



044468

EACH-FOR
Environmental Change and Forced Migration Scenarios

Specific Targeted Project
Scientific support to policies – SSP

D.2.2.1. General Overview Study NIS and Central Asia

Due date of deliverable: 31.07.2007
Actual submission date: 14.02.2008

Start date of project: 01.01.2007

Duration: 2 years

Organisation name of lead contractor for this deliverable: CEDEM

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Contents

1. OVERALL CONTEXT 3

1.2. Short overview of the region as a whole 3

1.2. Development, Population and Socio-Economic Trends 5

1.3. Political context 9

1.4. Socio-cultural aspects..... 10

2. ENVIRONMENTAL DEGRADATION..... 11

2.1. General overview..... 11

2.2. Aral Sea..... 15

2.3. Ferghana Valley 19

3. MIGRATION PROCESSES..... 23

3.1. General Overview and Historical Development 23

3.2. Main migration patterns, trends, and networks..... 26

3.3. Migration policies..... 27

CONCLUSION 28

Foreword

This General Overview Study is a compilation of a data and reports gathered in preparation of the case-studies to be conducted by the EACH-FOR project in the region. These case studies will include the Ferghana Valley in Kyrgyzstan and Tajikistan, as well as the Aral Sea in Kazakhstan, and will be conducted in the first half of 2008. Thus, though three case studies will be conducted, they are related to two environmental hotspots only, the Ferghana Valley hotspot being looked at from Kyrgyzstan and Tajikistan. This is reflected in the structure of this study, and particularly in Section 2 on environmental degradation.

This overview study is a first version that will be complemented by the works of local subcontractors, and presented at a seminar in Bishkek on March 11-12, 2008. The parts on environmental degradation were contributed by Jill Jäger and Johannes Frühmann, both from SERI.

1. Overall context

1.2. Short overview of the region as a whole

Central Asia is traditionally considered as a vast region of Asia, made up of five countries: Kazakhstan, Turkmenistan, Kyrgyzstan, Uzbekistan and Tajikistan. Despite some variations in the definitions of the region over time, this definition now seems to be the most accepted. The region is completely landlocked and is bordered by Russia, China, Afghanistan and Iran.



Figure 1: Map of Central Asia (Source: UN 2007)

The countries of Central Asia share many common characteristics, including strong historical ties with their nomadic peoples.

The geography of the region is varied, including high mountains, deserts and steppes. Most of Central Asia’s territory is too dry for farming, and land degradation and desertification are important environmental problems. The most important water sources are the Aral Sea and the Lake Balkhash, but they have both dried up considerably in recent years, as a result of desertification.

The five republics used to be part of the USSR, and their environment still bears the marks of the Soviet legacy: chemical, nuclear and land pollution are very pressing issues. Central Asia is home to some of the world’s most polluted sites, according to the Blacksmith Institute¹. Amongst them are the Aral Sea, the Ferghana Valley and the Semipalatinsk industrial complex in Kazakhstan. The former two will be the subject of EACH-FOR’s case-studies.

Given its strategic location between Europe, Russia and Asia, Central Asia has long been a strategic interest of the world’s superpowers. In addition, the region has some of the world’s largest reserves of oil, gas and uranium.

It is estimated that Central Asia is home to about 60 million people. Most of them are Shia Muslims. Though Russian is commonly spoken within the region, Central Asia’s languages belong to the Turkic group, with languages specific to each of the former Soviet republics.

The five republics still have strong ties with each other, leading the president of Kazakhstan Nazarbaev to propose the creation of a regional organization, the Central Asian Union, in April 2007.

Country	Population	Area	GDP
Kazakhstan	15,217,700	2,724,900 km ²	\$125.5 billion
Kyrgyzstan	5,264,000	199,900 km ²	\$10.764 billion
Tajikistan	7,320,000	143,100 km ²	\$8.802 billion

¹ The World’s Most Polluted Places, Blacksmith Institute, 2007.

Turkmenistan	5,110,023	488,100 km ²	\$45.11 billion
Uzbekistan	26,593,000	447,400 km ²	\$50.395 billion
Total	59,504,723	3,515,300 km²	\$240.571 billion

1.2. Development, Population and Socio-Economic Trends

Kazakhstan



Figure 2: Map of Kazakhstan (Source: CIA World Factbook)

Kazakhstan is the world's largest landlocked country, and the 9th largest country. It is over 2.7 million square kilometers in size. The country is inhabited by 15.3 million, with a population growth rate of 0.35 %. Thus the population density is rather low, with 5.55 inhabitant/square kilometer. The birth rate stands at 16.23 births/1000, with a fertility rate of 1.89 children born/women, while the death rate is at 9.4/1000. The median age of the population is 29.1 years (male: 27.5 years, female: 30.8 years), and the age structure stands as follows:

0-14 years: 22.5%
 15-64 years: 69.2%
 65 years and over: 8.3%

The sex ratio is 0.932 male/female, with a life expectancy of 67.22 years (male: 61.9, female: 72.84). The infant mortality is however still rather high, with 27.41 deaths/1,000 births. The literacy rate is excellent, with an official 99.5 % of the population over 15 being able to read and write.

In terms of development, Kazakhstan is classified as a medium country in terms of human development by UNDP, standing at the 73rd rank in 2007, a position that has consistently increased since 1995, after a drop following the collapse of USSR. Its GDP per capita is 7,857 USD, and the annual growth of the GDP is around 9%. Following major economic reforms at the collapse of USSR, Kazakhstan is now a market economy. Industry and services represent most of the GDP (and respectively 30% and 50% of the total workforce), with agriculture making up about 6% of it, despite 20% of the total workforce being employed in this sector. Kazakhstan received US\$ 230 million foreign aid in 2006, and US\$ 178 million in remittances. In 2007, its debt represented 11.8% of the GDP.

