Environmental Challenges in Aral sea basin : impact on Human health

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Abstract

The proposed paper intends to discuss the Aral Sea Environmental crisis in Central Asia and its impact on human health. The Aral Sea crisis in Central Asia is one of the biggest man- made Human disaster and ecological disasters in the world. After the disintegartion of Soviet Union, the Aral Sea water environmental challenges turned as a global challanges, when Central Asia beccame independent states its unable to solve this issues without global assistance. Aral Sea was the fourth largest source of water on earth, It was around 66,000 km2. However, the developmental human activities caused the aridness of Sea and water crisis in the basin. The destruction of the sea and its ecosystems as a result of cotton monoculture constitutes one of the greatest man-made environmental disasters in history. Various dimensions of Aral Sea crisis are well documented. However, the health impact of environmental disaster generated by Aral Sea crisis is an under-researched area exploring the health aspects in human security perspective provides a different view about the crisis and human tragedy it created in contemporary Central Asia. This paper focus mainly on the impact of environmental crisis on human health in five Central Asian states of Kyrgyzstan, Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan. And discuss about Environmental disaster, Environmental Degradation, Water Crisis, Climate change, Water Scarcity, Salinity, Desertification and Land Degradation in Central Asia. All these issues create human insecurity in Central Asia and as a result human health gets affected in this region.

Keywords: Environmental Crisis; Environmental Degradation; Land Degradation, Water Scarcity, Climate Change and Salinity.

Introduction

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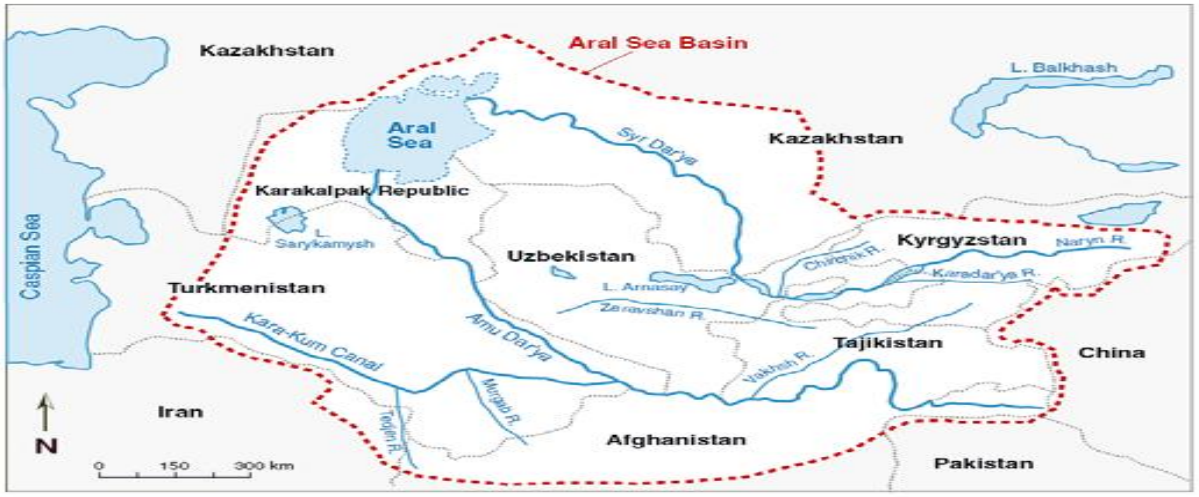
Aral Sea is the fourth-largest internal water resources in the world. Until 1960s, this water body had the surface of 68,000 km^2 and a volume of 1,056 cubic kilometers (km^3). Since 1960 the Sea has lost 73 percent of its water volume and has decreased in area by more than 50 percent. It has shrunk so much that as of now only two small water bodies are left, "Small Aral or North Aral" lying in Kazakhstan and "Large Aral or South Aral" lying in Uzbekistan. The shrinking of Aral Sea has given rise to many serious issues like social, economical, and ecological and health issues in the Aral Sea Basin.

After independent of Central Asian countries, they were unable to solve Aral basin crisis without interfering global assistance and its became a matter of international concern. It is among non-traditional security issues in the world. The Aral Sea destruction noticed as a greatest man made environment disasters, which caused by cotton monoculture of the region. The Aral Sea located between these two large deserts of Central Asia, "Karakum" and "KyzylKum". For centuries, the two rivers; Amu Darya and Syr Darya have been the main feeders of Aral Sea bringing huge volumes of freshwater into the Sea from north and south respectively. Syr Darya begins in Kyrgyzstan from "Tien Shan" mountains and Amu Darya begins in Tajikistan from "Pamir" mountains. Historically, Amu Darya supplied maximum volume of water; it's about 70 percent of the Aral Sea's water. The freshwater from these two rivers held in reserve the Aral Sea's water and salt at tolerable levels. Aral Sea was once a favorable ground for fishing. This water body annually yielded 40,000 metric tons of fish, weather most important tributaries of this delta hosted numerous smaller lakes, having biologically prosperous marshes and wetlands cover by 550,000 hectares. This sea spread not only to five Central Asian states, but also to Afghanistan and a some part of Iran.

