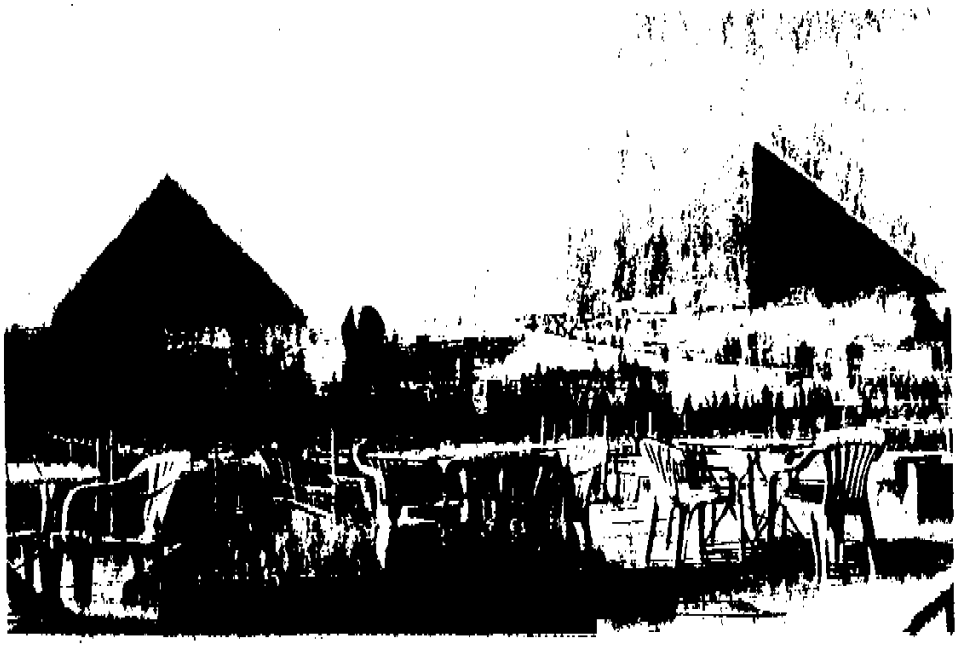
EM Pilot Project in Egypt



1997.

EM Research Organization,Inc.

The Promotion of EM in Egypt

1. Background

Under the leadership of Dr. Mamdouh Riad, the Undersecretary of State for Afforestation, Ministry of Agriculture and Land Reclamation, a pilot project was drafted in March 1997 prior to the implementation of a comprehensive program by goverment of Egypt to introduce EM to Egypt.

EM Research Organization started EM production in Egypt in July 1997, and technical guidance for the pilot project as well as several models for various fields of EM application during the period between October 1997 and March 1998.

The pilot project involves sewage treatment with EM for a lagoon system of 30,000 tons per day capacity and the creation of model sites which include the adoption of EM to fish farming, chicken farming, and successful fruit growing.

Presently, plans are under consideration for the expansion of the pilot and models to government programs in Egypt as well as their introduction to countries in the Middle East and North Africa.

2. Production of EM

The production level is 1 to 2 tons per month due to the limited demand for the pilot project and models. By the end of this year, 1998, the marketing network is to be established and production is expected to rise to a level of 10 tons per month.

3. EM Applications, the pilot project and models

a. Sewage treatment (30,000 tons per day)

The treated water showed BOD of 72 ppm before EM was adopted. Once EM adopted, it took 5 months to reduce it to 5 ppm. D.O. also improved from 2 -3 ppm to 4 - 8 ppm with the use of EM. It improved the clearness and reduced odor in the treated water. The use of the treated water for irrigation in agriculture is currently under consideration.

b. Fish farming

The use of EM improved fish growth twice as much as those of control (non-use of EM) in the average weight, especially during the slow growing season of winter. The farmer is very much satisfied with the result and there have been visits by many neighboring fish farmers with interest in EM.

c. Chicken farming

The use of EM improved the feed conversion rate and reduced the mortality rate compared with the control (non-use of EM). Many large farms were very much impressed with the resulting outcomes, such as the reduction of cost and higher income.

