



What is aquaculture? Its Present Status Around the World and Central Asia

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Dear Mum,

Every day there is something to learn. Grandpa told me that some fish are raised on farms. This is called aquaculture. He says that nearly half of all fish eaten in the world is farmed, not caught. So next time you go shopping for fish, remember to ask where it comes from and if it was caught or farmed.

*Love,
Lisa*



Key Points of Aquaculture

“Aquaculture is an industrial process of raising aquatic organisms up to final commercial production within properly partitioned aquatic areas, controlling the environmental factors and administering the life history of the organism positively and it has to be considered as an independent industry from the fisheries hitherto.”

Industrial Process

We will talk about;

- .Thousands of broodstocks,
- ..Millions of eggs,
- ...Millions of juveniles and adult fish,
-Thousands tons of feeds,
-Hundreds of fish farms, and
-Tens of fish process plants.

ENOUGH INDUSTRIAL?

Total World Fisheries Production (By Capture and Aquaculture; FAO, 2011)

- Capture Production:
90.400.000 tonnes



- Aquaculture Production:
63.600.000 tonnes
- (The value is about 120 billion USD)



A Comparison on Inland Production (FAO, 2011)

- Global Inland Production:
- 55.800.000 tonnes
- (Capture: 11.500.000 tonnes,
Aquaculture: 44.300.000 tonnes)



- Inland Aquaculture
Production in Central Asia
Countries (FAO, 2010):
- 72.000 tonnes
- (Capture: 63.300 tonnes,
Aquaculture: 8.700 tonnes)



Aquaculture Production in Central Asia Countries (FAO, 2010)

- Azerbaijan, 1000 tonnes;
- Kazakhstan, 224 tonnes;
- Kyrgyzstan, 319 tonnes;
- Tajikistan, 517 tonnes;
- Turkmenistan, 17 tonnes;
- and
- Uzbekistan, 6.600 tonnes



Main Species for Inland Aquaculture in Central Asia

Silver Carp (*Hypophthalmichthys molitrix*)

Silver carp (or Asian carp) are considered a highly invasive species that were imported to North America in the 1970's to control algae blooms in aquaculture and municipal wastewater treatment facilities. Shortly after their importation, they escaped from captivity, and began to expand their range into many North American waterways. Silver carp are filter feeders, and like the paddlefish, use gill rakers to filter phytoplankton, zooplankton, and detritus out of the water column. Silver carp prefer standing or slow-flowing conditions such as impoundments or backwaters. They have no stomach, and are believed to continually filter feed. As a result, silver carp can grow very quickly, and reach weights of over 40 lbs. Silver carp are commonly referred to as "flying carp" for their tendency to jump out of the water as high as ten feet when startled. These "flying" carp may pose a severe risk to recreational boaters traveling at high speeds in an uncovered boat.

Main Species for Inland Aquaculture in Central Asia

Common Carp (*Cyprinus carpio*)

The Common carp or European carp (*Cyprinus carpio*) is a widespread freshwater fish most closely related to the common goldfish (*Carassius auratus*), with which it is capable of interbreeding. It gives its name to the carp family Cyprinidae. Common carp are native to Asia and Eastern Europe. It has been introduced into environments worldwide, and is often considered an invasive species.

Common carp can grow to a maximum length of 5 feet (1.5 meters), a maximum weight of over 80 lb (37.3 kg), and an oldest recorded age of at least 65 years. The largest recorded carp, caught by an angler in 2007 at Rainbow lake near Bordeaux, France, weighed 88.6 pounds (40.1 kilograms). The wild, non-domesticated forms tend to be much less stocky at around 20% - 33% the maximum size.