Figure 1: The Aral Sea Basin



The Aral Sea Basin (Source: Micklin 2007)[2]

In the middle of the 20th century the Amu Darya had an around yearly flow of 77 km3 and the Syr Darya had a flow of 34 km3, whereas water use in this Sea amounted to about 117 km3 annually. There was an ecological balance in this region and the Aral Sea Basin was a good inhabitable place for millions until 1960s. But after 1960s decline of Aral water began. The force for financial growth by the former Soviet Union starting in the second half of the 20th century triggered the expansion of cotton (irrigated) production. To improve the production of cotton in the most remote areas, large dam were setup in upstream of both Syr and Amu Drya and for water diversities a huge canals was constructed. In this dry area millions of hectares for agricultural production were added by the establishment of this impressive irrigation network.

Environmental Challenges in Central Asia

Now the global environmental degradation is one of the biggest challenges in world. Which has created by human's activities, now become a severe danger for security of human. From Central Asia perspective, the region of Aral Sea is a good place to analyse these changes from Human Health Insecurity perspective. For the desert and semi desert region of Central Asian States, environmental issue presumes vast significance. Hence, Central Asian people were facing several environmental problems during the Soviet era. Further, the ecological issue has been aggravated during the last two decades. Environmental degradation is a process by which

[2] Micklin, Phillip (2007), "The Aral Sea disaster", Annual Review Earth Planetary Science. 35:47–72.

the environment is threatened in some way; the loss of biodiversity, Climate changes, stratospheric ozone depletion, water scarcity, Degradation of lands and change in ecosystem by Biodiversity loss can harm human health and the overall health of the environment. For example, the degradation of Aral Sea is major reason for vanishing of the Aral Sea, this is the main reasons disturbing the Central Asia's environment. More extraction of the Syr and Amu Darya rivers has been key reason of shrinkage of the Aral Sea. In significance, more than 40,000 square kilometres of marine uncovered to the extremely salty, and regularly windblown.

It is comprehensible that water of Syr darya and Amu darya has been very important for irrigation in this desert and semi desert region. At the same time as it was known that water was as valuable as blood for this province. In 1930, it was signalled the destruction of the very old system of irrigation of rice field, water pricing and the installation of a wasteful irrigation system at large scale. In Soviet Union economic structure whole state beside the Amu Darya which include of Uzbekistan Turkmenistan and Kyrgyzstan was selected for the cotton production. Large amounts of water were needed to irrigate the cotton industry especially to ensure high productivity. It was main income source for the Central Asian states. For this high level of irrigation, the only one alternative option was left to construct various dams across the Amu Darya River and to divert water that would have ordinarily gone into the Aral Sea, to meet the additional demand of irrigating cotton fields. This continued and by 1960s, it became obvious that the dams and large scale irrigation projects were drawing too much water from the Amu Darya since as the sea began to dry up. While prior to 1960 about 55billion cubic meters of water was flowing into the Aral Sea annually, by the year 2000 only about 1.5 billion cubic meters of water was reaching this region (Gidadhubli 2009)[3]. Finally, the monoculture of large cotton industry developed became the main culprit for the disappearing of the Aral Sea water.

Aral Sea ***Shrinking*** issues seem to be more callous in Central Asia as people have been totally depended on Aral Sea for survival. There has been major difference of water in the last 30 -35

[3] Gidadhubli, R.G (2009), "Security Concerns of Central Asia: Need of Effective Regional Cooperation", *Contemporary Central Asia*, 13 (2) august, 6-8

years leading to inefficient per capita accessibility of water. The root of this problem is attributable to a vast spreading of irrigation in the Central Asian Countries beginning in the 1950s, which highly reduced inflows towards the Sea.

