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Review Paper

Dark Age of Agriculture and Fishing Sectors during Soviet Central Asia: A Brief Review

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Abstract
Agriculture and fishing both require good source of water. Soviet Central Asia got a natural gift of fresh water in the form of the Aral Sea with two important lifelines i.e. Amu Darya and Syr Darya. During Soviet regime, Central Asian countries were the rich source of agricultural products, fresh fishes, raw materials for industries and cheap labor. But in between 1960s to 1990s, over focus on industries, arms and ammunitions, nuclear explorations and economic pressure changed the scenarios of Soviet Central Asia. Over production of cotton and wheat; deforestation; overdose of fertilizers, pesticides and insecticides; blind exploitation of natural water resources; ignorance of ecology safety measures; frequent man-made disasters with natural disasters; contamination of fresh water; weak sewage system with some relevant Soviet policies lead to incisive impacts on the Soviet economy. Over use of natural water arose water logging and salinization. Therefore, more or less these significant problems accelerated the progressive USSR to disintegrate into many fragments. Central Asia is one of them. After 1991, power decentralization, border disputes, poverty, unemployment, lack of funds and environmental problems directly impacted on agriculture and fishing sectors which caused to import food from other nations.

Key Words: *Agriculture, contamination, drying, exploitation and fishing.*

Introduction

The five Central Asian states are highly agrarian, with 60% of population living in rural areas and agriculture accounting for over 45% of total number of employed and nearly 25% of GDP on average. More than 80% of arable land in Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan is irrigated and only Kazakhstan with its wheat – based crop production, irrigates only 7% of it arable land (Lerman and Stanchin, 2006). Around 20% of the total agricultural land is suitable for production of crops because most part is covered by deserts and mountain pastures. Except Kazakhstan (known for wheat production), all other Central Asian countries are known for cotton production. The contribution of animal husbandry is significant in large parts of Central Asian agriculture. The area of agricultural land in Central Asia in 2004 was more than 150 million hectares that means that during last fifteen years it shrank almost two times. The area of irrigated arable land in 2004 constituted more than 9 million hectares, having increased against the level of 1991 by 5.8%. Lands of the total area of 37.6 million hectares are subject to salinization and flooding to a different extent (UNEP, 2007). More than 22 million people directly or indirectly depending on irrigated agriculture (World Bank 2003). Drying of Aral Sea and increased salinity, there has been no fishing in the Aral Sea since 1983. The production of fishes were decreased and in 1983 production restricted on fifty three tones. The commercial fishing activities were ceased and the Cessation of Aral accelerated after construction of Takhiatash hydro- node (1974). After crisis, fishing was largely caught in lakes and reservoirs. Both sectors after tremendous growth suddenly lean down with certain period of times. This was only due to arrogant Soviet legacy, poor management and negligence of natural ecosystem.

Agriculture

Before independence Central Asia was under USSR and followed centrally managed economic system. During the Soviet era in Central Asia there were huge development plans and policies implemented in agriculture sector which can be divided into six stages. The sixth (1962- 1990) one was the turning point because some big steps like introduction of Kolkhoz and Sovkhoz, new drainage and irrigation infrastructure, new introduction of irrigated lands, construction of more reservoirs, introduction of better livestock farming and horticulture farms in the zones of valleys and foothills, development of desert zones, more extension of cotton farms and development of machinery in agriculture. These steps had two aspects one was the massive development in agriculture fields and second one was the beginning of environmental problems like salinization, desertification, soil erosion and degradation of arable lands. We can call this stage as a worst stage because of the environmental change. More than 90% of agricultural lands were controlled by the collective and state farms in Soviet time. The inputs for agriculture and commercially marketed output all were under the clutch of Soviet government. Each Sovkhoz or Kolkhoz had its own veterinary experts, mechanical engineers, agronomists, irrigation engineers and specialists. Farmers were bound to work under pre- defined instructions of government. After independence agrarian reforms in agriculture sector especially land reform in Central Asia varied from country to country. De- collectivization of large state- owned enterprises and privatization of land holdings were significant steps. Today, almost all agricultural lands are cultivated either by individual lease hold farmers (Uzbekistan, Turkmenistan and Tajikistan) or private farmers (Kazakhstan and Kyrgyzstan). Cotton which is called ‘white gold’ is the backbone of Central Asian agriculture and economy because of the good