Kazakhstan’s natural resources are extremely rich, with large reserves of fossil fuels and minerals. The unemployment rate is at 7.1 %, with 19% of the population living below the poverty line. In 2007, the total value of exports reached US\$44.8 billion, and the total value of imports were of US\$29.91 billion. Kazakhstan has 90,000 kilometers of roadways, and 84,000 kilometers of them are paved.

Kyrgyzstan



Figure 3: Map of Kyrgyzstan (Source: CIA World Factbook)

Kyrgyzstan is a landlocked country, with the Tien Shan mountainous region covering about 80% of its surface. It is about 200,000 square kilometers in size. The country is inhabited by 5.2 million people, with a population growth rate of 1.35 %. Thus the population density is rather 26 inhabitant/square kilometer. The birth rate stands at 23.08 births/1000, with a

fertility rate of 2.68 children born/women, while the death rate is at 7.0/1000. The median age of the population is 23.9 years (male: 23.1 years, female: 24.8 years), and the age structure stands as follows:

- 0-14 years: 30.3%
- 15-64 years: 63.5%
- 65 years and over: 6.2%

The sex ratio is 0.962 male/female, with a life expectancy of 68.81 years (male: 64.8, female: 73.02). The infant mortality is however still rather high, with 33.8 deaths/1,000 births. The literacy rate is excellent, with an official 98.1 % of the population over 15 being able to read and write.

In terms of development, Kyrgyzstan is classified as a medium country in terms of human development by UNDP, standing at the 116th rank in 2007, a position that has consistently increased since 1995, after a drop following the collapse of USSR. Its GDP per capita is much lower than Kazakhstan's, at 1,927 USD, and the annual growth of the GDP is around 6%. Despite major economic reforms at the collapse of USSR, Kyrgyzstan is still a poor country, experiencing many economic difficulties, with a large agricultural economy. The services industry represent a bit less than 50% of the GDP, while agriculture still represent more than 30% of it.

	By % of the GDP:	By % of the workforce
Agriculture	31.7%	55%
Industry	19.8%	15%
Services	48.4%	30%

Kyrgyzstan received US\$ 268 million foreign aid in 2006, and US\$ 322 million in remittances. In 2006, its external debt reached 1.8 US\$ billion.

The unemployment rate is at 18 %, with 40% of the population living below the poverty line. In 2007, the total value of exports reached US\$1.04 billion, and the total value of imports were of US\$2.51 billion. Kyrgyzstan has 18,500 kilometers of roadways, and 16,800 kilometers of them are paved.

Tajikistan



Figure 4: Map of Tajikistan (Source: CIA World Factbook)

Tajikistan is a mountainous landlocked country, with Persian roots. It is about 142,600 square kilometers in size. The country is inhabited by 6.7 million people, with a population growth rate of 1.89 %. Thus the population density is rather 47 inhabitant/square kilometer. The birth rate stands at 27.33 births/1000, with a fertility rate of 3.09 children born/women, while the death rate is at 7.05/1000. The median age of the population is 21.3 years (male: 20.8 years, female: 21.8 years), and the age structure stands as follows:

0-14 years: 35%

15-64 years: 61.2%

65 years and over: 3.8%

The sex ratio is 0.99 male/female, with a life expectancy of 64.61 years (male: 61.6, female: 67.78). The infant mortality is however still rather high, with 43.64 deaths/1,000 births. The literacy rate is excellent, with an official 99.2 % of the population over 15 being able to read and write.

In terms of development, Tajikistan is classified as a medium country in terms of human development by UNDP, standing at the 122nd rank in 2007, a position that has consistently increased since 1995, after a drop following the collapse of USSR and the civil war that ensued. Its GDP per capita is 1,356 USD, one of the lowest of the former Soviet republics, and the annual growth of the GDP is around 7%. Partly due to a civil war that followed

independence, Tajikistan is a poor country, with a predominant agricultural economy. The different sectors of the economy are as follows:

	By % of the GDP:	By % of the workforce
Agriculture	23.6%	67.2%
Industry	30.6%	7.5%
Services	45.8%	25.3%

Tajikistan received US\$ 241 million foreign aid in 2006, and US\$ 466 million in remittances. In 2006, its external debt reached 1.31 US\$ billion.

The unemployment rate is at 12 %, with 64% of the population living below the poverty line. In 2007, the total value of exports reached US\$1.74 billion, and the total value of imports were of US\$2.36 billion. Tajikistan has 27,700 kilometers of roadways.

1.3. Political context

Kazakhstan

Kazakhstan is a republic with authoritarian presidential ruling, with little power outside of the executive branch. It gained independence in 1991, following the collapse of the Soviet Union. President Nazarbayev has been ruling the country since 1991.

The country is party to the following international environmental conventions: Air Pollution, Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Ship Pollution, Wetlands. It has signed, but not ratified, the Kyoto Protocol.

The country can be described as a ‘soft dictatorship’, where mock elections are held every 7 years. The number of presidential mandates is not limited. However, trade unions and human rights organization do exist.

Kyrgyzstan

Kyrgyzstan has been affected by political unrest after the troubles that followed the 2005 general election. The ‘Tulip Revolution’ forced President Akayev to resign, and the situation has been unstable since then, with several members of the parliament being assassinated. Human right and trade unions do exist, but are scarce.

The country is party to the following international environmental conventions: Air Pollution, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Hazardous Wastes, Ozone Layer Protection, Wetlands.

Tajikistan

Immediately after gaining independence in 1991, Tajikistan fell into a civil war, with different factions fighting each other, allegedly backed by Russia and Iran. The country is a republic, ruled by President Rahmonov. He was re-elected in 2006, despite protests by the opposition parties. As a result, the human rights situation remains very poor in the country, with political opposition, religious freedom and the press heavily constrained.

The country is party to the following international environmental conventions: Biodiversity, Climate Change, Desertification, Environmental Modification, Ozone Layer Protection, Wetlands.

