

EM Treatment on Sadat City Sewage Water Egypt

March 26, 1998

EM Research Organization

Progress Report

As Dr. Ma,douh Riad, Undersecretary of State for Afforestation Ministry of Agriculture and Land Reclamation, with the profound understanding of potentials for EM technology to make a contribution too Egypt and the Middle-east countries, took initiative to introduce EM to Egypt, the Pilot Project commenced and was successfully implemented under his leadership.

The project was conducted by the staff from the Ministry of Agriculture and Land Reclamation and EMRO who have received technical guidance from Dr. Teruo Higa throughout the project. It is intended to report the successful results of the project below.

Material and Instruments required for the 6 months period (Oct. '97 - Mar.'98):

EM	2,160 L (approximately)
EM	900 L (Special kind of EM essential for water treatment purposes)
Molasses	5,280 L (approximately)
Sandy Soil	70 t (approximately)
Clean Water	For the preparation of Extended EM solution, etc.
Water hyacinth	2 t (approximately)
Tanks	3 x 3 t
Injectors	3 x 15 m (1cm)
Sheets	5 x 5 m (for EM sandy soil)
Nets	4 (for pond 3 & 4)
Pump	1,500 t/day (water reverse system which shortens the time required for water treatment and also saves the cost of water required for the preparation of Extended EM solution, etc.)
Miscellaneous	

Achievements:

87 tons of Extended EM solution and 35 tons of EM sand changed the 1,066,260 tons of sewage pond into a fish pond.

Problems:

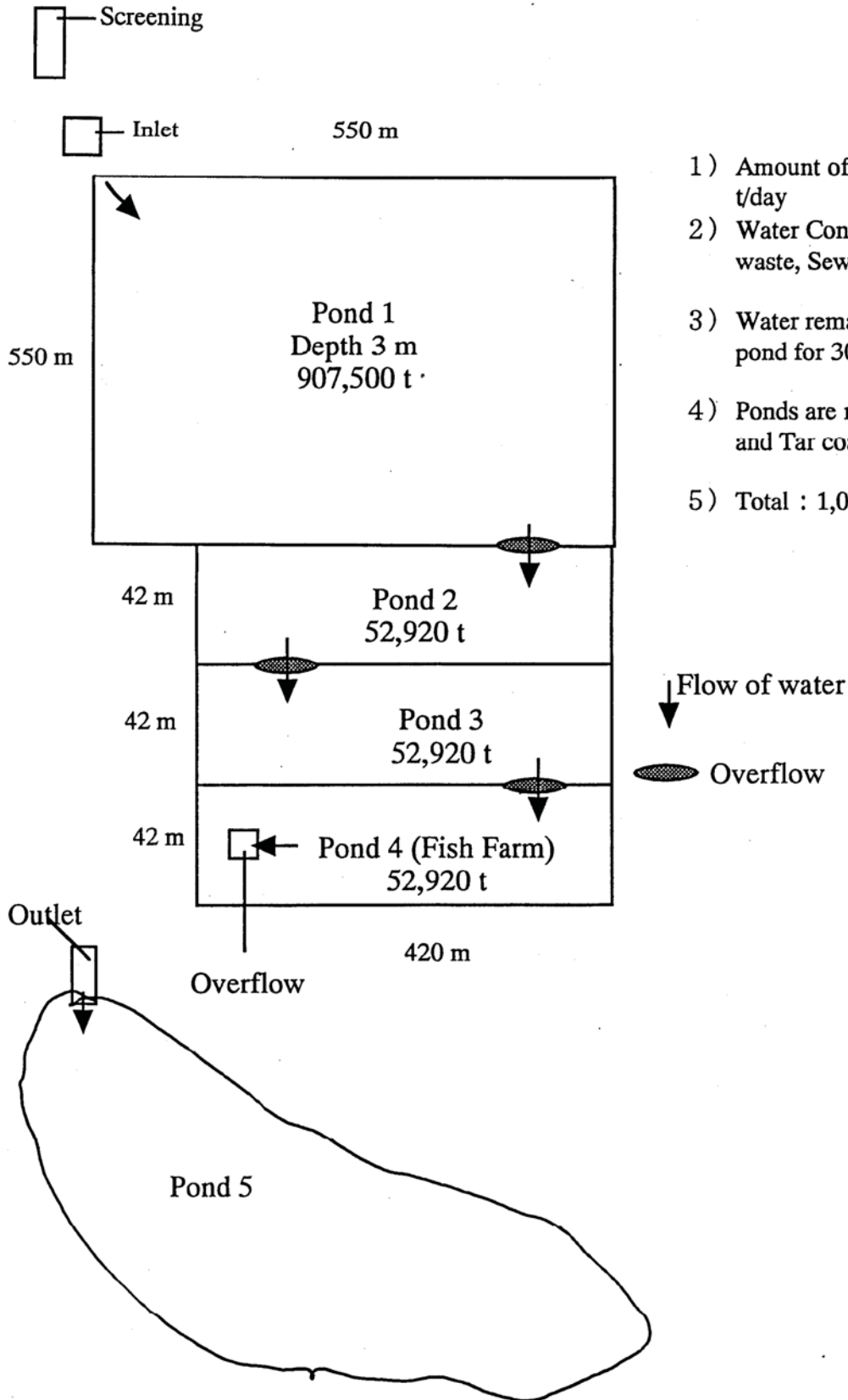
1. See pages 13 - 16. (The analysis data of major problems)
2. Pungent smell all around the area.
3. Harmful for irrigation purposes.
4. Spoiling the desert area and the farms near the pond.

