

# Aquaculture Development in Sistan-Baluchistan

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## Visit of Fish rearing sector report Zabol-Zahedan

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## Abstract

This report describes the visit of Fish rearing sector of "Aquaculture Development in Sistan-Baluchestan " project in Zabol and Zahedan which took place from 18<sup>th</sup> to 20<sup>th</sup> September 2007, by Dr.Rezvani(NPD) and Mr.Farahani (SHILAT officer). The aim of this report is to point out the works which have been done in the fish rearing sector up to now, problems and the suggestions.

## Introduction and visit program

In the mission first we met Mr.Afshariyan, Mr. Alizadeh, Mr.Rahdari and Mr.Piri from Zabol-SHILAT and agreed on the following issues base on the Aquaculture Development in Sistan-Baluchestan as the mission plan:

- Considering the *Shizothorax zarudnyi* breeding plan
- Considering the Hamoon Lake situation and the Hamoon hydrology and hydrobiology project.
- Warm waters fish Grass carp (*Ctenophryngodon idella*) and silver carp (*Hypophthalmichthys molitrix*) and rainbow trout (*Oncorhynchus mykiss*) rearing in multi-purpose ponds.
- Considering the fingerlings releasing procedure in Hamoon Lake and the fishing situation.

Also As Mr.Afsharians suggestion, group decided to visit the following project and places too:

- Visit of Iran-Afghanistan zero frontier line and the water flow which come from Afghanistan to Iran and Hamoon Lake.
- Visit of Ornamental fish breeding saloon in zabol University. (This project is conducting jointly by Zabol-shilat and Zabol University).
- Visit of chahnimeh and cage culture of rainbow trout.
- Visit of recycle system of rainbow trout culture in Khash.
- Visit of poultry and fish culture complex in Zahedan.

## Visit of Hamoon Lake and control of Gill nets.

### Introduction

Hamoon Lake is the biggest and the most important fresh water lake in Iran. The maximum area is estimated 5700 km<sup>2</sup>, 3820 km<sup>2</sup> in the Iranian side and the rest in Afghanistan (68% in Iran and 32% in Afghanistan).

### Water level in rain full Years

Hamoons		
	Total area	Iranian waters
Total Lake	5660	3820
Poozak Hamoon	1600	350
Sabery Hamoon	1650	970
Hirmand Hamoon	2500	2500

### Water volume in rain full Years

Hamoons		
	Total area	Iranian waters
Total Lake	8040	4655
Poozak Hamoon	3200	700
Sabery Hamoon	2340	1455
Hirmand Hamoon	2500	2500

Hamoon lake is formed by three part called Poozak Hamoon , Sabery Hamoon and Hirmand Hamoon which joint each other in full rain years and in a same level make a complex lake.

The extra water of Hamoon flow to south east via Shile River and then pour in to a natural big cavity in Afghanistan called Goodazre.

For visiting the Hamoon Lake, the group traveled 20-30 km from Zabol to the coast of Sabery by the Roniz Automobile (which has been bought by Iran-Italy project). The weather was windy the lake was a bit wavy. After a short survey in the Lake, the group started to check the Gill nets which were settled vertically on the coast with about 2 m depth. There was a few fish in each net and most of them were Chinese Carp species and *Silver Carp* in two sizes, up to 50gr or up to 150gr. Regarding the recent droughts in Hamoon Lake these fish were the result of SHILAT fingerling releasing programs or rarely natural breeding of few Chinese Carps brood stocks in the lake or in the rivers of Iran or Afghanistan. SHILAT officers and Mr. Piri suggested that in addition to Chinese Carp, probably *Grass carps* and *Silver carps* have natural breeding in the Lake too. But for proving the suggestion a serious study is needed.

In a meeting with two local fishermen, they were so happy about droughts ending and they believed although the fish are small but they earn about 200,000-250,000 rials daily from fishing.

