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THE KYRGYZ REPUBLIC

I. GENERAL GEOGRAPHICAL AND ECONOMIC DATA

Territory:	199 945 km²
Water area:	7 390 km²
Population:	5.2 million
GDP (2006):	US$ 3.0 billion
GDP per person (2006):	US$ 600
GDP of agricultural products (2006):	US$ 1.9 billion
Gross production of fish (2006):	US$ 131 500

Kyrgyz Republic (Kyrgyzstan) lies in Central Asia between 69° and 80° E and 39° and 43° N in the Pamir–Alai mountain system. The topography is highly dissected, comprising high mountains and intervening valleys. The territory stretches for 925 km from west to east, and 454 km from north to south. The country borders Kazakhstan to the north and northwest, China to the east and southeast, Tajikistan to the South and Uzbekistan to the West. The total area is 199 945 km².

The climate is sharp continental. The average temperature in January ranges from -1°to -8°C in the valleys, and to -27°C in the high mountains. In July the temperature is +15° to +27°C in the valleys, and +5 C in the high mountains.

The territory is covered by mountains (95 percent of the land area), dividing agricultural valleys and highlands. Fish farming is carried out in lakes and ponds in those valleys and highlands. There are some 3 500 rivers in which fish can be found.

At present, Kyrgyzstan is a small country with an open, mixed economy based on four guidelines: free enterprise, free system of pricing, free competition, and state management.

Gross Domestic Product (GDP) of the country in 2006 was som 113.2 billion (≈US$ 3 billion at an exchange rate of US$ 1 = som 38), and increase of 2.7 percent over 2005.

Gross agricultural production was som 72.2 billion (≈US$ 1.9 billion), up 1.5 percent from 2005 and providing 29 percent of GDP.

The gross harvest of fish in 2006 was 71.4 t, with an average value of som 70/kg, implying a total value of ≈ som 5 million (≈US$ 131 500).

The country has considerable potential for fish production in view of its climate and natural conditions. There are numerous lakes and ponds, a long summer with favourable temperature and insolation, good quality fresh water and other hydrologic conditions, with considerable

feed (phytoplankton, benthos) potential in bays and inshore shallow waters, contributing to a long exploitation period and therefore high fish producing capacity.

II. FISH PRODUCTION DATA

2003	Production	Imports	Exports	Total Supply	Per Caput Supply
	tonnes live weight				kg/year
Fish for direct human consumption	26	6 387	0	6 413	1.3
Fish for animal feed and other purposes	0	-	-	-	-

Currently, fishing is concentrated in Toktogulskoe, Kirovskoe and Orto-Tokoiskoe conservation reservoirs, and in small lakes such as Kara–Suu. In 2006, total harvest of fish was 71.4 t, with 8.14 t from lakes, 34.2 t from ponds and 29.1 t from conservation reservoirs. In 1996, the equivalent values were 204.4 t, 143.2 t, 44.2 t and 17.0 t, respectively.

It is obvious that fish productivity of lakes has dropped significantly, mainly in Issykkul and Sonkul lakes, due to: unregulated fishing; an abrupt increase in predatory fish numbers; especially zander; the cessation of the Issykkul fish factories; and widespread poaching, all of which led to overfishing and uncontrolled river flows. The rivers lost their spawning potential. In order to recover fish productivity, fishing was banned in Issykkul and Sonkul.

In recent years, pond fish farming in Kyrgyzstan had great difficulty because of lack of finances and non-availability of special feed, fish seed and other material resources essential for fish farming. Fish farms stopped using intensive techniques, and had to rely on obsolescent equipment that was difficult to maintain.

Today, fish farms can not achieve the former levels of fish production. For financial reasons, the farms concentrate on crop production (rice, tobacco and wheat). To regain former capacity, the state fish farms require considerable new investment.

At present, the fish sector provides very limited supplies, <1 kg/yr/person, so demand for inexpensive fish (carp, grass carp and silver carp) exceeds supply.