Treatment procedure:

- Extended EM solution 9 tons/week, injected into the sludge at the inlet of the pond. (Since Oct. 26 - Nov. 22) and (from Nov. 22 - Dec. 10 twice a week)
- EM sandy soil 5 tons/week, poured into the water at 5 different points of the 1st pond.
- Nile plants were placed in the water at the 3rd pond on Nov. 2.
- 3 nets were fixed in pond 4 to stop the flow of fish (Bolti).

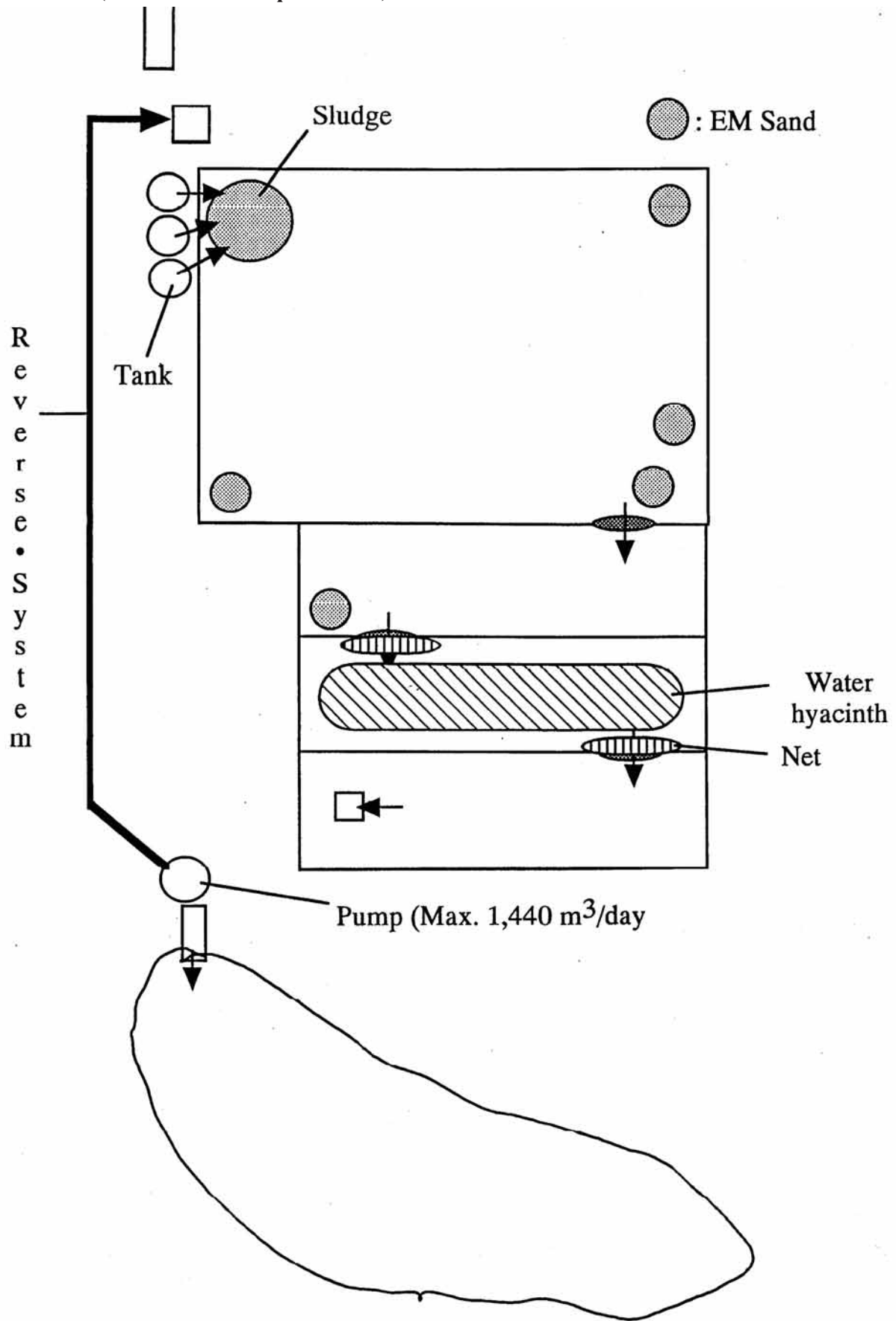
- 115 fish were transferred into pond 4 on Nov. 30.