The ***aridness*** of the Aral Sea has had major challenges for the population of the region in terms of health and employment. In some villages the majority of the population gets their drinking water from irrigation canals and the Amu Darya. During dry years, the population considers the drinking water salinity increased, tap water is limited or unavailable, and condition of groundwater and surface water become saline and polluted by bacteria. In Karakalpakstan and the lower delta of the Syr Darya, the incidence of common diseases associated with poor drinking water quality (typhoid, paratyphoid, dysentery, and viral hepatitis) is much higher than in the rest of the Aral Sea basin (Atanyazova 2003)[4]. According to McKinney, "the salt content of Aral Sea now exceeds 60 parts per hundred and has killed the sea's ecosystems, eliminating the once commercially-valuable fishery and causing salt laden windstorms that are detrimental to the population's health" (McKinney, 2003)[5]. Most of the fish species that once flourished in the Aral Sea have perished as the salinity of the sea has increased over the past decades. The Aral Sea has completely lost all of its commercial and most of its ecological importance as a fishery.

Karakalpakstan is an independent republic situated in the delta of the Amu Darya within Uzbekistan; has suffered more than any other region in Central Asian countries from the cumulative effects of the Aral Sea crisis. McKinney argues that due to decades of agricultural development that paid more attention to centrally-planned quotas than the state of the environment, nearly the whole of Karakalpakstan is either salinized or waterlogged" (McKinney, 2003)[6]. The main factors in this disaster are the release of highly mineralized and rich pesticide

[4] Ataniyazova, Oral A. (2003), "Health and Ecological Consequences of the Aral Sea Crisis", *the 3rd World Water Forum*, Uzbekistan.

[5] McKinney, (2003) "Cooperative Management of Transboundary Water Resources in Central Asia" in I*n the Tracks of Tamerlane—Central Asia's Path into the 21st Century*, eds. Burghart, D., and Sabonis-Helf, T., National Defense University Press, 2003.

[6] Ibid.

return flows into rivers, noticeably the use of unlined irrigation canals leading to waste and seepage of salts into groundwater, waterlogged fields leading to salty groundwater and salt runoff and the lack of drainage facilities to remove unwanted water and chemicals from the fields.

This diversion of water for enormous irrigation development was done intentionally by the officials of Soviet Union, unconcerned about the consequences of their actions. The development of human activity caused the aridness of Sea and water crisis in the basin. However, the destruction of the Aral Sea and its ecosystems as a result of cotton monoculture constitutes one of the greatest man-made environmental disasters in history. The Aral Sea is conceded as ***environmental disaster*** is about water, nutrition, air quality, climate, economy and the health care systems that are pushed into crisis. For example; winds pick up dust from the seabed and deposit it over a large populated area and this dust likely contains pesticide and chemical deposits that are responsible for the serious growth in mortality and other health problems in this region.

The problem of ***desertification*** is another big challenge which is caused by change in water supply conditions of the territory and drying of Aral Sea Region. Desertification refers to persistent deterioration process taking place in environment supplemented by a drop in the biologic production, salinization, development of erosion and other negative outcomes which directly influence the living determiners of the population and functioning in general of the economy of the region. In Kazakhstan, the Syr Darya delta has suffered lesser, but still significant damage. The river flows through deltas has greatly reduced, the effective abolition of spring floods in them (owing both to abridged river flow and building of upstream storage reservoirs) and gradually declining levels of ground water caused through the falling level of the Aral Sea, which have led to dispersal and increasing desertification.

The active influence of human activity on environment is often one of the major causes of its occurrence and it aggravates this process. The problem of social development prevailing in the region must be highlighted in the aggregate of problems. The drinking water problem remains one of the gravest social problems as there is reduced supply of quality water to rural population.

There has been a drop in the living standards of population during the transition period. However, it became intensified as a result of the impact of the deteriorating environment in the Aral Sea crisis due to above mentioned reasons. After Karakum and Kyzyl-Kum desert inhabits a vast expanse of the Syr Darya and Amu and it is second desert in the area in Central Asia. The region of Karakalpak and Kyzyl-Kum is one among the major pasturelands of distant pasture animal husbandry. Monotonous but continuous sandy territories sometime extend to several kilometres and sometime ridge like sand dunes. The environment developed in the region demands a significant change in the policies and strategies related to socio-economic development.

There is an increase in ***dust storms*** containing toxic salt residue. Populations (sometimes hundreds of miles away) downstream and downwind, inhale these cancer causing agents as consequence they suffer incidences of infant mortality, typhoid, hepatitis, respiratory illnesses and oesophageal cancers, etc. (Weinthal 2002)[7]. Wind scattered dust from the dry lake bed carries for great distances and has increased respiratory illnesses. The region of the cotton monoculture agricultural land and increased salinity of the Aral Sea is probably the main cause of death. But the cotton monoculture is also toxic pollution. The region was sprayed high amount pesticides such as lindane and DDT regularly; these are also sprayed frequently over the worker cotton field and villages through aircraft. All type of pesticides created a high quality risk on human health. In the last 15 years of the Soviet Union, the typhoid fever incidence has increased to a level 30 times greater than that of the world average. Similarly, incidents of hepatitis grew to 7 times the world average (Frederick 1991)[8]. Most of the increment can be attributed to the de-struction of the Aral Sea Basin which resulted in more limited and polluted potable water supplies while some of the increments in these diseases can be accredited to the economic and social turmoil in the period leading up to and during the collapse of the Soviet Union.

