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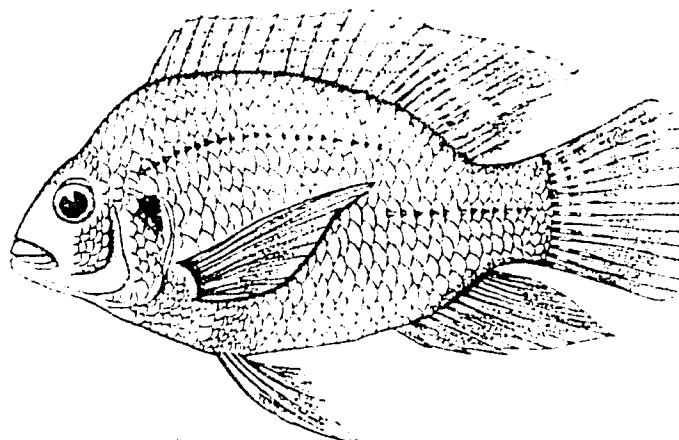
MINISTRY OF AGRICULTURE
AND FOOD SECURITY
ARAB REPUBLIC OF EGYPT

EGYPTIAN AQUACULTURE
DEVELOPMENT PROJECT

JMM-KNBS TECHNICAL ASSISTANCE TEAM
PROGRESS REPORT

AUGUST 28, 1982 TO FEBRUARY 28, 1983

USAID CONTRACT NUMBER 263-0064



USAID/CAIRO
DEVELOPMENT
INFORMATION
CENTER

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SECTION I
REPORT SUMMARY

- A. Project Management was significantly affected by personnel changes including:
1. The replacement of the Project Director, Mr. Hassan Amin Abdallah by Mr. Adel Ezzy and the subsequent reinstatement of Mr. Abdallah to said position.
 2. The USAID Project Officer, Mrs. Elizabeth Martella was replaced by Mr. Arnold Radi.
 3. The Special Education and Training Officer, Dr. Khairy Aref, was replaced by a team consisting of Mr. William Madden, Dr. Gary Jensen and Mr. Mohamed El Shenawi.
 4. The involvement of Mr. Salah Zaalouk and Dr. Yehia Hassan in the project was terminated.
 5. Mr. Darrell Deppert, Carp Hatchery Specialist and Mr. Wynne Davies, Aquaculture Engineer, joined the team in September and October respectively.
 6. The services of the Team Leader, Mr. Gerald Ginnelly, were terminated and Mr. Madden was appointed Acting Team Leader.

In January the JMM-KNPS Joint Venture assumed management of the support staff. Also in January members of the Technical Assistance Team (TAT) met with Mr. Michael Stone, USAID Mission Director, to discuss project shortcomings, particularly with respect to construction delays and overruns.

B. Personnel

1. The Acting Team Leader, Mr. Madden is also the Fish Transportation/Mullet Specialist. As Acting Team Leader Mr. Madden coordinated and supervised the work of the TAT as well as provided logistic support to the TAT by managing the local support staff beginning in January 1983. The assumption of responsibility for local office support required a disproportionate amount of time to stabilize and upgrade local support services and establish good office procedures. In addition,

Mr. Madden served on the special Education and Training Team, assisted with the NAC equipment list and training.

2. The Extension Specialist, Dr. Jensen, also undertook some of the duties of the Special Education and Training Officer. As Extension Officer he assumed the task of recruiting personnel for work in the fields of economics and marketing and rice-cum-fish farming. He assisted in setting up a four month training program at Abbasa Fish Hatchery, working closely with his MOA counterpart, Mr. Shenawi. Other phases of his work included development of an equipment list, demonstration of rice-cum-fish farming feasibility, yield trials, cooperation with Small Farmer Education Officers in Sharkia Governorate and development of baseline production, socio-economic, marketing and distribution data.

In the field of training, he supervised two training officers in conjunction with the four-month training program at Abbasa Hatchery, assisted in developing a fish farming manual, developed fact sheets for farm management and was instrumental in establishing criteria and selecting staff for Stateside technical training.

3. Pond Production Specialist, Mr. Malcolm Johnson, provided much needed advice to the managers of existing government fish farms and contributed greatly to the design of a Functional Organization Chart and operational schedule. He designed fish rearing programs to be conducted at the government farms at Kaswa, Zaweya and Barsic. He designed and oversaw the construction of a live fish transport tank and assisted the Mullet Specialist on problems associated with proposed collection sites. The pertinent facts were recorded in memoranda and reports.
4. Carp Hatchery Specialist, Mr. Deppert, has been very active since mid-September making frequent field visits to the existing hatchery at Abbasa and also to Fowa, where he has given invaluable direction and assistance to the managers and staff in improving plant facilities and operation as it applies to breeding, broodfish maintenance, fry and fingerling rearing, disease prevention and control, fish handling and water quality

management. He emphasized the need to exclude predatory wild fish from grow out ponds and was instrumental in developing a new, for Egypt, method of screening out unwanted larvae and fry from the water supply.

From background information gathered at existing hatcheries he developed design criteria for fry requirements projected for the NAC Abbasa when that facility comes on line.

After studying the NAC plans, Mr. Deppert was able to make many recommendations for equipping the breeding and egg incubation rooms. He also participated in developing an equipment list for the RTP Building, now under construction at the NAC Abbasa and in developing the Functional Organization Chart.

5. Fish Transport/Mullet Specialist. In this capacity Mr. Madden visited the proposed mullet collection stations to gather water quality data and to determine occurrence of different mullet species. Assistance and advice was given regarding collection and transportation of fry.

Mr. Madden developed and conducted a mullet/fry transport training program.

Construction plans for the proposed mullet collection stations were reviewed and problems delineated. The possible impact of the water-gate construction east of El Gameel on future fry collection at El Gameel was brought to the attention of the MOA and USAID.

Until the arrival of Mr. Deppert, Mr. Madden provided advice on carp production at the Abbasa Hatchery and Fowa and thereafter assisted the Hatchery Specialist as requested.

6. Aquaculture Engineer. Mr. Davies' activities of necessity must be supportive of the other team members. Following site visits to Abbasa and Fowa Hatcheries and in conjunction with the Hatchery Specialist he defined water quality problems at each facility. A modification to pond inlet works was designed to improve filtration of the canal water supply to eliminate wild fish larvae and fry.

At Abbasa a method of treatment of well water to remove iron was promulgated.

At the proposed El Gameel Mullet Collection Station the impact of a new watergate construction seven kilometers to the west was investigated and reported to both the MOA and USAID. Fresh water supply to both El Gameel and El Gamasa facilities was reviewed.

At the NAC site officials discussed the problem of unsuitable material - organic overburden - with Mr. Davies, but his role in this phase of the project was peripheral at best. In conjunction with other members, particularly the Hatchery Specialist, design problems, as they will relate to future plant operation, were noted and transmitted to the MOA.

Mr. Davies collaborated with Dr. Jensen in the training field. He prepared and gave lectures on civil engineering topics as they relate to Aquaculture Engineering.

The Engineer performed the drafting functions as required. These included a new office layout, Functional Organization Chart, and modifications to certain existing hatchery facilities.

C. Training

During this period three participants left for Auburn University for graduate training, one student returned after completion of a Masters level degree and four students who left in 1980 are still in the U.S.A.

Eighteen participants completed a non-degree ten week course in Fish Culture at Auburn University. A list of eighty-two prospective short term students has been developed.

A four month in-country training course began during this period at the Abbasa Fish Hatchery.

D. Problems and Recommended Solutions

1. Counterparts - most are office workers with little technical training. Selection of more suitably qualified, motivated counterparts is recommended.

2. Project Administration The Project Director has several assignments. This project should have a full-time Project Manager, answering to the Project Director.
3. Communications with the MOA have improved but overall communications with all involved parties still need more improvement. Reinstatement of monthly project meetings is recommended and the USAID Agricultural Office be made aware of the TAT's activities and achievements.
4. Training (General) is behind schedule and lack of scheduling candidates for English language training will exacerbate the situation. Top priority must be given to implementing goals.
5. Extension
 - (a) Counterparts Lack of counterparts limits the effectiveness of the program. An Extension Director should be appointed by the MOA to develop an extension program, particularly for private fish farming.
 - (b) Small Farm Production A program of cooperation with the organization needs to be implemented.
 - (c) Fish Marketing A person with an economics and marketing background should be appointed to gather baseline information.
6. Training
 - (a) Manuals There is a need to assign personnel to work on producing technical manuals.
 - (b) Training of personnel for participation in extension as distinguished from general fish farming is recommended.
 - (c) Technical
 - (i) Personnel should be trained specifically to help farmers interested in rice-cum-fish farming.
 - (ii) Yields Trials for rice/fish production in paddies should be conducted.
 - (iii) Content of Technical Manuals should

reflect Egyptian needs. Experience of other countries can be used until local information is gathered.

7. Hatcheries

- (a) General The Hatcheries should produce all species of target fish. Fingerling production needs to be improved and workshops for information transfer should be held.
- (b) Design and Operation Recommendations include:
 - (i) modification of inlet-monks for improved water filtration.
 - (ii) removal of iron by aeration, settling and filtration.
 - (iii) increase of egg incubation capacity.
 - (iv) modification to ponds - slope bottoms, isolate "water boils".
 - (v) add production of tilapia fingerlings.
 - (vi) transfer Chinese carp broodfish to Abbasa.
 - (vii) import rotenone (fish poison) and saran (for screens), because the materials are not available in Egypt.

8. Aquaculture Engineering

- (a) A suitably qualified counterpart should be appointed.
- (b) NAC Abbasa. There will be functional problems if the following modifications are not carried out:
 - (i) convert inlet work to valve and pipe/saran sock design.
 - (ii) slope pond bottoms to sump at outlet monk.

Aquaculture Engineer together with other TAT members should be authorized to design these modifications.

