



SHILAT



AQUACULTURE DEVELOPMENT IN SISTAN-BALUCHESTAN 2005 - 2008

*Project financed by Italian Cooperation
Italian Ministry of Foreign Affairs*

INDIA TECHNICAL VISIT REPORT FRESHWATER AQUACULTURE

September, 3-17, 2006

Executed by CIRSPE, Italy

ROME, NOVEMBER 2006

Aquaculture Development in Sistan-Baluchestan 2005-2008

Project financed by

Italian Ministry of Foreign Affairs

Italian Cooperation
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UNDP

United Nation Development Programme

SHILAT

Iranian Fisheries Organisation

CIRSPE

Italian Research and Study Centre for the Fishery

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ABSTRACT

This report describes the second training in India which took place from the 3rd to the 17th of September 2006, planned within the project “Aquaculture Development in Sistan-Baluchestan” in order to promote technical training in freshwater aquaculture to 12 Iranian Officers from the Shilat-IFO. The aim of this report is to point out the training targets and its results. The methodology applied will be also described as well as proper indicators for the effectiveness of this task.

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EXECUTIVE SUMMARY

1. This document describes the training on freshwater aquaculture which took place in India from the 3rd to the 17th of September 2006 which involved 12 Iranian fishery officers from the Shilat-Iranian Fisheries Organization (IFO). Objectives of the training will be also take into account as well as results obtained and indicators.
2. On June 2000 the General Department of Development Cooperation of the Italian Ministry of Foreign Affairs and the Iranian Ministry of Foreign Affairs signed a “Meeting Memorandum” in which the Italian party expressed its intention to finance cooperation activities in the Province of Sistan Baluchestan. Priority was given to the development of aquaculture in the Province of Sistan-Beluchestan bordering with Afghanistan and with Pakistan, giving it a strategic role.
3. On June 2003 the Italian Ministry of Foreign Affairs has approved to finance the project “Aquaculture Development in Sistan Baluchestan” (act n.49; 24/6/2003; N. aid 6945.01.3).The United Nations Development Programme (“UNDP”) has agreed to co-operate in the implementation of the project, with the modality of cost-sharing agreement to allocate the project budget in the beneficiary Country, having funds for “3.034.000.00 EURO” by grant.
4. SHILAT and CIRSPE agreed on organizing trainings in Thailand and India, with the technical support of NACA and AFTM (See Contract Annex 6).
5. Regarding the specific task of the training, the Project aims at achieving proper conditions promoting synergies between public (SHILAT)/private sectors.
This objective will be realized by improving the capacity of the public service, necessary for the new responsibilities and assignments tied to a great dissemination of operations, with the training of personnel, especially in management and technical activities. The reinforcement of the extension service is also crucial, with the undertaking of a clear-cut effort to disseminate the technologies prepared during the project activities. Specific initiatives (Internet,

Newsletter, Seminars, Interviews) will be organised in order to give the donor proper visibility, both at international and national levels, in part to contribute on bringing together supply and demand (technology and production).

6. The recipients of the training are the technicians of the Shilat (12 people) indicated by the responsible authorities of the Ministry and assigned to operate at the facilities and the offices (Zahedan and Chabahar), as well as in the extension service, for the entire duration of the project. This second training process, is addressed more directly to production activities.

7. Each member of the expedition wrote a brief report of the activities which have been carried out. It is interesting to note how everyone stressed one or another part of the tour in accordance with his personal and professional interests. Some of them at the end of the reports added conclusions and suggestions for the implementation of another training process.
In order to test if this training met the expectations and requests of the participants, at the end of this task, Iranian officers were given an anonymous questionnaire to be filled for their evaluation of the training process in India.

8. The 12 people that took part to the training were selected by Shilat with the purpose to create a task of trained officers which can divulgate in Iran good practices regarding freshwater aquaculture. This technical visit was useful to build an Institutional capacity regarding aquaculture for the Shilat-IFO. Improving the capacity of the Iranian Public Service is a mean to create a synergy between the public and private sectors. The visit also showed several models of freshwater aquaculture practices which can be replicated in the Sistan-Baluchestan Province in order to reduce the social imbalance and to raise people's incomes.

1 INTRODUCTION

The Islamic Republic of Iran and the Italian Government are reinforcing their political and economic relations in consideration of their reciprocal interest in the exploitation of Iran's raw materials and for exporting Italian technology, industrial products and consumer goods.

In June 2000 the General Department of Development Cooperation of the Italian Ministry of Foreign Affairs and the Iranian Ministry of Foreign Affairs signed a "Meeting Memorandum" in which the Italian party expressed its intention to finance cooperation activities in the Province of Sistan Baluchestan.

The topics relevant to the cooperation program were deeply studied during technical missions carried out by the General Department of Cooperation Development. Upon examination, priority was given to the development of aquaculture in the Province of Sistan-Beluchestan, bordering with Afghanistan and Pakistan, giving it a strategic role. This province is the poorest in the Republic of Iran (UNDP, 1999 "National Human Development Report"). There are interesting prospects for the development of aquaculture in the zone of Chabahar, in the south-east of Iran, suitable for the raising of shrimp. Aquaculture is already practiced in internal zones, with the technical context in the area of Zahedan (Sistan), where there are several facilities, playing a very important social, cultural and economic role. Aquaculture in Sistan-Baluchestan presents readily apparent, macroscopic limitations in terms of technology, service and the marketplace. In short, along with the high potential, recognised by the central system, which continues to invest on structures and equipment, there are unmistakable problems of growth and consolidation that can essentially be traced to the technical-cultural isolation that the country has experienced over the last decade.

Technical Project proposal has been prepared on 2002; on June 2003 the General Directorate of Development Cooperation/Italian Ministry of Foreign Affairs has approved to finance the project "Aquaculture development in Sistan Baluchestan" (act n.49; 24/6/2003; N. aid 6945.01.3), identifying the UNDP as International Agency in

Iran and the modality of cost-sharing agreement to allocate the project budget in the beneficiary Country.

The United Nations Development Programme (“UNDP”) and the Ministry of Foreign Affairs of Italy – General Directorate for Development Co-operation of Italy have agreed to co-operate in the implementation of a project in the Islamic Republic of Iran “Aquaculture Development in Sistan-Baluchistan”. The project budget has a funds “3.034.000.00 EURO” by grant (25/2/2004).

The Ministry of Jihad Agriculture – SHILAT Iran has been designated as the implementing agency and CIRSPE (Italian Fishery Research and Study Centre), via De’ Gigli d’Oro 21, 00186 Roma, has been designated as the contractor for providing technical assistance and training for a total budget of 1.744.000,00 Euro. UNDP manages the remaining budget, according to the project proposal, buying and supplying technical equipment.

1.1 Project Background

From a technical point of view, the project consists of 2 initiatives in 2 zones of the province (Sistan and Baluchestan), efforts that meet the different kind of needs present in the surrounding contexts.

The first zone of interest for the purpose of the project is that on the border with Afghanistan, near the city of Zabol. This reality, which features facilities for the fattening of trout and carp run on a family level, shows a production limitation that can be traced to the fluctuating availability of seed fingerlings, an annual uncertainty that prevents these family enterprises from properly planning their activities. SHILAT directly operates the centre for the reproduction of carps in Zahak (150 km north of Zahedan); this facility is already equipped with hatching facilities and fattening ponds.

The second zone for the project activity is in the south of the Province. A large facility for the shrimps raising (1.900 hectares) has been constructed near the location of Gowater, roughly 110 km to the east of the city of Chabahar. Inside this area there is an active perimeter of 20 hectares managed by the SHILAT for pilot and demonstration projects currently underway.

According to the Project Proposal financed by the Italian Ministry of Foreign Affairs (act n.49; 24/6/2003; N. aid 6945.01.3), the project, therefore, shall consist of:

- production initiatives in the public facilities of the SHILAT, with the results to be transferred to the private beneficiaries (the extension service of the SHILAT, seminars, Internet/newsletter);
- training addressed to the technicians of the SHILAT, with forecast fall-out on the private operations, given that the individuals trained are employed in the extension service;
- supply of technology to the public facilities in order to improve their efficiency and guarantee an adequate supply to private parties, demonstrating the worth of the new production strategies and, finally, testing and proposing technical packages which are innovative but appropriate to the context.

According to the Project Proposal financed by the Italian Ministry of Foreign Affairs (act n.49; 24/6/2003; N. aid 6945.01.3), the general objective of the project is to reduce poverty and social imbalance raising the income level of local populations and communities in the Province of Sistan-Baluchestan through the reinforcement and dissemination of aquaculture activities. The project aim is to expand and reinforce aquaculture activities both in terms of production/technology and economic results; to raise the socio-economic level of the groups and populations involved. The specific objectives, therefore, are:

- i) Identification of valid production strategies for aquaculture in Sistan-Baluchestan;

- ii) Identification of technologies that are appropriate for both the different contexts (fresh water and sea water);
- iii) Expansion of the production base and diversification of the product;
- iv) Institutional capacity building for the Ministry of Jihad Agriculture and professional growth for SHILAT-Iranian Fisheries Organisation.

Regarding the specific task of the training, the Project aims at achieving proper conditions that can promote synergies between public (SHILAT)/private sectors.