[7] Weinthal, Erika.(2002), "State Making and Environmental Cooperation: linking Domestic and International Politics of Central Asia". Cambridge, MA: The MTT Press. Pp. 2- 6.

[8] Frederick, Kenneth D. (1991). "The Disappearing Aral Sea". *Vital Water Graphic Resources* 102: 1-5.

The Aral Sea now bare seabed infected by runoff former- Soviet military base and a biological weapons laboratory. As result, the ecosystem of the Aral Sea has collapsed, the Aral Sea Basin have been documented by the ***climate changes***. The local climate of this region has been moderated with hotter, shorter summer and longer colder winter. Drying of Aral Sea is a very dramatic example of destroyed environment through the human being. Temperature of January month during 1981-88was 3.0-3.5 degrees Celsius lower in the Aral Sea region than the previous average and for the same period for July month it was 1-4 degrees Celsius warmer than average (Glantz 1999)[9]. Further, during the Soviet period vegetative season decreased to 170 days, the frequency of very hot days & dry weather increased by 15 %, and far short of the 200 frost free days were needed to grow cotton crop (Glantz 1999; Kriner 2002)[10]. Fishing industry regions were destroyed by the Aral Sea disaster. To the epitome of the problem, desertification is making its path in most of the surrounding agricultural land. Local climate change issues including irregular rain fall is also making huge adverse impact on the farmer's field and occupation. Declining production of fishery, some ten thousands of people were thrown out from their work.

Major Health Impacts on the Aral Sea Basin

The population around the Aral Sea suffers from generally poor health. Diseases seem to increase, particularly rates of tuberculosis, anaemia, respiratory infections, kidney and liver diseases, cancer and allergies. Average life hope in Kazakhstan's KyzylOrda decreased from 64 to 51 years old. Mostly women and children are in danger. fertilizers and pesticides, water pollution from industrie's waste materials, dust atromes, soil salinity, aridity, lack of potable water due to high level of dissolved solids, total hardness and sodium in water has affected human healths and its also cause of many disorders.

[9] Glantz MH. (1999), Creeping environmental problems and sustainable development in the Aral Sea Basin. Cambridge University Press, Cambridge. Pp. 3-9, 9- 94.

[10] Ibid, Kriner, Stephanie (2002). "Aral Sea Ecological Disaster Causes Humanitarian Crisis". http://www.redcross.org/news/in/asia/020410aral.html

Analysis of specific non-infectious morbidity dynamics in the Aral Sea Area population shows that the growing tendency of the morbidity by such pathologies as cardiovascular (blood vessel) diseases and diseases of urogenital system (reproductive system) was noted in recent years. These indices were higher than in the rest of Uzbekistan. Probably it is related to the large influence of the water factor (high mineralization and hardness of drinking water) on the functioning of the human body. At present the health conditions of the population living in the Aral Sea Region should be considered in relationship with the long term exposure to environmental contamination and particularly to the pollution of drinking water by salts.

Major Health Problems in Aral Sea Region

Disease/Affliction	**Major Cause**
Respiratory problems	Blowing salt and dust
Viral hepatitis	Contaminated water
Typhoid fever	Contaminated water
Cancer	Blowing salt and dust, toxic contaminants
Intestinal disorders and infections	Contaminated water, blowing salt and dust
Birth abnormalities	Toxic contaminants
Plague	Explosion of rodent population on dry sea bottom

Source: P. Micklin and W. Williams, *the Aral Sea Basin*, NATO, 1996.[11]

Epidemic diseases:

Urolithiasis (stone in urinary tract) and ***hypertension*** were specified as the problematic group of pathology, with the tendency to increase during the last several years and call for specialized

[11] Micklin, p. and W. Williams, *The Aral Sea Basin*, NATO, 1996.

study on the existence of an environmental effect, in this case the impact of water quality on such phenomena in population of the Aral Sea Area. According to the findings of some studies the prevalence of urolithiasis (stone in urinary tract) in the Aral Sea Area increases, particular, due to hardness of water. In general, most of these studies evaluate the morbidity on the basis of the routinely collected official data. This approach based on the data of visitation of patients to the medical facilities does not meet the necessary requirements of ***epidemiological*** studies for detecting real causing factors (Arustamov 2001, et al.)[12]

There upon the epidemiological survey has been conducted with regard to study the most frequent urological and cardiovascular diseases (heart or blood vessel diseases), as urolithiasis and hypertension among population of village Gandimiyon (Khiva district of the Khorezm region) Situated in the Aral Sea area, with a focus on the drinking water quality (Fayzieva 2002; Arustamov 2001)[13]. According to the finding of study the prevalence of urolithiasis was detected in 6.0 per 1000 examined population. Rate of urolithiasis was lower among those residents using of well water than the respondents using tap water for drinking (5.3 per 1000).