9. Mullet Fry Collection

- (a) A lack of trained staff to supervise the collection and transport of mullet fry continues to affect the availability of fry for private and governmental fish farms. A training program

for GOE personnel and fishermen is vital. The recently developed program should be continued and expanded.

- (b) Appropriate collection and transport methods need to be implemented and new equipment employed to improve fry survival.
- (c) Conflict between the military and MOA over access to nearly all collection sites must be resolved. Continued denial of access to sites and restrictions on collecting activities at critical times have been factors in lowered numbers of fry collected.
- (d) Assignment of MOA staff to collect field data on fry populations is required.
- (e) Pollution of nursery water by farming and industrial chemicals has a serious effect on fry survival. Efforts to safeguard critical areas need to be initiated.

SECTION II INTRODUCTION

The Technical Assistance Team (TAT) activities covered by this Bi-annual Progress Report are in accordance with the work described in the Inception Report. The Inception Report, prepared by TAT and the Joint Venture, JMM-KNBS contractor in November 1981 was approved by the Ministry of Agriculture (MOA), Undersecretariat for Aquatic Resources (UAR).

This report covers the period August 28, 1982 to February 28, 1983, a difficult period for the TAT because of changes in MOA Project leadership and the removal of the TAT Leader at the request of the Ministry with the agreement of USAID Officials. Nevertheless, and despite the temporary loss resulting from the lack of a Team Leader, the TAT pressed forward with many activities and functions requested by the MOA staff and with programs deemed to be beneficial to the Egypt Aquaculture Development Project.

One TAT/UAR/USAID project meeting was held in October. Unfortunately, scheduling difficulties resulting from the changes in leadership precluded other such meetings during the reporting period, despite the consensus of all participants that such meetings are very beneficial. They should be revived as soon as possible.

SECTION III
PROJECT MANAGEMENT

A. Personnel Changes

Significant and disruptive changes in project management occurred during this six-month period. The Director, Mr. Hassan Amin Abdallah was relieved of his duties on November 17, 1982 and the position was assigned to Mr. Adel Ezzy. Mr. Abdallah was subsequently reinstated as Project Director on January 19, 1983.

Mrs. Elizabeth Martella, USAID Project Officer, was replaced by Mr. Arnold Radi in February, 1983.

When Dr. Aref's services became unavailable on January 9, 1983, the position of Special Education and Training Officer was abolished. From then on the training and education duties were and will be shared between the Team Leader, the Extension Officer and the Home Office Coordinator for the Joint Venture (JV) in Pasadena, California.

The services of Mr. Salah Zaalouk as Special Consultant were discontinued as of November 1982; Dr. Yahia Hassan's involvement in the project ended in January 1983.

The management of the TAT office and support staff was assumed by the TAT as of January 9, 1983. To improve management of TAT transportation services, the Project Director, Mr. Abdallah, in January 1983, assigned an official from the MOA to serve in the TAT office as Transportation Manager. Also, Mr. Shenawi, Senior Training Officer in the MOA/Undersecretariat for Aquatic Resources was assigned as interim TAT Office Supervisor in addition to his training duties with TAT.

Mr. Darrell Eppert, Carp Hatchery Specialist arrived in Cairo on September 15, 1982 and became fully involved in the work of the TAT immediately. Mr. Wynne Davies, the replacement for the former Aquaculture Engineer (Mr. E.A. Ashworth) arrived on October 13, 1982. Mr. Davies also made his services available immediately.

B. Special Meeting

A most important Team function was attendance by members Madden, Johnson, Deppert and Davies at a meeting called by Mr. Michael Stone, Director of USAID Egypt. At this meeting the TAT members expressed their views on the causes for the delays in completing the NAC and MHC Abbasa facilities and the reason for cost overruns. To improve the management of the project it was felt that a full-time Project Manager, reporting directly to the Project Director, was needed - a person who had no other responsibilities. The need for increased participation by the TAT was emphasised. To date, the TAT has been kept on the periphery.

SECTION IV
TEAM PERSONNEL ACTIVITIES

A. Team Leader

The services of Mr. Gerald Ginnelly, Team Leader, were discontinued as of November 1, 1982, and Mr. W. Madden assumed the position of Acting Team Leader pending a decision on a permanent replacement. Subsequently in a letter of 19 February to the Project Director the Joint Venture named Mr. Madden as Team Leader. Mr. Madden performed and continues to perform supervisory and general administrative duties related to management of the Technical Assistance Team and support services of the TAT Office. The Team Leader coordinated all TAT activities and attended meetings with USAID staff and the MOA, Project Director and staff. Specific activities performed during this period include direction of and participation in the TAT's efforts in developing the NAC equipment list and an organizational chart for the NAC. The Team Leader also participated in training related functions including assistance in selection of candidates for ex-country training.

In conjunction with the Project Director, the Team Leader and the TAT members worked to develop strategies for project redirection which were submitted to the Project Director.

B. Extension Specialist and Training Officer

The efforts of the Extension Specialist during the six month period covered by this report were based upon the work plan developed by Dr. Gary Jensen and submitted to and approved by the MOA/UAR in August 1982. As noted in Personnel Changes, Section II, Dr. Jensen is also serving as Training Officer.

1. Extension

(a) Recruiting

A written request was made for extension personnel to work in the areas of:

- fish farming economics and marketing.

- rice-cum-fish farming for small farmers,
- providing technical assistance to private pond operators.

Assistance was provided in the selection of candidates for long-term academic training.

A list of equipment for use by a field posted Fish Farming Extension Specialist was prepared. Information was gathered on marketing and demand at the village level of mirror carp produced in irrigated rice fields.

2. Technical Training

- (a) Training Program (February 1 - May 30, 1983, Abbasa) Direction and assistance were given in developing and implementing a four month, in-country technical training program at Abbasa Fish Hatchery from February 1 to May 30, 1983. Assistance was also given in the selection of eighteen participants, some of whom afterward will work in the Extension Program in concert with the Extension Specialist. Training material was prepared and technical instruction provided for the program. All these activities were carried out in a close working relationship with the training counterpart, Mr. Shenawi.
- (b) Training Program Specialist
Provided supervision and assistance for two on-site Training Coordinators during on-going four month training program, prepared training material and plans with coordinators, prepared teaching methodology guidelines.
- (c) Training Manual
Provided assistance on the content and organization of a Fish Farming Manual being prepared by the MOA.
- (d) Fact Sheets for Private Fish Farmers
Prepared an informal fact sheet on the use of the secchi disc as a management tool for pond water quality.

3. Selection and Stateside Training of Project
Technical Staff

- (a) With the close cooperation of Mr. Shenawi, the following documents were prepared and submitted:
- (i) selection criteria for participant training candidates and action guidelines.
 - (ii) Updated summary of training accomplishments and progress in Stateside and in-country training activities.
 - (iii) Time flow chart for scheduling participant training candidates for language training and/or TOEFL testing.
 - (iv) Action flow chart for ADP staff selection for long-term academic training.
 - (v) Standard questionnaire form to evaluate long-term academic training.
 - (vi) Chart summarizing present status of ADP long-term training participants comparing projected completion dates with project activities completion date.
- (b) Served as active member of the Participant Training Selection Committee to select ADP staff for Stateside Training Program.
- (c) Participated in interviews of seventy-three staff members of the Undersecretariat of Aquatic Resources and selection of prospective ADP staff for long-term academic training.
- (d) Worked with the training staff and English language training advisor in USAID to schedule necessary English courses for prospective candidates; to develop methods of following progress of ADP staff undergoing Stateside training; to process required documentation for new participant training candidates.

4. Equipment

A list of equipment and supplies, with specifications, for use in Extension was prepared and submitted to the Team Leader.

5. Rice-Cum-Fish Farming

Completed method and result demonstration at a Basyun farm and prepared a report of same. Report shows that culturing fish in rice paddies is a viable technology; in 1982 the increased profit per feddan over rice farming alone was estimated at L.E. 56.000. With UAR Extension Department, plans are being prepared for additional demonstration prospects in 1984.

6. Yield Trials

Technical assistance related to pond construction and management of fish stock was provided to a private commercial fish farmer. The culture of Chinese carps with introduced.

7. Small Farmer Production

In the Sharkia Governorate assistance was given to Small Farmers Project Officers in evaluating the feasibility of using secondary and tertiary irrigation canals for fish culture. Plans were initiated to introduce rice-cum-fish farming in this Governorate. Plans were made to hold one day workshops on fish farming for Agricultural Extension Agents and Loan Officers of the Small Farmer Project at Zagazig and Benha.

8. Baseline Production, Socioeconomic Marketing and Distribution Data

A fish marketing questionnaire covering species, time of harvesting and demand was prepared and tested at Cairo's Central Fish Market. A revised questionnaire was submitted to the Project Director for approval. An extension counterpart was requested to gather marketing and economic data for use in determining the economic viability and subsequently support the development and expansion of the aquaculture sector of agribusinesses.

9. Other Functions

Tilapia Research

Assisted in the design and implementation of tilapia research studies. Assisted UAR researcher in implementing the following studies:

- (a) sex reversal of tilapia species by oral administration of methyltestosterone.
- (b) tilapia hybridization.

C. Pond Production Specialist

1. General

The primary task of the Pond Production Specialist has been to advise and assist the MOA/UAR on the best means to increase pond productivity. During the reporting period the Pond Production Specialist made periodic advisory and discussion visits to a private fish farm near Baltim. Periodic advisory and discussion visits were also made to MOA/ADP farms and hatcheries at Raswa, Abbasa, Zaweya and Manzala.

Consultations were held with officials of MOA/ADP as appropriate for the purpose of making requests, coordination and planning, information exchange and position review. Informational and activity memoranda were submitted to ADP as appropriate. Participation of the Pond Production Specialist was crucial in the TAT joint effort of preparing a functional organizational chart to be recommended for the NAC and in preparing descriptive material for this chart. Of similar value was participation in the TAT joint effort of preparing a project position paper effective February 15, 1983, and a suggested revised pro forma operational schedule for the ADP for presentation to ADP/MOA, USAID and JVAC.