1.4. Socio-cultural aspects

Kazakhstan

Ethnic Kazakhs represent more than half of the total population, while Russians make up 30% of the total. Other ethnic groups include Tatars, Uzbeks, Bashkirs, Uyghurs and Ukrainians:

Kazakh (Qazaq) 53.4%; Russian 30%; Ukrainian 3.7%; Uzbek 2.5%; German 2.4%; Tatar 1.7%; Uygur 1.4%; other 4.9% (1999 census)

The country is bilingual, with Kazakh and Russian both widely used. The Russian language is used to communicate between the different ethnic groups. Islam is the largest religion in the country, with about 47% followers. The second religion is Russian Orthodox Christianity, with about 45% followers. Gender disparity is very low, Kazakhstan’s Gender Development Index standing at 99.7% of its Human Development Index.

Kyrgyzstan

Ethnic Kyrgyz represent an overwhelming majority of the population, which has strong nomadic roots. Other ethnic groups include Uzbeks, Russians, Dungans, Ukrainians and Uyghurs:

Kyrgyz 64.9%; Uzbek 13.8%; Russian 12.5%; Dungan 1.1%; Ukrainian 1%; Uygur 1%; other 5.7% (1999 census)

The country is bilingual, but Russian is far less used than Kyrgyz. Other languages include Uzbek, since there are four Uzbek enclaves in the country. Islam is the largest religion in the country, with about 75% followers. The second religion is Russian Orthodox Christianity, with about 20% followers. Gender disparity is very low, Tajikistan's Gender Development Index standing at 99.4% of its Human Development Index.

Tajikistan

Tajiks are the main ethnic group of Tajikistan, with a considerable Uzbek minority.

Population distribution amongst ethnic groups is as follows:

Tajik 79.9%; Uzbek 15.3%; Russian 1.1%; Kyrgyz 1.1%; other 2.6% (2000 census)

Tajik is the official language, but Russian is also widely used in government and business. Almost all Tajiks are Sunni Muslims, with a small minority (5%) being Shi'a Muslims. Religious freedom is limited. Gender disparity is very low, Tajikistan's Gender Development Index standing at 99.4% of its Human Development Index.

2. Environmental Degradation

2.1. General overview

Central Asia encompasses **Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan**, five countries positioned half-way between the Atlantic and the Pacific, the Tien-Shan mountains and the Caspian Sea. The region is rich in natural resources, which have been industrially exploited and processed for decades, often leading to considerable environmental pollution and degraded land. Decades of Uranium mining has left the region with poorly maintained radioactive waste storage sites. Kazakhstan's already high level of natural radiation is increased by the remnants of nuclear test sites including the famous Semipalatinsk nuclear testing ground. Current and historical industrial pollution remains an environmental as well as a security threat throughout the region. Also the dried-up Aral Sea

will probably remind generations to come that managing transboundary basins with many competing interests is not an easy task.

Ballance and Pant (2003) surveyed recent environmental data. The data on air pollution show mixed trends. The volume of emissions into the atmosphere fell during the first half of the 1990s in all countries and in many of the region's larger cities. In later years the level stabilized or rose slightly. The reductions were a result of the economic depression at the beginning of the 1990s. Problems related to water resources are more serious. Water quality in the region is often unsuitable for human consumption or irrigation. Water shortages are often acute and made worse by the uneven distribution of water resources in each country. In some of the region's major river systems, the contamination of surface water along long stretches was found to be several hundred times greater than the permissible limits. In Kazakhstan and Uzbekistan parts of several rivers were found to be extremely polluted with mercury, oil, heavy metals, fluorine, pesticides, radioactive contamination and other toxic substances. In 2003 about two-thirds of the population in Tajikistan relied on untreated water taken directly from rivers, canals and irrigation ditches. The incidence of water-borne diseases such as malaria, acute intestinal infection and bacterial dysentery is on the rise in several countries. The health burden due to water-related problems is several times greater than that attributed to air pollution. Climate change is expected to exacerbate water problems in the region².

The threat of plague in Central Asia may be increasing owing to climate change. Researchers have found that warmer spring temperatures and wetter summers in Central Asia affect the prevalence of *Yersinia pestis*, the bacterium that causes plague, in the great gerbil population. Most strikingly, an increase of 1°C in spring temperatures increases prevalence by more than 50 per cent. A combination of effects leads to the threshold density condition for plague being reached more often, increasing the likelihood of an outbreak of plague in humans³.

There has been a general warming trend in Central Asian republics on the order of 1-2 degrees C since the beginning of the 20th century that might have a strong potential impact on

² (<http://centralasia.foreignpolicyblogs.com/2007/04/05/central-asia-climate-change-overview/>)

³ (http://www.wellcome.ac.uk/doc_WTX035278.html)

the regional temperature and precipitation regimes and also on natural ecosystems, agricultural crops and human health⁴.

Since 1960 the total irrigated area in the Aral Sea Basin increased from 3 million to 8 million hectares and the application of mineral fertilizers rose between three and six fold. The Aral Sea crisis is estimated to affect 35 million people living in the basin. Balance and Pant (2003) conclude that water shortages and problems of water quality have reached a very serious state in most of Central Asia. Hot spots of degradation are transboundary problems in particular the degradation of the Aral Sea area and the contamination in the Ferghana Valley.

The EM-DAT information on natural disasters in Central Asia is only available since the dissolution of the Soviet Union. The tables are appended below. They show that earthquakes, floods and slides have affected thousands of people. The summary table for Kyrgyzstan shows that earthquakes, floods and slides are also the disasters that leave people homeless in the region.