Main causes of death, standardized death rates all ages per 100,000 people, 1990-2005 (selected years)

	1990	**1995**	**2000**	**2005**
Diseases of the circulatory system	480	628	601	561
Diseases of the respiratory system	139	188	116	79

[12] Arustamov, DL, Fayzieva DK, Nurullaev RB, Klyopov YY. (2001), "Study on the rate of urolithiasis in the Aral Area and the quality of potable water", In: Fajzieva D, Brebbia CA, editors, Environmental Health Risk1, WIT press, Southampton, Boston. pp. 105- 111.

[13] Arustamov, DL, Fayzieva DK, Nurullaev RB, Klyopov YY. (2001), "Study on the rate of urolithiasis in the Aral Area and the quality of potable water", In: Fajzieva D, Brebbia CA, editors, Environmental Health Risk1, WIT press, Southampton, Boston. pp. 105- 111.

Malignant neoplasm (cancer)	113	69	78	73
Diseases of the digestive system	39	50	47	46
External cause, injury and poison	57	59	36	33
Infectious and parasitic diseases	43	62	36	29
Mental disorders and diseases of the nervous system and sense organs	7	14	10	11

Source: WHO Regional Office for Europe, 2010.[14]

Rate of hypertension among examined group of population of the village was 28.75 per 1000 population. It was significantly higher among respondents using well water 44.8 per 1000 than those respondents using tap water 12.6 per 1000. At the same time, the rising of the rate of hypertension among examined group was caused by the increase in the consumed volume of drinking water. Thus, relatively low level of urolithiasis in the village Gandimiyon of the Khorezm area did not confirm to the locally dominating opinion on the impact of increased levels of water hardness on stone formation in the urinary region. The study on rate of hypertension in relation with water consumption and using of different water sources for drinking gives grounds to assume that high level of sodium has exaggerating effect on development of the diseases among population in the Aral Sea area (Arustamov, 2001)[15].

Childhood Anaemia:

Childhood anaemia is recognized as a significant and growing health problem among children in the region and the hypothesis that due to several factors, including iron deficiencies and environmental impact. Relationship between anaemia and contaminate environmental impact

[14] WHO Regional Office for Europe, (2010), *Millennium Development Goals in the WHO European Region: a situational analysis at the eve of the five-year countdown*. Copenhagen. (http://www.euro.who.int/__data/assets/pdf_file/0006/95595/E93723.pdf).

[15] Ibid.

have investigated and iron deficiency anaemia among schoolchildren in two regions of Kazakhstan and found a significantly higher rate in the area close to the sea, and iron deficiency anaemia are only one third of all cases (Morse and Holmes 1994)[16]. Morse suggests potential causes of anaemia to be here micronutrient status, parasite infection, genetic disorders, and the impact of environmental pollutants. Exploring Diet and haematological data in a subsample of the same population, it was found that iron intake was enough, but that bio available iron intake was significantly lower metabolic needs when uptake inhibitors common Kazakh diet (for example: black tea and whole grains) were considered. Though there are some limitations in this study, including small sample size and the algorithms used to assess the bio availability, the Morse is right in suggesting that iron improvement or supplementation programs alone cannot solve the problem of anaemia in the region.

Hypercalciuria, Crystalluria and renal tubular dysfunction

Exposure to high saline environment in the Aral Sea region is reported to be associated with a number of health problems, including hypercalciuria high levels of calcium in the urine (CA) and sodium (Na) excretion (Abdullaev 2010)[17]. ***Crystalluria*** (the formation of crystals in the urine), predecessor urolithiasis formation of urinary stones or "stones" in the urinary tract, is reported. Relationship between crystalluria, urolithiasis and high urine sodium and other dissolved solids in drinking water is common. Take on a random in a "typical settlement" in Uzbekistan Region (Khorezm) for an interview and urological research. Results adults showed significantly lower rates of those who are in other local data. Between 50 and 85 percent of children were identified as having crystalluria, but were not provided any contribution rates. (Kaneko et al.2002)[18].

[16] Morse, C. and Holmes, F. (1994). "The prevalence of anemia in the Aral Sea region. The meaning of anemia". Common Health Newsletter 2.