Estimated Employment (2006):	
(i) Primary sector:	120
(ii) Secondary sector:	2200
Gross value of fisheries output (2006):	$US 131 500
Trade (2006):	
Value of total fisheries imports:	$US 3 949 000
Value of total fisheries exports:	$US 18 000

III. STRUCTURE OF THE FISH FARMING SECTOR

General structure

Water bodies include Issykkul, Sonkul and Karasuu lakes, Toktogulskoe, Bazarkorgonskoe, Ortotokiskoe and Kirovskoe large reservoirs, and more than 1000 ha of ponds. In 1991, the fish harvest was 1 400 t.

There are pond fish farms in all regions of the state (Chuiski, Uzgenski and Talaski state fish farms) with established production potential. Tonski and Karakolski fish factories and 15 private commercial fish farms have been built and are operational. These factories and farms provided 71.4 t of marketable fish in 2006 (the statistics are underestimates because of poaching and undeclared catch). In 2004, a moratorium was placed on fishing in Issykkul and Sonkul until 2008, with fish being caught only for breeding purposes.

Institutional authorities are the Fish Farming Department of the Ministry of Rural, Water Farming and Processing Industry; the Scientific Piscicultural Council; and the "Fishing and hunting Kyrgyz union" association.

Lakes and ponds sector

Catch characteristics

Table 1. The catch from lakes and ponds for the period 1993–2006 (tonne).

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2007
Total catch	350.2	197.7	185.7	204.4	101.2	85.3	44.46	51.02	201.6	187.8	93.9	13.3	42.7	71.3
Lakes	133.1	129.3	123.6	143.2	89.2	85.3	44.46	51.02	180.0	151.2	67.2	-	13.5	8.14
Ponds	201.2	64.0	56.3	44.2	4.7	-	-	0.40	12.3	23.8	19.1	13.3	16.5	34.2
Reservoirs	15.9	4.4	5.8	17.0	7.3	-	-	-	9.3	12.8	7.6	-	12.7	29

Table 2. Catch composition from the major fish farming reservoir of Lake Issykkul (1965–2003; tonne).

	Species composition							Total
	chebak	chebachok	zander	trout	whitefish	bream	other	
1965	32	1275	20	-	-	-	26	1335
1968	23	1010	38	4.5	-	2	12.5	1090
1975	77	686	112	47	-	2	5	927
1980	36	224	36	40	5	1.5	2	344
1985	14	86	22	13	23	7	1	174
1990	32	163	32	18	21	15	5	278
1992	19	90	21	7	15	0.5	2	169
2003	2.5	5	1.5	-	-	-	0.5	10

Table 3. Haul-and-release of fish by the amateur and sporting subsector, Data from the "Fishing and hunting Kyrgyz union".

Years	Hauled fish by fishermen (kg)	Released juvenile fishes (kg)	Visitors to reservoirs (persons)
1999	13 865	1 264	3 119
2000	13 868	1 423	4 851
2001	10 896	1 756	5 228
2002	6 586	1 410	3 787
2003	15 535	1 042	6 096
2004	16 237	1 719	4 042
2005	12 658	1 719	32 392
Total	89 645	10 169	32 392

Fishing resources

The Kyrgyz Republic has rich water resources, with 3 500 rivers; several large lakes: Issykkul (62 600 ha), Sonkul (28 000 ha) and Karasuu (400 ha); and Toktogulskoe, Bazarkorgonskoe, Ortotokiskoe and Kirovskoe reservoirs; together with numerous small reservoirs for irrigation purposes coutrywide (some 43 000 ha) and more than 1000 ha of ponds.

The main fishing lake, Issykkul, lies at 1 609 m above sea level, but only about one-third of the area is suitable for spawning and fattening of fish, so the productive area is about 20 000 ha. The second largest lake is Sonkul, at 3 016 m above sea level.

Nationally, there is considerable potential for fish farming. All river systems have local species of fish that are few in number and with poor market potential. The mountainous source of the rivers means clear, clean water but with little feed. Currently rivers have little commercial significance, but they have enormous potential for highly profitable trout farming.

With suitable investment, there is considerable potential for the development of aquaculture in the reservoirs of Naryn, Kurpsaiski (1 200 ha), Tash–Kumyrskoe (780 ha), Shamaldysaiski and Uch–Korgonski.