Kyrgyzstan: Top 10 Natural Disasters - number affected

Disaster type	Date	No Affected
Earthquake	19-Aug-1992	86,806
Slides	14-Apr-1994	58,500
Earthquake	22-May-1992	50,000
Earthquake	26-Dec-2006	12,050
Wind Storm	Jan-2006	9,075
Flood	18-May-1998	7,728
Flood	10-Jun-2005	2,050
Earthquake	9-Jan-1997	1,230
Slides	May-2002	1,002
Epidemic	13-Mar-1997	336

(Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net – Université catholique de Louvain - Brussels – Belgium")

Kazakhstan: Top 10 Natural Disasters - number affected

Disaster type	Date	No Affected
Extreme Temperature	Nov-1997	600,000
Earthquake	23-May-2003	36,626

⁴ http://www4.gvsu.edu/lioubime/CentralA_files/CentralAsia.htm

Flood	26-May-1993	30,000
Flood	24-Feb-2005	25,000
Wild Fires	17-Aug-1997	8,000
Flood	13-May-2001	3,668
Flood	Apr-2000	2,500
Epidemic	9-Dec-1998	593
Epidemic	1999	166
Epidemic	Jan-2000	114

(Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net – Université catholique de Louvain - Brussels – Belgium")

Tajikistan: Top 10 Natural Disasters - number affected

Disaster type	Date	No Affected
Flood	13-Jul-2004	400,000
Flood	27-May-1996	180,000
Flood	7-May-1993	75,357
Flood	25-May-1992	63,500
Flood	24-Apr-1998	40,974
Epidemic	13-Feb-1997	15,618
Earthquake	29-Jul-2006	15,427
Flood	24-Apr-2006	13,000
Flood	7-Jul-1999	9,392
Epidemic	31-May-1996	7,516

(Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net – Université catholique de Louvain - Brussels – Belgium")

Turkmenistan: Top 10 Natural Disasters - number affected

Disaster type	Date	No Affected
Flood	Jan-1993	420
Earthquake	6-Dec-2000	0

(Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net – Université catholique de Louvain - Brussels – Belgium")

Uzbekistan: Top 10 Natural Disasters - number affected

Disaster type	Date	No Affected
Earthquake	15-May-1992	50,000
Flood	24-Feb-2005	1,500
Slides	Jan-1992	400
Epidemic	4-Feb-1998	148

Slides	24-Nov-1999	0
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(Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net – Université catholique de Louvain - Brussels – Belgium")

Summarized Table of Natural Disasters in Kyrgyzstan from 1992 to 2006							
	# of Events	Killed	Injured	Homeless	Affected	Total Affected	Damage US\$ (000's)
Earthquake	4	58	100	32,618	117,368	150,086	163,000
avg per event		15	25	8,155	29,342	37,522	40,750
Epidemic	1	22	0	0	336	336	0
avg per event		22	0	0	336	336	0
Extreme Temperature	1	11	0	0	0	0	0
avg per event		11	0	0	0	0	0
Flood	2	4	0	9,778	0	9,778	2,660
avg per event		2	0	4,889	0	4,889	1,330
Slides	7	249	20	14,155	45,636	59,811	37,500
avg per event		36	3	2,022	6,519	8,544	5,357
Wind Storm	1	4	0	0	9,075	9,075	0
avg per event		4	0	0	9,075	9,075	0

Created on Jul-2-2007. - Data version v03.07

(Source: "EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net - Université catholique de Louvain - Brussels - Belgium")

2.2. Aral Sea

2.2.1. General Overview

The Aral Sea is one of less than 20 ancient lakes in the world, and is estimated to be more than 5 million years old.



Figure 5: Location of the Aral Sea

To many, the Aral Sea has become synonymous with environmental catastrophe. In the Soviet Union era massive amounts of water were diverted for irrigation of cotton and the lake began to shrink dramatically. At the same time, pesticides were being applied to fields in the watershed by airplane. The Aral Sea was the fourth largest lake in the world; it has now lost 90% of its source waters and two thirds of its surface area. Salinity has increased fourfold.

Changes in the lake have caused local climates to change and desertification has increased, along with rates of respiratory diseases and cancers from salt and toxic-laden dusts.

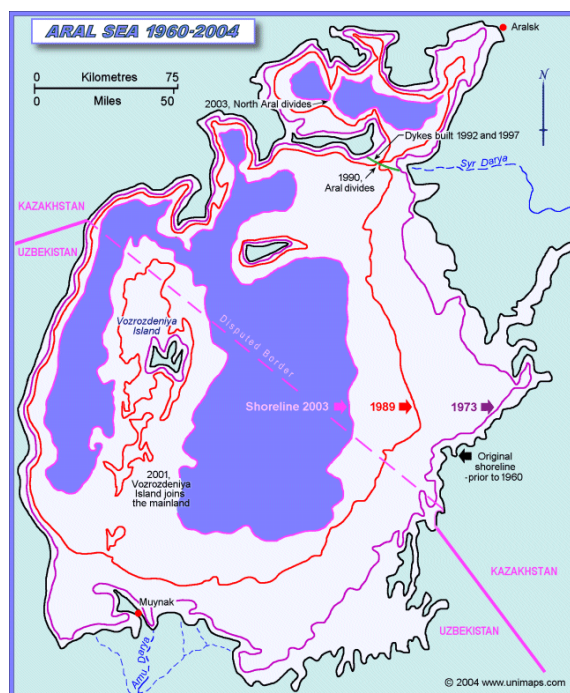


Figure 6: Changes in the Aral Sea's shoreline (Source: <http://www.unimaps.com/aryl-sea/index.html>)

2.2.2. “Hot spots” of environmental degradation & vulnerability

From the 1930s, the former Soviet Union started building large scale diversion canals to irrigate vast cotton fields in a grand plan to make cotton a great export earner. This was achieved, and even today Uzbekistan is still a large exporter of cotton. But the cost in ecological and human terms have been astronomical.