This objective will be realized improving the capacity of the public service, necessary for the new responsibilities and assignments tied to a great dissemination of operations, with the training of personnel, especially in management and technical activities. Reinforcement of the extension service, with the undertaking of a clear-cut effort to disseminate the technologies prepared during the project activities. Specific initiatives (Internet, Newsletter, Seminars, Interviews) will

be organised to donor visibility, both international and national, in part to contribute on bringing together supply and demand (technology and production).

The recipients of the training are technicians of the Shilat indicated by the responsible authorities of the Ministry. The first training process was organised as a technical visit, while the second one, is an on-the-job initiative addressed more directly to the production activities.

1.2 Training targets

Progressing the development of the project “Aquaculture Development in Sistan - Baluchestan” and in the direction of scientific growth of technicians and stakeholders of the project itself, it was appointed that two trainings in India would be done. The first journey with the title of scientific visit to freshwater aquaculture was planned for fishery directors and the second one is addressed to experts with the title of a practical training period on propagation and rearing of freshwater aquaculture.

Preliminaries of this mission were prepared; India was chosen as the scientific visit place. This Country is the second producer of warm water fishes in the world. The Central Institute of Freshwater Aquaculture with the abbreviation of CIFA has been chosen by NACA as the reference centre of warm water fishes in Asia and Oceania.

The second training concerned twelve Iranian experts (6 experts from Sistan, one from the central Shilat, one from Khoozestan, one from Mazandaran, and one from AFTM) which on the 3rd of September 2006 left to India and came back to Iran on the 17th of May.

The choice of the people to be involved in this technical visit in India aimed at selecting Iranian fishery experts which could contribute to establish effective synergies between the public and the private sector in order to raise the income level of the local populations and communities in the Province of Sistan-Baluchestan through the reinforcement and dissemination of aquaculture activities.

The training aimed at having an overview on the on field activities and abilities as well as best exploitation practices of the resources in warm water aquaculture in India. One of the targets of this task was to benefit from the high experience of the Indian experts in developing aquaculture in warm and humid regions.

India with 2.2 million tons of aquaculture production is the second in the world for the amount of production and it is also one of the forerunners countries in aquaculture industry that, with the least expense and equipments, earns the most profit from its potentials.

The main target of this training, as it was fixed by the project proposal, was to work for an institutional capacity building and professional growth of the Shilat-Iranian Fisheries Organization in order to reduce poverty and social imbalance in the Sistan-Baluchestan Province through the good practice of aquaculture activities.

2. TRAINING

2.1 Training Description

An important part of visit took place at the Central Institute of Freshwater Aquaculture (CIFA). The aim was to acquaint trainees with the activities of this centre also exchanging views with related experts. This centre is in Orrisa state on the outskirts of Bhubaneswar, the centre of this State. Several meetings took place in this phase in order to earn profit from the experience of Indian experts and farmers for the development of aquaculture in Sistan-Baluchestan.

The second argument of the training process is “**Culture of Freshwater Finfish and Shellfish**”.

Trainers were selected experts from CIFA, having an high level expertise on freshwater aquaculture. Here follows the list of the lecturers and the subjects they were training Iranian experts on:

ID	Subject
1.	Status of freshwater aquaculture in India N. Sarangi
1.	Advances in seed production technology of major carps P. Routray
2.	Raising carp seed in nursery and rearing of ponds J. K. Jena
3.	Grow-out culture of carps in ponds and tanks J. K. Jena and P. C. Das
4.	Breeding, seed production and grow-out culture of Asiatic catfish, <i>Clarias batrachus</i> A. K. Sahu and S. K. Sahu
5.	Hatchery technology of giant freshwater prawn, <i>Macrobrachium rosenbergii</i> Bindu R. Pillai
6.	Grow-out culture technology of giant freshwater prawn, <i>Macrobrachium rosenbergii</i> D.R. Kanaujia and Bindu R Pillai
7.	Ornamental fish breeding and culture Saroj K. Swain
8.	Cage aquaculture

P. Kumaraiah

9. **Integrated fish farming**
Kuldeep Kumar and U.L. Mohanty
 10. **Fish culture in flow-through system**
B. C. Mohapatra
 11. **Aquatic environment in fish culture**
S. Adhikari
 12. **Selective breeding and its application in aquaculture**
Kanta Das Mohapatra and J. N. Saha
 13. **Fish feed formulation and feeding technology in carp farming**
S. N. Mohanty and S. S. Giri
 14. **Fish health management**
B. K. Mishra
 15. **Application of engineering principles in establishment of aquaculture complex**
C. D. Sahoo
-

2.2 Indicators

Each member of the expedition wrote a brief report on his done activities. It is interesting to note how everyone stressed one or another part of the tour according to his personal and professional interests. Some of them at the end of the reports added conclusions and suggestions for the implementation of another technical visit.

In order to test if the technical visit met the expectations and requests of the participants, at the end of this task, Iranian experts were given an anonymous questionnaire to be filled for their evaluation of the technical visit in India.

2.3 Methodology

The training program was scheduled to last for two weeks. Members had 5 flights that were done in the routes of Tehran, Delhi, Kolkata, Bhubaneswar, Hyderabad, Delhi and Tehran. The program included a fourteen-hour journey by train, a journey between cities by bus and two days for going and coming back among several farms in Anhera Pradesh state. The program in detail is the following:

Details Program	Time	Date
Arrival at Delhi, Gandhi International Airport	4pm	Sep. 3, 2006
Departure from New Delhi to Kolkata (By flight)	9pm	Sep. 3, 2006
Departure Kolkata to Bhubaneswar (By flight after 24 hrs delay due to bad weather)	6am	Sep. 5, 2006
Arrival at Bhubaneswar and shift to the hotel	7am	Sep. 5, 2006
Arrival at CIFA and meeting with the director and scientists, presentation of India aquaculture status, visiting CIFA	9am	Sep. 5, 2006
Theoretical and practical classes in CIFA		Sep. 6-12, 2006
Examination and certificate award		Sep. 13, 2006
Departure for Vijayawada (14 hours journey by train)	5pm	Sep. 13, 2006
Arrival at Vijayawada and get hotel	7am	Sep. 14, 2006
Visit to fish farms and Hatcheries in Andhra Pradesh	9am	Sep. 14, 2006
Visit farms of fish and shrimp in Vijayawada area	7am	Sep. 15, 2006
Departure Vijayawada for Hyderabad by car	9pm	Sep. 15, 2006
Arrival at Hyderabad and departure for New Delhi at 5:45 am (by flight)	3am	Sep. 16, 2006
Arrival at Delhi Airport, having a trip to Taj Mahal	8am	Sep. 16, 2006
Departure Delhi to Tehran	4pm	Sep. 17, 2006

3 RESULTS

3.1 Institutional strengthening

The 12 people that took part to the technical visit were selected by Shilat with the purpose to create a task of trained officers which can divulgate in Iran good practices regarding freshwater aquaculture. This technical visit was useful to contribute to the institutional capacity building regarding aquaculture for the Shilat-IFO. Improving the capacity of the Iranian Public Service means to create a synergy between the public and private sectors. The visit also showed several models of freshwater aquaculture practices which can be replicate in the Sistan-Baluchestan Province.

Here follows the list of all the participants to the technical visit:

	NAME	SURNAME	PHONE	E- MAIL	
1	ABDOLALI	RAHDARI	09153421322	Rahdari57@yahoo.com	
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11	AHMAD	NOORY	09125186031	Ahmadnoori57@yahoo.com	
12	JAVAD	SAYADFAR	66943714		

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Iranian Fisheries Research Organization
Research & Study Centre for the Fishery /Asian Fisheries Technology &*

3.2 Indicators

3.2.1. Journey reports

At the end of the technical visit, each member of the expedition wrote a brief diary of the tour from his point of view. Reading this Journey reports (Annex 4) several interesting notes about the relevance of this task can be stressed. Iranian Officers taking part to the visit, stressed the relevance of this experience held in a forerunner Country in terms of aquaculture technologies. India is, indeed the second aquaculture fish producer of the world and more than one trainee considered the fact that the applied research is truly strictly connected with production. Farmers can really count on researchers support in order to improve their products both in terms of quality and quantity.

3.2.2. Questionnaires

After the end of the journey, the participants were given a simple questionnaire to be filled in order to express their opinion on the technical visit in India. Hereby you can find the grid of the answers to the questionnaire. The good thing to notice is that everyone was happy with the technical level of the visit. We just picked some questions about different matters regarding the implementation of the technical visit.