Main Species for Inland Aquaculture in Central Asia

- **Crucian Carp** (*Carassius carassius*)

Crucian carp is a freshwater fish that inhabits lakes, rivers and reservoirs in various countries in Asia and Europe. They normally dwell in the bottom layer of the water column. Comparatively, they can tolerate a wide range of environmental conditions. They are sedentary fish, which can propagate naturally in various types of water bodies, such as rivers and lakes. Crucian carp is basically an omnivore that naturally feeds on organic detritus, filamentous algae, small benthic animals, and pieces and seeds of aquatic weeds. However, the fry/larvae feed on zooplankton. In addition, in aquaculture, they well accept artificial feed, such as by-products from grain processing and oil extraction, and pelleted feed. Rainfall, water level and temperature changes are the stimuli for reproduction. The presence of aquatic weeds is also important for spawning; they serve as the substrata for the eggs, which are adhesive. Crucian carp is a medium-size fish with a moderate growth rate that can reach 1.25 kg.

Main Species for Inland Aquaculture in Central Asia

- **Freshwater Bream** (*Abramis brama*)
- The common bream lives in schools near the bottom. At night common bream can feed close to the [shore](#) and in clear waters with sandy bottoms feeding pits can be seen during daytime. The fish's protractile mouth helps it dig for [chironomid](#) larvae, [Tubifex](#) worms, [bivalves](#), and [gastropods](#). The bream eats water plants and [plankton](#) as well.
- In very turbid waters common bream can occur in large numbers, which may result in a shortage of bottom-living prey such as chironomids. The bream is then forced to live by [filter feeding](#) with its gill rakers, [Daphnia](#) water fleas being the main prey. As the fish grows, the [gill rakers](#) become too far apart to catch small prey and the bream will not then grow bigger than 40 centimetres (16 in). If a common bream is malnourished it can develop a so-called *knife back*: a sharp edge along its back.

Main Species for Inland Aquaculture in Central Asia

- **Grass Carp** (*Ctenopharyngodon idella*)
- The grow-out of grass carp is mainly conducted in earthen ponds and cages in Vietnam. Polyculture with other species (e.g. silver carp, common carp, rohu and mrigal etc.) is common. Grass carp may be stocked as either major or secondary species. Grass carp usually account for 60 percent of the total stocking density of 1.5-3 fish/m² (dependent on the level of intensity) in ponds and the fingerling size is 5-6 cm (mountainous areas) and 12-15 cm (lowlands). The stocking rate in cage culture is 20-30 fish/m³ but much larger fingerlings are used (normally 50-100 g). Grass carp are usually fed with terrestrial grasses, cassava leaves, banana stems and maize leaves in grow-out culture. Grass carp production usually accounts for 60 percent of total production (7-10 tonnes/ha) in ponds. The marketing size for grass carp is 1-1.5 kg and 1.5-2.5 kg in ponds and cages respectively.

Main Species for Inland Aquaculture in Central Asia

Rainbow Trout (*Oncorhynchus mykiss*)

The rainbow trout is a hardy fish that is easy to spawn, fast growing, tolerant to a wide range of environments and handling, and the large fry can be easily weaned on to an artificial diet (usually feeding on zooplankton). Capable of occupying many different habitats, ranging from an anadromous life history [strain known as steelhead] (living in the ocean but spawning in gravel-bottomed, fast-flowing, well-oxygenated rivers and streams) to permanently inhabiting lakes. The anadromous strain is known for its rapid growth, achieving 7-10 kg within 3 years, whereas the freshwater strain can only attain 4.5 kg in the same time span. The species can withstand vast ranges of temperature variation (0-27 °C), but spawning and growth occurs in a narrower range (9-14 °C). The optimum water temperature for rainbow trout culture is below 21 °C. As a result, temperature and food availability influence growth and maturation, causing age at maturity to vary; though it is usually 3-4 years.