They continue to raise chicken with EM, but with no medicine and still expect the improvement of chicken's health.

d. Fruits growing in sandy soil

The use of EM showed higher yield in growing grapes than the control (non-use of EM) as well as easier to control the pH of the sandy soil.

4. Comments

Currently EM is being introduced in such fields as afforestation and other fruit growing (bananas and oranges), and EM is expected to be adopted to create models for the treatment of solid wastes and in the cattle raising and dairy farming.

DATE July 27,1998

EM REPORT

TITLE: EM Sewage Treatment in Egypt.
PERSONS/ORGANIZATIONS: The Ministry of Agriculture and Land Reclamation, Undersecretary of State for Afforestration, Egypt and EM Research Organization, Japan.
LOCATION: Located 100 km from Cairo in Egypt.
PERIOD: October 1997 through March 1998 (5 months).
SCALE: Treated amount of sewage: 30,000 ton/day, Natural oxidation pond method

1. **ABSTRACT:** The sewage consists mainly of that from factories such as metal fabrications, detergent, and food processing, as well as city waste water. The level of heavy metals in the sewage does not present any problem, but its quality must be improved if it is used for afforestation and agriculture. EM was introduced to the existing treatment system and was able to continuously clean to the level usable to agriculture purposes.

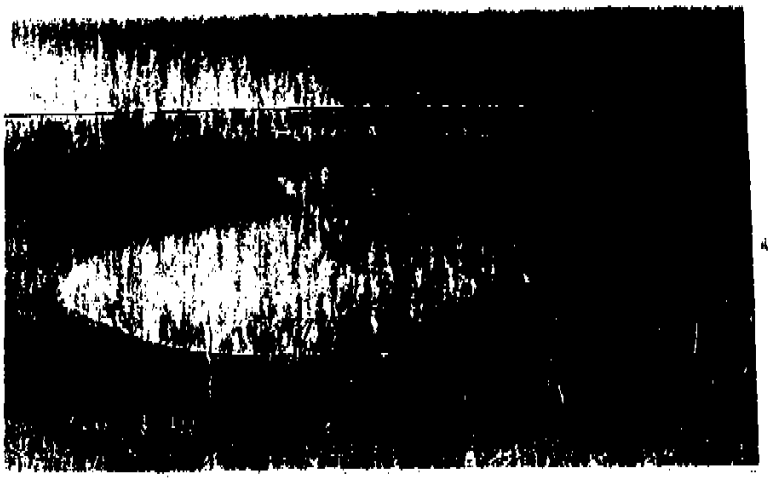
PURPOSE:

- To treat sewage to the level of water quality allowed for agricultural irrigation according to the national standard.
- To create a model of recycling sewage for afforestation and agriculture.
- To eliminate odor problems at the treatment sites.

MATERIALS AND METHODS

1. **PREPARATION:** EM secondary solution (EM and molasses 5% each) and EM sand (soaked in the secondary solution and molasses dilution and dried)
2. **METHODS:**
    1. Inject EM secondary solution into the sludge deposited at the inlet of the system (9 to 18 ton/week)
    2. Deposit EM sand at six places including the inlet (total 1 ton/week)
    3. Return the treated water from the outlet to the inlet.
3. **MATERIALS :** (for 5 months) EM: 2,160 liters; Molasses: 2,160 liters

RESULT: It took only 90 days to eliminate odor and reach the required quality level for agricultural irrigation: BOD < 20 ppm and COD < 50 ppm.
DISCUSSION: A large amount of EM fixed materials brought a positive result earlier.
REFERENCES: None.
INFORMATION EDITOR: Contact: EM Research Organization, Okinawa, Japan.



EM Testing in the Sewage Treatment System in Egypt

It shows the first lagoon, a natural oxidation pond. The major source of waste water to be treated is from various factories and the contents and natures, thus loading to the system, vary from time to time, leading the treatment very unstable.

EM Testing in the Sewage Treatment System in Egypt

It shows the fifth lagoon, a natural oxidation pond. Transparency of the water must be more than 30, more like 50 if measured by the cylinder test, and BOD less than 10 ppm.