2. Fish Rearing Programs

Special designs for fish rearing programs to be conducted at Raswa, Zaweya and Barsic Fish Farms

were prepared and submitted to the farm managers. This entailed travel to these farms for final planning and to conduct agreed upon fish rearing programs.

3. Mullet Collection

In association with the Mullet and Fry Transport Specialist, fry resources, water quality and physical attributes of the mullet fry collecting stations at El Gamasa, El Gameel, El Gerby and Kitchener Drain were appraised.

4. Live Fish Transport Tanks

Sources for all material necessary to fabricate a 1.2 m x 2.4 m model fish transport tank were identified. The fabrication of the required metal parts and the construction of the transport tank was completed under the supervision of the Pond Production Specialist. Arrangements were made for the importation of mechanical and gaseous aeration devices from the U.S. and the installation of these devices on the transport tank.

Raswa Fish Farm personnel were instructed in the use of the tank in the transportation of fish fry. A one-day training lecture on the transportation of live fish for trainees in the collection of mullet fry at Raswa was conducted at the request of the Mullet and Fry Transport Specialist.

5. Special Documents

The following documents were prepared:

- (a) a comprehensive discussion of fertilization of fish ponds with special implications for Egyptian fish ponds.
- (b) record forms suitable for the permanent recording of all data pertinent to fish farms, and fish production research.
- (c) lecture outline and instructions for the proper use of fish farm records and their importance. The lecture will be presented at an internal aquaculture training program on April 15, 1983.

- (d) detailed specifications for equipment and supplies for the NAC laboratories and farm bank equipment.

D. Carp Hatchery Specialist

The major task of this position has been to advise and assist the MOA/UAR in all phases of hatchery production of fish fry and fingerlings.

The Carp Hatchery Specialist, Mr. Darrell Deppert, arrived in Cairo on September 15, 1982. Soon after arrival, he made several orientation trips to the existing MOA fish hatcheries at Abbasa and Fowa, and to the National Aquaculture Center Site. The only scheduled meeting between the MOA, USAID, and the TAT since the arrival of the Carp Hatchery Specialist in Egypt was held in the project office on October 20, 1982. During this meeting both Mr. Abdallah and the then Project Director, Mr. Zaalouk agreed that the Hatchery Specialist's immediate duties should be to assist the MOA staff in the successful management of the Abbasa and Fowa fish hatcheries, and to advise the MOA of any corrective measures to be taken at the Abbasa, Fowa, Saftakalid and San El Hagar hatcheries with regard to design, construction and operation.

The period covered by this report is one during which the activities of the carp hatcheries have been at a minimum. Therefore frequent visits to hatcheries were not required. Visits to the Abbasa hatchery were made on : September 26, October 7, 14, 25 and 28, November 11 and 29, and December 22, 1982, and on January 26, March 16, 23 and 30, 1983. The December 15 visit coincided with a construction meeting between the MOA, USAID and TAT. Visits to the MOA hatchery at Fowa were made on November 8 and 10, 1982.

1. Fish Hatchery Management

(a) Existing MOA Fish Hatcheries (Abbasa/Fowa)

Following review and evaluation of previous recommendations and results of observations made during numerous field trips to the hatcheries, certain conclusions were reached. The following discussions reflect these conclusions

regarding management of the hatcheries and modification of the design and operational plans.

Fish fingerlings of 1-2 gms minimum size should be the major product distributed from the hatchery. During the past six months fingerling production ponds have been drained, poisoned if necessary, and prepared for receiving fry when fish breeding begins in April. Recommendations were made for erradicating the wild fish in fingerling and broodfish ponds and for shortening the rearing time of fry in the hatchery building before stocking in ponds.

Recommendations were submitted to the Project Director concerning the selection and handling of broodfish, fish breeding, establishing broodfish requirements, management practices and prophylactic disease treatment.

Detailed advice and assistance was given in setting up fertilizing and feeding programs and specifications for the construction of broodfish and fingerling nets.

(b) National Aquaculture Center

The fish hatchery mission and goals were promulgated and design criteria for the fish hatchery components were recommended. Assistance was provided in the preparation of the NAC Functional Organizational Chart and function description; work and hatchery operational plans were developed.

The major emphasis or mission of the hatchery component of the National Aquaculture Center is to:

- (i) provide fish seed of 1-2 gram size, to meet the requirements of the foodfish production and homestead sections of the NAC and the private sector.
- (ii) conduct research in all areas of fish

hatchery operations for the purpose of improving and developing more productive fish hatchery methods.

- (iii) coordinate hatchery production and research efforts with the activities and needs of the extension, training, production and homestead sectors.

Fish hatchery and pond design changes to meet or satisfy culture design requirements were requested. A list was made of fish hatchery related equipment to be purchased. Detailed specifications of certain items were prepared.

2. Fish Hatchery Plant Designed and Operation

(a) National Aquaculture Center

During the reporting period a number of facts were learned regarding fish hatchery design and development in Egypt. By taking these facts into account, design criteria for pond production and broodfish requirements were developed and egg demands by species established. Egg demands were then used to determine hatchery incubation, rearing, and broodfish holding space needs.

Design and hatchery plant operational recommendations have been provided as requested in the project meetings and correspondence. For the NAC the calculations and recommendations are as shown in TABLE 1.

TABLE 1
FRY REQUIREMENTS
PROJECTIONS FOR THE NAC, ABBASA

1.	Total number of feddans (production) to be supplied by the NAC	<u>5,000 Feddan</u>
2.	Requirement of fingerlings (40-50 gm.) (per feddan) for production ponds	Per Feddan
	- Common Carp	1,200
	- Chinese Carp	1,000
	- Tilapia	1,750
3.	Requirement of 1-2 gm. seed for hatchery ponds after primary nursing to produce 2.	
	- Common Carp	1,600
	- Chinese Carp	1,400
	- Tilapia	2,300
4.	Requirement of 4-5 day old fry from hatchery to produce 3.	
	- Common Carp	3,200
	- Chinese Carp	2,800
	- Tilapia	3,000
5.	Egg requirement to produce 4.	
	- Common Carp	12,800
	- Chinese Carp	11,200
	- Tilapia	3,500
6.	<u>Number of Eggs Required for 5,000 Feddans</u>	
	- Common Carp	64,000,000
	- Chinese Carp	56,000,000
	- Tilapia	17,500,000
	<u>Broodfish Required for 5,000 Feddans</u>	
	- Common Carp	4,500 kg
	- Chinese Carp	3,500 kg
	- Tilapia	10,000 kg

The hatchery facilities of the NAC now under construction will include brood-stock ponds, spawning ponds, and a variety of nursery ponds. Facilities inside the research and training center will include a spawning and breeding room, an egg incubation room, and a fry rearing room. The ponds have been designed to provide space for a wide range of experiments in spawning and larval rearing techniques.

The breeding and egg incubation rooms of the RTP building have been left open for final tank design. Individual tank designs for the mobile tanks have been completed and are as called for in the equipment list and specifications developed for the hatchery section. The mobile tanks are to be of fiberglass construction and include both rectangular and circular holding and spawning tanks. In addition, to provide greater production potential to cover the Chinese carps, both circular and funnel type incubators are to be provided with McDonald jars in the egg incubation room. All incubation units except for the McDonald jars are to be mobile. The circular tank and funnel incubation units will increase the egg holding capacity by 10 million. By having available various incubation and spawning apparatus, scientists will be better able to evaluate different methods and establish one for use nationwide.

Major modifications to the NAC facilities, plans and specifications are detailed in Section VI. The detailed list and specifications for the NAC hatchery related equipment was completed. The list includes

equipment to be used in the hatchery rooms of the RTP and in the outdoor ponds and tanks.

- (b) Existing MOA Fish Hatcheries (Abbasa/Fowa) Hatchery plant design and operational recommendation have been made and can be seen in Section VI.

3. Functional Organization - Seed Production

The carp Hatchery Specialist also assisted in the preparation of the Functional Organizational Chart and the description of functions within the seed production sector was broken up into collection, hatchery and primary nursing. Collection has to do with mullet exclusively at the present time. Under hatcheries and primary nursing, all species are included (i.e. mullet, carp, tilapia and others)

4. Future Considerations

An up-to-date hatchery operations manual and/or work plan has not been completed for the NAC hatcheries. It was deemed necessary to first observe operation of the existing facilities before a report be written. Immediately following the 1983 breeding and seed production season a detailed operations manual for existing hatcheries should be prepared - this could be used as the basis for an initial operations manual for the NAC hatchery.

It is anticipated that the necessary technical input to the existing hatcheries through continued field visits and memoranda directed at answering operational questions will be maintained throughout the life of the project.

E. Fish Transport/Mullet Specialist

The major task of this position is to advise and assist the MOA/UAR through the Project Director in improving fry transport methods and any activities involving mullet as related to fish pond production.

1. Fry Transport

- (a) During this period multiple visits were made to the mullet fry collecting areas at El Gameel, El Gamasa, El Tawal, Kitchener Drain and El Gerby to observe on-going collection of fry. Chemical measurements were taken of the local habitat water and the transport water to define more clearly environmental conditions during the collection and transportation process. Data was gathered on the occurrence of different mullet species. Advice was given on improved methods for fry collection and transport to the collectors, farm management at Raswa, and to the personnel of Undersecretariat for Aquatic Resources at Damietta. Assistance and advice was given to the personnel at Raswa Fish Farm in collecting, transporting and handling of mullet fry required for stocking the farm. A program was initiated for collecting weekly samples of mullet fry from El Gameel to establish baseline data for the relative abundance, species composition and occurrence of mullet fry at that station.
- (b) Assistance was given to the Pond Production Specialist in introducing the use of a fish transport box for Raswa Fish Farm.