Site map of water treatment station:



- 1) Amount of Water 30,000 t/day
- 2) Water Contains Industrial waste, Sewage water, etc.
- 3) Water remains in the pond for 30-35 days
- 4) Ponds are made by Cement and Tar coal material.
- 5) Total : 1,066,260 t

Flow chart (water treatment procedure):



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	
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	-

Remarks

Unit: ppm

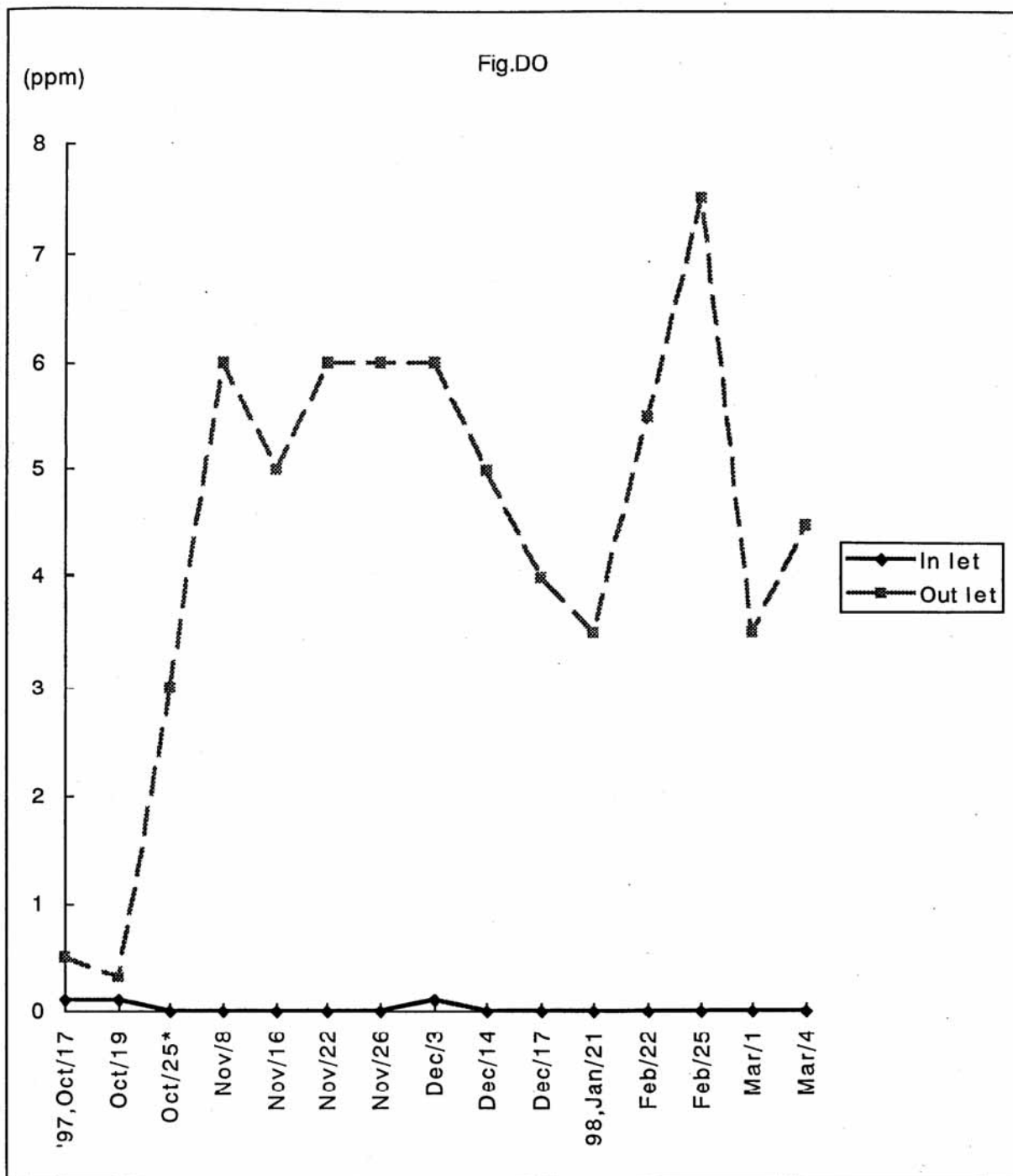
Before EM treatment: '95, Jan 30 and '97, Oct 28.