source of foreign exchange and employment opportunities (Table 1). Kazakhstan is known as a one of the major breadbaskets of the world. The major agricultural product of Kazakhstan is wheat than cotton. In 2004, grain production was only 9 million tones, but it reached 19 million in 2007 (Peyrouse, 2009). Later the production decreased slightly. The booming demand and production of oil and natural gas affect the production of grains in Kazakhstan. Turkmenistan and Uzbekistan is well known for cotton. The main agricultural power of Central Asia is Uzbekistan than Turkmenistan because about 95% of the Turkmenistan's land is covered with deserts and only 5% of the surface area is well for cultivation. In the Khorezm and Karakalpakstan of Uzbekistan, there is good production of cotton, cereals, vegetables and fruits but in recent years the Aral Sea crisis make these places deserts due to lack of water. In terms of economic activity, agriculture is a leading sector in Turkmenistan. Both the countries are employs about half of the total population and play significant role in GDP. Tajikistan and Kyrgyzstan have limited agriculture potential due to the mountainous topography. In Tajikistan about 20% of land is arable and agriculture accounts for nearly 30% of total GDP. The agriculture of Tajikistan is highly influenced by disintegration of Soviet Union and the Civil War because these leaded to the migration of workers and labors. After 1990s, Tajikistan recovered and contributed wheat (36%), cotton (30%) and others (9%) (Mizobekova, 2009). Cotton is mostly produced in the southern region of Khatlon and Sogd Province. Here rapid growth of population, scanty of arable land, more emphasis on industrial work and insecurity of food pressure on the limited land since independence. In Kyrgyzstan, agriculture contributes 32% of GDP and 2.7 million of the total population active in workforce (Peyrouse, 2009). In Central Asia the area devoted to cotton increased from 441,000 hectares in 1914 to more than one million in 1940 (Spoor).

Table 1. Total production of cotton in Central Asia (thousands of tons) and its share in world production

Country	1913	1970	1980	1990	1998	2002	2004
Kazakhstan	11	91	118	102	55	105	148
Uzbekistan	171	1483	2061	1593	1000	1033	1125
Tajikistan	11	240	334	256	110	165	172
Turkmenistan	23	287	415	437	197	148	203
Kyrgyzstan	9	62	68	25	27	25	40
Total Central Asia	225	2163	2996	2413	1389	1476	1688
World Production	6296	11740	13831	18970	18713	19437	26193
% of World Production	3.5%	18.5%	21.5%	13%	75%	7.5%	6.5%

Source – Sebastien Peyrouse, 'The multiple paradoxes of the agriculture issue in Central Asia', November 2009: pp. 7.

The table clearly shows the production of cotton in Central Asia and its contribution in the world production in between 1913 to 2004. From 1913 the production of cotton was increased and in 1980- 90 productions was in peak but after that there was gradual declination of production and in 2004, total production of Central Asia was restricted up to 1688 thousand tons. The declination of cotton production has many reasons such as weak irrigational facilities, huge scanty of water, mono- culture, overdose of chemical fertilizers, shortage of fertile lands, lack of knowledge and techniques after disintegration of USSR, water- logging, salinization, degradation of arable lands, desertification, pace in natural calamities (floods, droughts, landslides and earthquakes), climate change, intensive heat, increased evaporation rate, pollution of land and water, radioactive pollution and local environment change. So, environmental problems are one of important problems in Central Asia which hindered the production of agricultural crops.