	Item	Total answer	Excellent	Good	Average	Bad
1	Duration and period of trip	11	1	5	5	-
2	Time table of the trip	11	1	3	6	1
3	Visits program	10	1	2	7	-
4	Technical and scientific level of the visits	11	1	6	4	-
5	Technical and scientific level of those whom you meet	11	5	5	1	-
6	Indian host behavior	11	10	1	-	-
7	The lecturers dominance on technical items	11	8	2	1	-
8	Scientific level of the classes	11	-	8	3	-
9	Practical works value	11	-	2	9	-
10	Translation level in classes	11	8	3	-	-
11	Examination level	11	3	6	1	1
12	How the Indian side answer to your questions	11	4	4	3	-
13	How much did you earn in technical view	11	-	6	5	-
14	Executor behavior (AFTM)	11	2	4	3	2
15	Accommodation	11	1	5	5	-
16	Transportation, flights, train, cars	10	4	2	4	-
17	Food items	11	3	3	4	1
18	How was this trip compare to your other trips	9	1	2	6	-
19	Your general satisfaction of the trip	10	1	2	7	-
	Total		54	71	74	5
	Percentage		26.5%	35%	36%	2.5%

4. CONCLUSIONS

One of the main objectives of the project “Aquaculture Development in Sistan Baluchestan” is to strengthen the public service transferring know-how and technologies in order to establish a productive synergy between public and private sectors which can improve the general conditions of the population living in Sistan and Baluchestan related to aquaculture activities.

During the technical visit in India, 12 members of the Shilat-IFO, had the opportunity to become acquainted with several freshwater farming techniques which could also be imported in Iran.

Analyzing the activities carried out within this technical visit, C.I.R.S.P.E. can attest that the objective regarding the strengthening of the public service is successfully achieved, contributing to the achievement of the specific objectives of the project.

ANNEX 1 (Freshwater shrimp propagation)

Freshwater shrimp propagation

Freshwater shrimp (*Macrobrachium*) males have longer body comparing it with females and the maximum length, which has been reported so far, is about 320mm with a weight of 654gr. This species has an high growing rate and it is resistant against environmental factors; it is also suitable for poly culture rearing systems.

Freshwater shrimp has two life chains: 1- freshwater 2- saline water.

Young shrimps move to the mouth of the river for breeding. In that zone, river water is brackish and after laying eggs and passing larva period, changing into a shrimp (development), post larvae enter freshwater.

When females are fertilized, eggs are under their belly or between the belly feet. Eggs colour is orange, changing into pale orange and then to grey. That process takes about 21 days.

- Freshwater shrimp larva rearing techniques:

a) Rearing larvae in green water: this technique was used in the past, but now it is rarely in use.

b) Rearing larvae in clear water: this technique has been used since 1976.

In the first technique, larvae were reared in water with a salinity of 10-12 PPT. There was also phytoplankton, mainly *Clorella* family, in water which was coloured in yellowish green. In this system, larvae accumulation was low (50 pieces in one litre), maintaining quality is difficult and water loses its quality fast.

In the second technique, the salinity of water is about 10-12 PPT and there isn't any plankton. There are 100-400 pieces of larvae in each litre and tanks are in cylinder shape with the capacity of 0.5-2 square meter. Some factors such as light, temperature and food must be under control and they don't depend on the environment situation. High catching and water reuse are the main advantages of this method but, on the other hand, high expense is its constraint.

-Requirements for a Freshwater shrimp propagation centre:

- 1- High quality of fresh and saline water;
- 2- Suitable breeders;
- 3- Access to constant electricity (without cuttings);
- 4- Good climate condition (water temperature about 28-30 °C);
- 5- Access to data and experts;
- 6- Access to skilful workers;

- Equipment needed in a propagation centre:

- 1- Aerator and water supply system;
- 2- Tanks for storing saline water, freshwater and brackish water;
- 3- Tanks for larvae rearing;
- 4- Generator for electricity supplying;
- 5- Breeder tanks;
- 6- Larvae tanks;
- 7- Pail, net, chemicals and filter bags;

The bulk of keeping ponds are four times more than larvae rearing ones and it is made of cement or fibreglass. In this system, aerators are used without oil. These aerators supply a high quantity of air without oil and there is always one spare aerator.

- Providing breeders for propagation centre:

Breeders can be provided from nature (wild breeders) or can be caught from rearing ponds or from breeder ponds. The size of breeder ponds is from 0.04 to 0.1 depending on the capacity of the propagation centre and 2-3 pieces of breeders are kept in each square meter considering that one male is enough for four females. The food used for this pond is pelt and the amount of protein and oil are respectively 40% and 10%. Feeding is done at early morning and it is 15% of biomass decreasing to 3% after 2-3 months.

- Rearing management of freshwater shrimp ponds for making breeders:

That includes measuring physical and chemical factors of water such as Oxygen, temperature and etc, on a daily basis. According to the arranged protocol on training

period in this training system, 30-50% of water will be exchanged and after 4-5 months, breeders can be harvested. It is very important to be careful about choosing female breeders. Selected breeders are disinfected

using copper sulfate 0.3ppm or formalin 30ppm for 30 minutes and they are put in tanks for larvae releasing. One square meter is considered enough for each 2-3 pieces and these breeders are daily fed by natural food such as meat, fish, shell, and pellet (6% of biomass weight). Cleaning tanks is done daily and 50% of water is exchanged every following day.

Females, which have released their eggs, must be transferred to the breeder ponds after 24-48 hours. Hatched larvae behave like plankton and they need brackish water with a salinity of 10-12 PPT. These larvae are reared in those tanks where they are hatched and the water salinity of these tanks or larva ponds will reach 12PPT step by step.

- Feeding larvae in larva tanks:

First method:

200-300 larvae are exposed to a salinity of 10-12 PPT with the water temperature around 28-30 centigrade; dissolved Oxygen is more than 5 mgr and NH₃ is less than 0.1 mgr/l. Feeding is done 4-5 times in this method and starts at 7am. In the evening, tanks are cleaned by siphoning and about 50% of water is exchanged. The rearing period is about 20-25 days and the survival percentage is around 80%-90%.

Second method:

50-60 larvae are kept in each litre. Salinity is about 10-12 PPT, temperature is about 28-31 centigrade, oxygen is more than 5 mgr and NH₃ is less than 0.1 mgr/l. Tanks are cleaned by siphoning every day and 50% of water is exchanged. The rearing period is about 20-25 days and the survival percent is 60%.

- Post larvae rearing:

Post larva rearing can be done in a covered place or in an open environment. Tanks are made of cement or fibreglass. In these tanks, rearing accumulation is about 2000-5000 post larvae in each square meter. The food used for post larvae is in granule form and the amount of given food is 100% of biomass weight. Food is given 3-4

times in a day and cleaning is done every day exchanging 50% of water. The rearing period is 10-15 days and the survival percent is 90%.

- Monoculture rearing of freshwater shrimps:

Shrimps are reared in two ways: periodical, and permanent which depends on the region climate. In periodical method, there isn't any hunter or food rival but the difference in shrimp size is very high; in the permanent method, size difference isn't so much but there are a lot of food rivals and hunters. In this second method, shrimps are permanently released and water temperature is more than 24 °C.

Things needed for rearing freshwater shrimp:

- 1- suitable water;
- 2- good quality of soil;
- 3- shrimp post larvae availability;
- 4- access to needed food;
- 5- suitable climate;
- 6- good quality water;
- 7- appropriate infrastructure;
- 8- ponds of about 0.5- 1 ha;
- 9- Ponds should ideally be rectangle shaped;
- 10- depth of ponds must be 1.5-2m;
- 11- suitable inlet and outlet;
- 12- free board of about 50cm;
- 13- Wall slop of about 1.5cm and wall is made of clay;
- 14- Inlet and outlet must be designed in such a way to enable the quickest water exchange in the ponds.

ANNEX 2 (Visit to farms in Krishna-Godavari basin,
Vijaywada)

Details of farms of a few fish farmers in Krishna-Godavari basin,

Vijaywada

1. Visit to the farm of Vermi-compost production

The Nilagiri Foundation was visited, Atmakuru Village, Guntur, Andhra Pradesh, a registered Company involved in commercial production of Vermicompost. Mr. A. Raghurami Reddy, General Secretary, explained the activity of the society, which is targeted to train small and marginal farmers in neighbouring districts of the state Andhra Pradesh. The main aims of the organization are to promote alternative scientific agriculture methods, to promote vermiculture and organic farming, and to make rural people as active actors of their development. The vermicompost production unit is situated in 0.4 ha land area with bed area of 45' x 55'. All the processes involved for vermicompost preparation including vermicompost bed preparation, earth-worm introduction, bed management, production and marketing aspects were discussed in detail by Mr. Reddy.

2. Visit to fish farms

The state Andhra Pradesh has been leading in commercial aquaculture in India over the last two decades. Again freshwater aquaculture has been concentrated in Krishna-Godavari deltaic area (Krishna and East Godavari districts encompassing Kolleru lake area). The commercial activity started in this area during 1980s with an area of about 14,000 ha. Now it has spread to over 140,000 ha, producing 0.5 million tons of fish. While all along the visit of Krishna-Godavari Delta there were fish farms on both sides of the roads, we specifically visited four farms and had detailed discussions with the farmers, and some of the information collected during the visit were discussed. Furthermore, during the technical visit some of the fish packing and transportation agencies involved in the trade, were also visited.

Farm No. 1:

During this first visit, trainees had the chance to observe the harvesting operation of the carps. The method of packing in ice for long distance transportation was also

studied.