2. Fry Transport Training Program

A mullet fry identification and transport training course was developed and conducted during October and November. The course was held at Raswa Fish Farm and was attended by 12 participants. Course work included lectures and classroom demonstrations in mullet fry identification and basic responses of fish fry to capture, handling, and transport shock. Methods to reduce mortality were presented with emphasis placed on identifying currently employed collecting and transport procedures which could be adapted to improve survival. Field work consisted of equipment training and actual collection and transport of fry to Raswa Fish Farm.

Best Available Document

At Abbasa, high iron concentration in the well water and variation in pressure in the hatchery distribution pipelines are significant problems. The water supply at Fowa and the present filtration system do not adequately remove floating or suspended solids from the river water.

Also at Abbasa the quality of the water drawn from the Ismailia Canal to the grow-out ponds is variable and frequently very poor. The existing vertical screen system is inadequate and permits entry of predatory fish into the ponds. A modification of the inlet monk, a saran tube attached to a valved 8" pipe outlet, has been developed and a suggestion made that one assembly be installed on a trial basis.

At Fowa Hatchery the problems include:

- quality of water pumped from the Nile for use in the hatchery
- prevention of entry of predatory fish into the grow-out ponds.

Under study to improve the quality of the Nile River water is the possibility of installing sedimentation basins and duplication and improvement of the filtration system. Also a third treated water pump is needed to provide standby capacity so that the reliable flow can be increased from 9 to 18 L/S. This will permit the hatchery to operate at 100% capacity instead of 50% as at present.

Plans for the NAC project have been reviewed. The current problem of passage of wild predatory fish from the supply canal to the grow-out ponds at the Abbasa and Fowa Hatcheries likely will be duplicated at the NAC production ponds.

Whether the inlet monks, which have been precast, can be modified for filtration through a saran sock remains to be seen.

Drawings of monk modification at Abbasa Hatchery were prepared but implementation has not been possible. Since before MCA change of Project Director it has been difficult and impossible for MCA staff to obtain a decision

3. Mullet Collecting Stations

Water quality analysis of the freshwater source at El Gamasa was conducted and a search for an alternative supply initiated after it was determined that water in Drain No. 1 was deficient in oxygen and high in harmful chemicals. Subsequently, freshwater from the El Gamasa piped water line was made available.

Drawings of the proposed collecting stations were reviewed and appropriate action initiated to correct design faults relating to aeration of the incoming water. The location and potential loss of access to the fry at El Cameel after completion of the New Manzala channel and watergate was reviewed with MOA and USAID personnel.

4. Abbasa Hatchery

Advice to the Abbasa Hatchery on carp production techniques and water supply and quality problems was provided until the arrival in September of the Carp Hatchery Specialist. Thereafter assistance to the Carp Hatchery Specialist was provided on similar matters at Abbasa and Fowa hatcheries after a debriefing period.

5. Private Fish Farms

Advice on mullet species composition and condition at private fish farms in Kafr El Sheikh and Dahab Island was provided on a regular basis.

F. Aquaculture Engineer

Mr. A. A. Ashworth, P.E. returned to the United States in August 1982. His replacement, Mr. J. Wynne Davies, P.E., arrived in Egypt on October 13, 1982 and became involved in the Aquaculture Development Project immediately. The role of the engineer was determined to be primarily one of support to the other specialists on the technical advisory team and to the Aquaculture Development Project. Visits were made to the existing hatcheries at Abba and Fowa to inspect and review water supplies at each location.

on even minor action items. Plans of the Abbasa and Fowa Hatcheries have been requested frequently so that preliminary plans and recommendations can be formulated for the iron removal facility at Abbasa and the water filtration plant modifications at Fowa, but without success.

1. Mullet Collection Stations

A site visit to Raswa Fish Farm and the proposed El Gameel and El Gamasa Mullet Collection Stations with Mr. Madden and Mr. Johnson took place on November 22, 1982. The purpose of the visit was to become acquainted with sites and review fresh water supply problems at the proposed collection stations.

Control gate structures are under construction seven kilometers west of El Gameel; these gates will link the Mediterranean Sea to Lake Manzala. The purpose and mode of operation is unknown; if flow through the existing channel at El Gameel is stopped or reduced considerably, the advantage of a collection station at this site could be reduced to zero. This question is to be pursued with the Ministry of Irrigation but the Project Director cancelled the planned meeting with the Ministry staff members which was set for December 12, 1982. On December 13, 1982, the El Gameel Mullet Collection Station site was visited with Mr. Madden (TAT) and Mr. Roger Russell, an USAID Engineer to acquaint Mr. Russell with potential problems with Lake Manzala water levels/inflow posed by the new gate structure/bridge being constructed 7 km east of the existing Lake Manzala channel (El Gameel). Subsequent discussions with Mr. Yussri Wissa, a senior MOA Engineer who formerly worked for the Ministry of Irrigation, lead us to believe that the flow through the existing channel at El Gameel will not be blocked but may be reduced.

(See memorandum of December 19, 1982).

On December 22 and 23, 1982, visits were made to Ismailia, Port Said, Mansoura and Sherbeen with Messrs Ibrahim Gallela and Magdy Awad of MOA. These visits were made to:

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- obtain construction permits for NAC inlet/outlet structures from canals and drainage ditches;
- secure potable water supply for El Gameel and El Gamasa Mullet Collection Stations.

The securing of a water supply was to be pursued by Mr. Awad.

2. NAC, Abbasa

The role of the TAT's Aquaculture Engineer appears to be that of an observer only. A construction meeting was held at the Abbasa NAC site on December 15, 1982. In attendance were representatives of the Contractor (Modern Contractors), the Construction Manager (P.B./ Sabbour) and MOA staff including Mr. Adel Ezzy, the new Project Director. In attendance from JMM-KNBS were Messers Madden and Deppert and the Aquaculture Engineer. Meetings were attended at the Project Office to discuss:

- potential water supply problems at the Model Homestead Complex;
- Contractor claims for extras due to excessive "unsuitable material" - organic topsoil;
- construction problems, primarily problems of pond drainage.

3. Training and Extension

Consultations were held with the Extension Specialist on participation in a Fish Farming Training Program commencing in February 1983. Engineering topics (tentative) to be included were site evaluation, criteria, site evaluation methods, design criteria, plane table mapping, levelling, design and layout of model fish farm, construction specifications, contracts and procedures and construction cost quantities and estimates.

Lecture notes and pictorial and graphic presentations were prepared for the classes held from February 10 to 24, 1983. The limited time available restricted the scope of the lectures. The objectives therefore was to acquaint the students with the role of an Aquaculture engineer and to instill an understanding for the need of good design and construction procedures while not forgetting the ultimate economic consideration, namely the

4. Office and Administrative

Drafting projects by the Aquaculture Engineer have included a new office layout for more efficient and practical use of the space available and the production of a Facilities Organization Chart developed by the TAT and which required several modifications to achieve its final form.

June 1, 1983, at the Abbasa Fish Hatchery facilities. The students will participate in practical application of class work for approximately two hours each morning. Each week one day is set aside to visit existing hatcheries, those under construction and existing fish farms. The curriculum, instructors and schedule are reproduced in the Appendix.

SECTION VI
PROBLEMS AND RECOMMENDED SOLUTIONS

In this section problems and their solutions, as perceived by the Acting Team Leader and the various specialists, are presented. As might be anticipated, there was some duplication of thought particularly with respect to general problems and overall management.

A. General

1. Counterparts

During this period counterparts were assigned by the Project Office to each member of the TAT. All of these persons are workers with limited or no technical training and experience in aquaculture and are primarily office staff for the Project. Their duties are first to staff the Project Office and they are not generally available for field work or close working interactions. It is recommended that the Project Director consider the possibility of selecting highly motivated persons to serve as counterparts for each TAT member who will share office space with the TAT and work directly with each Specialist. Each TAT member should be assigned several counterparts each of whom will be given responsibility for specialized work on specific projects to be carried out under the guidance of each Specialist.

2. Project Administration

This project is so large and complex that it merits the full time attention of a Project Administrator. The ADP Director is also the Director of the FAO Red Sea Project and the head of the Undersecretariat for Aquatic Resources. These two activities, especially the administration of the Undersecretariat require a great deal of his time.

It is suggested that an administrator or manager be given the full time responsibility of directing the Aquaculture Development Project under the guidance

SECTION V
TRAINING

A. Academic

Three participants left for graduate training in the USA at Auburn University. They are Mrs. Fatma El Namaki, Mr. Abd El Rahman El Gamel and Mr. Hussein Hibeicha. The first two are studying general aquaculture practices and the latter is studying aquacultural economics and farm management. The first Egyptian student to complete graduate training at the Masters level under this project, Mrs. Fatma Hafez left for training in September 1980 and returned to Cairo in December 1982.

Four other participants who left Egypt in September 1980 are still in the USA. Mr. Ali Khatar was admitted to the Ph.D. program at Auburn University. The statuses of Mr. Hussein El Ghobeshy, Mr. Ibrahim El Shistawy and Mr. Abd El Ghani Ez El Din are still undetermined although all three received their M.Sc. degrees in mid-1982 along with Mr. Khatar.

Eighteen participants completed a special ten-week course in fish culture at Auburn University in September 1982. Six of these participants stayed on for three weeks of practical training at a private fish farm in the state of Mississippi.

Four potential participants took the TOEFL examination during this period but no future candidates were available for English language Training at the American University. However a list of 87 potential participants were identified within the MOA/UAR. All were interviewed and evaluated for the selection to take place in March 1983.

B. In-Country Training

A training program for sixteen potential fish farming technicians was developed by the Acting Training Officer, Dr. Jensen and his counterpart, Mr. Shenawi. This four-month course commenced on February 10, 1983 and continues until

of the Undersecretary of Aquatic Resources Project Director.

3. Communications

Communications between the MOA/UAR/ADP personnel and TAT have improved markedly during the last half of this period. However overall communications with all involved parties still need more improvement. It is recommended that the monthly joint meetings formerly held by the TAT, the ADP Director and staff and the USAID Project Officer be reinstated.