Analysis Data on Sadat city sewage water treatment station:

in let	'95,Jan/30	'97,Oct/28	97/Nov/22	97/Dec/21	'98,Jan/21	98,Feb/22	other's
BOD	266	257	85	63	100	60	
COD	339	600	160	350	163.3	125	
Phosphate	3.45	6.8	7.1	3.89	5.1	4.9	
Nitrate	4.3	0.01	0.09	0.12	0.15	0.11	
T,K,N		14	10.4	25.2	10.85	10.33	
Cd	0.3127	<0.05	0.02	0.01	0.01	0.01	
Pb		0.6	0.03	0.28	0.68	0.45	
Cu	0.231	<0.1	0.21	0.01	0.02	0.01	
Zn	1.431	2.2	0.25	0.45	0.24	0.54	
Ni	0.22	<0.15	0.027	0.13	0.25	0.11	
Cr		<0.2	0.01	0.03	0.02	0.04	

out let	'95,Jan/30	'97,Oct/28	97,Nov/22	97,Dec/21	'98,Jan/21	98,Feb/22	Goal limit
BOD	36	72	60	11	25	5	<20
COD	138	121	126	241	40.8	62.5	<50
Phosphate	3	4.8	6.3	2.9	3.36	2.9	<20
Nitrate	8.2	0.25	0.01	0.08	0.12	0.09	---
T,K,N		10.1	9.3	11.2	9.45	7.08	<30
Cd	0.225	<0.05	<0.02	0	0.01	0.01	<0.01
Pb		<0.2	0.07	0.17	0.09	0.03	<5
Cu	0.225	<0.1	0.08	0.01	0.01	0.01	<0.2
Zn	2.025	<0.05	0.01	0.06	0.08	0.1	<2
Ni	0.0625	<0.15	0.025	0.11	0.13	0.09	---
Cr		<0.2	0.01	0.01	0.02	0.01	---

Remark's:

1,Unit:(ppm).

2,Befor EM Treatment:'95,Jan/30 and '97,Oct/28.

3,After EM Treatment:'97,Nov/22 and '97,Dec/21, '98,Jan/21, 98,Feb/22.

Analyzed by: Ministry of Agriculture and Land Reclamation, Egypt.
(Dr. Mohammed Al-fattah)

CODE#
DATE July 28,1998

EM REPORT

TITLE: EM Fish Farm in Egypt.
PERSONS/ORGANIZATIONS: The Ministry of Agriculture and Land Reclamation, Undersecretary of State for Afforestration, Egypt and EM Research Organization,Japan
LOCATION: Fayum, Egypt, 100 km southwest from Cairo.
PERIOD: November 1997 through May 1998 (6 months).
SCALE: Pond A (2.5 ha, 25,000 tons, EM applied after hatched fish was brought in)
Pond B (3.2 ha, 32,500 tons, EM applied when it was dried up)
ABSTRACT: The sites had no problems such as diseases and consequent use of medicine, but the practice was less cost effective due to a low density farming with a low level of technology. It is possible to raise the density without creating any problem for better cost-effectiveness, because EM can maintain water clean even with more fish and directly improve fish health, both of which results in better growth. This was the first cost-effective model for higher density fish farming in Egypt and showed the effect of faster growth.
PURPOSE:

- To improve water quality even against less frequent replacement.
- To improve the growth rate and increase the yield.
- To increase the density and raise the level of general fishing technology.