Mr. K. Bhaskara Rao was an agriculturist having 20 ha land, who had taken up a new venture of aquaculture in 1982. He converted his rice fields by digging two ponds, one of 0.4 ha for seed rearing and the other one of 3.6 ha for grow-out carp culture. In those days rice cultivation was risk prone because of the frequent flooding of fields during monsoon time and often the crop loss

used to be total. The complete excavation method was adopted for the construction of ponds. It was a very good start for this farmer and within two months rearing of 0.1 million seed in 0.4 ha pond he obtained a revenue of Rs.60,000 by selling 60,000 fingerlings. The remaining fingerlings were stocked in his 3.6 ha pond for grow-out culture at 2000 fish seed/ha. Culture of rohu and catla at 5:1.5 ratio was followed due to preferential market demand for the species.

In the first years Mr Rao was targeting to produce 4-6 tonnes/ha. Gradually, he has adopted intensive culture system with two species combination, viz., rohu as a major component of stock at 95% and the rest with catla with production levels of 8 to 10 MT per ha for each crop. The stock fingerlings always reared and stunted in his ponds as he wanted to be sure of its age before stocking in culture ponds. The intensive culture system demanded heavy manure (cow dung and poultry manure along with chemical fertilizers), in stages in order to produce and maintain high levels of plankton production in ponds of over 10 ha area. Gradually, he acquired ponds of 300 ha on lease, in three culture areas for grow-out. He is now practicing new feeding technique by cooking feed ingredients for fish easier digestion and to obtain a better conversion. The ingredients used are cheaply available coarsely ground pearl millet mixed with broken rice and de-oiled rice bran in 1:1:1 ratio. The ingredients are mixed together and cooked in water. Fishes are fed in bags after overnight cooling the food. Almost the entire quantity of harvested fish is packed with ice in plastic crates and transported on road by trucks to Kolkata and other centres for marketing.

Farm No. 2:

The farm in Janardanapuram village was visited, Nandivada Mandal, Krishna District of Andhra Pradesh, who was another agriculturist turned successful into aquaculture in Budameru area of Kolleru Lake. He is well qualified with a Post-Graduate Degree in Plant Sciences, he started aquaculture in 1990 in a 12 ha area. Due to continued

flooding of his agriculture area he converted his agricultural land into fish ponds. Later he expanded the aquaculture activity to 50 ha water area. The cultured practices followed by Mr. Nagireddy are given as below:

Ever since initiating fish culture, he has been applying only processed farmyard manure in order to boost blooming of plankton in ponds, when his counterparts in the area were applying both farmyard and poultry manure. This practice in a long run showed beneficial and he could maintain the production levels constant over the years. Procuring fry from hatcheries and its stocking in fish ponds was adopted in early stages of culture, which resulted in low growth, poor survival with low production levels on harvest. At present, as many of the farmers, he is also involved in seed rearing at high density and feeding with high protein diet for 9-10 months

obtaining 100 g juveniles. When stocked in low density in grow-out culture ponds these juveniles grow fast and attain 1.5 kg in 9-10 months.

During initial stages, three species composite culture was adopted, stocking with rohu, catla and mrigal, together at 7.500 per ha. The stock used to be harvested once when they have attained a weight of 1.0 kg, thus obtaining a total fish production of 7.5 tons/ha per year. However, this practice gradually changed, guided by market trends, to two species culture, with rohu at 95% and catla at 5%, with a combined stock density of 10,000 per ha with intermittent stocking with equal numbers on harvesting of fish of over 1 kg size. The production levels in this system have been over 10-15 tons/ha. Recently, murrel (*Channa striatus*) is being stocked at 500/ha, as a measure to control weed fish populations, including tilapia. Because of this, the additional production of murrel has been to the tune of about 500 kg/ha, which is fetching three times higher market value over carps.

In the earlier culture systems, fishes used to be fed on a mixture of de-oiled rice bran and oil expelled groundnut cake at 80:20 ratio. With the rise in prices of groundnut cake, this system of feeding became expensive and adopted intensive intermittent manuring so as to produce *in situ* natural food, viz., plankton for the carps to graze on, thereby reducing the quantity of supplemental feed in the carp grow-out system. Bag feeding method has been adopted incorporating only de-oiled rice bran to the extent of meeting mainly carbohydrate requirement as the fish gets many of its essential amino acids, vitamins and minerals through natural food materials produced in pond. Very recently, even cooked feed, mainly to improve digestion by fish and to reduce

wastage, was given incorporating de-oiled rice bran with any of the cheaply available cereals like pearl millets and sorghum.

He has uniquely developed a system for continuous generation of revenue adopting intermittent fish harvesting in four stocking systems, viz., stocking in February, April, June and August. In each system, two partial harvests followed by a final harvest are done for liberal regulation of finances in a better and profitable way. This practice of stocking and harvesting is now followed by many aquaculturists in the region for better management of their financial needs during culture.

He has inspired many prospective entrepreneurs into aquaculture which have by now developed about 7.000 ha under commercial farming in Budameru. The booming aquaculture industry has given adequate support for the development of other related activities like the establishment of feed manufacturing units, ice factories and processing plants, farm management and product harvesting, fish handling and transport establishments, providing employment opportunities for many in the area. This has clearly established the socio-economic growth of the society to a great

extent, when compared to other connected agricultural activities.

Farm No. 3:

Mr.Sri. S. Suparna is one of the most successful carp fish breeders and developed a commercial carp hatchery in the region. Sri Suparna is a graduate in mechanical engineering from Bangalore University. He has two hatcheries with production capacity of 2070 million spawn, every year. The 33 ha water spread area for maintaining brood fish stocks and for rearing seed in nursery and rearing ponds have the capacity to produce more than 700 million fingerlings per year. During 2002, Sri Sairam hatchery was given the rights for multiplying Jyanthi rohu seed, under a MoU agreement with CIFA, for distribution under its commercial seed production activity. The hatchery started supplying seed fish since 2003. In addition to meeting most seed requirements of the region, he has also supplied seed to many agencies, including supplies to other States.

Farm No. 4:

Farms undertaking the culture of black tiger shrimp, *Penaeus monodon* in freshwater were visited. It was understood that though the farming is being done in complete

freshwater areas in this area, the soil has a certain salinity. The practices involved for farming, including stocking, feeding, fertilization, aeration etc. are similar to the ones undertaken in coastal shrimp farming. Production levels are obtained by the farmers in the area, thus proving much higher revenue than freshwater carp production systems can assure.

ANNEX 4 (trainees journal)

Mr. Javad Sayadfar's report:



Aquaculture development in Sistan and Baluchestan province and using biotechnology for fish rearing and also getting benefit as much as possible from equipment especially from the soil and water resources were the aims of this journey.

Training and getting experience are the ways for taking these aims. India was chosen because it is the second fish producer, after China, in the world and it has the first rank in developing village, spreading information, producing food and creating employment. Its climate is similar to Sistan and Baluchestan province. In this country, cheap equipment and methods are used versus those countries which have mass production without paying attention to the expenses and employment. Some fish rearing ponds don't have developed aerators, pump, concentrate food and any other expensive tools in this country and water bloomed before is even kept.

Because of the time limitation, if some limited aims were considered in this training period, training would be more beneficial. Training must be according to our country requirements especially Sistan province so some subjects such as; visit to the rearing and propagation of Indian native fish that it isn't commercial species even in India and also the rearing and propagation of different kinds of Catfishes that haven't any scale so they aren't suitable in our country from religious point of view and also they aren't considered as commercial species in the world and also visit to some laboratories and engineering parts, aren't useful but instead of them, the training time about carp rearing and propagation must be longer for achieving the best result. And also our experts have knowledge and experience about some parts such as fish rearing in the cage, that isn't developed in India, more than Indian experts.

Because of these reasons and also because CIFA experts had a lot of useful information about carp fishes, group asked them to give some information just about this species in 3-4 days and some useful points were presented.

Mr. Ahmad Noori's report:



The training period which was considered for two weeks was a good opportunity for programming a good aquaculture development. India is the second aquaculture producer in the world. This country has used all of the human and natural property for achieving this aim.

CIFA (Central Institute of Freshwater Aquaculture) is similar to a research center by having 500 numbers of small and big ponds which are allocated to research activities. Many of CIFA heads are researchers and acquainted with the scientific activities. In this center, there are a lot of laboratories instead of administrative rooms. These laboratories are equipped by tools needed for doing research. Heads' rooms seem as if they were places for doing research.

It is noticeable point that meeting CIFA chief is so easy and without any problem. CIFA heads form a close relationship with each other and with clients.

I think India aquaculture development can be studied from two aspects; the first one is about natural situations in India that make it possible to have mass production without using complicated equipment. The second one is about fishery heads, producers and researchers that good behavior, acquaintance with the fishery principles and accurate schedule can be the major factors in India success.

Totally, it was a useful journey. If we take a deep look, we can have a noticeable development by using existing equipment.

Noori

Mr. Rahdari's report:



A review on the scientific journey and training period in India

Journey date: from 03-09-2006 till 17-09-2006

The second journey was done in the direction of the aquaculture development in Sistan and Baloochestan province by construction program of UNDP¹ and with the financial support of Italy government.

Members of this journey included 6 technicians from Sistan Shilat, 4 technicians from Golestan, Mazandran, Kermonshah and Khuzestan provinces, one technician from Iran Shilat central office and one translator.