4. Training

Training is considerably behind schedule as noted in the Audit Report. Because no one was scheduled for English language training during this period the delays in training schedules will increase.

To change the current situation the new Special Education and Training Team must give top priority to implementing the project training goals.

B. Extension Specialist/Training Officer

1. Extension

(a) Counterparts

The Extension Specialist has no assigned local counterpart to work specifically on Extension Activities. The lack of a counterpart and ADP extension staff limits the effectiveness and progress of extension-related work. No long-term planning for extension programs or activities can be implemented without permanently assigned extension staff. With the assistance of the Extension Specialist ADP extension staff can develop programs to assist private fish farmers improve their capabilities, practices and production.

It is recommended that a Director for Extension at the NAC be recruited based on qualifications and experience. It is recommended that the selected individual be assigned as the technical extension counterpart to the Extension Specialist. Then appropriate steps can be taken to develop the

extension organization and activities at the NAC.

(b) Organization

A Director for Extension and essential support staff should be recruited and given the responsibility to initiate the development and organization of the extension component of the NAC.

More emphasis on the organization and responsibility of a national extension service to assist private-sector fish farming development is required.

The Extension Specialist has no extension counterpart(s) to assist in the development and implementation of extension programs on the local, regional or national level.

It is recommended that qualified counterparts be assigned to work with the Extension Specialist to expedite the organization and functioning of a national fish farming extension service.

(c) Small Farmer Production Project

Extension programs and activities need to be implemented with cooperating farmers associated with the Small Farmer Production Project.

To achieve these goals the Extension Specialist must be given assistance by technical extension counterparts.

(d) Fish Marketing

The fish marketing questionnaire study has not been implemented because of the lack of an assigned counterpart.

It is recommended that a counterpart with the required background and experience be assigned to work in extension activities to assist in economic and marketing matters and gather needed baseline information.

2. Training

(a) Technical Manuals

There is no full-time training staff for fish farming to develop technical training materials and manuals.

One or more technical staff should be assigned to work permanently in training. Those persons should prepare much needed training materials with assistance from the Extension Specialist and other TAT members. Visual aid and written materials should be developed for various technical areas and filed for easy use. All materials should be in the Arabic language.

- (b) All training to date has been technical training for MOA staff who have diverse responsibilities ranging from extension to hatchery management to commercial fish production. No extension training has been carried out because priority has been given to upgrading the technical capability of MOA staff.

Following the completion of the on-going second in-country training program, training emphasis should be directed towards MOA staff who are, or will be, working in extension.

Extension training is required to serve as a base for an extension organization and services. The training must be based on extension philosophy and methods appropriate to serve the fish farmers of Egypt.

(c) Technical

(i) Rice-Cum-Fish Farming

Preliminary results indicate that rice-cum-fish farming can be an appropriate technology for small farmers in Egypt. Farmer response to the new integrated farming practice has been favorable, however, widespread development and extension are hampered by the lack of trained extension staff.

It is recommended that an individual be assigned to work with the Extension Specialist and be trained in rice-cum fish farming to provide technical assistance to interested farmers.

(ii) Yield Trials

Yield trials of fish raised in rice paddies should be instigated. Accurate records of rice and fish production should be kept.

(iii) Manual Content and Form

Insufficient experience and information are presently available to develop a country-specific manual on fish farming in Egypt. However with an operational NAC to develop research and extension capabilities, the needed field experience and information on which a manual should be based will be forthcoming.

Work to develop a manual or guide should be postponed until adequate in-country information is available on technical and economical aspects of fish farming in Egypt. Work should be done to determine or evaluate the above. In the meantime existing material prepared in other countries should be researched and used where deemed appropriate until manuals based on Egyptian experience can be produced.

C. Carp Hatchery Specialist

1. General

In keeping with the goals of the UAR for the development of fish production in Egypt, it is recommended that all fish species targeted for production be produced at the hatcheries. Creation of multispecies hatcheries incorporating the seed production of the common carp, grass carps, chinese carps and tilapia is envisaged.

Future assistance should center on the further development and standardization of fingerling production

techniques, fish breeding techniques including those species that have caused difficulty in the past. Workshops and seminars for hatchery personnel should be conducted to transfer information.

Continued on-site management observation and on-the-job training is essential to ensure that worthwhile improvements are maintained and proven beneficial work habits and practices are not abandoned.

2. Fish Hatchery Design and Operation

Some of the following recommendations have, or are, being implemented.

(a) Modifications to the Water Supply

The existing inlet monks should be modified so that all water will enter the pond through a pipe installed above the normal pond operating level and a screen/filter tube or "sock" capable of filtering out particles as small as 1 mm. attached to the end of the pipe. This modification is necessary to prevent the entrance of wild fish into the pond.

(b) Filtration of Well Water Supply

To remove the iron from the well water supply at the Abbasa Hatchery it is recommended that it be aerated and passed through a slow-sand filter, which will be easy and economical to operate.

(c) Modifications to the Egg Incubation Capacity

The silos and aquaria should be used to increase the egg incubation capacity. The screened stand-pipes in the silos should be modified by the addition of air diffusers which will provide the proper conditions for hatching eggs.

(d) Modifications to the Ponds

Recommendations include the sloping of the pond bottoms to the drain and the construction of dikes to seal off certain areas of ponds subject to water boils. The areas where "boiling" occurs then will be isolated from the main pond area.

(e) Seed Production

In addition to carp, a program to produce tilapia fingerlings on all MOA hatcheries should be implemented as soon as possible.

(f) Chinese (grass) Carp

Transfer Chinese (grass) carp broodfish from various locations (Fowa Hatchery, Serow Hatchery, Ismailia Fish Farm) to Abbasa Hatchery for holding as future broodfish for the NAC and to produce fry during the 1983 season.

(g) Material Acquisition

Rotenone (fish poison) and saran (screen material) should be imported for the fish hatcheries and production farms. Both of these materials are essential and are currently unavailable in Egypt.

D. Aquaculture Engineer

1. Personnel

As construction of new fish farm facilities is expected to take place on marginal land and to ensure that the work is well planned and constructed, the input of the Aquaculture Engineer and his counterpart will be of critical importance.

It follows that the counterpart should have a good background in either civil or mechanical engineering and that he can adapt to the special needs of aquaculture. Requests have been made for the assignment of a qualified counterpart in addition to the present counterpart but to date no action has been taken.

2. NAC Abbasa

Review of the plans and discussions with the Hatchery Specialist suggest that there will be significant functional problems when the facility is placed in operation. These include inadequate filtration of supply water and pond drainage.

(a) Inlet

It is recommended that each inlet monk be modified to a valved pipe inlet, with a saran sock fitted on to the end of the pipe to filter the water.

Drawings of such a modification have been prepared for use at the existing Abbasa Hatchery. With minor adjustments such a drawing could be the basis of the proposed modification.

(b) Pond Drainage

As described by the Hatchery Specialist, flat pond bottoms will make it difficult to harvest ponds completely. A more practical method of pond drainage will be to slope the pond bottom towards a sump constructed at the outlet monk.

To effect these changes in a timely manner, it is recommended that the Aquaculture Engineer in conjunction with the other members of the TAT be authorized to develop the changes described which are necessary for the ultimate success of the NAC.

E. Fish Transport/Mullet Fry Specialist

1. Fry Collection Stations

Generally, the methods now used for collection and transport of mullet fry and other species will continue to incur unnecessarily high mortalities, resulting in limited numbers of fry for stocking fish ponds, until fry collection stations are constructed. Because of the seasonality of fry occurrence and yearly variation in numbers, the collection stations are critically needed so that fry can be treated for disease, shock and injury, and to allow accumulation of fry stocks prior to their distribution to fish farms.

2. Training

Even though observed stocks of mullet fry are more than adequate for present and future needs in Egypt, current collecting and transporting practices contribute to fry losses exceeding 90% of all fish collected for stocking in ponds. The lack of a cadre of fishermen and GOE personnel trained in proper fry collection, handling and transport techniques continues to be the underlying factor in the poor survival of mullet collected and transported to fish ponds. To improve survival rates and thereby increase the numbers of fry available the MOA must:

- (a) Continue a training program for both GOE personnel and fishermen involved in fish collecting and transport based on a course and materials developed and provided by the Fish Transport/Mullet Fry Specialist.
- (b) Select suitably motivated graduates of the above course for intensive training by the Fish Transport/Mullet Fry Specialist in the collection, handling and identification of mullet fry. These individuals should then be assigned to specific collection sites to oversee and assist collecting and transporting of mullet fry by other trained personnel.

3. Studies

Inadequate understanding by the collectors of the mullet fry migrations inshore and their inability to identify and select the two most important species of mullet from the general nursery population of fry further contributes to the low numbers of suitable fry available to the fish pond operators. In addition, the yearly fluctuations in numbers of fry available and variation in the time of the inshore migration and subsequent availability for collection are poorly understood in the Eastern Mediterranean. Selected MOA staff mentioned in (b) above should be assigned to collect basic data on mullet fry populations to better understand these phenomena.

4. Equipment

A lack of suitable transport equipment is a serious block to improved fry survival. Simple and inexpensive equipment developed by the TAT need to be employed by MOA personnel as soon as possible.