[17] Abdullayev, I. (2010) "Aral Sea crisis: large scale irrigation and its impact on drinking water quality and human health", Asian Journal Water Environmental Pollution. 7(1), 63-69.

[18] Kaneko K, Chiba M, Hashizume M, Kunii O, Sasaki S, Shimoda T, Yamashiro Y, Dauletbaev D, Caypil W, Mazhitova Z. (2002), "Extremely high prevalence of hypercalciuria in children living in the Aral Sea region". Acta Paediatr. 91(10): 1116-20. http://www.ncbi.nlm.nih.gov/pubmed/12434899

conducted a study in August 2000 study the prevalence of hypercalciuria in a random sample of school children living near the Aral Sea (Karalinsk) and a control group of Kazakh live far from the sea. Results showed hypercalciuria in almost 40 percent of children in the group of the Aral Sea compared with 13 percent in the control group. In while the consumption of salt water, dust, and food is one of the possible causes of increased urinary excretion of urine and sodium, other renal tubular dysfunction (kidney problem) related with toxic chemical (e.g., lead and cadmium).

Spread of Infectious Diseases

The most serious problem is the continuing spread of infectious diseases such as ***tuberculosis*** (T.B), ***hepatitis*** (Inflammation of the liver) and ***respiratory***, ***gastrointestinal*** (food poising) diseases (Ministry of Health, Department of Statistics, from 1997 and the Demographic and Health Survey 1996)[19]. Other sets of complex diseases are chronic health problems for which no reason, no action to prevent them clear.

The retreat of the Aral Sea has exposed former seabed significant winds that led to airborne dust deposition rates, which have been found to be one of the highest in the world. Dust (PM10 or less) exposure has been hypothesized that a potential risk factor for acute respiratory infections, asthma and other respiratory diseases, conditions that have been considered in a number of studies in the area of the Aral Sea (UNICEF 2000; Institute of Obstetrics and Gynaecology Uzbekistan and Macro International, Inc. 1997)[20].

Institute of Obstetrics and Gynaecology Uzbekistan and Macro International Institute. In 1997 reported that the percentage of children under 3 years old with a cough and rapid breathing (symptoms compatible with SARS) during the 2 week period was 3.8% compared to 1.2% nationally. UNICEF found rates of minor symptoms of ARI (<1%), although the study was

[19] Ministry of Health, Division of Statistics. Public Health Services and Population Health in the Republic of Uzbekistan, (1997) - Informative and Statistic Booklet [English and Russian]. Tashkent, Uzbekistan: Ministry of Health, Division of Statistics, 1998.

[20] UNICEF (2000), MICS, Multiple Indicator Cluster Survey. State Department of (Uzbekistan) and UNICEF: Uzbekistan, Tashkent. And Institute of Obstetrics and Gynaecology [Uzbekistan], Macro International Institution. (1997) Uzbekistan Demographic and Health Survey (UDHS) 1996. Institute of Obstetrics and Gynecology and Macro International institution.

conducted in the summer, when respiratory infections, usually at the lowest level (UNICEF2000)[21]. Lung function and respiratory symptoms of children across Karakalpakstan found significant geographical variation of these results, but no significant association with the deposition of dust. Over all, the evidence that respiratory health has been affected by exposure to the environment in the Aral Sea area remains questionable.

Higher number of Anaemia in Women

Lack of contraceptives forces women to resort to abortion as a means of birth control. Unsafe abortion is a common cause of morbidity and mortality in women, but only one of many major medical interventions, which are still often lead to complications due to poor sanitation and lack of antibiotics. Many pregnant women suffer from malnutrition. Anaemia is one of the most acute problems, and iodine deficiency and chronic malnutrition are very common in the region, while the absence of laboratory testing equipment is a complete blood count is impossible. Chronic malnutrition in children is also reported from several countries (Morse 1994).

In Karakalpakstan a higher number of women are suffering from anaemia which rate is 91 percent of non-pregnant, 87 percent of teenagers, and almost 99 percent women; anaemia is very big problem for this region. In the 1980s, only 17-20% of pregnant women were anaemic. Level drops during pregnancy about 70% of pregnant women in Karakalpakstan have severe anaemia in the third trimester. Mostly women have face complications during pregnancy and childbirth, including internal bleeding. 87 percent babies also infected with anaemia. In the absence of anaemia during pregnancy and early childhood poses a high risk for a weak immune system and the risk of brain damage.