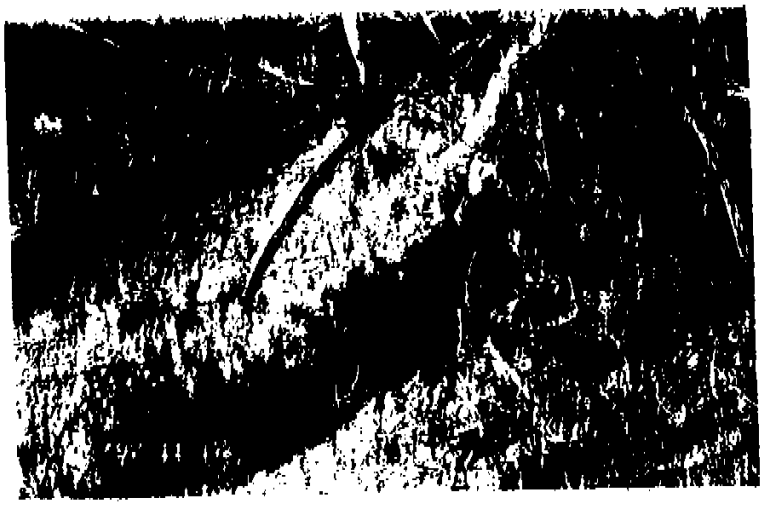
MATERIALS AND METHODS

1. **Preparation:**
   1. EM secondary solution (EM and molasses 5% each for the first treatment and then 10% propagated with additional EM and molasses).
   2. EM anaerobic bokashi, and EM chicken dung anaerobic bokashi.
2. **METHODS:**
   A. EM treatment for the soil of pond bottom at the time of drainage of the water:
      1. Spread EM chicken dung anaerobic bokashi (500 kg/ha) and EM secondary solution diluted at the rate of 1 to 200 - 300 water (30 liters/ha).
      2. Till the soil and leave it exposed to sun for seven days.

   B. Fill the ponds with water and dripping EM secondary solution at the rate of 1 to 100,000 of the filled water.
   C. Bring in the hatched fish to the ponds one week after.
   D. Add EM secondary solution at the rate of 1 to 100,000 of the filled water every other week after the fish release.
   E. Add EM anaerobic bokashi to feeds for every feeding.

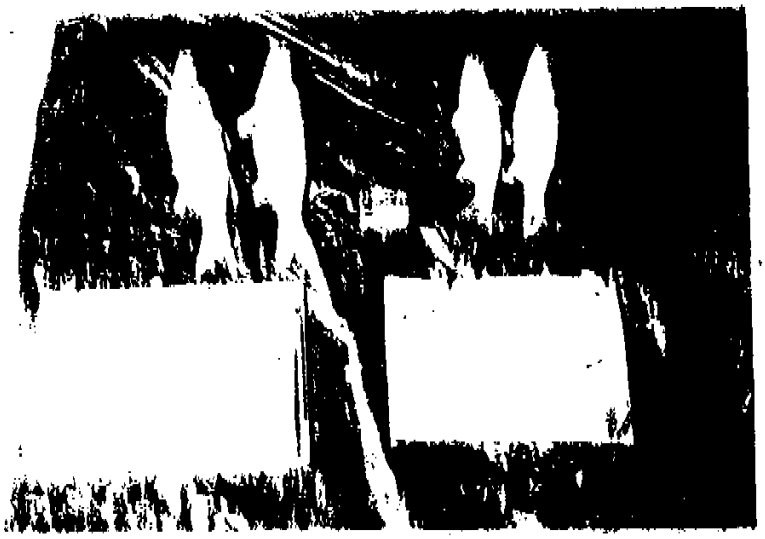
1. MATERIALS: EM: 80 liters; Molasses: 80 liters.

RESULT: It takes more than one year to grow mullet. Though it was released to the ponds during the winter season, which is known for its slow growth, it took 3 to 4 months to grow big with the use of EM. (After 4 months from the release, EM grown mullet was 500 gram per fish on the average , while without was 250 gram per fish.) The result from the experiment with the above steps B through E was encouraging enough to lead to introducing the step A and to invite many other fish farmers to learn about the use of EM.
DISCUSSION: It is understood that EM improved water quality as well as developed "good" micro flora in the water.
REFERENCES: None.
INFORMATION EDITOR: EM Research Organization, Okinawa, Japan.



EM Experiment for Desert Land Reclamation

Since highly saline underground water is used for irrigation repeatedly, salt deposit on the ground. Due to the concentrated salt, many planted trees are observed dead standing.