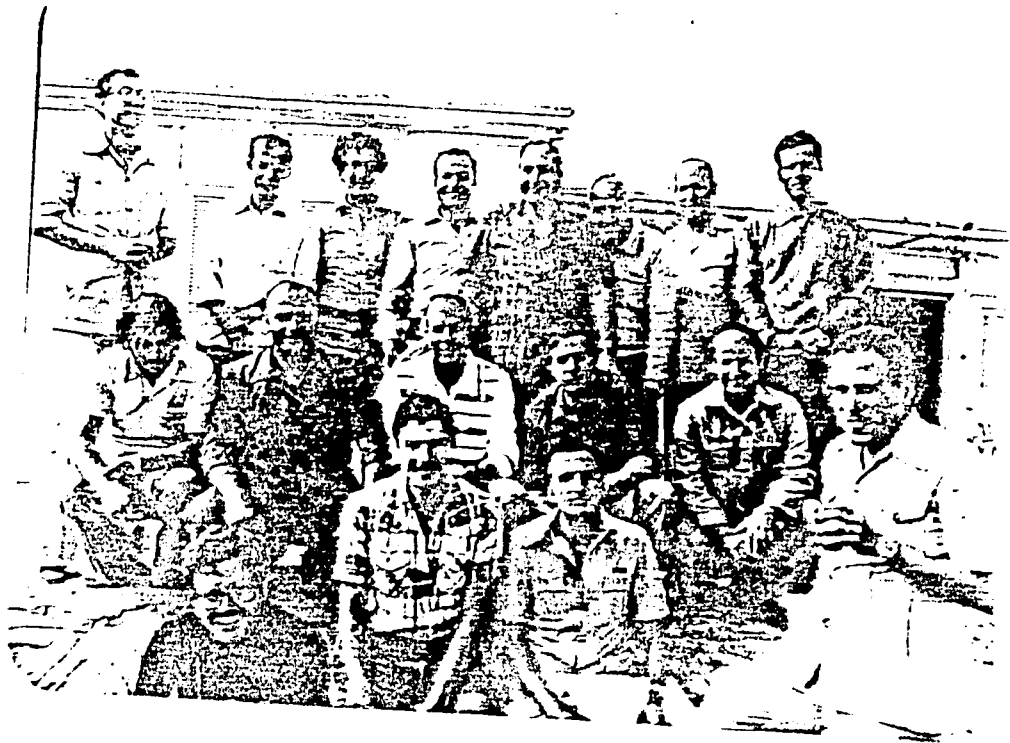
5. Habitat

Agricultural drains discharging fresh water into the sea provide a focus for mullet fry migrating shoreward. Reduced oxygen levels and high concentrations of agricultural and industrial chemical have seriously reduced the number of fry collected at these sites. The most productive collection sites need to be protected and efforts to safeguard these critical areas need to be identified. A sampling program to monitor water quality is strongly recommended as soon as possible.

6. Collection Sites

All collection sites identified to date lie within areas controlled by military forces. Access to these sites is limited and is alternately open and closed. Present restrictions on access to sites and periods of collecting and harassment by military personnel must be resolved.

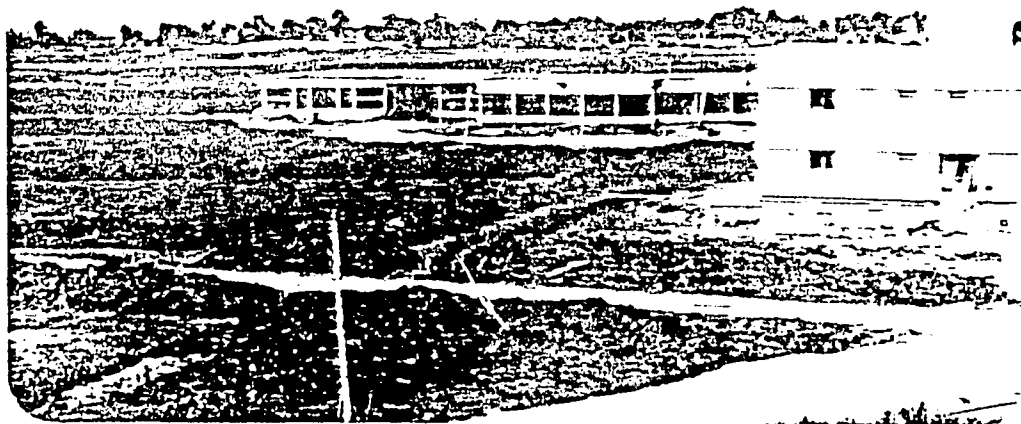
A P P E N D I X



Participants in the Mullet Fry Transport Training Course conducted by TAT member, Mr. William Madden, and organized by Mr. Mohamed El Shenawi, Raswa Fish Farm, October and November of 1982. Photograph by William Madden.



TAT/MOA Fish Culture Training Program
participants. Abbasa Hatchery.
February - June 1983.
Photograph by Wynne Davies.



Research Training and Production Building
under construction. Nearly complete
Senior staff housing in foreground.
Abbasa NAC site. Photograph by Wynne Davies.



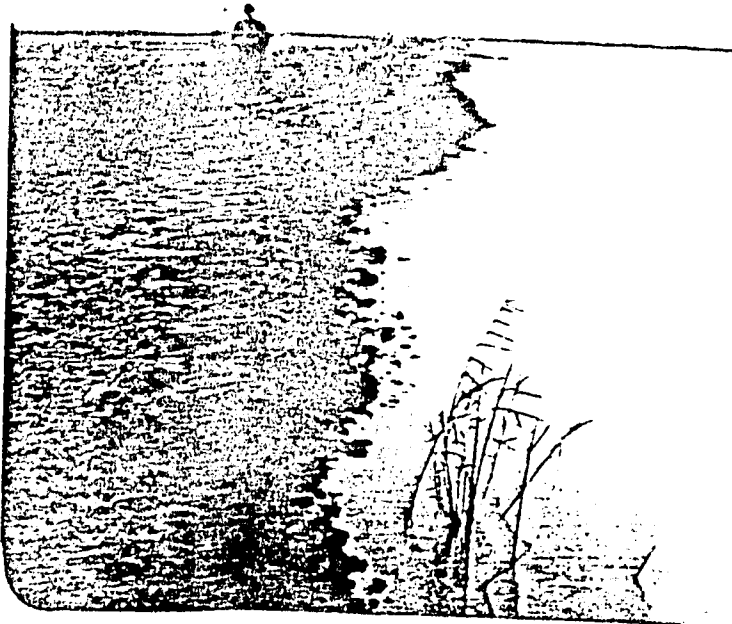
Organic overburden
"unsuitable material"
removed for burning
at NAC site. Abbasa.
Photograph by Darrell
Deppert.

..... Phragmites roots.



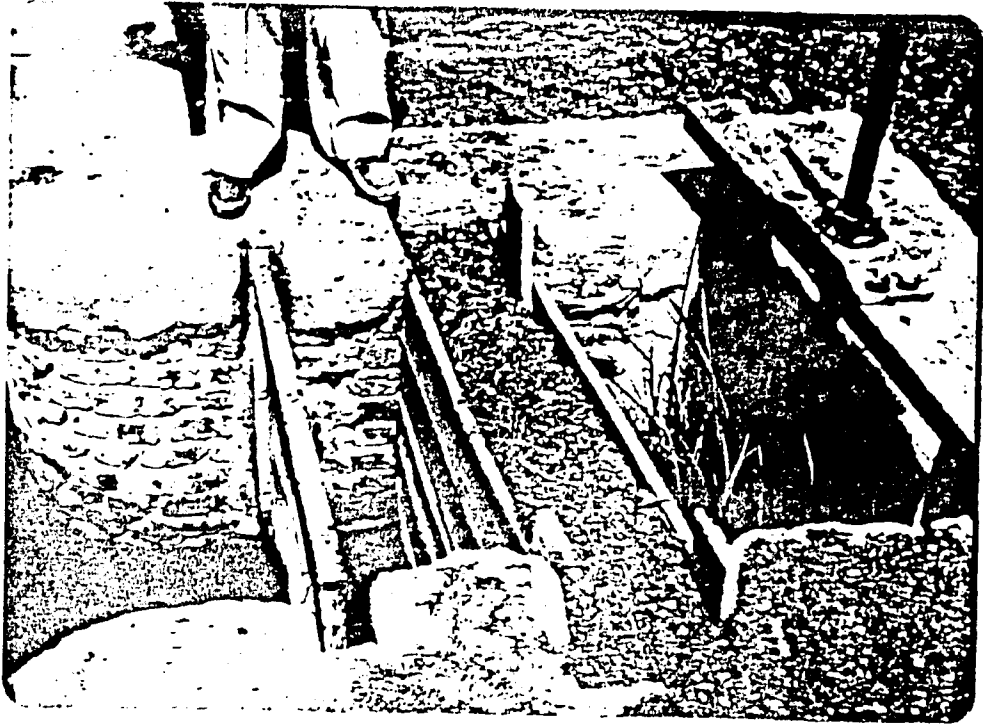
Production pond construction and typical pond
inlet structure in the foreground, with resi-
dential quarters in the background. Model
homestead complex, Abbasa. Photograph by
Darrell Deppert.

TAT member, Dr. Gary
Jensen, surveying damage
to pond dike due to the
erosive action of the
waves and poor construction.
Anwar Kalash farm 1982
Photograph by Wynne Davies.



Typical wind generated waves
3 - 5 cm high can cause
severe erosion to pond dikes
especially if those dikes
are poorly compacted and
constructed. Photograph
by Wynne Davies, 1982.