After EM treatment: '97, Nov 22, '97, Dec 21, '98, Jan 21 and '98, Feb 22.

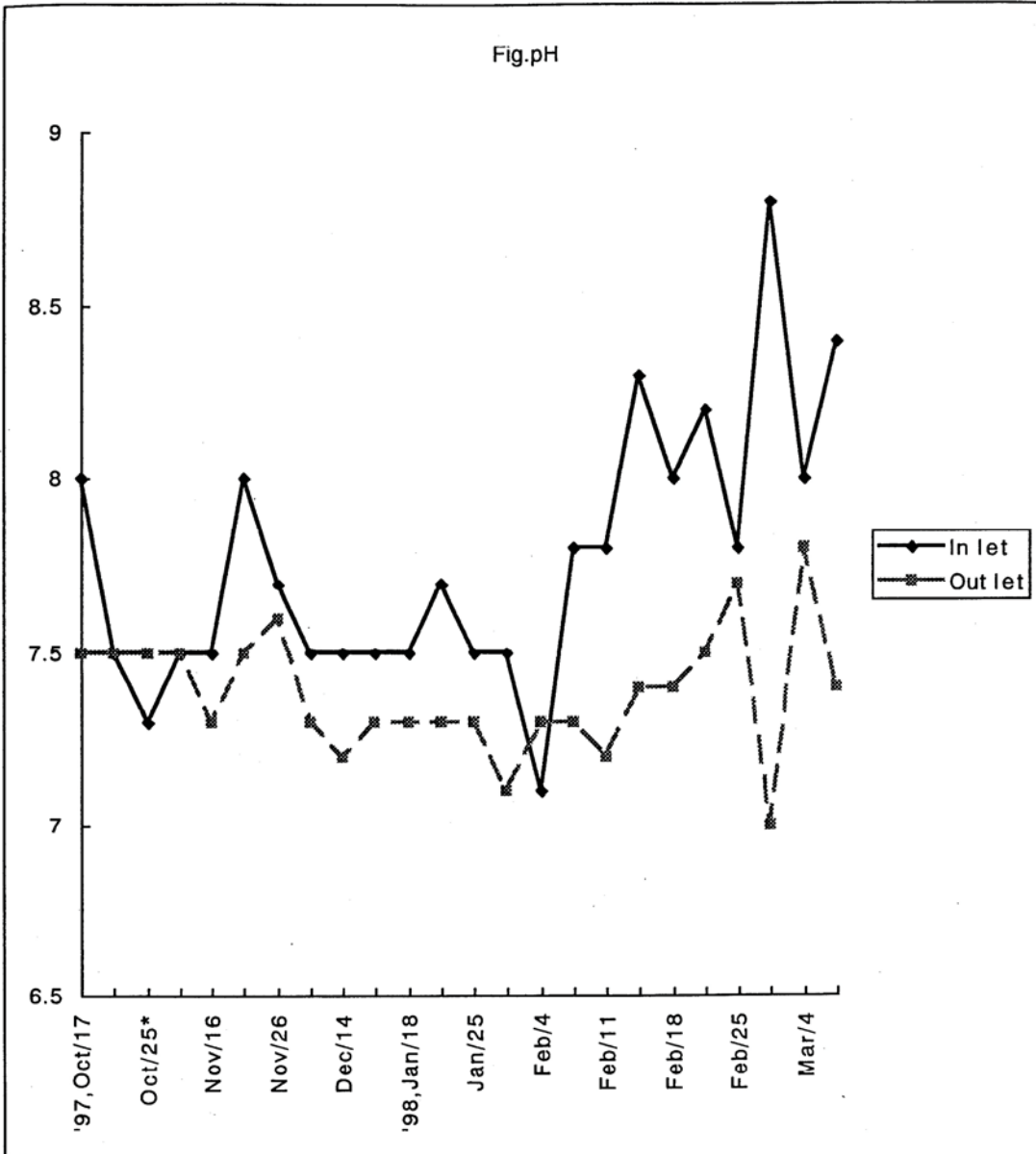
Analyzed by Ministry of Agriculture and Land Reclamation, Egypt. (Dr. Mohammed Al-Fattah)

