Environmental issues in issyk kul lake, kyrgyzstan

Issyk Kul is popular tourist destination in Kyrgyzstan. Tourists from Central Asia, Russia and Europe come to enjoy the magnificent view and the serenity of the lake surrounded by humongous mountains of Tianshan. It is regarded as the jewel of the country. 10% of the country’s GDP is contributed by tourism sector, and 9% of it is coming from Issyk Kul lake tourism industry. The local residents rely on seasonal income from tourism industry, but the season is quite short only about 3 months. Lake and biodiversity. Issyk Kul is endorheic lake, which means it lies in the basin within the mountains.

The lake is supplemented by 118 small rivers and streams from melting snow caps, but does not have an outflow (see picture 1). Although there is a theory that it might have the outflow somewhere deep in underground, it yet has to be studied. Its length is 182 km and width of 60 km, the coverage area is 6236 square km, altitude of 1609 m above sea level and it is second largest high altitude lake in the world after Lake Titicaca in South America. The water, in generally, never freezes because of its level of salinity.

The study was done to measure the level of salinity and it shows that the level varies from 4. to 7. 0% depending on the site where the sample was taken and seasonality. After heavy rains, for example, the level of salinity show as low as 2%. During winter months the water temperature is 5 to 6°C, on the shallow areas in northern part of the lakes the water sometimes freezes. Biodiversity of the Issyk Kul area consist of 1500 species of plants, 30 species out of it are important wild medical plants; wide variety of mammals (54 species), birds (267species) and 28 species of fish, 11 out of it are indigenous and 7 full species and 1 subspecies are endemic to the lake.

In the native dish fauna of Issyk Kul there were no predators. In the late 1950s the local scientists suggested that the fish stock quantity of the lake can be increased and as well as the quality improved. Supposedly, the introduction of the predator species like Sander Lucioperca should somehow increase the fishing productivity of the lake. With that theory in 1960s there was big scale of works of introduction of new atypical species into Issyk Kul waters.

In the list of introduced species were Pike-perch Sander lucioperca , Oriental Bream Abramis brama orientalis, Grass Carp [Ctenopharyngodon idella] and Tench [Tinca tinca] and others. The decision was made without thorough study and deep analysis. For example, Pike perch Sander luciperca is typical predator fish. It is nutrition consists of 80-90% of small fish and is active year around. Its population growth brought to decreasing of usual fish stock of the area. Although the local residents are proud of the lake, but they are not aware of the endangered endemic fish they have and how their fishing activities can affect them.

While the pike-perch and oriental beam were well adjusted to the new environment, the Rainbow Trout [Onchorhynchus mykiss], the Sevan Trout and the Common Whitefish needed some supporting to maintain their population. These are the predators, which endangered endemic species like Issyk-Kul Marinka [Schizothorax pseudoaksaiensis issykkuli] and Naked Osman [Gymnodiptychus dybowski]. During latest studies only naked osman was seen in the lake and the Issyk Kul Marinka almost disappeared. Conservation activities for the Issyk Kul area have been undertaken for about 60 years.

Starting 1970 the fishing activities in the area were restricted, no fishing near waterfowl concentrations in winter times, mainly in the shallow bays of the lake. The agriculture activities were done near the shore lines of the lake before, but now it has stopped and it shows positive effect on the development of flora and fauna of the Issyk Kul. In 1976 Soviet Union signed RAMSAR convention. The RAMSAR convention's mission is " the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".

Being part of this convention significantly improved the situation by 15000 hectares of water and 5000 hectares of border land being protected. The whole area became a biosphere reserve in 1998 and by 2000 over 4 million hectares were covered as biosphere reserve. After separation from Soviet Union Kyrgyz Republic did not sign the Convention until 2007 as independent country. Issyk Kul area is officially recognised by UNESCO as one of the possible World Heritage area, but it is still not yet included in the list. Being a biosphere reserve did ot prevent the disappearance of some indigenous species in Issyk Kul.

Therefore, signing the convention and declaring biosphere reserve are not enough to protect the fauna. Strategies for conservation were not implemented. Management and relationship with different stakeholders are very important. The Fishery in Issyk Kul There was no history of fishing before 19th century. The lake was regarded as holy place for kyrgyz people, they did not swim and catch the fish there. Petroglyphs or rock paintings do

show scenery of hunting on wild animals, but no evidence of any swimming or fishing activities.

Fishing started, according to statistics, after 1870, but commercial fishing is believed to have started on the lake in the 1890s. At first it was relatively disorganized and concentrated mainly on five species of fish: Schmidt’s Dace locally known as Chebak, Issyk-Kul Dace locally Chebachok, Common or Sazan Carp, Issyk-Kul Marinka and Naked Osman. Chebachok was the dominant species and accounted for around 90% of the overall catch. Records show that by the end of the century the annual fish catch was varying from 17. 4 to 104. 8 tonnes per annum.

However the most prevalent Schmidt’s Dace was considered during Soviet Union as a low-value trash fish. In 1930 a leading Soviet fisheries academic of that time, L. S. Berg recommended introducing new species and 755, 000 eggs of the Lake Sevan Trout were procured and discharged into Issyk-Kul in order to develop a commercial trout fishery . Later was another 800000 eggs released. The adaptation to the lake was successful and fecundity increased five times and the growth rate four to six times. Also the Issyk kul trout matured much earlier than original sevan trouts reaching up to 89cm and 17kg.