High levels of reproductive pathologies (complications during pregnancy and birth, miscarriages, infertility) include in this region for over 20 years. One out of every 20 children born with abnormalities, and this figure is about 5 times higher than European countries. High levels of pesticides detected in most samples Karakalpakstan women represent a greater threat to both mothers and their children. Effects include changes in reproduction and foetal development,

[21] UNICEF (2000), MICS, Multiple Indicator Cluster Survey. State Department of (Uzbekistan) and UNICEF: Uzbekistan, Tashkent.

neurobehavioral changes, impaired endocrine function, dermatological damage, soft tissue cancer, and changes in liver function. The environmental factors as like; salinity of drinking water, pesticides are mainly cause of poor health for women and children in the region of Aral Sea. Arrangements with social, medical factors are cause of maximum number of pathologies in this region (Ataniyazova, Oral 2003)[22].

Poor fertility

In the newborn mortality rate in the Aral Sea region has increased from about 25 per 1,000 live births in 1950 to 1970 it was 100 per 1,000 in 1996. In some areas of Karakalpakstan, the newborn mortality rate is more than 100 thousand. Low birth rate, growth retardation, delayed puberty and backwardness psycho neural all considered being much more common than usual. Acute respiratory infections account for almost half of all child deaths, while gastrointestinal diseases rank second (MSF 2001)[23].

Cases of many diseases increases by Water carries infectious diseases, including typhoid fever, hepatitis and gastrointestinal diseases caused widespread outbreaks (MSF 2001; Glantz 1999)[24]. Tuberculosis and respiratory diseases are serious problems. Malnutrition and anaemia at very high speeds (Ataniyazova et al. 2001; Ferriman 2000)[25]. Liver and kidney diseases are becoming more common, as well as certain types of cancer, especially liver and oesophagus (Glantz

[22] Ataniyazova, Oral A. (2003), "Health and Ecological Consequences of the Aral Sea Crisis", *the 3rd World Water Forum*, Uzbekistan.

[23] MSF (2001) Aral Sea Programme, Medecins Sans Frontieres, Accessed online 16 February 2014 URL:http://www.msf.org/aralsea

[24] Ibid, Glantz MH. (1999), Creeping environmental problems and sustainable development in the Aral Sea Basin. Cambridge University Press, Cambridge. Pp. 3-9, 9- 94.

[25] Ataniyazova Oral A, Adrian S, Mazhitova Z, et al (2001), Workshop report: Continuing progressive deterioration of the environment in the Aral Sea region: disastrous effects on mother and child health". Acta Paediatrica 90:589-591. And Ferriman A. (2000), "Charity calls for help for people of Aral Sea area". British Medical Journal 320:734.

1999)[26]. Kazakhstan mortality is very high. In 1965, the infant mortality rate for the entire basin of the Aral Sea was about forty-five deaths per thousand live births. Now it is about more than seventy per thousand. (Giles FS; Wiggs et al. 2003).[27]

Among children under five years, acute respiratory infections as well as pneumonia (lung infection) are responsible for between one third and half of newborn death. In Kazakhstan, diarrhoea, acute respiratory infections, including influenza and pneumonia accounted for more than 40 % of deaths of children fewer than five years.

Birth weight and postnatal growth

All national health surveys Uzbek above consideration of physical development, including birth weight, weight-for-age and height-for-age. Institute of Obstetrics and Gynaecology Uzbekistan and Macro International Inc. In 1997 say, no significant differences were detected between the study region of Karakalpakstan, Khorezm and other regions of the country on the percentage of infants born weighing less than 2500 g (defined as low birth weight). As for the height -for-age, over 26% of children from Karakalpakstan, Khorezm were moderately to severely stunt (defined as -2 standard deviation units from the median of the international reference population WHO). Although this figure is high, it is somewhat smaller than that reported in the national (31%). In Ministry of Health of the Republic of Uzbekistan in 2004 results show that in Karakalpakstan and Khorezm children under 5 years average, lived the same or better than in other study areas for height for age, weight, height, and weight for age. In Karakalpakstan and Khorezm in 2000 9% of children born within 12 months of the study were low birth weight is defined as born under 2500 g as compared to 6.0% in Uzbekistan as a whole (UNICEF, 2000). In 2006 the study

[26] Glantz MH. (1999), Creeping environmental problems and sustainable development in the Aral Sea Basin. Cambridge University Press, Cambridge. Pp. 3-9, 9- 94.

[27] Giles F.S. Wiggs et al. (2003) "The Dynamics and Characteristics of Aeolian Dust in Dryland Central Asia: Possible Impacts on Human Exposure and Respiratory Health in the Aral Sea Basin." The Geographical Journal (June 2003): 142-157.

area of Karakalpakstan and Khorezm had the lowest percentage of children born under the 2500 (UNICEF 2006)[28].