FISHING MEANS

The fishing fleet on Issykkul, Sonkul and Toktogulskoe consists of light metal boats with outboard motors of 20–30 hp with a carrying capacity of up to 700 kg, up to 5 m in length and 1.5 m beam. Wooden and GRP longboats are up to 8 m LOA, with a 2 beam. It is primarily the privately owned fish farms that have floating transport. Because of small size of water bodies, there is no need for larger vessels.

Major fishing gear and resources.

Open water fishing uses seines meshes from 10 to 150 mm, with fish ponds used for breeding marketable fish and seedstock. Six fish ponds have already been installed, with capacity up to 150 tons, based on Russian technology. Nets and seines are produced by Russia and China, who have also been sources for dippers, barrows, tables for prophylaxis and sorting of fish, and baths for fish treatment. Weis incubatory devices are used. GRP trunking and pools produced by Russia, Turkey and China are used for breeding and raising fry.

Management

The official plan for national fish farming development for 2007–2011 defined the main goals and objectives. The major goal is development of state fish farming, creation of conditions for preservation of valuable fish species, and rational use of fish funds, coupled with development of pond fish farming.

The main objectives of the programme are:

- Improvement of the normative and legal basis for effective development of fish farming, with submission of changes and amendments to the Fish Farming Law of the Kyrgyz Republic.
- Organization of effective system of protection, reproduction of fish resources and replenishment of commercial resources of valuable fish species.
- Creation of conditions for development of commercial pond and lake fish farming by renting out ponds and fish plots to investors (tenants) for long-term periods.
- Management of scientific development of fish farming.
- Preparation of staff for the fish sector and raising qualification levels in the Institute of Ecology and Nature Exploitation at I. Arabaev University.
- Attraction of domestic and foreign investors for development of the fish sector.

Technical measures

Currently, the main control measure is the complete moratorium on commercial fishing on Issykkul and Sonkul lakes. Elsewhere, scientific recommendations apply for closure of local areas of spawning and fattening in national parks, and regulation of net meshes. There are also catch limitations.

The Fish Control Inspectorate of the Ministry of Agriculture was responsible for issuing licences for fishing and fish farming in Kyrgyzstan, including lakes Issykkul and Sonkul. Currently, the Office of State Monitoring of Flora, Forest and Fauna of the State Agency for Environmental Protection and Forestry issues licences for industrial fish take in all fish farming reservoirs and for catches for breeding

purposes. The Fish Inspectorate of the Fish Farming Department of the Ministry of Rural, Water Farming and Processing Industry controls fish funds protection in fish farming reservoirs, regardless of form of ownership. Office of protection and rational use of objects of flora and fauna of the State Agency for Environmental Protection and Forestry controls public access to reservoirs.

The Fish Farming Department, as a major user of all fish farming reservoirs in the Kyrgyz Republic, establishes the quota of fish catch in collaboration with the National Academy of Sciences and the State Agency for Environmental Protection and Forestry. The Office of fish breeding, fishery and processing of the Fish Farming Department allocates quotas thus established, and leases fishing areas through the issuance of fishing tickets. In turn, fish farming units are required to contribute towards breeding and re-stocking activities.

Economic incentives

- The Government of the Kyrgyz Republic on 6.12.2005 issued Law No. 554 which says: If a fish farming entity imports technical equipment for the development of fish farming in the republic, they are released from paying the tax on additional value.
- Proposals about equalization of fish farming to agricultural tax and other payments, clarification of tariff and customs policy concerning imported fish products, with the goal of protecting domestic producers are in preparation.
- Proposals for exemption from payment for natural resource application have been drafted, and according to the proposal, people who breed marketable fish will not pay for water utilization.

Fishermen communities.

Recreational subsector

The members of the public organization “Kyrgyzrybolovsoyuz” (Fishing Kyrgyz Union) has over 24 000 members active in amateur and sport fishery. In 2006, over 2 500 people bought licences permitting fish catches, with a fixed time limit. All are required to abide by the Rules and Conditions for amateur and sport fishery (one rod per member, fishing ony during the open season, and minimum size of allowable catch). Data from this sector are not included in national fishery data.

Aquaculture subsector

There are only pond fish farms in aquaculture.

POST-HARVEST UTILIZATION

Fish consumption.