Trout needs river for reproduction and because Issyk Kul has no suitable spawning rivers for it, it was suggested to establish hatcheries and put in them spawning fish, extract the eggs and raise the fry-fingerlings and then release them back into the water. Authorities of fisheries were encouraged by significant number of Dace and they decided to introduce more alien

species in the lake. The next ones were Pike-perch and Oriental Bream being introduced in 1954–1956, later they added Grass Carp and Tench and others.

Sometimes later in the early 1970s it was decided to introduce Common white fish and the Baikal Omul from Sevan Lake and Baikal Lake. Successful integration of Pike perch and Sevan trout has impacted the balance between predators and prey fish in the lake. There were too many predator fish. And it decreased the total fish productivity too. Nowadays there are Rainbow trout farms in the lake itself. Rainbow trout is very predacious and if Pike-perch usually remains in deep waters, the Rainbow trout even comes near the shoreline to shallow water.

Some fish escape from the cages and endanger the endemic fish of the area. The government recognised the catastrophic situation of Issyk Kul Lake and declared the Moratorium for Artisanal and Commercial fishing from 2008 to 2013. People in Issyk Kul area. Issyk Kul province has a population of 437200 habitants with more than nine ethnic groups [see table1]. Mainly they live in towns and in the villages near the shores of the Issyk Kul. Main sources of livelihood are agriculture, livestock rearing, tourism services and fishing.

Fishing is not considered as main livelihood, and the average contribution to annual income is only about 5-15%, but there are some households which on 30% depend on it. There are 3 types of involvement in fishing activities: fishers, fish processors and sellers. Fishers are young and middle aged men, fish processing and selling involves women and sometimes children. Especially during summer months, when it is peak tourist season and children are on school breaks, whole family including children sell fish to

local and international tourists. The most popular fish among the tourists was Issyk kul Dace until it disappeared.

According to UNDP the monthly income of the fisher is not more than 40USD and women get from fish processing about 54USD . Some families rely on fish processing and selling activities during tourist season, which is about three months, to earn enough to get through the year till next season. Conclusion Reflection I often travel to Issyk Kul, because it is for us a must go place during hot summer time. Most people go there every year to escape the congested polluted city. As soon as we enter the area it is seen on the sides of the road buckets of apricots, apples, black and red currant, peaches and other fruits and berries.

Before we used to see lots of processed dried fish for sale and we used to stop and buy it, but now it is a rare picture. In the resorts and guesthouses along the beach are usually lots of women and children passing by and selling their fish, but that is not the previously prevaled Chebachok, they say that there are no more that kind of fish left and it is rare catch. Although local people are proud of the nature and the lake, they do not understand that endemic species are endangered and might disappear completely.

There was a ban for fishing activities declared, but the endangered fish species did not increased and despite the moratorium being declared, there are still illegal fishing activities going on. If no policy and conservation strategies are undertaken, that ban will not help the situation at all. After having several different cases in class like preserving environment in Palawan for example, it made me think that just making the regulations like

declaring the restrictions in fishing activities is not enough and there has to be more things done.

Fishermen in Issyk Kul can be divided into 2 categories: the ones who have been fishing for long years and know more about fish and the environment, and the ones who just started fishing and violate basic ethics of fishing and lack of knowledge on this matter, therefore cause more harm to the fauna. It has to be mentioned that illegal fishing is part of the income source of many households and if it has to be eliminated, then other options for income sources have to be offered.

The main problem, as I see, is that the biodiversity is under threat due to alien predator species, the other problem is illegal harmful fishing, which is not being addressed because the existing policies and regulations are not being implemented. Identifyiing those problems I would suggest 3 aspects on approaching this: 1. Eliminating illegal fishing activities by tightening the penalties for every case filed. On the other hand to give the fishermen incentives by registering them and let them enter the legal fishing activities.

If the registration process or getting fishing permission is complicated, then to simplify this process. Also to give them more information about legal fishing and illegal fishing and its consequences like penalties and damage to the environment. Important is also to involve them in the environment awareness campaign. It has to be explained the benefits of preserving the indigenous species and they can be part of it. This could be task of LGU and NGOs, for this reason they have to support each other and work together.

The fishermen, fish processers and sellers have to be involved in the biosphere conserving activities themselves. They are the best advocates for it. 2. Conservation strategies. The Fisheries Department has to come up with a strategy to preserve the endemic species. For example the Nomad Osman species are also habited in Son-Kul Lake in Kyrgyzstan and they can be cultivated and transferred to Issyk Kul Lake. Of course, it has to be studied well before starting transfer, because they might need special care and very sensitive to transferring process.

Recommendations of the other experts can be sought by organising the conference for conserving the endangered species. The government officials have to be informed and supportive of the program 3. The policy and regulations have to be strengthened to make the efforts worthwhile. For example if the illegal fishing is the concern, then the penalty for it has to be substantial and for people to do their fishing activities legal, it has to be provided simplified process of registration and offered other incentives like opportunities to further improving fishing equipment, fish trading etc.

The rainbow trout farms have to be removed, because it is harming the natural environment of the lake and if illegal farms found, they should be penalized and removed. As I mentioned before in the above paragraphs that Issyk Kul is one of the tourist destinations in Kyrgyzstan. Every year tourists from neighbouring countries and form European countries come to enjoy the amazing scenery of the place, which is surrounded by the ancient legends.

The mountains with their snow-caps are attracting the visitors and alluring them to explore the nature. The lake with its refreshing water is awaiting the

guest to plunge into it and enjoy it. In the world of scarce resources we can’t afford to consume mindlessly the resources we have without thinking about the next generations. Everyone should be responsible in preserving the environment, its flora and fauna and if everyone is aware and contributing to conservation of our environment, I think, we will solve many environmental issues of today.