The drying of Aral Sea is the significant cause of the decreasement in the agricultural production because some important regions of Central Asia like Dasoguz Velayat of Turkmenistan, Kyzyl- Ordynskaya Oblast of Kazakhstan and Karakalpakstan of Uzbekistan which was known for the production of crops, now most of the agricultural lands of these regions become deserts because of the loss of water for irrigation. The two important lifelines (Syr Darya and Amu Darya) of Central Asia fulfilled the water requirement of large parts of Central Asia. The Syr Darya river fulfilled the water requirement of Golodnaya, irrigation land of Chimkentskaya, Fergana Valley, Kyzyl- Ordynskaya Oblasts of Kazakhstan and steppes of Dalverzinskaya and the Amu Darya river satisfy the water requirements of Karakalpakstan, Amu- Bukharsky and Karshinsky Canals, Khorezm and Surkhandaryinskaya Oblasts of Uzbekistan, Karakum- Darya and Dasoguz in Turkmenistan. The dominated agricultural crops of Central Asia are cotton, grains, and vegetables including fodders. It is important to note that 88% of the land is used as permanent pastures, 7% arable rainfed and only 5% of arable land (FAO, 2006). This figure clearly shows that the limited arable land and pressure of growing population and excessive demands for food and fodder which are making the Central Asian agricultural lands uncultivable. Soil conditions heightening the risk of degradation of land in the whole Central Asian region include hydromorphy, salinity, soil erosion, sodicity and shallowness of soil (FAO, 2000). Water logging, salinity and sodicity are some important problems which massively affecting 53% of the arable land of Central Asia; 16% in Tajikistan, 50% in Uzbekistan, more than 33% in Kazakhstan, 12% in Kyrgyzstan and 96% in Turkmenistan (Bucknall et al., 2003). Huge amounts of productive irrigated lands are turning to degraded marginal lands, which are then abandoned by farmers (Toderich et al., 2009). It is remarkable that 84% of the irrigated land of Fergana Valley degraded by the high salinity (Giese and Sehring, 2007). Salinity captured maximum fertile lands of Syr Darya regions (Mirzachuli steppe), Khorezm and Karakalpakstan of Uzbekistan, Dasoguz of Turkmenistan, trans- boundary areas of Uzbekistan and Tajikistan, Fergana valley, Kyzylorda of Kazakhstan, oasis of Kashkadarya, Bukhara and Chardjoy. Salinity affected regions facing unemployment, poverty and poor health problems which cause the migration of people in safer areas. Traditionally, the pastoral systems were practiced on rangelands which dispersed over the mountains, steppes and deserts occupy more than 90% of the region (Gintzburger, 2004). These lands are now facing degradation and unable to produce sufficient amount of fodder to support livestock production. Decades to