The Institute of Nurture of the Academy of Sciences of the Soviet Union recommended an annual per capita consumption 12 kg of fish, equivalent to 60 000 t/yr for Kyryzstan. Today, actual consumption is a mere 1.3kg a year. If the large imports neighbouring countries are discounted, per capita fish availability from domestic production drops to 0.01 kg/yr. There is no fish used for animal feed purposes.

Previously, imports from Russia and the Baltic states made up the shortfall. Now there is considerable illicit trade in fish from Kazakhstan. Most of the imported fish is of poor quality, and supplies three-quarters or more of the local supply. Local fish is considered of better quality.

The highest consumption of fish of local origin occurs in the autumn to winter period when there is a large yield of autumn-winter spawning species of fish in major water bodies.

In restaurants and public food services, fish products are accessible only for that small share of population that is affluent. The greater part of the population consumes fish in a quantity far below recommended levels. The local population prefers to buy whole fresh fish.

Fish markets

In the large markets of Bishkek–Oshski, Alamedinski, Orto–Saiski and others, there are special fish stands. Stands have refrigerators for freezing and chilling fresh fish. All fish caught in reservoirs of the republic is sold mainly fresh. Fish from Issykkul, for the most part trout – gegarkuni, *Coregonus cisco*, chebak and chebachek, is sold in salt, dried and smoked condition. They can not be sold officially because of the moratorium. Sellers buy illegally caught fish and process it (gut, salt and smoke it) often in unhygienic conditions with gross violation of technology. Nevertheless, unlicensed persons prepare fish products that satisfy large local demands. All fish production sold through the special shops and fish stands of the city markets is subject to strict veterinary and sanitary control.

Fish prices fluctuate depending on the species of fish and period of year. Prices for the more common species are: bream – som 35–40 (≈US$ 1.0); roach – som 25–35 (≈US$ 0.8); crucian carp – som 35–40 (≈US$ 1.0); pike – som 40–45 (≈US$ 1.2); sazan – som 60–70 ≈US$ 1.6); and trout – som 300–500 (≈US$ 7.8–13.0). Wholesale prices on average are about 30 percent less.

V. ACTIVITY OF THE FISH SECTOR

Economic role of the sector in the national economy

The sector is minor in the national economy (<1 percent of GDP), compared with agriculture at 29 percent. The sector is nevertheless important in the national diet as a source of animal protein, so has a valuable local role that should be supported.

Demand

Basically, the urban population drives demand for fish. The affluent groups want expensive types of fish (trout, *Coregonus cisco* and *C. peled*), people with average income seek cheaper fish (bream, roach and others).

Supply

Before the moratorium, the major part of the national catch came from Lake Issykul (now in through poaching) and Lake Sonkul, and is transported to the markets of Bishkek city. Fish from other domestic sources tend to be sold locally because of low yields.

The catch from Lake Sonkkul in the cold autumn, winter and spring seasons could be transported safely to markets because of the naturally cold conditions. In summer, people tried to transport fish at night. If fish was transported during the day in summer, then it was salted and conveyed in its salty state. There is no electricity supply around the lake, and so refrigeration is not available.

Only fish from aquaculture is utilized in Kyrgyzstan. All fish caught in the republic is used domestically because of the small supply, mainly in fresh condition. Fish transported from Kazakhstan, mainly from Balhash lake and Tashatkulski reservoir, is also sold fresh. As the greater part of fish from Kazakhstan enters into Kyrgyzstan by smuggling, it is impossible to estimate the volume of imported fish. Russia is the second largest supplier, primarily Far Eastern salmon—Siberian salmon, hunchback salmon, rarely black salmon, and smoked sturgeon. The Baltic states and other countries export mainly canned fish, rarely red and black caviar and canned “sea kale” to Kyrgyzstan. It is impossible to estimate the volume of imported fish production because dealers try to conceal information about the true volume of imported fish to minimize taxes.

Employment

The sector provides employment for 400 workers of the Fish Farming Department, plus about 3 000 in the private sector.

Agricultural development

Fishing is major single income for the lacustrine populations. The moratorium had a very negative effect, and they have resorted to poaching to survive. However, in the absence of the moratorium there was a real danger of collapse of the fishery.