Persistent organic pollutants (POPs): the risks, as well as the body burden

Persistent organic pollutants (POPs) and heavy metals found in agricultural chemicals have been reported to be present at high levels in local products. environment and population of the Aral Sea, understanding of other contexts to pose significant health risks to children, affecting the endocrine (gland which help to control metabolic activity), reproductive and immune systems, neurological development and pre-and post-natal growth (Jensen et al. (1997)[29]. In reply the decline in breastfeeding, problems associated with chemical contamination of the mother, examined levels of contaminants in breast milk and a variety of products, including fish and dairy products.

The results showed that breast milk samples taken from agricultural areas of southern Kazakhstan were very important levels of highly toxic compounds, including tetra-chloro-dibenzo-p dioxin (TCDD) product of many common agricultural chemicals (Jensen et al. (1997)[30]. in a comparative study of Kazakh children living near the Aral Sea and hospitalized for "environmental illness" and the reference population of comparable age from Europe and Almaty, found that levels of poly chlorinated biphenyls (PCBs), dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyltrichloroethane (DDT) of the compound in blood lipid significantly higher among hospitalized children. Although these results are important, comparing children with symptoms of "environmental illness" to those who do not is problematic.

[28] UNICEF (2006), MICS, Multiple Indicator Cluster Survey. State Department of Statistics (Uzbekistan) and UNICEF–Uzbekistan, Tashkent.

[29] Jensen S, Mazhitova Z and Zetterstrom R. (1997) Environmental pollution and child health in the Aral Sea region in Kazakhstan. The Science of the Total Environment 206:187-193.

[30] Ibid.

Single body burden study was conducted in Karakalpakstan (Ataniyazova, et al.2001).[31]Tests to measure the metals, persistent organo-chlorine-pesticides (OCPs) and dioxins have been made in the cord blood, the blood of pregnant women and in breast milk from subjects living in the immediate vicinity of the Aral Sea. Like the results presented in Kazakhstan, the results showed significantly high levels of β-HCH, DDT and DDE levels of TCDD and six times higher than those in Western Europe and one of the highest levels in any country in the world.

Conclusion

Water is very important resource for Human development not only in Central Asia Aral Sea basin also in all worlds. Humans are highly depended on this resource. It's very important not only for domestic use but also for agriculture and industries. Environmental challenges in Aral Sea Basin are one of the most important issues in Central Asian Region in aspect of peace, security and health. It's very complicated issues which effected health and economic, regional and international aspect of Central Asia's people directly and indirectly.

On conclusion stage can say that the drying of the Aral Sea accompanied by high degradation, which affected its own and neighbouring ecological system. The east of Aral Sea became more vulnerable due to ecological degradation in the Syr Darya and the Amu Darya where the Khorezm Region of Uzbekistan, the Republic of Karakalpakstan and the Tashsuz Region of Turkmenistan are located. Hence the direct impact on water resource manipulated through the construction of various barrages and dams, who help to divert the water follow for irrigation purpose.

Human health is required strategic involvement to understand the desirable results, through agreement, support of high policies on global level. Water is very basic need for human life even we can't imagine human life without water because of it through environment we must study

[31] Ataniyazova, Baumann RA, Liem AKD, Mukhopadhyay UA, Vogelaar EF, Boersma ER (2001). "Levels of certain metals, organochlorine pesticides and dioxins in cord blood, maternal blood, human milk and some commonly used nutrients in the surroundings of the Aral Sea (Karakalpakstan, Republic of Uzbekistan)" Acta Paediatric. 90(7):801–808. http://www.ncbi.nlm.nih.gov/pubmed/11519985

about water crisis and human health. Although in Central Asia water degradation has traditionally been an environmental or technical issue, its causes and effects are linked to socio-economic conditions and its prospects related to political frameworks. Even assuming that suitable technical options exist for managing water degradation, there is no guarantee that such options will be adopted, even if longer term national or global interests are served thereby. In other words, neither individuals, corporate nor governmental responsibility for the environment can be assumed, nor any policies aimed at managing water degradation can be recognized. In these circumstances to start with, the primary objective should be to ensure that any technical options for managing water degradation are the best that current scientific knowledge allows. Some degradation, like soil nutrient depletion, is relatively uncomplicated and locally manageable in technical terms. Others, like deforestation, are less straightforward on account of their broad bio-physical feedbacks and overall technical complexity.

In short I can say that through salt and Air burn the drying of Aral Sea have many harmful effects on human health and animals. Excess use of pesticides in the rice and cotton fields and the remains thing release into the rivers, has badly infected the water of Aral Sea. Especially for those peoples, who is living along the rivers banks. Diseases like tuberculosis, cancer, allergies and anaemia are normally in this region; so many children already born with defects and this reason has affected people's health badly.

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