EM Experiment for Fish Culture

Striped mullet grown in a fresh water pond
Left: EM treated, Right: Control (no EM)

Poultry
CODE#
DATE July 27,1998

EM REPORT

TITLE: EM Broiler Chicken Farm in Egypt.
PERSONS/ORGANIZATIONS: The Ministry of Agriculture and Land Reclamation, Undersecretary of State for Afforestration, Egypt and EM Research Organization, Japan.
LOCATION: Located in Egypt, 100 km from Cairo.
PERIOD: November 1997 through May 1998 (6 months).
SCALE: EM treatment (4,250 chickens), Control (4,250 chickens).
ABSTRACT: Set a large size experiment at a well organized farm and observed improvements in the feed conversion and reduction in sickness with EM.
PURPOSE:

- To improve feed conversion and growth, and shorten the cycle.
- To reduce cost of feeds, disease and stress, and the high mortality rate.

MATERIALS AND METHODS

1. **PREPARATION:** EM Secondary solution(EM and molasses 5% each) and EM anaerobic bokashi
2. **METHODS:** 1) EM secondary (diluted at rate of 1 to 500 water) : spray once three days before housing chicks and evey other week after that add to the drinking water at the rate of 1 to 2,000 in water 2) EM anaerobic bokashi : Mix to feed at the rate of 1 to 2,000 water
3. **MATERIALS:** EM: 40 liters; Molasses: 40 liters

RESULT: -Improved feed conversion rate
- Higher gained weight
- Reduction in mortality: EM (2%), Control (2.5%)

DISCUSSION: A combination of EM spraying to the houses, feeding, and drinking complemented each other. EM chickens are healthier showing better growth and raised in the improved environment showed less stress, sickness, and less mortality.

REFERENCES: "Preliminary Report of EM Treatment at United Poultry Co", Syed Ali, EMRO.

INFORMATION EDITOR: Contact: EM Research Organization, Okinawa, Japan.

CODE#
DATE July 27,1998

EM REPORT

TITLE: Model for Turning Desert Green in Egypt.
PERSONS/ORGANIZATIONS: The Ministry of Agriculture and Land Reclamation, Undersecretary of State for Afforestration, Egypt and EM Research Organization, Japan.
LOCATION: Wadi Natun, 100 km northwest from Cairo.
PERIOD: November 1997 through May 1998 (6 months).
SCALE: 70 acres.
ABSTRACT: A program called "Egypt-Japan Friendship Forest" was adopted as a part of the Afforestation Program of Desert in the region and many Japanese tourists participate in the program by planting trees. Also present in the area is a collaborative research with a certain Japanese university for improving the soil. It was decided to experiment EM for trying to solve problems caused by salt and saline water.
PURPOSE: To solve the problem crops suffer from such water as generally saline and salt increase caused by occasional local downpours

- ◇ Crops suffer from such water as generally saline and salt increase caused by occasional local downpours. Crops may grow but wither with the accumulated salt in the water. EM is to be introduced to solve this problem, which is expected to represent a model for future afforestation in the desert.

MATERIALS AND METHOD

1: PREPARATION : Refer to "2. METHODS"

2: METHODS:

1. EM Secondary (EM and molasses 5% each, diluted at the rate of 1 to 1,000 in water) :
   Dripping to irrigation water and liquid fertilizers: 15 liter/acre/week
   Spray : 4 liter/acre/week
   *After some time the amount will be reduced and some portion be replaced with EM green grass fermented solution.
2. Extract of EM anaerobic bokashi
   Apply as irrigation : 15 kg/acre/2-4 weeks

3 : MATERIALS: for 6 months EM: 1,500 liters; Molasses: 1,500 liters.

RESULT: Visible increase in humus in the soil
- The soil improved its fertility with the application of EM, EM bokashi, and EM compost.
- The location of the site has a high visibility to visitors as well as a strong tie with Japanese tourists, and the involvement by Japanese Embassy and Afforestation..... Agricultural difficulty lies in the source for irrigation water, saline, and of organic matters which is little available.

DISCUSSION: None.
REFERENCES: None.
INFORMATION EDITOR: EM Research Organization, Okinawa, Japan