CWDS has gained confidence in its professional capability to manage and implement the development programs of national importance in the country.

Introduction of EM in Nepal

CWDS is a professional NGO in Nepal involved in promoting SARD related programs since 1991. With the affirmative response from APNAN the initiatives of CWDS for the introduction of EM in Nepal materialized after the first visit of APNAN's official delegation under the leadership of Prof. Dr. Teruo Higa during March 1996. The subsequent visit of APNAN's Senior Technical Officer to Nepal during June followed by the continued technical assistance of Mr. Shoji Kanda – EM Researcher from EMRO – has made the application of EM in Nepal broad-based during the year 1996 and 1997.

EM Production and Processes

The first lot of EM (500 liters) was produced in the later part of June 1996 with technical assistance of Mr. S. Kanda at the Demonstration and Training Centre of CWDS with further production of EM (1200 L) during August and September at CWDS' Demonstration and Training Centre in Kakani. In the later part of 1996, EM stock solution (500 L) was made in Biratnagar for its distribution in the eastern part of Nepal, specially for tea growing areas. In 1997, altogether 1200 L of EM stock solution were made in Kakani (500 L), Biratnagar (500 L) and Narayanghar (200 L) and distributed from four locations including Kathmandu.

Different formulations/processes of EM being used are:

- EM Stock solution
- Secondary solution of EM
- Anaerobic bokashi with rice bran as base material
- Fermented Plant Extract (FPE)
- Kitchen Garbage Extract

EM Training and Extension

EM is a new introduction to Nepal. Orientation of CWDS' professionals in knowing EM technology was the primary need and thus, APNAN facilitated two of CWDS' staff through training in its practical applications at Bangkok and Saraburi in Thailand in 1996. These were the initial trained manpower in Nepal to know about EM technologies.

Once EM stock solution was available in Nepal, the technical staff of CWDS together with Mr. S. Kanda of EMRO/APNAN started going around to make the concerned people know about EM and

its efficacy. At the same time, demonstrations of EM were established on different aspects varying from agriculture, livestock to waste/garbage management at different locations, the central location being the project area of CWDS at Kakani in Nuwakot district near Kathmandu valley.

The efficacy and impact of EM applications was so quick that the term EM began to be popular among different groups of people and more at farmers level. Besides continued promotion of EM, a training (15-18 Sept. 1996) for farmers was quickly organized by CWDS at its Demonstration and Training Centre. CWDS' personnel together with Mr. S. Kanda made a short trip (19-26 Sept. 1996) to Terai area of eastern Nepal for the initial introduction of EM in that region. Repeated interactions have been continued with Municipality officials/representatives for the application of EM in city waste management. Several meetings/interactions with different individuals/groups/agencies have been continued as EM extension process. The use and importance of EM was introduced to 10 Slurry Extension Officers (SEO) of Biogas Support Project on 1st October 1996 out of their interest to know about EM and integrate it with their slurry management program. The SEOs also visited CWDS' Demonstration and Training Centre to know about the practical aspects of EM. Realizing the increasing inquiry about EM technology from different interest groups of people, CWDS organized EM Technology Training for professionals from GO/NGO and private sectors. This residential training (20-23 Nov. 1996) at Demonstration and Training Centre of CWDS at Kakani was attended by 20 people. The participants were from diverse fields varying from agriculture institute to farmers level; from research centre to actual practitioners associated with GOs and NGOs and private sector. Several EM technology training at different locations have been organized within this period. A one day workshop was organized on 19th May 1997 in Kathmandu to share EM experiences in different sectors and accumulate the feed back for future direction of EM activities in Nepal. The participation of scientists and officials from the Agriculture Department and NARC together with the representatives from NGOs and farmers was an encouraging indication about the increasing interest of people in EM and its technologies.

While promoting EM to divergent groups of people, the need for a introductory manual/handbook of EM in Nepali language was felt urgent to make our approach more effective and efficient. A brief introduction about EM has been introduced in the country through the quarterly publication KISAN of CWDS having its readers/subscribers in all 75 districts of the country. EM introductory Booklet (24 pages) and EM Practical Pocketbook (28 pages), both in Nepali language, were printed and distributed all over the country through relevant individuals and organizations. These are the first printed material available on elaborating the technology and application aspect of EM in Nepali language and thus the attention of divergent sections of people has been drawn towards EM and its utility in Nepali context.

Successes and Experiences

Uses of EM in different applications in Nepal started from July 1996. Although, a period of just 15 months is very short to be able to present some significant information in front of a gathering of this nature, I, on my own and on behalf of our organization (CWDS), privileged to put forward the efficacy of EM in Nepal as experienced by our team within the last 15 months.