The subject of this journey can be categorized into three parts: 1- the training part that was theoretical. 2- Experienced part that was practical. 3- Extra activities.

Following points can be stated about three mentioned parts.

1- Positive points:

- The training classes were held in CIFA¹. This institute was in good position from scientific and researching point of view. The teachers had PhD and good practical and scientific experience.
- Existence of the rearing ponds in CIFA showed that there wasn't any distance between research and execution. Besides being a work pattern, it made it possible to practically access to the scientific results. Indian experts were so successful in omitting this distance as if I always thought that I was in an executive center.
- Professors' effort to eliminate Iranian expert's need was noticeable.
- The institute director paid attention so much to how the classes were held and made a lot of efforts. Other people were the same specialty Dr. Jena that we don't know how to express our thanks to him because of all favorites he did for us. All people in the center helped us and also a note was given to us at the beginning that showed the time table and their attention to this period what isn't found in our country at all.
- As I know, Mr. Esmaeili tried so much to coordinate all activities for holding this period and unsuitable program of Iran Shilat caused that the list of the members was changed for four times. Each list took a long time for being

coordinated with India. It is clear that Mr. Esmaeili made a lot of serious efforts for this journey that I appreciate him sincerely.

- I don't know to state this point as a positive or negative point that the number of personnel in CIFA is great. Each part has enough or more than enough specialized and unspecialized personnel.

2- Negative points:

- I was appointed as the training head by the executor of this period, Asian Fisheries Company. I arranged all titles and programs according to the group need but it took several days to match with the lecturers.
- No agent from Iran was officially present in this journey
- The training course was delayed for two months due to some official works. This delay caused that the propagation season was over in India and we were in India right at the end of propagation season.
- The most important bothersome matter was the low hygiene of Indian and to have culture and religion based on no cleanliness.
- Discrimination was evident. There were both poverty and rich families in India. The centre driver wasn't allowed to have lunch with the centre members or guests.

Mr. Fadaei's report:

The report of journey to India (visit to CIFA and freshwater aquaculture farms)

Journey date: from 03-09-2006 till 13-09-2006

The expedition members: Mr. Noori as translator, Mr. Rahdari, Mr. Zaboli, Mr. Sargolzaei, Mr. Fadaei, Mr. Shah Mahmoodi, Mr. Najafi, Mr. Mirzaei, Mr. Ali Mohammadi, Mr. Sheikh Visi, Mr. Sayadfar.



The aims of this mission:

Studying and being acquainted with the equipment of warm water aquaculture of freshwater fishes in India, being acquainted with the results of these activities, comparing the aquaculture of Sistan and Baloochestan province with the mentioned country, studying the problems of aquaculture and getting benefit from suitable methods for increasing the amount of production in our country and also spending a short training period in CIFA.

The places where classes were held:

Training classes with different subjects about aquaculture and by using experienced and famous professors were held in Central Institute of Freshwater Aquaculture (CIFA).

The first training class with the presence of Dr. Sarengi was held after the introduction meeting. This class was about the introduction of CIFA, lakes and freshwater resources, agriculture and aquaculture production, production export and the income earned from fishes. The classes were from 9am till 9pm and in these classes, some subjects such as; the propagation and rearing of

Indian freshwater fish (Catla, Rohu and Mrigal), freshwater shrimp, Catfish, nutrition, pond preparation, aquaculture engineering and etc were studied.

Problems of the training period:

- 1- Holding twelve-hour classes in a day reduced the ability of learning.
- 2- With attention to the aim of getting benefit from the methods of the propagation and rearing of Chinese carp fishes by attending these classes but many parts of the subjects were about the rearing of the native species.
- 3- Some classes such as nutrition class were in low level.

Positive points of the training classes:

- 1- Having moral and experienced professors.
- 2- Holding classes in a suitable place.
- 3- Using slides in the classes for developing the training.

Visited places:

- 1- Orissa state and Bhubaneswar city.

Holding classes and making visits were done according to Dr. Jena's guidance.

The number of the visits to aquaculture centers and fun places were good and it is necessary to state them.

- 1- Visit to the propagation centre of Carp fishes in CIFA.
- 2- Visit to the laboratories in CIFA.
- 3- Visit to the library.
- 4- Visit to the rearing farms of fingerlings.
- 5- Visit to the farms in which ornamental fishes were produced.
- 6- Visit to the temples and fun places.
- 7- Visit to the zoo.
- 8- Visit to Bangal gulf.

2- Vijayawada:

- 1- Visit to the centre in which salt water Monodon shrimp post larvae were produced that were on the margin of Bangal gulf.
- 2- Visit to KVK or the centre of producers.
- 3- Visit to the farm in which salt water Monodon shrimps were reared in freshwater that at the time of the visit, shrimps attained the weight of 30gr.
- 4- Visit to the working-place in which fingerlings were produced.
- 5- Visit to the farm in which bazaar fishes, Rohu, Catla and Merigal were reared that at the time of the visit, the average harvesting weight was 1 kg.
- 6- Visit to vermin-compost farm (production of earthen worm)

Conclusion:

India is one of the countries with long service of aquaculture in the world and now, has the second rank, after China, from the amount of production point of view. Because of its climate, producers and people who learn about aquaculture can do the activities in aquaculture all along a year. Because of this suitable situation, the amount of production is 8-10 ton in each hectare but it has been specified by a lot of efforts that the production of 10t/h hasn't been received really. At the end, I express my thanks to those people who provided the situation for making this journey such as Iran

Shilat Organization Dr. Rezvani, Mr. Ghavidel and the head of Asian Fisheries Company specially Mr. Esmaeili who made a lot of efforts to arrange this visit well.

Mr. Zaboli's report:



One of the programs of UNDP, United Nation Developing Program, in Iran is the development of aquaculture in Sistan and Baloochestan that has been started from three years ago and it has been executing from 1384 with the execution of the project of Sistan native fishes propagation (Schizothorax) that the activities for achieving this aim have been done by Sistan Shilat experts' efforts and using Dr. Gupta's worthy experience, one of the CIFA professors.

It is worthy mentioning that aquaculture had noticeable development in the last decades and its role in providing protein needed by humans, becomes more year after year. India with a production of 2.2 million is the second producer in the world so using the experience of this country in aquaculture development is so useful. For this reason; two scientific journeys were

arranged with the execution of Asian Fisheries Company and the financial support of Italian Government and under control of Iran Shilat Organization.

Journey date: from 03-09-2006 till 17-09-2006

Expedition members:

Fadaei, Noori, Ali Mohammadi, Mirzaei, Moghtader, Zaboli, Shah Mahmoodi, Sheikh Visi, Najafi, Sayadfar, Sargolzaei, Rahdari.

The training period was theoretically and practically held in CIFA. This institute is one of the most active research centres in India that its researches have done a lot of activities in aquaculture development.

CIFA has four main sections:

- 1- Aquaculture production and ecology.
- 2- Fishes genetic and biotechnology.
- 3- Fishes physiology and nutrition.
- 4- Fishes hygiene management.

1- Research and execution are deeply related to each other in India as research results are immediately used in the execution part. Researches are based on requirements.

2- Using the native species for rearing is one of the factors of fishery development in India. These species are nominated to the aquaculture part for rearing after doing scientific and genetic researches.

3- Indian researchers and professors work so much in the execution part and they don't get used to sitting behind the desk and it is hard to recognize them from workers.

4- The amount of the salary depends on the scientific knowledge level and academic education.

5. In our country, releasing post larvae in the rearing ponds causes the reduction of the survival percent that is one of the reasons of being unsuccessful in freshwater shrimp rearing but in India, larvae are released in the ponds after attaining the weight of 1-2gr (juvenile).

6- There are communication centres gratuitously for answering the technical questions about rearing all over India.

7- All CIFA staff in know English well that it has the important role in the scientific promotion.

8- It is so usual for Indian researchers to write scientific essays as each development is immediately written versus our country.

9- Having abundant water and the least changeable climate are some of the blessings in India.

10- Rearing fishes in the sewers after filtering is one of the rearing methods in India. According to what Indian experts say, although fishes are reared in the sewers, they don't have any disease.

11- Rearing plastic equipment is made in a part of CIFA that is also one of the policies for using facilities as much as possible.

12- Fishes rearing is intensively based on the equipment and facilities in the region so because of this matter, designs are economical in India.

13- One of CIFA achievements is the production of kits for recognizing fish diseases and pollutions as quick as possible.

14- Water, soil and nutrition laboratories are used so much in CIFA as preparing feed and fertilization are completely done in the practical way.

15- There isn't any outlet in the ponds because of the good management of the water quality. And also water shortage isn't observed there. This method is used because of saving the unriched water versus what is observed in the ponds of our country. Of course, Indian carp fishes are so strong against the chemical changes.

16- White spot disease is one of our country problems that in India, during a research activity, the salinity of water is decreased 1ppt in each day so it is attained zero in 10-12 days and then shrimps are released in the freshwater. These processes reduce the odds of white spot disease.

17-journey to India, the second fish producer in the world, gave some positive views to all attendees but if this training period was held in another country with similar climate condition and rearing fish species to our country, it would be more useful and full-containing than this one.