Following graphs show a clear picture of a remarkable progress of EM treatment.

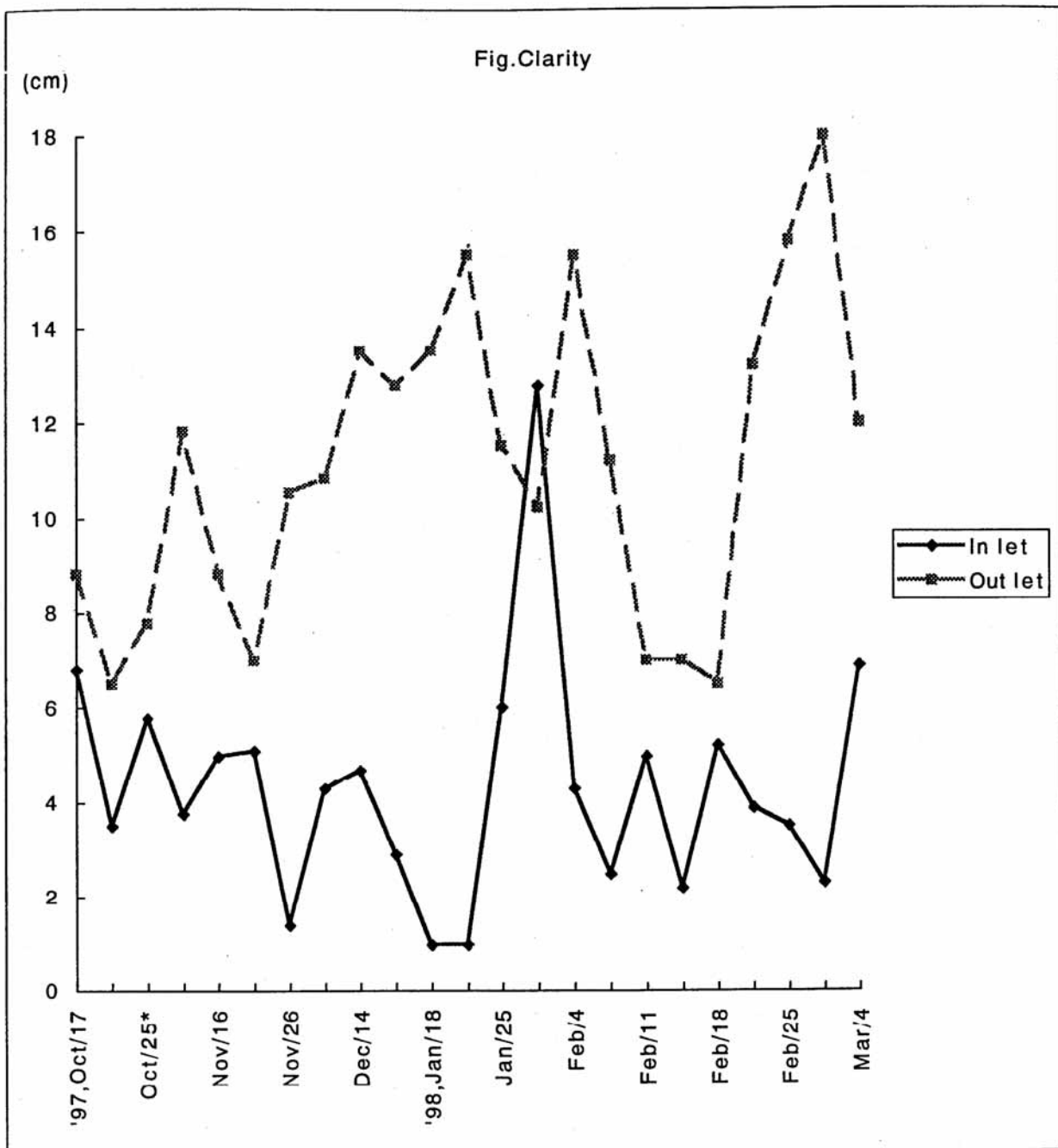
DO



pH

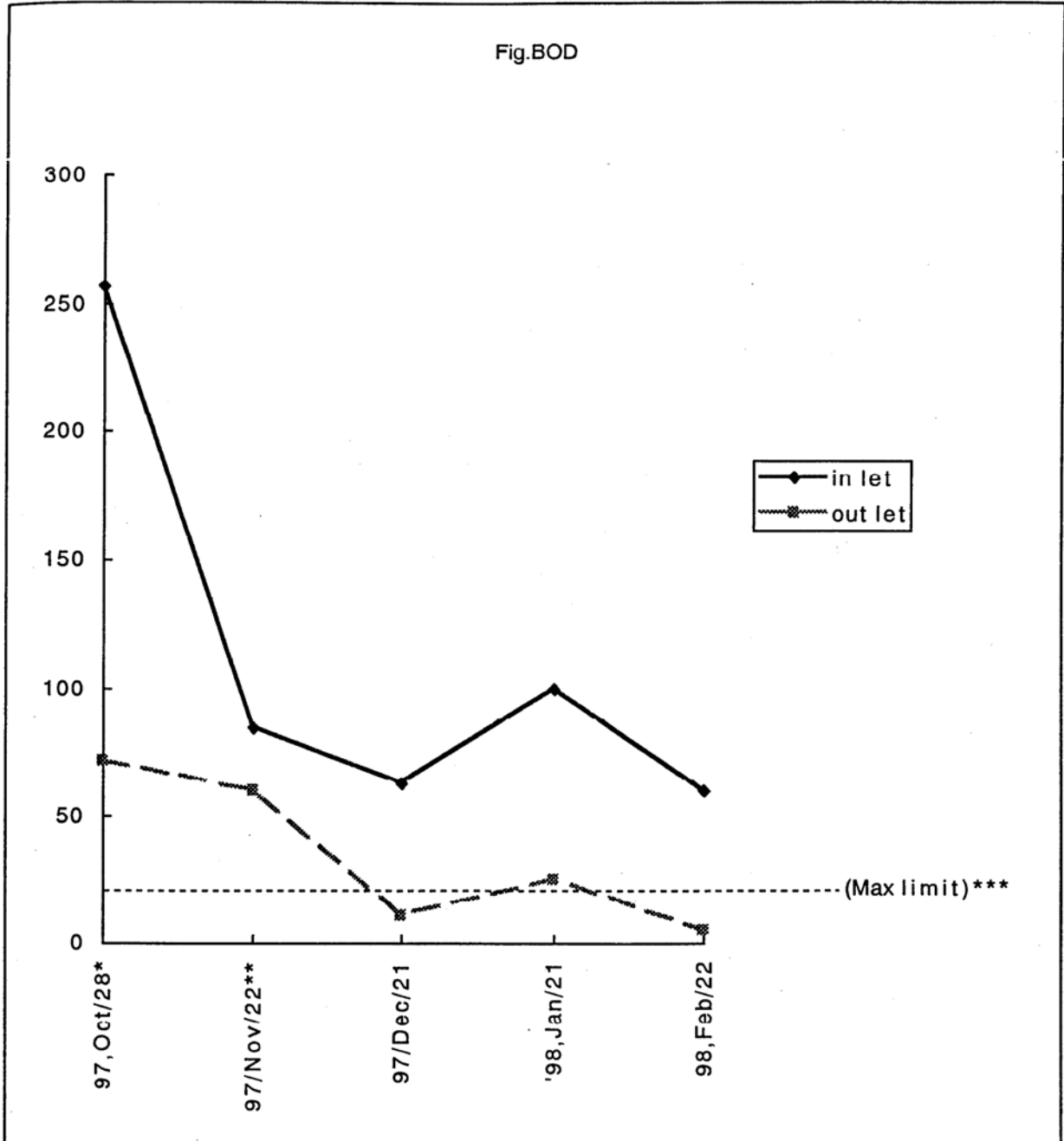


Clarity



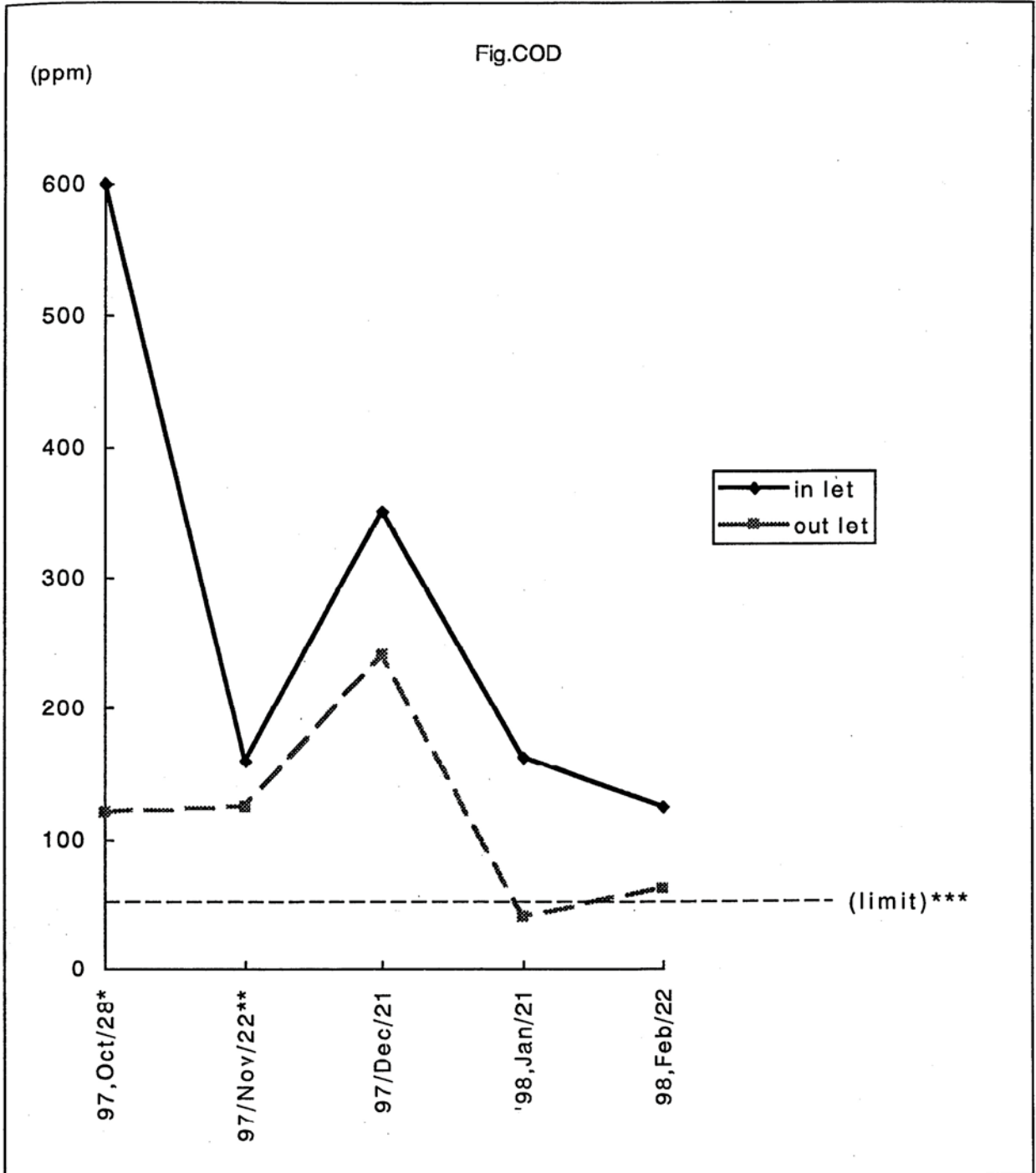
BOD

Fig.BOD



COD

Fig.COD



Observations:

- No more smell from the water or around the area.
- After the decomposition of sludge, the water getting lighter and water can be seen.
- Birds can be seen all day coming to the pond very often.

Goal:

To achieve the certain specific levels mentioned below.

Parameters	Unit	Result
BOD ₅	Mg O ₂ /L	Less than 20 ppm
COD	Mg O ₂ /L	Less than 50 ppm
T.K.N	Mg N/L	Less than 30 ppm
P	Mg P/L	Less than 20 ppm
Heavy metals	Mg /L	Less than the max.

Results:

- Achieved value of BOD₅ on '97, Dec 21 and '98, Feb 22.
- Achieved value of COD on '98, Jan 21.
- Achieved value of T.K.N,P, Heavy metals.
- Value of DO and pH. They indicated high quality water for irrigation. Also, fish culture.
- Final pond's water indicated high clarity.
- Reducing an offensive odor recognized on first pond.

Remarks:

This project was launched on Oct. 20 by the cooperation of the Undersecretary of State for Afforestation of the Ministry of Agriculture and Land Reclamation, Egypt, EMRO (EM Research Organization, Japan), APNAN (Asia Pacific Natural Agriculture Network) and INFRC (International Nature Farming Research Center, Japan).

EMRO is very grateful to Dr. Mandouh Riad and his staff for their assistance for EMRO staff to accomplish their assignment successfully.

Having had a successful trial, Dr. Mandouh Riad, Undersecretary of State for Afforestation of the Ministry of Agriculture and Land Reclamation and EMRO currently continue their discussion for the expansion of the project to a comprehensive and governmental EM program to be adopted in Egypt. EMRO wishes wholeheartedly that Egypt countries to prosper and EM will be introduced and contribute to countries in the Middle-east and North Africa with assistance by Egypt.

Project is an integrated effort executed, supervised and analyzed by:

Dr. M. Riad, K.Asato, Dr. M.Abdel-Fattah, S.Ali, M.Nakamine, T.Nakahira, M.Ibrahim and G.Folly, Ernest. S.Matsukawa, H.Tajimi.

The pilot project underwent successfully during it's first two months period. The remaining three and one half months period will be enough to reach the goal, however if we set up the Reverse System Pump, it will make the quality of the water much better and will be a timesaver and also low cost.

It is recommended that the Egyptian side consider the operations of the project by the help of the local staff, which EMRO team has trained, applying the same treatment method for the remaining period, however, the necessary supervision can be done by the EMRO team from time to time. In this way, the EMRO team can take care of other new projects in Egypt and outside of Egypt.

Note:

The Sadat city sewage water treatment data cannot be published without the prior permission of EMRO HQ, Okinawa, Japan.