By 1960, 25 to 50 cubic kilometres of river water were being diverted annually for irrigation and the shoreline began to recede. The mean level dropped 20cm per year for 10 years, then the drop rate accelerated to 60cm/year in the 70s, then to almost a metre per year in the 80s.

By 1990, as a result of the continuing water diversion and evaporation, the shrinking Aral divided in two and its salinity increased from 10 grams per litre to 45. In some parts of the south Aral, salinity was as much as 98 g/litre in 2001. The once thriving fishing industry has been destroyed along with the fish and most of the flora and fauna. Salt pans and contaminated runoff lakes have appeared, and winters have become harsher and longer, summers hotter and shorter.

The primary victims of the degradation in the Aral Sea region are the most vulnerable: children, women, ill-paid inhabitants of cities and rural areas. The region has the highest child mortality rate in the former USSR (75 children per 1000 newly born) and a high level of maternal death (about 120 women per 10,000 births). The disease rate (TB, infections and parasites, typhus, hepatitis, paratyphoid) is increasing. Anaemia, thyroid, kidney and liver diseases are widespread. Cancer, asthma and heart diseases are also increasing. Research has shown that the incidence and increases of these diseases are related to environmental degradation.

2.2.3. Adaptation and state-capacities

Attempts in 1992 and 1997 to build the 14 km long Karateren-Kokaral dyke between the north and the south Aral (the south being abandoned, the north reflooded) was successful for 9 and 12 months until they were both breached by the weight of the water, and the fact that only enough money was available to build an inherently weak sand structure. This same plan, using concrete, was revived in 2003 by the Kazakh government.

Since the 1980s the cultivation of new large irrigated areas was banned and large-scale water resources projects have been introduced. At the same time measures to improve living

conditions in the area of the Aral Sea were adopted (health-protection schemes, water-supply, gasification, improved social care, and the watering of the AmuDarya and SyrDarya deltas).

2.2.4. Environmental change and conflict

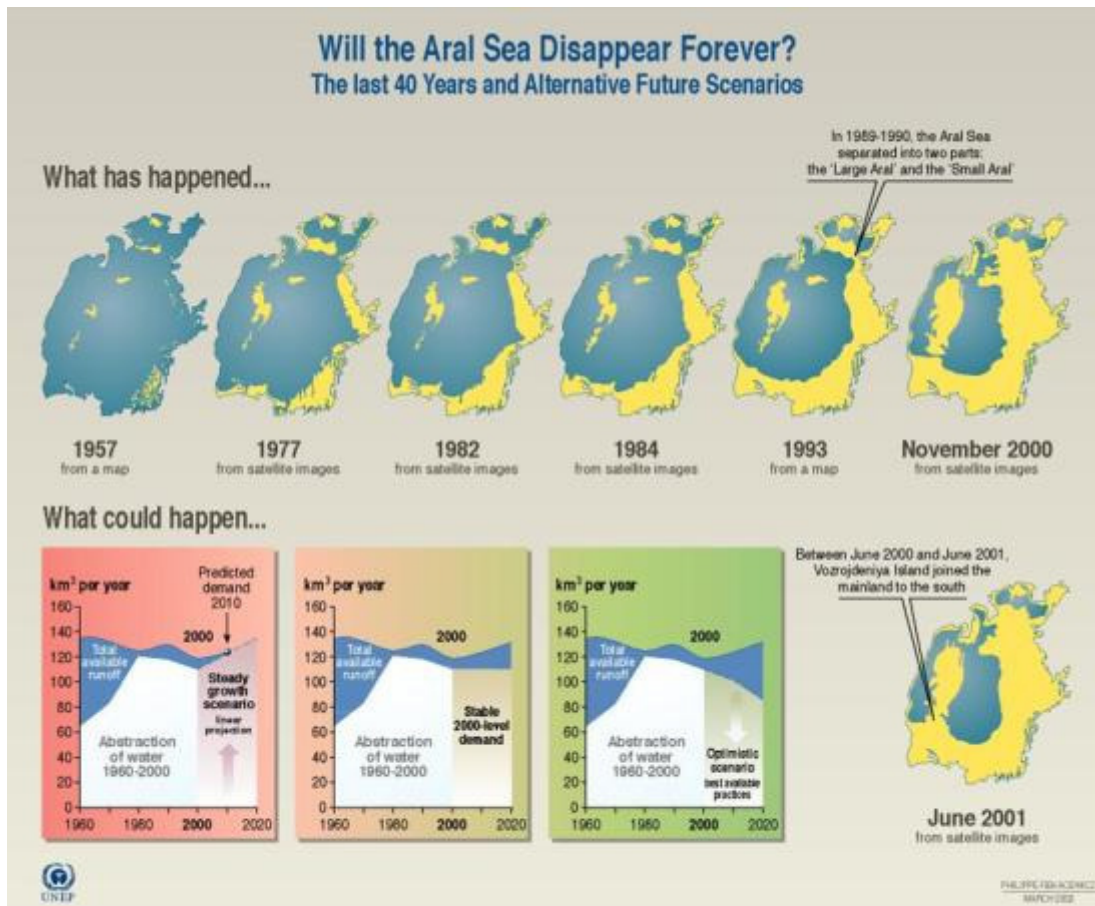
The future looks bleak for the south Aral, but depending on the desire of the nations bordering the Aral -and how much money is available - the north Aral may have a chance. Preserving or restoring the Aral depends on limiting water use, a volatile issue in a region of ethnic tensions.

Only a huge injection of money (estimate in 2004 was \$300 billion) and cooperation between the former five Soviet states can save the Aral, but convincing the five to work together will not be easy, as all have competing economic interests.

The Uzbekistan dictatorship is intolerant of dissent, and may crack down on any groups trying to force change, or the Karakalpaks, an ethnically distinct people of the southern end of the lake who are disproportionately effected by the Aral disaster, may take matters into their own hands.