Main Species for Inland Aquaculture in Central Asia

- Pike Perch (*Sander lucioperca*)
- Pike-perch inhabits lakes, rivers, reservoirs and the coastal marine waters (in the catchment areas of the Caspian, Aral, Baltic, Black, and North seas. It is now widespread in France and western Europe, is rapidly extending its range in eastern and central England, and is acclimated to the waters of northern Africa (Algeria, Morocco, Tunisia), North America, and Asia (e.g. China, Kyrgyzstan). This species generally attains lengths of 50-70 cm and body weights (BW) of 2-5 kg but a maximum length of 130 cm and weights of 12-18 kg have been reported. Males reach sexual maturity at 2-3 years, females at 3-4 years. Water temperature at spawning initiation ranges from 8.0 to 15.0 °C. Generally, water depth at natural spawning grounds ranges from 0.5 to 3.0 m. Pike-perch deposit eggs into nests that they have built on sand, gravel (preferred substrate), or aquatic vegetation. Males actively guard nests with eggs for 5-8 days until the larvae hatch. Relative fecundity is 170-230 eggs/g BW. Eggs are small; the diameter of unhardened and hardened eggs range from 0.6-1.0 mm and 0.9-1.6 mm respectively. One kg comprises 1.5-2.2 million (unhardened) or 1.0-1.5 million (hardened) eggs.

Challenges in Central Asia

- Legislative, institutional and financial frameworks;
- National policies and strategies;
- Use of resources;
- Fisheries and aquaculture data information;
- Fishers/Farmers Associations;
- Capacity building;
- Technology transfer;
- Research and development;
- Seed supply;
- Ingredient/feed supply;
- Fish quality and hygiene;
- Monitoring, control and surveillance.



FISHDEV: Destroy the Challenges



CENTRAL ASIA REGIONAL PROGRAMME FOR FISHERIES AND AQUACULTURE DEVELOPMENT
ЦЕНТРАЛЬНО-АЗИАТСКАЯ РЕГИОНАЛЬНАЯ ПРОГРАММА РАЗВИТИЯ РЫБОЛОВСТВА И АКВАКУЛЬТУРЫ



FISHDEV

Central Asia Regional Programme for Fisheries and Aquaculture Development

- **Originator:** Kyrgyzstan, Tajikistan, Turkey, Uzbekistan
- **Beneficiary Countries:** 7 SEC Countries
- **Budget:** USD 1,800,000
- **Delivery:** USD 1, 250,195
- **Duration:** 5 years (Started in November 2009)
- **Date of SC Approval:** May 2009
- **Date of country signatures:** Azerbaijan (Jan 2011); Kyrgyzstan (Jan 2010)Tajikistan (Jan 2010);Turkey (March 2010) ;Uzbekistan (Jan 2010)
- **Objective:** To increase Central Asian fisheries and aquaculture sector performance in terms of its capacity to generate food, employment and income, and in terms of its economical viability, environmental compatibility and social acceptability.
- **Status:** Operational

FISHDEV



Central Asia Regional Programme for Fisheries and Aquaculture Development

- ✓ FISHDEV delivered substantive activities within the specified timelines which contributed greatly to the expected outputs of the programme.
- ✓ Supported greatly the establishment of Central Asia and the Caucasus Regional Fisheries and Aquaculture Commission(CACFish) as a Regional Fishery Body under FAO.
- ✓ 5-Year Work Programme for CACFish has been prepared.
- ✓ Drafting of working documents of the First session of Technical Advisory Committee(TAC) of the CACFish.
- ✓ 2 technical assistance projects have been finalized.
- ✓ 1 technical assistance project is under review.
- ✓ 14 English and Russian documents published and distributed.
- ✓ 7 publications are under preparation.



FISHDEV

Central Asia Regional Programme for Fisheries and Aquaculture Development

- ✓ SEC Fishery and Aquaculture Web Page developed and updated
<http://www.fao.org/europe/sec/activity-areas/fisheries/en/>
- ✓ Conducted a high number of activities with participation from relevant stakeholders.
 - 8 intergovernmental meetings,
 - 6 regional workshops,
 - 7 regional trainings,
 - 5 national workshops,
 - 1 expert workshop,
 - 3 study tours.
 - Until the end of 2012 1 training workshop and 2 intergovernmental meetings will be held.
- ✓ 7 national consultants contracted
- ✓ The overall programme is on the right track
- ✓ No delays in implementation,
- ✓ Good recognition and active participation by stakeholders