centuries of overgrazing have taken their toll on the sustainability of the land (Normile, 2007). Loss of biodiversity, inappropriate block structure, mismanagement of watering points, salinization, water logging, soil compaction, heavy grazing pressures, poor pasture management, lack of water, soil erosion and depleted fertility have adversely affected the pasture production. In Uzbekistan, Kazakhstan and Turkmenistan, farming in large scale is practiced with goats, camels, horses and sheep. Forest areas of the mountainous regions of Kyrgyzstan and Tajikistan are open to unregulated grazing of livestock on steep slopes and uncontrolled cutting of trees so that here problems like landslides, rockslides, mudslides and avalanches are common. The rangelands areas and livestock system are seriously affected by salinity. About 2.8 million hectares of rangelands in Kyzyl-Kum desert was affected heavily by salinization (UNDP, 2007). Central Asian mountain ecology consists of high and low mountain deserts, steppes, semi- savanna and meadows. The foothill of mountains were largely developed by Soviet government and transformed into arable lands, hay fields and pastures and the process is still continue. More than 25% of the arable lands in the mountainous regions are present in the south-eastern parts of Central Asia. Most of agricultural activities are active in the slopes of mountains which contribute soil erosion, loss of fertile soil, run- off gullies and moisture deficits. In recent years, environmental change in mountainous region of Tajikistan and Kyrgyzstan such as floods, avalanches, melting of glaciers, degradation of arable land, deforestation, slides, pollution of upstream rivers cause the significant declining of agricultural and livestock products. The extremely remote areas of mountainous region characterized by rural poverty, lack of basic needs, unemployment, and limited knowledge of farming also caused the exploitation of arable lands and contribute to natural and man- made disasters. Kazakhstan has great caliber to produce grains but climatic conditions allow rainfed agriculture so spring crops are extensively grown like spring wheat. The southern and south- eastern parts of Kazakhstan is more favorable. Rotation of spring wheat with summer fallow practiced once in three or five years but the summer fallow areas are highly faced by wind erosion, sand storm and decrease of organic matter (Akshalov, 2006) and caused substantial decrease of the fertility of soil. In some other parts of Central Asia, rainfed agriculture is practiced in slopes. In these areas, agriculture is jeopardized by inappropriate maintenance of nutrition of soils, water erosion and inordinate tillage. Because of the low productivity in rainfed systems, farmers do not have much money and resource to introduce improved techniques and inputs (Oweis, 2000). Migration and accumulation of salts by wind and water led to degradation of the vegetation and crops. Fodder areas due to secondary salinization, loss of fertility of soil and severe degradation of land, declined by 9 to 14% (ADB, 2007). Some other environmental problems includes less precipitation, semi- arid climate, desertification, intense heat, sand storms, pollution of fertile lands do not allow to extend the area of irrigated land. The environmental problems in Central Asia are directly or indirectly inter- linked with the anthropogenic and natural disasters and in current context the deterioration of the production of agricultural crops are also caused by these apart from other problems which form critical situations for economy and society.

Fishing

In 1960s, the production of fish concentrated on the deltas of major rivers and inshore waters of the Aral Sea. In 1958 there were record production of fish and reached up to fifty thousand tones. The major fish species which were common at that time: Shemaya, Ream, Roach, Barbel, Pike, and Wels. In 1960s fish farms were very few. At that time fisheries were handled by government and fisheries cooperatives. During 1970s, the concentration of fishing activities were transferred from Aral to Lake Aydar- Arnasai and Sarykamysh but later Sarykamysh lost their value because of the high salinity. Historically, the Aral Sea may be divided into three periods: 1933- 1965, 1965- 1983 and 1983- present. The first period was the period of intensive irrigation construction and reduction of water flow to the delta regions. Second period was the period of permanent deterioration of hydroecological regime and massive reduction of fishing activities in the sea and the last period include ceasing of commercial fishing in the Aral Sea and transference of fishery into deltaic and internal water bodies (Kurambaeva, 2003). After independence, there were huge fall of agricultural production, deterioration of irrigation which had led to the declination of fish production. The five new independent states had boundaries and borders which caused division of water, fishing grounds which led to the conflicts about water division which also vanish the extensive fishing activities. Uzbekistan has some of the big fishing grounds like Muynak, Khorezm and Balikchi. Fish production in ponds decreased in Uzbekistan. Training and education of specialists also stopped and research network came to an almost complete standstill (Kamilov, 2003). The aquaculture production prior to independence and after independence is shown in table. According to the table 1980s was the fruitful time and the lowest production found in 1996. The trend is also same for capture fisheries in Uzbekistan. Today, Uzbekistan has no specific fishery development projects and national programme supported by national or international authorities. Uzbekistan is well developed for fish production in irrigation water bodies as comparison to other Central Asian states because of better industrial infrastructure, diversified agriculture, effective transportation, concentration of rural population and favorable economic and social conditions (Table 2).

Table 2. Aquaculture and capture fisheries in Uzbekistan (in 1000 tons)

Year	Capture fisheries			Aquaculture	Total
	Reservoirs	Lakes	Rivers		
1980	1.0	5.5	0.5	23.0	30.0
1994	0.8	2.0	0.3	14.6	17.7
1996	0.3	1.2	0	5.0	6.5
1999	0.4	3.1	0	5.6	9.1
2000	0.3	2.7	0	6.2	9.2

Source – Kamilov, 2003

Muynak city is in the Amu Darya delta in northern Karakalpakstan of western Uzbekistan (Fig. 1). Muynak (or Moynaq) had a fishing industry and thriving harbor that employed about 30,000 people at its heyday time (UNICEF). Fishermen used to catch fish and in Muynak fish – canning factory they process it. Fish cannery workers and fisherman, these two types of employed person were found. There were about 1,200 fishermen involved in 12 fisheries collective farm. They had 113 fishing ships and caught about 75% of total fish of Uzbekistan (Tleuov, 1981).