2.2.5. Scenarios for the future

The demise of the Aral Sea was caused primarily by the diversion of the inflowing Amu Dar'ya and Syr Dar'ya rivers to provide irrigation water for local croplands. The Figure below shows the disappearance of the Aral Sea from 1957 to 2000 and three possible scenarios showing the relationship between future demand (and thus water abstraction) and future available runoff in cubic kilometres per year. The scenarios cover the time period from 2000 to 2020. They show what may happen if water abstraction and the demand for water continue to increase, what may happen if they remain the same as they were in the year 2000, and what may happen if they decrease.



Sources: Nikolai Denisov, GRID-Arendal, Norway; Scientific Information Center of International Coordination Water Commission (SIC ICWC); International Fund for Saving the Aral Sea (IFAS); The World Bank; National Aeronautics and Space Administration (NASA); United States Geological Survey (USGS); Earthshots: Satellite images of environmental change. States Department of the Interior, 2000.

Figure 7: Will the Aral Sea disappear forever? (Source: http://maps.grida.no/go/graphic/aral_sea_trends_and_scenarios)

2.3. Ferghana Valley

2.3.1. General Overview

The Ferghana-Osh-Khudjand area in Central Asia (also referred to as the Ferghana Valley) is a cross-border area between Uzbekistan, Kyrgyzstan and Tajikistan (Figure 8). The region is a typical example of former centrally planned economies, where development plans paid little attention to local conditions (especially environmental) and social progress was planned to be achieved through large-scale industrial projects. In the Ferghana Valley the construction of enormous irrigation schemes enabled this region to become one of the biggest cotton producers and in addition extensive heavy industry based on mining and oil, gas and chemical production were developed. Discoveries of uranium ore led to extensive mining. The area became an important source of uranium for Soviet Union civilian and military nuclear projects.

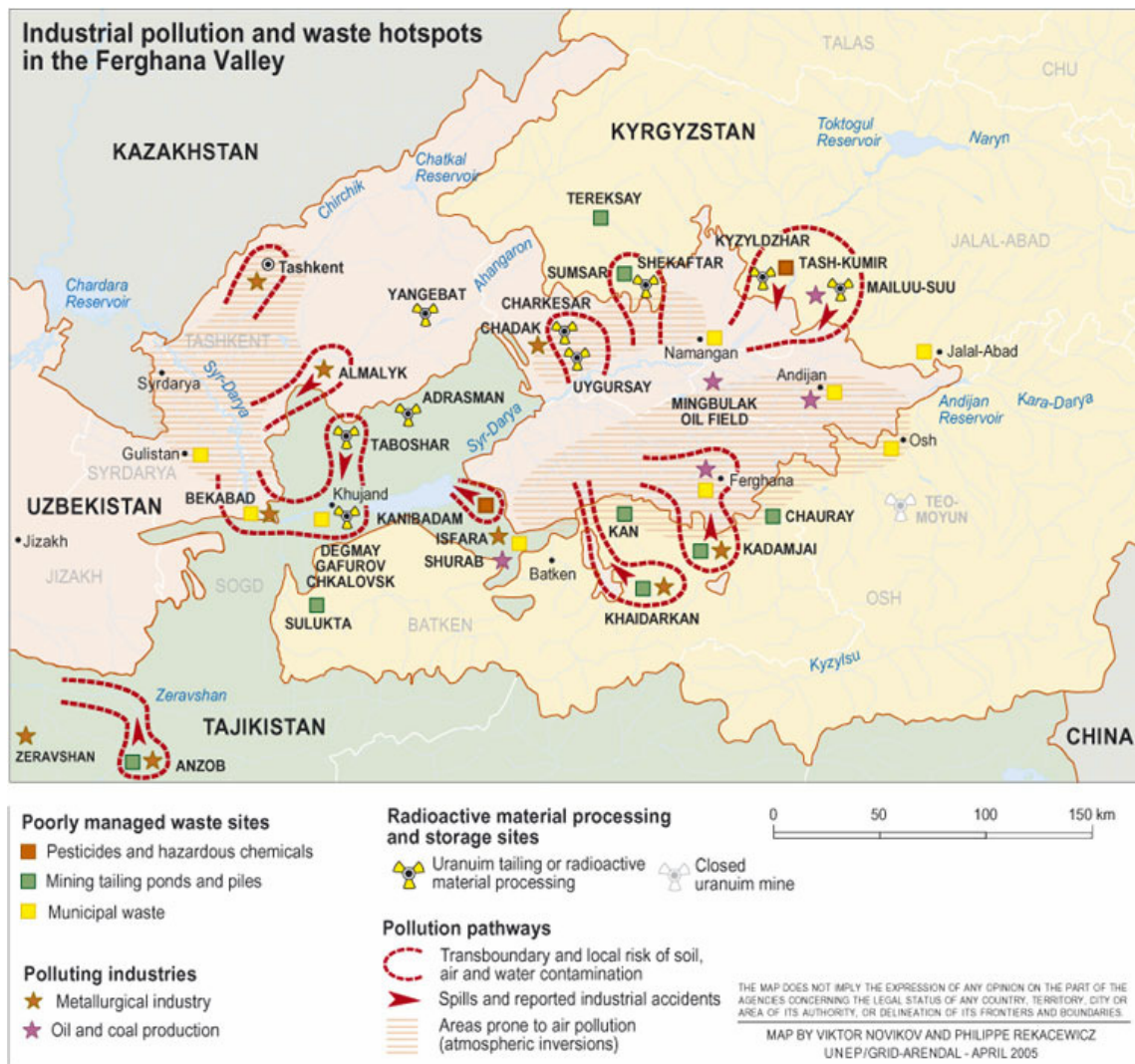


Figure 8: Radioactive, chemical and biological hazards in Central Asia. (Source: The Environment and Security Initiative – ENVSEC, <http://www.envsec.org/maps.php>)

2.3.2. “Hot spots” of environmental degradation & vulnerability

Several factors – population density in disaster-prone areas, high overall population growth, poverty, land and water use, failure to comply with building codes, and global climate change – make the region particularly vulnerable to natural as well as human-made hazards (UNEP and others 2005). Consequently, cumulative risks from different industrial facilities, depreciating infrastructure and contaminated sites pose threats not only to the inhabitants living directly in the polluted zones, but also trans-boundary impacts in the valley shared by the three countries.