Because of budget constraints, the state can not invest sufficient finances into the agricultural development of fish farming territories. For example, poverty in all rural areas is greater than in cities. The most evident gap is in Issykkul region, where poverty in cities was 23.1 percent, while it was 62.9 percent in villages.

Social security of fishermen depends on the conditions of contract between the fishermen and employers (tenants or owners of reservoirs or concessions). Employers transfer money as a social security deduction into a social fund. The state enterprises, fish farms and Tonski fish factory financed by the state budget are provided with obligatory social security and deductions into a social fund.

VI. FISH SECTOR DEVELOPMENT

1. Obstacles

Poaching

In the Issykkul region there are 500–1000 poachers, according to unofficial data. If we estimate that 100 poachers take 10–15 kg of fish a day and fish 100 days a year, then their haul will constitute 250 tonne. According to inspection data, there are about 100 part-time or sport fishers who haul fish once or twice a week, and their yields do not exceed 3–4 kg, or 10 t/yr. In total, these two groups yield 260 t/yr of fish, but official statistics shows much lower figures.

Over 100 poachers were charged in 2006, with more than 1000 nets confiscated, and 188 old nets were lifted in Sonkul lake in 10 days in 2006. Fines constituted som 45 000. In June to September of 2005, the 1191 illegal nets were confiscated. At Issykkul, fines totalled som 12 000. These data are from the Special Office of Public Prosecutor, based on police raids. The real number of poachers is much higher. Employees of public agencies aid poachers.

Licence fees

Establishment of a high payment (som 4/kg (≈11 cents)) for the issue of licences to take fish means that it can be economically unprofitable for fish farms, and they are abandoning the activity.

General financial constraints

The state and fishermen suffer from acute financial constraints. There is therefore very little investment in production means on the part of producers, and very limited back-up support from government for training and resource replenishment Some som 2 million/yr are needed for reproduction, fish resources security, fishing scientific research in state reservoirs, and training of fishermen and ichthyologists.

The fish inspectors do not have adequate state financing and this does not stimulate their fish security activities.

Uncoordinated initiatives

There is a general lack of coordination of actions among the various authorities. For example, in 2004–2005, Issykkul and Naryn state region administrations did not study the real condition of Issykkul and Sonkul lakes and did not consider scientific recommendations. Without the participation of the Fish Farming Department, they prohibited both the take of the predatory fish zander and the removal of old, abandoned nets.

Unclear and ambiguous legislation creates bureaucratic problems. Licensing functions are confused between the Ministry of Rural, Water Farming and Processing Industry and the State Agency for Environmental Protection and Forestry.

Uncoordinated fish take and unequal load on separate plots are major factors in yield decreases. The take load on Issykkul for trout, chebak and chebachek till recently was distributed unequally across the lake and was conditioned by large pre-spawning and spawning shoals in lake areas. As a result, fishing pressure on load on large shoals was excessive. The single measure regulating fish take was the regular rotation of fishing areas concessions, but was inadequate, and stocks reduced, such as the collapse in Semenovski chebak.

Excessive fishing during the spawning period also affected the biological structure of the populations. Thus, because male chebachek spend longer in the mating area than females, they were caught in greater numbers, which unbalance the normal gender ration. Nets with 17 mm mesh took 12.5–14.5 cm fish, and this corresponds to age groups about to become sexually mature, thus affecting the potential for the next spring spawn.

Poachers use finer nets (14-16 mm mesh) and therefore remove juveniles and sabotage the spawning potential of the population.

Another problem derives from poor restocking strategies for trout. Fish farms release fry that are very immature (larval stage), and they have difficulty in surviving and growing. Little natural feed in the rivers lead to large mortality levels. The fry have then to compete with the more numerous zander population and face the reduction in biomass through fishing of the main feed: chebachek and loach.

Establishment of a pumping station on the Jergalan river led to considerable fingerling mortality, and sexually mature fish were being taken before spawning. The net result was a collapse in the stock.

Fishing regulations and harvest quotas are disregarded, and by-catch of the juvenile stages of some species disrupts natural life-patterns. Thus the large number of *Coregonus cisco* taken by the *Coregonus*

peled fishery of Sonkul prevents any development of the *Coregonus cisco* stock.