18- Indian carp fishes can't be reared in our country because they are so sensitive to the temperature changes.

19- Journey to a foreign country with different cultures and languages needs a guide or director acquainted with the problems of the journey that unfortunately, we didn't have experienced guide so we didn't achieve maximum efficiency.

Mr. Sargolzaei's report:



Date: from 03-09-2006 to 17-09-2006

A meeting was held on September 2nd in Shilat Central Office with the presence of Mr. Esmaili and all expedition members with the title of guidance and explanation of how the training period would be held.

We left Tehran to Delhi at 9.30 on September 3rd and arrived there at 16.30, according to Indian time. We stayed in the airport till 11pm and unfortunately, the next flight was delayed for 2 hours so the flight to Kolkata was at 2.30am and the flight to Bhubaneswar was also delayed by bad weather and after 2 hours, it was announced that the flight was canceled. We were tired and out of good mood but finally Mr. Noori got other tickets and the flight to Bhubaneswar was at 5.30 and we arrived at 7am. Dr. Jena, CIFA agent, took us to the hotel and after a short rest; we went to CIFA with Dr. Jena. At 9.30. First, Dr. Jena introduced carp rearing species and also native species such as Merigal, Rohu, Kalbaso, ornamental fishes and freshwater shrimp.

Dr. Sarengi, CIFA chief, welcomed us and then an introduction meeting was held for introducing all CIFA personnel and also expedition members.

The training period was started on the next day that the aim of these classes was to be acquainted with the propagation and rearing of freshwater species.

about the journey:

1-the training subjects weren't according to what group members asked. With attention to the short time, the subjects should have been about carp fishes, not about other unrelated subjects such as Catfish, aquaculture engineering, consumed fishes and their benefit, ornamental fishes and etc. Explaining these subjects, time was wasted.

2- With attention to the translator's duty, although we wanted to learn subjects from Indian experts, either Mr. Noori, group translator, answered our questions with a lot of pride or no answer was given to our questions.

3- A large number of classes were theoretical but group members asked the classes were held practically that nobody paid attention to this matter. At the end, with Mr. Radari's insistence, classes became more practical.

4- Holding twelve-hour classes in humid air (about 97% moisture) wasn't suitable and learning in this situation was so hard. It is suggested that these kind of problems are also considered for the next training period.

6- Although, in Iran, Chinese carp fishes are reared more, subjects were about Indian carp fishes. It is suggested that because of Chinese species compatibility with our country, visit to China is arranged for the next training period.

7- We wanted to know the factors or methods which caused the production of 8-10t/h but they didn't answer our questions correctly. We just can assess the following:

1- Passing winter doesn't happen in India.

2- Temperature changes don't happen so much.

3- There are a lot of water and workers.

We can get this amount of production by observing standard.

At the end of the period, certificates were given to the group members.

We went to Vijayawada in the evening of that day and arrived there after a fourteen-hour journey. After a two-hour rest, we started meeting with fish farmers and on the next day, we also had some meetings with shrimp farmers and at 20pm, we went to Hyderabad then at 5.45am we went to Delhi and after one-night stay in Delhi, we came back to Teheran at 16.10pm.

Suggestions:

1- The arranged programs must be coordinated with the host country and expedition members because the aim of holding this kind of training period is to transfer the experience and information of that country to our country.

2- Everybody's duties must be appointed specially about the group head for preventing from losing the respect of the country. It was expected that at the

introduction meeting in CIFA, an agent from our group presented a report about production, potential and capacity of our country but it wasn't done.

3- Some ecological situations such as hygiene and feed must be considered according to the limitation of our religion and must be mentioned to other countries.

Mr. Sheikh Visi's report:



A meeting was held on September the 2nd for guiding and assigning duties.

We left Tehran at 9.30 on September 3rd and arrived in Delhi, at 15.30pm then we went to the internal flight airport for the flight to Kolkata but it was delayed so the flight was at 2.30. We should go to Bhubaneswar at 5.30am according to the arranged program but unfortunately, the flight was delayed by bad weather and it was cancelled. On September 4th, we went to Bhubaneswar at 5.30 with all problems. When we arrived in Bhubaneswar, we went to the hotel with Dr. Jena. Hotel was excellent and we didn't have any problem there.

After a short rest, we went to CIFA at 9.30. First, Dr. Jena presented a brief report about CIFA and rearing species in the region including Indian carp fishes (Rohu, Catla, Kalbaso, ornamental fishes, shell, Catfish) and Chinese carp then we had a meeting with Dr. Sarengi. Another meeting was held in the conference hall. In this meeting, first, Dr. Jena told his colleagues about Iranian expedition and other Shilat subjects then Iranian expedition members and CIFA personnel were introduced, finally, classes were started.

A brief explanation of these classes and visits are given in the following:

Professors who were appointed for these classes had good information and experience. Some classes were held about nutrition, propagation and rearing, aquaculture engineering, hygiene, disease and freshwater shrimp. Some subjects were so simple that it was announced to Dr. Jena by Mr. Rahdari, the training head of group. Professors didn't answer some questions. Classes were held theoretically but it was better to be held practically. Learning about some other subjects sometimes doesn't have any problem but learning about Catfish that in our country because of religious limitation mustn't be used and spending long time on it was a useless activity. It was a good training period although much time was spent on theoretical classes rather than practical ones.

Some visits were made to the different temples in Bhubaneswar, Konark and the zoo in Bhubaneswar. Indian carp rearing centre and Vijyawada were also visited. At the

end of the period, we went to Hyderabad then Delhi and finally we came back to Tehran.

Assessment:

1- All CIFA personnel specially Dr. Sarengi, Dr. Jena and Dr. Das cooperated with us in all cases. I thank all of them.

2- Economical program was arranged well.

3- Group translator was so good at translating but wasn't so good as the directorship of the group.

4- It is better that in other journeys, some countries such as China and Thailand are visited because Chinese carp are adapted to the climate of Iran.

At the end, I express my thanks to Mr. Esmaeili with his good directorship and all people who prepared the situation for this journey.

Mr. Sasan Shah Mohamadi's report:



This training journey was done in the direction of aquaculture development program in Sistan and Baluchestan province for developing Iranian expert's knowledge. The expense of this period was provided by Italian government and with the cooperation of UNDP and Iran fishery. This training period was implemented in Central Institute of Freshwater Aquaculture (CIFA) in India and Asian Fisheries Company (AFTM) was its executor. Practical training for rearing and propagating freshwater aquaculture was the aim of this journey.

We went to Delhi at 9.30 am on September 3 and then we went to Kolkatta at midnight. After one-night stay in Kolkatta, on September 5, we went to Bhubaneswar at 6am.

We arrived at Bhubaneswar airport at 9am then Dr. Jena took us to the hotel. We went to CIFA at 12.30am. A meeting for introducing CIFA professors and Iranian

expedition members was held then another meeting took place in Dr. Sarengi's room for introducing this centre and its activities and also some explanations were given about the production of shrimps and fishes in freshwater and saline water and about the rank of this country in the world.

The following activities including visits and classes were done in this rearing period:

- Chinese fishes propagation (theoretical and practical)
- Indian and Chinese carp fishes rearing (theoretical and practical)
- Carp fishes nutrition (theoretical)

- Water quality management. (Theoretical)
- Freshwater shrimp propagation (Theoretical and visit to the freshwater shrimp hatchery)
- Freshwater shrimp rearing. (theoretical)
- Fish rearing in cages. (theoretical)
- Visit to the zoo and private aquarium.
- Visit to the temples.
- Catfish rearing and propagation (theoretical and practical)
- Fish genetic laboratory. (theoretical)
- Fish disease and hygiene. (theoretical)
- Propagation laboratory for harvesting Hypophyz and keeping sperm in liquid nitrogen.
- Visit to the training centre in CIFA.
- Aquaculture engineering. (Theoretical)
- Visit to the method of selecting the best rohu fish in the rearing ponds (tagging)
- Visit to carp fishes hatchery and silver carp propagation.
- Visit to the concrete ponds, the places for keeping silver carp fingerlings and grass carp and Indian native fishes.
- Visit to the CIFA aquarium (ornamental fishes).
- Visit to the working-place in which equipment needed for fish propagation and rearing is made.
- Visit to the library and informative centre.
- Visit to the rearing pond of Indian carp fish in Vijayawada.

- Visit to the centre of producing the earthen worm and compost manure in Vijayawada.
- Visit to freshwater Monodon rearing pond in Vijayawada.
- Visit to the working-place of propagating saline water shrimp in Vijayawada.

We turned back to Tehran at 6pm on September 17.

Suggestion

Because there were many subjects to study and time was so short, it was better to spend much time on carp fish propagation and rearing in this period. Subjects were so interesting but it was impossible to obtain all technical cases in this short time. It is suggested that in other periods, longer time is considered for training and attention gives to the practical training.



Mr. Korosh Mirzaei's report:

The report of the propagation and rearing of Indian carp fishes and freshwater fishes.