2.3.3. Adaptation and state-capacities

The in-depth assessment of environment and security risks in the Ferghana Valley was completed and published in 2005. It is now the basis for an extensive work programme, which focuses on the management of land and water resources, pollution from hazardous waste dumps and industrial activities, natural disasters, and biodiversity issues (Figure 9). Continuing projects in the region include media tour and training courses for professional journalists raising awareness of environment and security links in Central Asia, opening of Public Environmental Information Centres, and supporting environmental journalism festivals. Projects on natural disaster mitigation in local communities, capacity building of local environmental laboratories for radioactivity analysis and monitoring, studies of hazardous waste disposal and environment and health assessment are also currently being carried out in the border regions of Kyrgyzstan and Tajikistan.

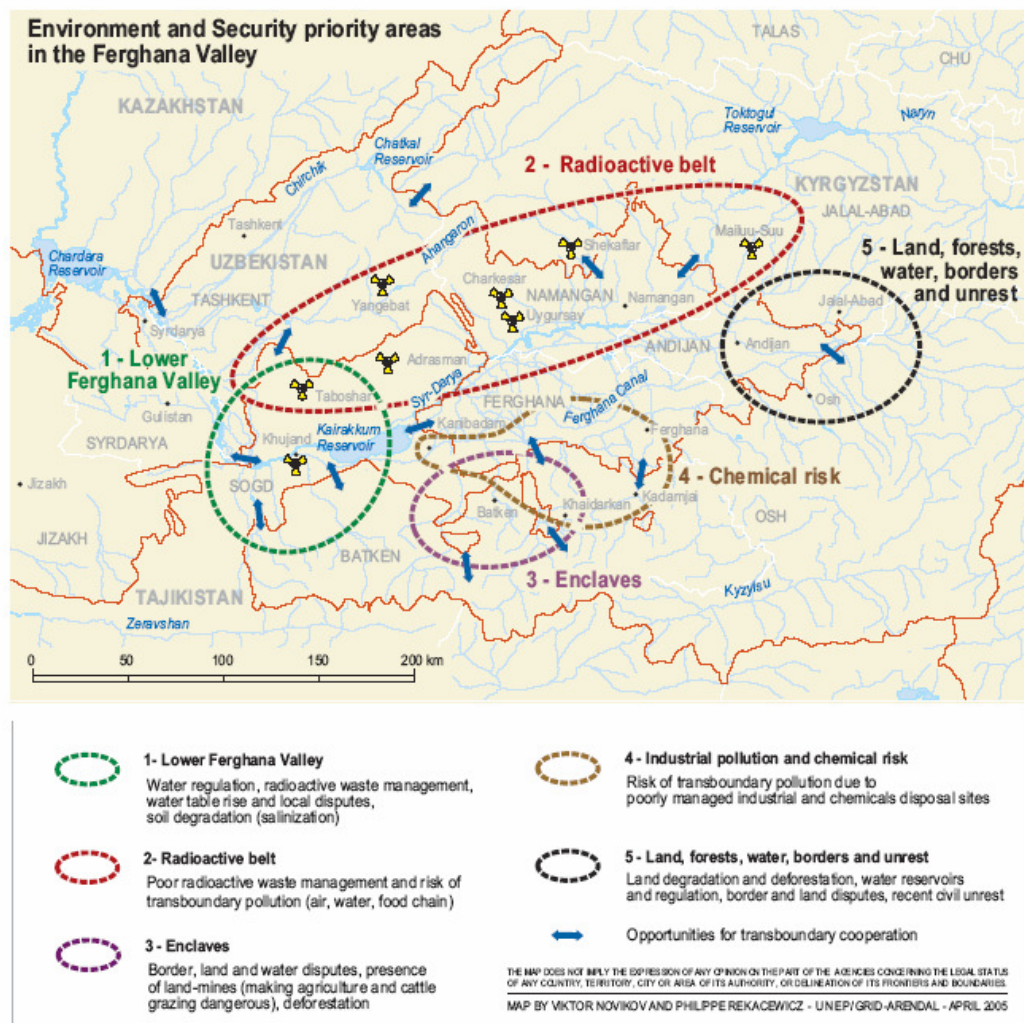


Figure 9: Environment and safety priority areas in the Ferghana Valley. (Source: The Environment and Security Initiative – ENVSEC, <http://www.envsec.org/maps.php>)

2.3.4. Environmental change and conflict

Even though past spills and accidents have created tensions between the countries of the region, officials do not consistently regard environmental pollution by existing facilities as a security problem (UNEP and others 2005). In the immediate wake of the break-up of the Soviet Union, pollution and particularly shared water in this newly internationalized river basin, created tensions among the new states. Officials point to the potential this area has to serve as an example of international cooperation in addressing legacies of the past. However, without extensive international aid this task will be impossible for the local governments. Also, in the absence of alternative development plans and access to environmentally-friendly technologies and management practices some of the abandoned facilities may be re-opened.

Outbreaks of water-related diseases (Typhoid fever, malaria and hepatitis) have recently been recorded in the region (UNEP and others 2005). State borders have little effect in restricting the spread of disease. Outbreaks of this sort contribute to tension in the same way as chemical pollution (UNEP and others 2005).

2.3.5. Scenarios for the future

According to UNEP et al. (2005), climate change could have a significant impact on environment and security in the region, in particular through effects on water and agriculture. As shown in Figure 3, the region has already experienced considerable warming in the last two decades.