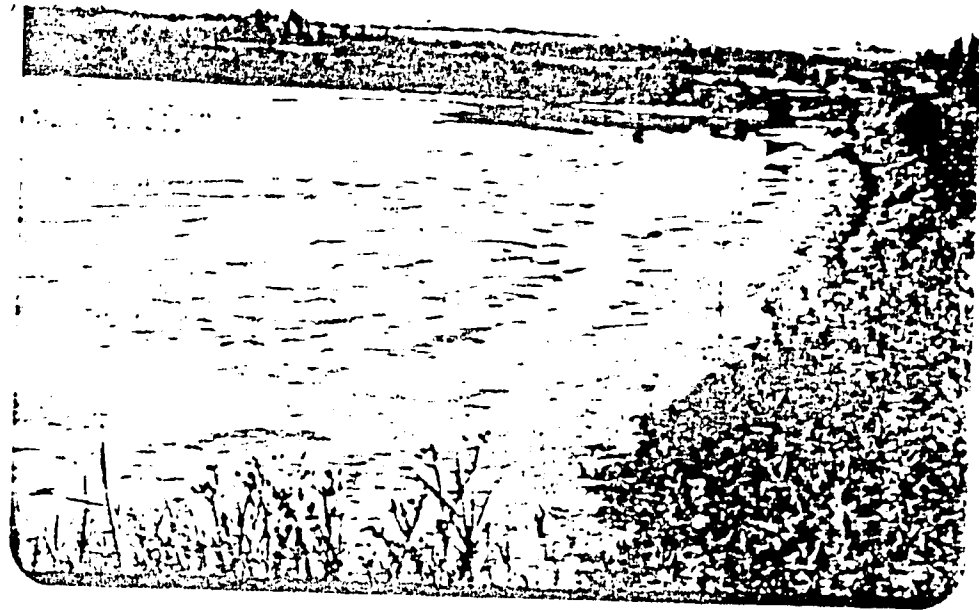


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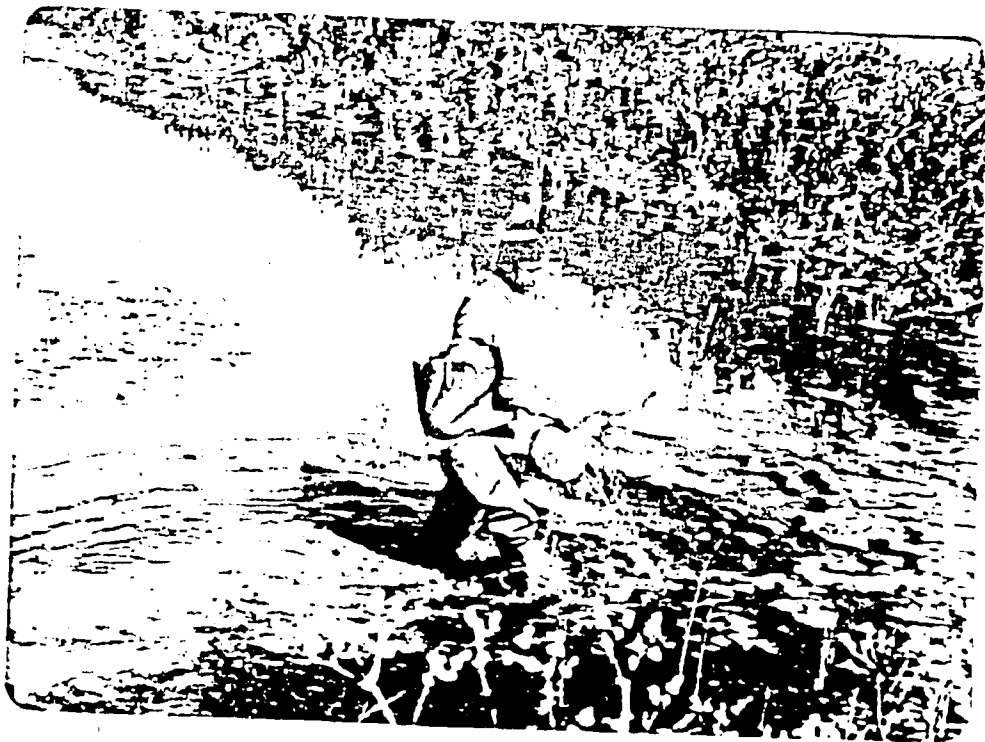
Monk modification from vertical screen to pipe/
saran sock. Pond inlet at Abbasa Hatchery.
Photographs by Darrell Deppert.

AFTER

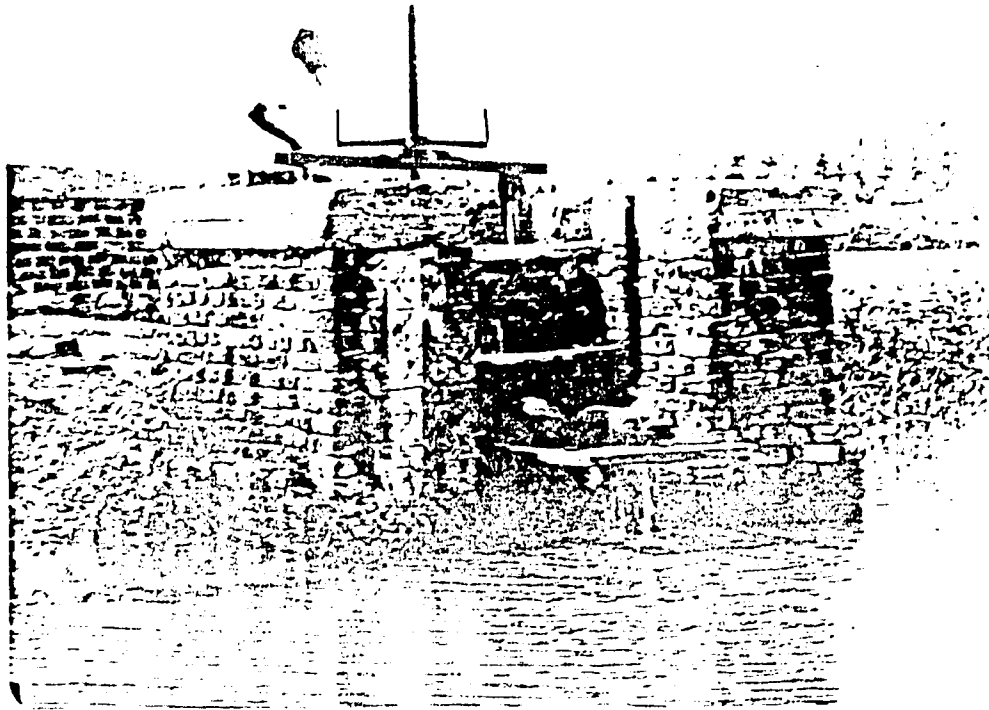




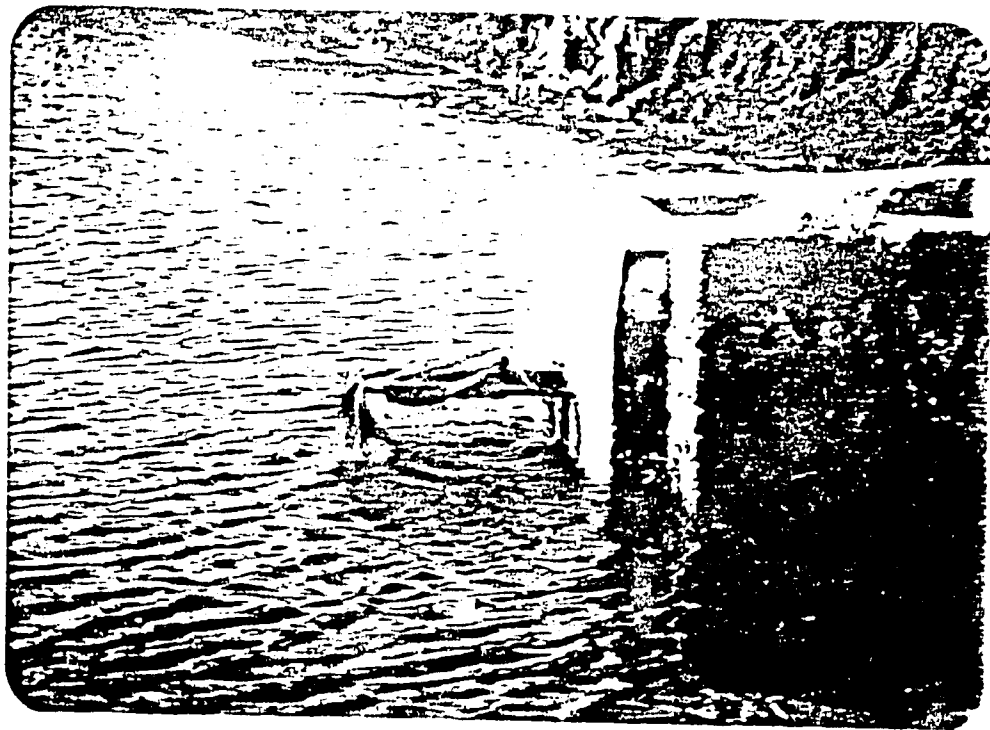
Abbasa Hatchery ponds drained for preparation and poisoning. After being poisoned, water was supplied through a fine mesh nylon pipe sock and the fish fry stocked. Photograph by Darrell Deppert.



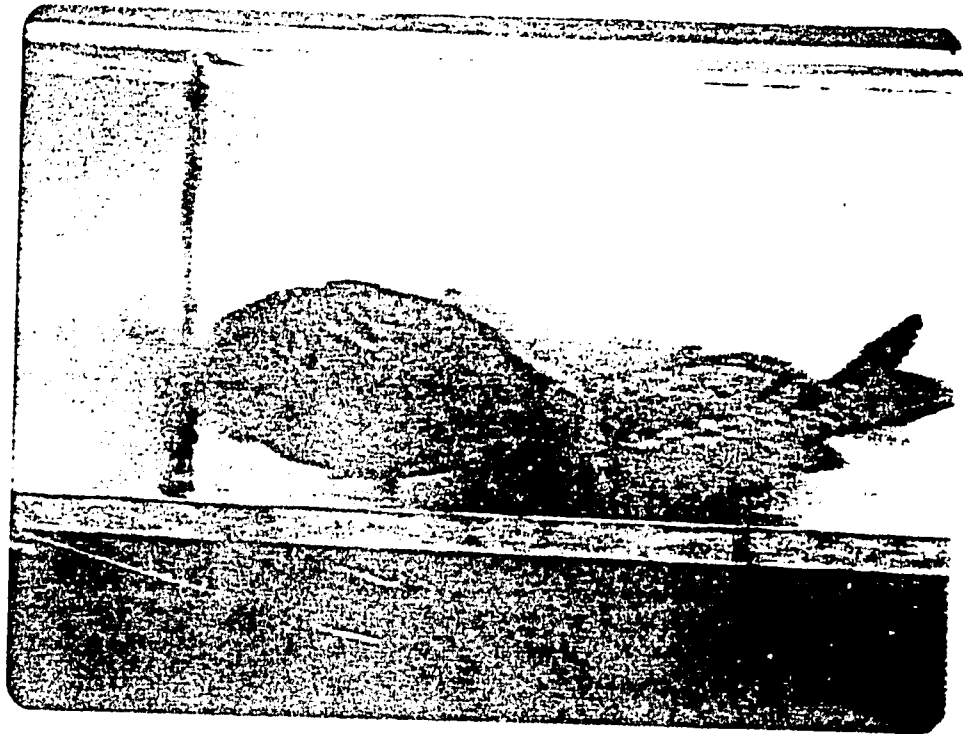
Due to the unavailability of proper fish poisons for hatchery use, the application of methyl parathion was initiated for partial control of wild fish and aquatic insects before filling and stocking. Photograph by Darrell Deppert.