There were no exact static of the number of fishermen but the estimation is about 2-5 thousands family. The price of the fish is about 8,000-10,000 rials in the local market and very rarely they prey *Grass carps* and local species *Schizothorax* brood stocks which are selling 35,000-40,000 rials. Also it must be mentioned that regarding to SHILAT static's the harvesting amount of Chinese Carps in the last decades estimated more than 12000 tons yearly.

When the Lake was dry lots of domestic animals plied through it and producing lots of animal fertilizer, has making a very good situation for fish feeding in the Lake , so that 500-1000 milligram released fingerlings after 2-4 month are 50-150 gr and even more now .

Based on the conducted monitoring and primary data the Lake's water situation is so similar to fish culture ponds. For example PH=8 , Nitrate =1.2-1.5 mg/L , O<sub>2</sub> =8-9 mg/L .the only difference is phosphate = 8-9 mg/L which is 0.5 mg/L in fish culture ponds .

In the Lake there are 17 species of fish that 4 species of Chinese carps and 3 species of Schizothorax have economical value. Also lake has a high primary production that, fast growth of *Silver carps* proves it.

Hamoon Lake is a very good source and reason for joint Iran-Afghanistan cooperation in fishing and people livelihood development .At the moment about 200,000 hectare of the Lake in Afghanistan and 250,000 of the Lake in Iran is full of water.

Regarding the high quality of water like as high primary production and high level of nutrition, the lake has the capacity of rearing 100-1000 fingerling per hectare of carps.

And if we decided to release only 100 fingerlings per hectare, minimally we need a warm water fish breeding center with 25 million fingerling production capacities in Iran and a 20 million capacity center in Afghanistan, to release 45 million fingerlings per year in the Hamoon Lake. And if we assume the harvest of 50-100 kg /hectare, two countries would harvest 22.5-45,000 tons/year.

The only thing which can be dangerous for sustainability of this suggested program is strong fluctuation of water flow and water volume in a year. But such a huge harvest can be a strong intensive for both countries for

sustainable flow of water. Also Afghanistan government in addition to fishing development and making job opportunities, with changing poppy farms to fish culture farms can attract international political and financial supports, and Iran as a neighbor and friend country can help her a lot. Also sustainable flow of water from Afghanistan to Iran can be an effective conserve of natural environment of Hamoon Lake which is too important for environment department of UN and People who are interested in environment issues.

So for sustainable fishing in Hamoon Lake it is necessary for SHILAT to:

- Request for sustainable flow of Iran water quota of Hirman River through diplomatic lines.
- Increase the capacity of Zahak breeding saloon and rearing ponds to 25 million fingerlings for different kinds of Chinese Carps, Indian Carps and indigenous species. It seems that the breeding saloon must develop 2-3 times bigger and the efficient area of ponds must increase to 80-100 hectare.
- Cooperate with Afghanistan government in establishing a Chinese breeding center in Nimrooz- Afghanistan. And follow this issue from Iran – Afghanistan relation office in Jihade- agriculture ministry.
- After 7 years drought (1997-2004), now it is estimated that the total amount of fishing in Hamoon Lake is about 15 tones, but unfortunately the weak and unhealthy transportation (in gunny and bye motorcycle) decrease the quality of fish meat a lot. So as the first step organizing fishermen in some workers cooperatives and providing them CSW (Cold water systems) with subsidy facilities is highly necessary.

Also making a modern and healthy aquatic bazaar by SHILAT, Jihade-agriculture, Sistan-Baluchestan State Capitol and zabol municipality would be so useful.

- Along with stock rehabilitation and sustainable fishery programs in Hamoon Lake , using standard fishing strategies with suitable methods, for prevent numerous harvest of 20-30gr fish,or in the other word using fishing management in the Hamoon Lake would be useful.
- Chahnimes are big amount of fresh water resource which now use as the fresh water source for Zabol house usage. the estimated amount of fresh water in chahnimes are 650 billion m<sup>3</sup> which is too more than the house usage needs .Also the chahnimes area are about 5000 hectare but there is a project in the province for developing it .
- So regarding to available facilities, conducting a study on Environment impact assessment( EIA ) of Indian and Chinese carp on Hamoon Lake and releasing 10-20 *silver Carps* fingerlings in chahnime is suggested.