Expedition members: Mr. Abdolali Rahdar, Mr. Taghi Najafi, Mr. Mahmoodreza Sargolzaei, Mr. Reza Fadaei, Mr. Gholamreza Zaboli, Mr. Farshid Sheikh Veisi (all of them from Sistan Shilat), Mr. Javad Sayadfar (from Central Shilat), Mr. Hamid Moghtader Gilavaei (from Mazandaran Shilat), Mr. Sasan Shah Mahmoodi (from Kermanshah Shilat), Mr. Akbar Ali Mohamadi (from Gorgan Shilat).

A meeting was held with the presence of all named people and Mr. Esmaeili, the director of Asian Fisheries Company, in the central Shilat on September 2nd. In this meeting programs, scheduling and some matters were explained and each person's duty was assigned. Mr. Noori was assigned as translator and coordinator. At the end of the meeting, Mr. Esmaeili answered all the questions about the journey.

Our flight was at 10.30am on September 3rd and we arrived in New Delhi at 16.30pm. Because Mr. Noori as coordinator wasn't acquainted with the customs and inspection regulations in foreign airport, there was a long delay in going to internal flight airport and also flight from this city to Kolkatta was delayed. On the second day of the journey, the flight to Bhubaneswar with several delays was finally canceled. These problems and our inexperienced coordinator in such conditions, increased our tiredness.

Finally, on the third day, we went to Bhubaneswar at 6.30 and arrived there at 8.00. Dr. Jena welcomed us in the airport and took us to the hotel. In the evening of that day, a meeting was held by Dr. Sarengi and he gave some explanations about CIFA activities and India fishery.

After introducing members and professors, visits and classes started from the sixth of the September and continued till the thirteenth of the September and they are explained in the following:

- 1- Propagation and artificial fertilization techniques of carp fishes and the management of the propagation centre.

- 2- Visit to larvae-fingerlings ponds, catching some of them and watching its practical stages.
- 3- Visit to catfish propagation centre and watching its practical stages.
- 4- Visit to genetic and biotechnology laboratories and being acquainted with the related techniques.
- 5- Visit to soil and water laboratory and the methods of measuring and controlling physicochemical factors of soil and water.
- 6- Visit to breeding ponds (in these ponds, besides putting mark on fishes, statistic information relating to genetic development in each fish is recorded and by making genetic bank, finally, selected breeders with genetic quality are offered to the private propagation centre during six years).
- 7- Attend the class about freshwater shrimp propagation and rearing and visit to its propagation stages in the hatchery.
- 8- The principles of fish nutrition and laboratory of nutrition and making food.
- 9- The principles of Indian carp fishes rearing.
- 10- Visit to the public and private center for propagating ornamental fishes
- 11- Rearing in the cage.
- 12- The principles of hygiene and fighting against diseases and acquaintance with all kinds of kits for recognizing disease and producing hygienic vaccine.
- 13- Visit to the working-place in which tanks and aquaculture equipment are made.

High production (10t/h) without aerating. Some factors such as suitable temperature, active nutrition during year, good management of giving manure, maintaining floor quality by controlling physicochemical factors such as Oxygen and NH₃ and probably giving food with hand to the rearing species cause this production. (As you know, in Iran, two species; silver carp and big head which have the most amount of production aren't fed by hand).

After taking water, exchanging water or running it on the ponds is done in small amount just for making amends the amount of evaporated or penetrated water, versus Iran. And for controlling water quality some activities such as, controlling macrobiotic and chemical factors, good management of giving manure and adding some materials such as probiotic, NH₃ and aloom are done.

India doesn't have any encouraging program for increasing production because of hygienic reasons.

Social aspects:

- 1- Simple relationship between heads, other personnel and producers and their simple life.
- 2- Expensive fuel and electricity so production method is assigned according to them.
- 3- Short direction from theoretical stage to practical stage (it means that all stages including study, research, making and implementation are done in one place)
- 4- 5- Fare of workers is low (man and woman must be with each other) and other expenses are low.
- 5- Building rearing ponds is easy for all people without needing authorization except for special cases.

It's necessary to say that the climate of the visited places was different from Iran so it is better that in the future this matter is considered for other visits. If the visited places have the same climate as Iran, we can get benefit from the experts' experience more than these places with different climate.

Mr. Moghtader's report:



Brief report of the journey in India

This training period was started with the presence of 12 experts on September 3rd. We went to CIFA at 11am on September 5th.

This period was held in two, theoretical and practical sessions. Some theoretical classes were held about fish rearing in the cage, aquaculture and rearing species in India, rearing management, disease, nutrition and shell rearing and the practical classes were about shell rearing and the way of putting core on it. Soil and water laboratory, the laboratory of propagation and disease and some fish rearing ponds were visited.

It seems necessary to mention that scheduling for this kind of journey must be so accurate for getting the maximum benefit from time and expense. Having accurate information of attendees' experience and knowledge is necessary for achieving this aim because by knowing these factors, people who set the schedule can arrange all

programs in the way that time is used well and much necessary information will be received. With attention to the time and equipment, it was a useful training period and it is hoped that we have other journeys to other countries which have enough experience in aquaculture.

Mr. Najafi's report:



Expedition members: Mr. Zaboli, Mr. Rahdari, Mr. Fadaei, Mr. Sheikh Visi, Mr. Sargolzaei, Mr. Mirzaei, Mr. Ali Mohammadi, Mr. Moghtader, Mr. Shah Mahmoodi, Dr. Noori.

Group moved to Delhi at 9.30 on September 3rd and arrived in Delhi at 15.30 then went to Kolkata by internal flight and because of bad weather they stayed in Kolkata for one night. On September 5th, they arrived in Bhubaneswar at 7.30am. A meeting was held for introducing CIFA and all expedition members on that day.

The second day report:

- Visit to CIFA ponds.
- Visit to incubation hall in which Indian and Chinese carp fishes were propagated.
- attending the theoretical class about hatching, keeping and propagation of sperm that Dr. Gupta trained and Dr. Rahotroy showed some slides at the end of the class.

The third day:

- Visit to Catfish propagation hall.
- Visit to the genetic and biotechnology laboratory.
- Visit to the shell cultivation laboratory, soil and water laboratory and doing some experiments related to soil and water.

The fourth day:

- Being acquainted with the way of selecting the best Rohu fish (by tagging) and being acquainted with freshwater shrimp.

-Attending the theoretical class about the management, technology and rearing of Rosenbergii shrimp.

The fifth and sixth days were allocated to visit to the religious centres and zoo in Bhubaneswar.

The seventh day:

- attending the theoretical class about aquaculture engineering.
- attending the theoretical class about fish nutrition.
- attending the theoretical class about carp fishes rearing.

The eighth day:

- attending the theoretical class with the title of aquaculture in India including polyculture rearing in the cage and its management.
- Being acquainted with the nutrition laboratory and analyzing some materials existing in feed.
- Being acquainted with the disease laboratory and the way of recognizing diseases by kits made by CIFA experts.
- attending the theoretical class about carp fishes rearing. Dr. Das trained this class.

The ninth day:

- Having an exam and holding a goodbye meeting.

We left Bhubaneswar to Vijyawada at 3pm.

The tenth and eleventh day:

- Visit to the rearing ponds, nursery ponds, freshwater shrimp rearing ponds salt water shrimp propagation hall in Vijyawada.

On the night of the eleventh day, we left Vijyawada to Hyderabad. The twelfth and thirteenth days were spent in Delhi and we left there to Tehran at 4pm on the thirteenth day.

Suggestion:

With due attention to the climate condition and rearing species in Iran, holding the training period in another country with the same situation of our country was better.

There were some problems in this journey and group desire wasn't satisfied because the group director hadn't experienced any foreign journey like this before. If another person who was more experienced than him was appointed, we would get the maximum benefit from this journey.

Mr. Seid Akbar Ali Mohammadi's report:



Brief report of journey to India:

This training period started on September 3rd with the presence of 12 Shilat experts from six different provinces and it was continued till September 17th. First, we went to Delhi then Kolkata and finally with a one-day delay, we went to Bhubaneswar where the centre of freshwater aquaculture was. After holding some theoretical and practical training classes for eight days, we went to Vijayawada for visiting for two days and then to Hyderabad and Delhi and finally we came back to Teheran on September 17th.

At the beginning of the journey, Dr. Jena as the executor head welcomed us at the airport and then a meeting was held with the presence of Dr. Sarengi, the chief of the centre, and all members of the scientific team. The mentioned period was held in two theoretical and practical parts that the theoretical subjects was taught by some experienced professors such as Dr. Jena, Dr. Sarengi, Dr. Das and their other co-workers about the amount of production, preparing ponds, propagation and rearing of Chinese and Indian carp fishes, rearing fish in the cages and aquaculture engineering. And also some practical classes were held about the rearing of shell for producing pearl and the ways of putting core, propagation of Chinese carp fishes from the stage of injecting hormone to the stage of producing larvae, propagating Catfish, the way of tagging and visit to the soil and water laboratory, fish diseases and visit to the fish rearing pond, catching fish, rearing fingerlings in the farms and the way of packing the fish with the ice powder and its transportation.

Farmers in India have the maximum amount of production with the minimum amount of equipment as the less expense is spent on structure and concentrate feed including rice bran which its oil is taken out and peanut congelation is used for feeding fishes but the production is about 8-10t/h. of course, the climate condition in India is so suitable for rearing fishes because temperature is above 22 centigrade all along the year and the length of the rearing period is 12-18 months that these factors are so important for fish rearing.