Fine mesh nylon filter "sock" partially filled with filtered debris. Abbasa Fish Hatchery, 1983. Photograph by Darrell Deppert.



Filter sock of Fowa Fish Hatchery, 1983. Photograph by Darrell Deppert.



Abbasa Hatchery mirror carp broodstock
being prepared for breeding, 1983.
Photograph by Darrell Deppert.

FISH FARMING TRAINING PROGRAM
1 FEBRUARY - 1 JUNE 1983
ABASSA FISH HATCHERY

Tentative Schedule of Activities

Date/Day	Activity	Instructor(s)
Feb.1/Tue.	Settling-in of training participants	Mr. Shenawi Mr. Rahman
Feb.2/Wed.	Program objectives and training philosophy status of fish farming in Egypt and govern- ment developmental policy	Mr. Shenawi TBA
Feb.3/Thu.	Description, operation and tour of Abassa fish hatchery	Mr. Tawfik
Feb.4/Fri.	Holiday	
Feb.5/Sat.	Classification of local pond fishes	Dr. Zakaria
Feb.6/Sun.	Practical identification of local pond fishes	Dr. Zakaria
Feb.7/Mon.	Adaptation features of fish to aquatic envir- onment	Mr. RAHman
Feb.8/Tus.	Field trip. National Aquaculture Center	Dr. Jensen
Feb.9/Wed.	Adaptation features of fish to aquatic environment	Mr. Rahman
Feb.10/Thu.	Site evaluation criteria	Mr. Davies
Feb.11/Fri.	Holiday	
Feb.12/Sat.	Practical soil analysis	Dr. Ragab
Feb.13/Sun.	Site evaluation methods	Mr. Davies
Feb.14/Mon.	Design criteria	Mr. Davies
Feb.15/Tue.	Field trip. Zaweya Fish Farm	
Feb.16/Wed.	Plane table mapping	Mr. Davies
Feb.17/Thu.	Plane table mapping	Mr. Davies
Feb.18/Fri.	Holiday	
Feb.19/Sat.	Differential levelling	Mr. Davies
Feb.20/Sun.	Differential levelling	Mr. Davies
Feb.21/Mon.	Design and layout of model farm	Mr. Davies
Feb.22/Tue	Field trip. Barsic Fish Farm	
Feb.23/Wed.	Construction specification, contracts and procedures	Mr. Davies

Feb. 24/Thu.	Estimation of construction costs	Mr. Davies
Feb. 25/Fri.	Holiday	
Feb. 26/Sat.	Evaluation	Mr. Rahman
Feb. 27/Sun.	Biology of carp species found in Egypt	Mr. Deppert
Feb. 28/Mon.	Biology of carp species and application to culture	Mr. Deppert
Mar. 1 /Tue.	Field trip. Private Fish Farm	TBA
Mar. 2 /Wed.	Biology of local mullet species	Mr. Madden
Mar. 3 /Thu.	Biology and culture application of mullets	Mr. Madden
Mar. 4 /Fri.	Holiday	
Mar. 5 /Sat.	Principles of Aquaculture	Mr. Rahman
Mar. 6 /Sun.	Biology of local tilapias	IOF - TBA
Mar. 7 /Mon.	Biology of local tilapias and application to culture	IOF - TBA
Mar. 8 /Tue.	Field trip. Mullet collection station	TBA
Mar. 9 /Wed.	Principles of Aquaculture	Mr. Rahman
Mar. 10/Thu.	Principles of Aquaculture	Mr. Rahman
Mar. 11/Fri.	Holiday	
Mar. 12/Sat.	Biology of other Nile fishes	IOF
Mar. 13/Sun.	Basic water chemistry and terminology?	Dr. Talat
Mar. 14/Mon.	Basic water chemistry	Dr. Talat
Mar. 15/Tue.	Field trip. IOF Barrage Station	TBA
Mar. 16/Wed.	Principles of Aquaculture	Mr. Rahman
Mar. 17/Thy.	Principles of Aquaculture	Mr. Rahman
Mar. 18/Fri.	Holiday	
Mar. 18/Sat.	Use of water analysis kit and hydrometer	Mr. Rahman
Mar. 19/Sun.	Water quality related of fish production	Dr. Talat
Mar. 21/Mon.	Applied management of water quality in ponds	Dr. Jensen
Mar. 22/Tue.	Applied management of water quality in ponds	Dr. Jensen
Mar. 23/Wed.	Principles of Aquaculture	Mr. Rahman
Mar. 24/Thy.	Principles of Aquaculture	Mr. Rahman

Mar.25/Fri.	Holiday	
Mar.26/Sat.	Principles of Aquaculture	Mr. Rahman
Mar.27/Sun.	Natural aquatic food organisms	Dr.-Sherif
Mar.28/Mon.	Collection and identification of pond organisms	Dr. Sherif
Mar.29/Tue.	Field trip. Private Fish Farm	TBA
Mar.30/Wed.	Stomach content analysis of local pond fishes	Mr. Rahman
Mar.31/Thu.	Evaluation	
Apr.1 /Fri.	Holiday	
Apr.2 /Sat.	Holiday	
Apr.3 /Sun.	Holiday	
Apr.4 /Mon.	Nutrition of fish	Dr. Gaber
Apr.5 /Tue.	Nutrition and applied feeding of fish	Dr. Gaber
Apr.6 /Wed.	Natural foods and fish production	Mr. Wagdi
Apr.7 /Thu.	Guidelines and determination of feeding rates.	Mr. Wagdi
Apr.8 /Fri.	Holiday	
Apr.9 /Sat.	Chemical fertilization of fishponds	Dr. Ozoris
Apr.10/Sun.	Organic fertilization of fishponds	Dr. Ozoris
Apr.11/Mon.	Determination of fertilizer rates for ponds	Mr. Rahman
Apr.12/Tue.	Field trip. Manazala Fish Farm	TBA
Apr.13/Wed.	Methods and application of monitoring fish growth rate in ponds	Mr. Rahman
Apr.14/Thu.	Preparation and use of farm records	Mr. Johnson
Apr.15/Fri.	Holiday	
Apr.16/Sat.	Levels of fish production	Mr. Rahman
Apr.17/Sun.	Fish reproductive physiology	Dr. Helmy
Apr.18/Mon.	Artificial propagation of fish	Dr. Ghoniem
Apr.19/Tue.	Field trip. Suez Canal University	TBA
Apr.20/Wed.	Determination of fish stocking density	Dr. Jensen
Apr.21/Thu.	Practical problems for feeding and fertilization	Mr. Rahman

Apr. 22/Fri.	Holiday	
Apr. 23/Sat.	Fish diseases and parasites: Importance/case studies	Dr. Mohyi
Apr. 24/Sun.	Fish health maintenance and prophylaxis	Dr. Mohyi
Apr. 25/Mon.	Practical treatment methods	Dr. Mohyi
Apr. 26/Tue.	Field trip. Serow Fish Farm	
Apr. 27/Wed.	Equipment and methods for fish harvesting and collection	TBA
Apr. 28/Thu.	Evaluation	
Apr. 29/Fri.	Holiday	
Apr. 30/Sat.	Holiday	
May 1 /Sun.	Holiday	
May 2 /Mon.	Management steps for nursery ponds	Mr. Tolba
May 3 /Tue.	Management considerations for growout ponds	Dr. Jensen
May 4 /Wed.	Fish production methods and results/case studies for local fishes	Dr. Jensen
May 5 /Thu.	Fish production case studies continued	Dr. Jensen
May 6 /Fri.	Holiday	
May 7 /Sat.	Review of fish production results in Egypt	TBA
May 8 /Sun.	Cage design and culture of fish	Mr. Ettewa
May 9 /Mon.	Holiday	
May 10/Tue.	Field trip. Safta Khalid Hatchery	TBA
May 11/Wed.	Integrated fish culture	Dr. Jensen
May 12/Thu.	Preparation of a farm plan	Dr. Jensen
May 13/Fri.	Holiday	
May 14/Sat.	Applied management of aquatic plants in Fishponds	TBA
May 15/Sun.	Live fish transport and handling	Mr. Johnson
May 16/Mon.	Fish marketing in Egypt	Dr. Jensen
May 17/Tue.	Field trip. Raswa Fish Farm	TBA
May 18/Wed.	Applied economic feasibility analysis	TBA
May 19/Thu.	Applied economic feasibility analysis	TBA

May 21/Sat.	Repair and maintenance of fish nets	TBA
May 22/Sun.	Finalization of pond work	TBA
May 23/Mon.	Reporting and discussion of pond work results	Mr. Rahman
May 24/Tue.	Field trip. Private Fish Farm	TBA
May 25/Wed.	Model fish farm operation	Dr. Jensen
May 26/Thu.	Holiday	
May 27/Sat.	Final examination and program evaluation	TBA
May 28/Sun.	Presentation of special assignment	TBA
May 29/Mon.	Presentation of special assignment	TBA
May 31/Tue.	Review of final examination	Mr. Rahman
June 1/Wed.	Presentation of training certificates	TBA