Also it must be mentioned that based on a contract with Iranian Fisheries Research Organization (IFRO) planned in "Aquaculture Development in Sistan-Baluchestan "project, 57900 fingerling of 3 species of Indian Carps has been imported to Iran.

At the moment these fingerlings are rearing in two Aquaculture centers in Bandare anzali and Khoozestan and the fingerlings weight up to 29.09.07are in the following table.

species	Number of fingerling delivered to khoozestan	Number of fingerling delivered to Guilan	Primary weight 29.08.07	Average weight on 08.08.07	total
<i>Labeo rohita</i>	9300	9000	490mg	27gr	18300
<i>Catla catla</i>	9200	9600	400mg	10gr	18800
<i>Cirrhinus mrigala</i>	10400	10400	270mg	35gr	20800
<i>Total</i>	28900	29000	57900		

These 3 species are *Cirrhinus mrigala* , *Labeo rohita* and *Catla catla* .

*Cirrhinus mrigala*: can live in fresh and brackish water, feed on bentoze and grow up to 13 kg.

*Labeo rohita*: is a benthoplagic species, live in tropical marine and brackish water, feed on detritus and invertebrates, grow up to 45 kg and is a valuable species in the market.

*Catla catla*: is a benthoplagic species, live in marine and brackish waters, and feed on planktons. Catla larva feed on plank tonic unicellular alga. They are almost omnivorous and adults feed on zooplanktons.

These species especially *Catla catla* can introduce to Hamoon Lake and Chahnimes in coordination with Iran Department of Environment.

### ***Shizothorax zarudnyi* breeding**

Based on the contract with Iranian fisheries research organization (IFRO) planned in "Aquaculture Development in Sistan-Baluchestan "project,

about 400,000 larvae have been produced from cultured brood stocks which is a brilliant result of the project. But unfortunately bad situation of rearing ponds with lots of frogs made a big loss in rearing ponds. and at the end of rearing period 80,000 fingerlings have been delivered to Zabol- SHILAT .About 20,000 fingerlings have been released to Hamoon Lake (They are in such a good situation as reported by monitoring program ) and the rest are in Zahak and Zabol university for maturation programs .

### **Multi-purpose ponds (Agriculture and Aquaculture)**

We visit 2 farms in Zabol and one in Zahedan. They were 200 m<sup>2</sup> and cultured Grass Carp in the first six month of year and rainbow trout in second part of the year. About 800-1000 kg fish produces in each farm and there are 120 farms in the area.

Using aerators could increase the production and using this culturing system is suggested for the area.

### **Cage culture and ornamental fish rearing projects**

These projects are conducting jointly by SHILAT-Zabol and Zabol University. Both of them were in foundation preparing stage.

## Results and Recommendations

Effective efforts of Zabol-SHILAT and "Aquaculture Development in Sistan-Baluchestan" project have been made new hopes about Aquaculture development in local people.

continuation of these efforts and installing new complementary projects such as follows will help in stabling the Aquaculture development in Zabol.

- Continuing the Hamoon Lake monitoring plan , estimating the aquatic production potential , estimating the aquatic stocks , Lake production trend and considering if Chinese Carp has natural breeding in the Lake or not?
- Establishing and developing Chinese , Indian carp and indigenous species breeding centers in Zahak –Iran and Nimrooz-Afghanistan
- Preparing SHILAT's water quality control laboratory for using the purchased equipments (by Iran-Italy Project) as soon as possible.
- Conducting a study on Environmental impact assessment (EIA) of introduction of Indian Carps to Hamoon Lake and Chahnimes.
- More emphasis on *Shizothorax zarudnyi* breeding project and other valuable indigenous species.
- Imported Indian Carps planed in Iran-Italy project

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The visit of Dr. Rezvani (NPD) from Hamoon lake