Fig 1. Moynaq fishing ground *(Source – Jutta Sommerbauer, 2008)*

Many people engaged in shipping company, ship maintenance plants and shipyards. But now Muynak is separated from sea by more than 140 kilometers. Vessels and ships that once floated in water now stand on sands rusting in the sun at ship graveyard. The affected people were displaced from there because of dust storms, poor health, poverty and most important lack of jobs. Severe droughts, intense heat and high evaporation rates caused the drying of lakes, rivers and reservoirs in Central Asia. Construction of dams and barriers also influenced the fish production especially in Kyrgyzstan and Tajikistan because they blocked migratory ways of fish. The quality of water is also a big factor for Amu Darya lower reach fishery and hydro ecosystems. Presence of poisonous minerals, radioactive elements, industrial waste, agricultural waste, salts, ionic contents and other pollutants restricted the fish biodiversity to develop. The hydro ecosystems of Karakalpak and Khorezm (Uzbekistan) and Tashaus (Turkmenistan), all are getting water from Amu Darya have high concentration of agrochemicals and that agrochemicals also found in fishes and when the people eat that fishes suffered from many types of diseases. According to one figure, the aquaculture and inland fisheries production in Central Asian countries fell down heavily (Table 3). Uzbekistan, Turkmenistan and Kazakhstan fell from between 60 to 70% and production in Kyrgyzstan and Tajikistan dropped by more than 90%.

Table 3. Production of fish in Central Asia (in tons) in between 1989 to 2006

Country	1989	2006
Kazakhstan	89,508	35,676
Turkmenistan	52,526	7,200
Uzbekistan	25,526	7,200
Kyrgyzstan	1,447	27
Tajikistan	3,547	210

Source – FAO, 2008

The fishing industry in Aral Sea Basin in its pick time had employed about 40,000 people and produced one- sixth of the USSR's production but the environmental change and uneven human interference reduced the production and caused thousands of people were unemployed. The established socio- economic situations disturbed after the crisis of Aral Sea. Apart from inland fishing, the fishing activity in Caspian Sea regions is also significant. Caspian Sea is a landlocked sea by five countries. Turkmenistan and Kazakhstan touched its border with Caspian Sea. Some important fish species like Sturgeon, Kilka, Seal, Roach and Goby are found in these regions. But the fish production declined in these regions because of illegal fishing, inland rivers sewage discharge, oil spills, polluted water of agriculture and refineries and transportation.

Conclusion

The disintegration of Soviet Union caused to the cancelation of trade agreements, distribution of agricultural products and economic linkages. All independent countries had formulated their own independent economy. For farmers, one of the biggest problems was the management of their individual land without any proper help of specialists or agronomists. Most of the farmers started to ignore farming practices and crop production mechanisms in Central Asia. Farmers were unknown about the balanced use of fertilizers, crop rotation, shortage of agricultural machinery, over pressure of human and livestock populations on land and water, new inexperienced farmers, shortage of irrigation water and inappropriate crop management and agronomic technologies. These all situations were leaded the exploitation of water and fertile lands which result the Aral Sea crisis, the biggest anthropogenic disaster. Fishing areas were worst affected due to drying of Aral Sea. Local people were highly dependent on this Sea. But salinization, sand storm and temperature rise make the situation unhealthy to survive. People suffered from many life killing diseases. Therefore, if we close analyzed the situation then we find that both agriculture and fishing depends on water availability but drying and contamination of maximum water resources of Central Asia caused the negative impacts on both the sectors.

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