- EM has been proved in reducing the time required for compost making to about 2-4 weeks which otherwise takes 6 to 8 months.
- Greens and all other wastes at farm level are easily converted to compost within a month, which has become a major source material for the regeneration of already deteriorated soil due to continuous and unscrupulous use of chemical fertilizers.
- Kitchen wastes (both raw and cooked) in the city area are easily and quickly converted to useful compost for agricultural use which otherwise were thrown in the waste bins adding to city pollution.
- EM has been proved to be of great advantage to few NGOs in city area involved in making compost out of household wastes with the purpose of environmental concern and as a income generating activity for the organization by selling the compost for pot plants and flower gardens

in the city area.

- The poultry rearing farmers are using EM extensively in its feed, water and bedding to be relieved from the scheduled use of antibiotics and have better meat with improved weight and quality. But the more important attraction for using EM is getting relief of the filthy smell of poultry yards which was a big problem as poultry raising is a household enterprise in residential houses of small scale farmers.
- According to farmers' expression, EM acts as appetizer on pigs which make it to consume more feed resulting in quick gain in meat. The health of pigs is better and the filthy smell of the yard is reduced to almost nonexistent.
- Sher Bonemeal Pvt. Ltd., a factory in Patan city within Kathmandu valley making bonemeal and organic manure out of the collected remains of slaughtered animals (mostly buffaloes) for meat purposes, is using EM continuously to reduce the filthy smell of its factory premises which otherwise was a big issue within the surrounding municipality.
- Nepal Agro Organic Fertilizer Pvt. Ltd. In mid-western terai of Nepal has expressed positive response in using EM in the process of making organic fertilizer.
- The visible impact of EM applications on vegetable seedlings in nurseries has drawn the attention of the farmers involved in commercial vegetable production.
- The impact of EM applications on growth, vigor and increased production of vegetables are the influencing cases on increasing use of EM.
- The influence of EM (Use of bokashi and 7 sprays) on root growth in peas has impressed the farmers and extension workers about the positive impact of EM.
- Quite positive results have been observed in one season's trial of EM applications on rice field in the mountain (6000ft.) with an increased yield of 6 per cent in grains and 16 per cent in straw. This trial is being repeated to validate the results of the first year. The details of EM trial on rice are as follows;

The rice (variety-Cowchin) was already transplanted in the last week of June 1996. Out of the total rice field, 250 sq. mt. area was marked for EM applications leaving the remaining rice fields for the usual operations fertilizer (urea) application in particular as practiced by the farmer (Mr. Lal Bd. Tamang) for comparison. The first EM application in spray form was done on 12th July followed by repeated spray at weekly intervals. Altogether 8 applications were done, the last one on 29th August 1996. Regular observations have revealed following factual information which, may not be of so importance in statistical terms, is of great value for the practitioners and we are impressed of the results of EM application in rice field and so are the farmers who have been watching this effort of ours with EM.

Following results are presented based on one sq.mt. area from EM applied plot and control plot of rice for comparison and understanding. (Table 1)

Table 1. Effect of EM on Growth and Yield of Rice cv. Cowchin

	EM	Control
Number of heels	60	60
Number of tillers/heel	10	8
Number of leaves/plant	35	28
Plant height	70 cm.	65 cm.
Grain weight/sq. m.	455 gm	430 gm
Straw wt.	1660 gm	1430 gm

Besides other difference, the increased weight of 25 gm. of rice grain and 230 gm of straw over control field is attractive to discuss. The increased yield/hectare due to EM application is estimated to be 250 kg. of grain and 2300 kg. of straw. The increased yield of rice grain and straw are important for farmers in Nepal. This positive indications are to be verified by systematic and scientific trials in the coming season.

- The use of EM on corn field has been quite impressive. Corn is the major crop and staple food in hills.
- The use of EM in Tea Gardens has been accepted as the best technology in different ways from making compost to treatment. Kanchan Jangha Tea Estate has been certified for its organic tea production and four other tea gardens are in conversion stage to organic. All of these tea estates in eastern hills of Nepal are using EM technologies and its different formulations in their farm operations.

Recommendations

Based on the experiences/successes gained and lessons learnt during the last 15 months while working with EM technologies in different sectors, the following recommendations are suggested to be considered to make EM technology a popular and dominant contribution in different fields of activities in Nepal.

- EM has great potential to be integrated in promoting sustainable agriculture systems and therefore, CWDS needs to enlarge its SA network activities to promote EM in Agriculture which is the dominant economic sector in Nepal still employing more than 80 per cent of the population and contributing more than 45 per cent in the total economy of the country.
- EM is a new material in Nepal's context and therefore, it needs few validation trials both in agriculture and waste management sectors to have enough scientific evidence to prove the efficacy of EM with facts and figures in local situations to satisfy the queries of the inquisitives.
- With scattered but intensive effort of CWDS and its functionaries for the last 15 months, the interest of concerned people has been drawn towards EM within the country which has made CWDS to be responsive and accountable both to the people and to EM related activities. After organizing few EM technology training and a workshop until September 1997, now it is high time for CWDS and its supporters (EMRO/APNAN/INFRC) to enlarge and strengthen the EM related activities together with ensuring the production of EM, its packaging and marketing system in Nepal.