2. Development perspectives and strategies

The Fish Farming Department prepared a program of fish farming development for the republic for the period 2007–2011, where concrete proposals were put forward concerning recovery and development of the fish sector of the republic. The Department will conduct scientific fishing research in all major fish farming reservoirs of the state, develop a legal base for effective development of fish farming, and create conditions for development of pond and lake fish farming.

Practical results should be improved employment potential for the population and increased income for rural dwellers, which will reduce poverty levels.

3. Research

The Laboratory of Ichthyology and Hydrobiology of the National Academy of Sciences, and the Scientific Fishing Centre MCVHPP estimate fish bioresources and dynamics of fish species number, on the basis of which annual harvest limits are proposed. Large-scale scientific research is lacking due to financial constraints..

4. Education

Professional training for the fishery sector is provided by the biology faculty of the I. Arabaev National University; the Institute of Ecology and Nature Exploitation; the ecology faculty of Kyrgyz Agricultural Academy; the biology faculty of Karakul University; and the fish-breeding faculty of Kyrgyz Agricultural Technical (Secondary) School. Each faculty has space for 5 to 10 students. Field work is carried out Issykkul bio-station of the Biology and Soil Institute of the Academy of Sciences of the Kyrgyz Republic.

5. Foreign assistance

Currently there is no foreign assistance. Private inward investment in the fishery sector has been discussed with a Turkish company, and an Iranian company is discussing a trout-breeding project at Issykul, with an initial investment of 300 thousand.

VII. FISH SECTOR DEPARTMENTS

Fish Farming Department of the Ministry of Rural, Water Farming and Processing Industry of the Kyrgyz Republic is the state authority managing fish farming in the country. It is state funded and implements state policy in the sphere of fish farming development and management. It directs organization of harvests, replenishment of fish resources and security of fish stocks. It also coordinates fish farming in general, regulates harvest quotas, and controls and allocates fishing areas.

The State Agency for Environmental Protection and Forestry is responsible for control of reservoirs and their public utilization.

The Fish inspectorate of the Department has a Chief of Inspectorate, and fish inspectors in regions and oblasts. The scientific fish breeding centre is located in Issykul oblast (region) as part of the Biological Station of the Academy of Sciences, and is active in scientific investigations, including the state of stocks.

The republican society “Kyrgyzohotsoyuz” rents reservoirs and rivers for recreational fishers and controls their activities.

In 2007, an Association of Fish Breeders of Kyrgyzstan was established.

VIII. GENERAL LEGISLATIVE FRAMEWORK

The functioning of fish farming is based on a number of laws:

1. Law of the Kyrgyz Republic, No. 53 of 16 June 1999 “Environmental protection”.
2. Law of the Kyrgyz Republic, No. 1561-XIL of 18 May 1994 “Specially secured territories”.
3. Law of the Kyrgyz Republic, No. 54 of 16 June 1999 “Ecological expertise”.
4. Law of the Kyrgyz Republic, No. 115 of 13 August 2004 “Steady development of ecological–economic system of Issykkul”.
5. Law of the Kyrgyz Republic, No. 48 of 9 June 1999 “Biosphere territories in the Kyrgyz Republic”.
6. Law of the Kyrgyz Republic, No. 805-XII of 6 March 1992 “Veterinary medicine”.
7. Law of the Kyrgyz Republic, No. 59 of 17 June 1999 “Fauna”.

8. Law of the Kyrgyz Republic, No. 40 of 26 July 1999 “Joining of the Kyrgyz Republic to the Biological Diversity Convention ”.
9. Law of the Kyrgyz Republic, No. 140 of 6 August 2005 “Joining of the Kyrgyz Republic to the Karthen bio-security protocol to the Biological Diversity Convention of the UNO”.
10. Law of the Kyrgyz Republic, No. 38 of 25 June 1997 “Fish farming”.
11. Ghe government Regulation of the Kyrgyz Republic, No. 43 of 29 January 1996 “National plan of the Kyrgyz Republic, concerning environmental protection of the Kyrgyz Republic”.
12. The strategy of bio-diversity preservation of the Kyrgyz Republic, approved by Government Regulation of the Kyrgyz Republic, No. 524 of 3 August 2002.
13. Program for fish farming development of the Kyrgyz Republic, 2007–2011.

Some organizional relationships in the fishery sector.