With attention to the time and equipment, this journey was so good from the point of training and scientific and fun visits and was also executed with the right directorship.

ANNEX 6 (CIRSPE/AFTM CONTRACT)

Contract
for
The implementation of a Training course and technical visit on
freshwater aquaculture management for the staff of the Fisheries
Iranian Organization

between

The Research and Studies Centre for the Fishery, S.C.A.R.L, called "C.I.R.S.PE" below, resident in No.21- Gigli D'ORO Ave. 00186 Roma, represented by the president, Doctor Massimo GUERRIERI, resident in No.21 Gigli d'Oro Ave. Roma

and

The Asian Fisheries Technology & Management Co. Ltd. nominated "AFTM" below situated in Unit 22, No. 23,27th St., Alvand St., Arjantine Sq., Teheran –Islamic Republic of Iran, its director: Mr M.E.Esmaeili resident in Unit 22, No. 23,27th St., Alvand St., Arjantine Sq., Teheran.

Introduction

-Referring to the financing of the project Aquaculture in Sistan-Baluchestan Province of Islamic Republic of Iran approved by the Italian Ministry of Foreign Affairs - the General Director of Cooperation of the Development,

-Referring to the presentation of the above mission from the Italian Government to the United Nations Development Project (UNDP) in Teheran based on a reciprocal agreement on the subject,

-Referring the direct intervention of SHILAT, Iranian Fisheries Organization, in both administration and operation of the project in order to respect the technical and professional contribution of Iranians that is the principle of the Italian cooperation in the development.

Both parts agree on and draw up what follows

Article 1

AFTM undertakes to carry out the following activities with its own structures and staff:

- Implementation of a visit on freshwater aquaculture management for the 11 staffs of the Fisheries Iranian Organization for one week (from the 21st of May until the 28th) and a training course (from the 2nd of July until the 15th) for 12 technicians from Shilat. AFTM undertakes to provide a detailed time table for both trips, which will be accepted by Shilat, 15 days before the leaving. AFTM will send a coordinator for each trip for coordination, translation, managing the plan. The analysis of the expenditure is drawn in the ANNEXURES A, B, C and D which are part of this contract and it is subscribed by both parts.

The visiting programme will take place in India, by the cooperation of CIFA, ICAR, government of India,.

AFTM will carry the domestic flights in India, the accommodation and the transportation.

AFTM undertakes to provide CIRSPE with all the didactic papers that will be given to the delegates as a technical support.

AFTM undertakes to provide to CIRSPE a detailed report after the ending of the visit and Training Course, with all the activities done within the trip.

Article 2

AFTM assures that the staff assigned for the implementation of the Training Course is qualified and willing to perform the services described above. AFTM assures all work required under this contract are carried out in accordance with the highest standards of the profession of craft.

CIRSPE will pay the insurance for the course participants for the entire period of the Training Course with the Insurance Company Asia, Teheran Apadan n.20 for medical assistance (50.000 Euro) and in case of died (20.000 Euro), according to the Iranian Law and social customs, for an amount of 50 Euro/participant, for a total amount of 1.250 Euro.

CIRSPE will provide the tickets for the participants as follows:

Flights	Participants	Unit price Euro	Total price
Zahedan-Tehran-Zahedan	5	90	450
Tehran-Delhi-Tehran	12	300	3600
Zahedan-Tehran-Zahedan	10	90	900
Tehran-Delhi-Tehran	13	300	3900
Total	25		8850

CIRSPE will pay to the training participants a pocket money of 40 Euro/day for a total amount of 10.120 EURO.

AFTM will provides the Indian domestic flights as follows

Indian domestic flights	Participants	Unit price Euro	Total price
Technical visit	12	445	6540
Technical visit and training	13	445	5785

Article 3

This contract will begin the 9th of March 2006 and will end on the 31st of August 2006. Any extension to this term must be written and signed by both parts.

The technical visit and Training Course shall end within the month of July 2006, during July and August AFTM will write the report of the activities. This report shall be provided to CIRSPE office in Teheran within the 31st of August 2006.

Article 4

As a support of the implementation of the Training Course, CIRSPE will provide AFTM a financial contribution of EURO 44.763,00

The payments will be made according to the following schedule:

- a) A payment of 20% of the total amount at the signing of the contract;
- b) A payment of 30% of the total amount at the end of the technical visit

- c) A payment of 20% of the total amount before the starting of the training course
- d) A payment of the remaining 30% after the approval from the CIRSPE office in Rome of the final report of the activities done by AFTM.

AFTM will provide the invoices of the payments described in a), b), c) and d) of this article, to the CIRSPE office in Rome.

CIRSPE will pay with a bank remittance within 20 days after the receiving of the invoice and after the approval of the services provided by AFTM.

AFTM will provide a receipt proving the payments.

Article 5

CIRSPE and/or AFTM can rescind this contract, with a written note, if one of the parties believes that it is impossible or inopportune to go on with the developing of the visit and Training Course for any reason out of CIRSPE or AFTM control like war, natural disaster or any similar event; or in the event of delay or lack of one of the party. If that happens, the work done up 'till that moment will be paid.

For any inobservance of the conditions of this contract from one of the contractors, the other party can write a note with the detailed inobservance, indicating also the corrections to be done within 60 days. If the party does not make the requested actions, the other party can rescind this contract without losing any of its right.

Article 6

All the papers and technical matters produced within the project will be at disposal of the Steering Committee of the project and C.I.R.S.P.E., therefore, has the right to

publish and divulgate a part or the integral version of the papers referring to their institutional aims.

All the materials are owned also by AFTM and that can be used by AFTM; provided acknowledgement of other parties is to be given

Article 7

The contractors undertake to consider data and information managed during the carrying out of the present work and concerning the other party, strictly confidential.

Article 8

If any controversy referring to the interpretation and application of this contract happens, both sides agree to try their best to solve the problems of disputes, mutually, otherwise they may refer to SHILAT as the fair part (foreign affairs or NPD). If not solved the Italian judicial court in Rome, has the exclusive right to make establishments.

This contract is signed in 4 original copies, 2 in English and 2 in Italian.

Rome, 9th of March 2006

AFTM
Executive Manager
M.E.Esmaeili

C.I.R.S.PE.
The President

Massimo GUERRIERI

Terms and conditions mentioned in art. 1,3,4,5,8 are accepted and confirmed.

AFTM
Executive Manager
M.E.Esmaeili

C.I.R.S.PE.
The President

Massimo GUERRIERI

ANNEXURE A

Cost estimation for first delegation for technical visit on freshwater aquaculture management

(11 delegates from Shilat and one coordinator from AFTM for 8 days- from the 21st of May until the 28th of May 2006)

No.	Item	Unit price Euro	Participants	Total	EU
1- Tickets	Indian domestic flights	445	12	6540	
2- Accommodation	7 days hotel charges	300	12	3600	
3- Transportation	Van and taxi for visits and local transportations for 8 days			1200	
4- Legal charges	Visa and airport tax	50	12	600	
5- Technical materials	Papers, books, manuals, CD, for each person	20	12	240	
6- AFTM	For services and report preparation			1500	
7- CIFA charges	Services charges for 12 members to CIFA, India			1800	13740
8- contingency	10% of the expenses			1370	
Total					15110
Tax 10%	10% of the contract price			1511	
Total					18.361

ANNEXURE B

Cost estimation for second delegation for training course on freshwater aquaculture

(12 delegates from Shilat and one coordinator from AFTM for 15 days – from the 2nd of July until the 15th of July 2006)

No.	Item	Unit price Euro	Participants	Total	
1- Tickets	Indian domestic flights	400	13	5785	
2- Accommodation	14 days hotel charges	500	13	6500	
3- Transportation	Van and taxi for visits and local transportations for 15 days			2200	
4- Legal charges	Visa and airport tax	50	13	650	
5- TRAINING COURSE CHARGES	LECTURES, ORGANISER			4400	
6- Technical materials	Papers, books, manuals, CD, for each person	30	13	390	
7- AFTM	For services and report preparation			2000	21340
8- contingency	10% of the expenses			2130	
Total					23470
Tax 10%	10% of the contract price			2347	
Total					26.402

ANNEXURE C

Total Cost of technical visit on freshwater aquaculture management (11 delegates from Shilat and one coordinator from AFTM for 8 days) for second delegation for training course on freshwater aquaculture (12 delegates from Shilat and one coordinator from AFTM for 15 days)

General total

Total visit training	12 people			18.361	
Total training	13 people			26.402	
Total training	25 PEOPLE			0	44.763
insurance	25 people			1250	
Flight	25 people			8850	
Pocket money	25 people			11640	
TOTAL				66.503	

ANNEXURE D

DETAILED BANKING INSTRUCTIONS

Correspondent Bank	Credit Suisse (Head Office) Zurich SWIFT CODE -CRESCHZZBOA-
Beneficiary Bank	Export Development Bank of Iran Central Br.Code 1301 SWIFT CODE -EDBIIRTHCEN- In favor of Mr. Seyd Javad Moosavi A/C OR ID n. 010138216 Transfer under MT 103 MSG