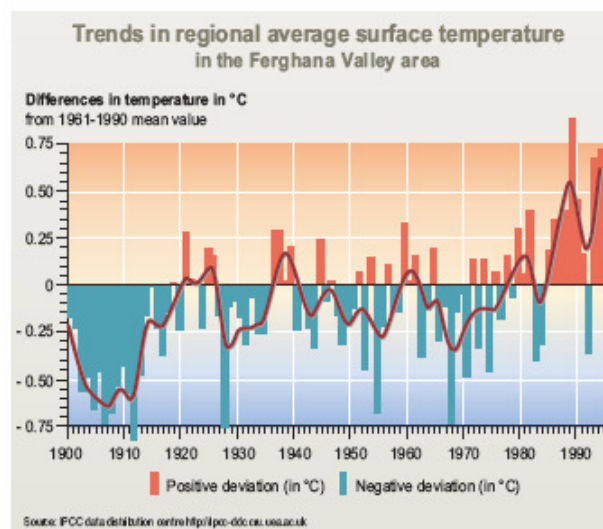


Figure 10: Trends in regional average surface temperature in the Ferghana Valley area. (Source: UNEP et al. 2005)

Water shortages and problems with water quality, already an issue in the Ferghana Valley, are unlikely to improve given current scenarios for climate change. Land conditions may worsen as desert areas expand. Potential decreases in food production (rice, cereals) and possible spread of vector-borne and infectious diseases would affect vulnerable populations, especially the poor, elderly and children. Finally there is concern that the frequency and intensity of extreme weather events would increase and enhance problems already faced with chemical and radioactive contamination, as well as affecting agricultural productivity.

3. Migration processes

3.1. General Overview and Historical Development

The region as a whole is prone to important migration movements, international and internal. Its current demographic composition has been heavily impacted by international migration: after the collapse of USSR, many Central Asians returned home, while Russians fled to Russia. The civil unrest and conflicts that followed the collapse in some regions also induced flows of refugees.



Figure 11: Migration in Central Asia. (Source: World Bank, website)

Migration today plays an important role in the development of the region, notably through remittances. In 2004, for example, remittances in Tajikistan represented up to 20% of the

GDP⁵. Kyrgyzstan and Tajikistan have all adopted the 1990 International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families in the 2000s, while Kazakhstan is considering a ratification. Labor migration is widely acknowledged as a positive factor for development for the whole region.

It is to be stressed, however, that the three studied countries have a negative net migration rate, and thus appear to be rather origin than destination countries, Russia and Germany remaining the destination of choice for many emigrants.

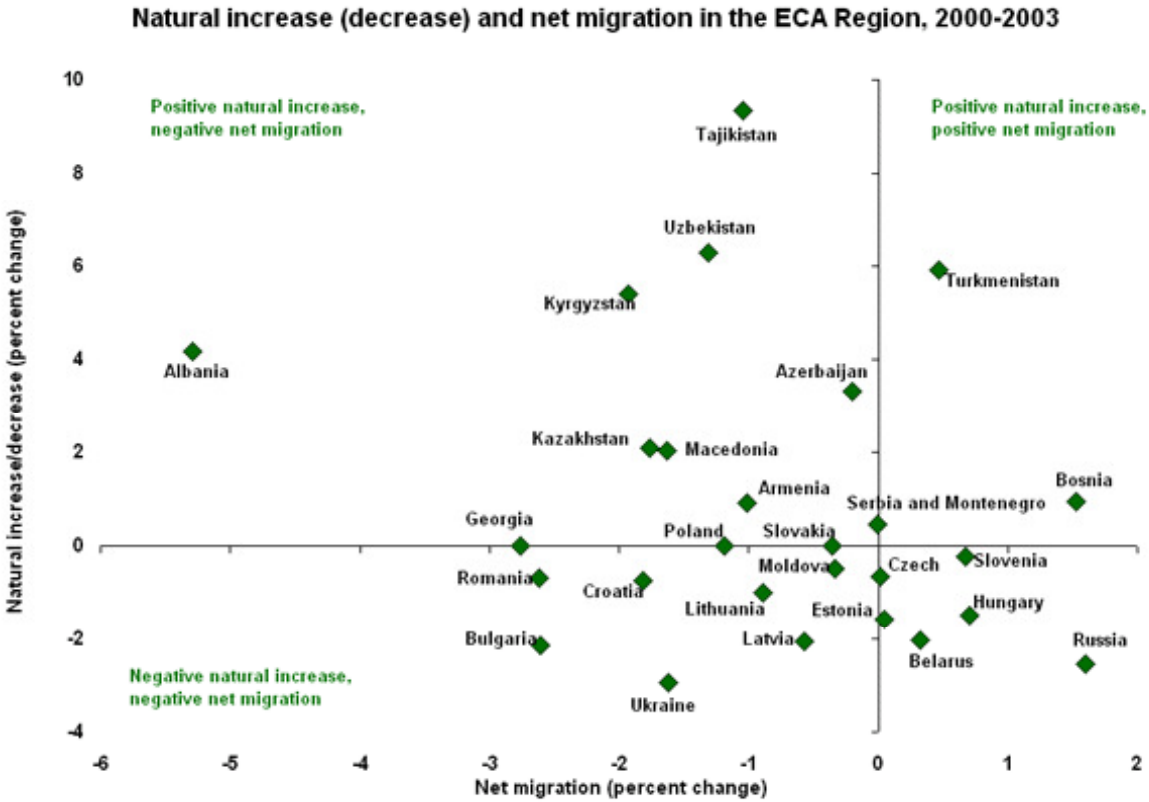


Figure 12: Natural increase/decrease and the net migration in the ECA Region (Source: World Bank, website)

⁵ Source: Balance of Payments Statistical Yearbook.

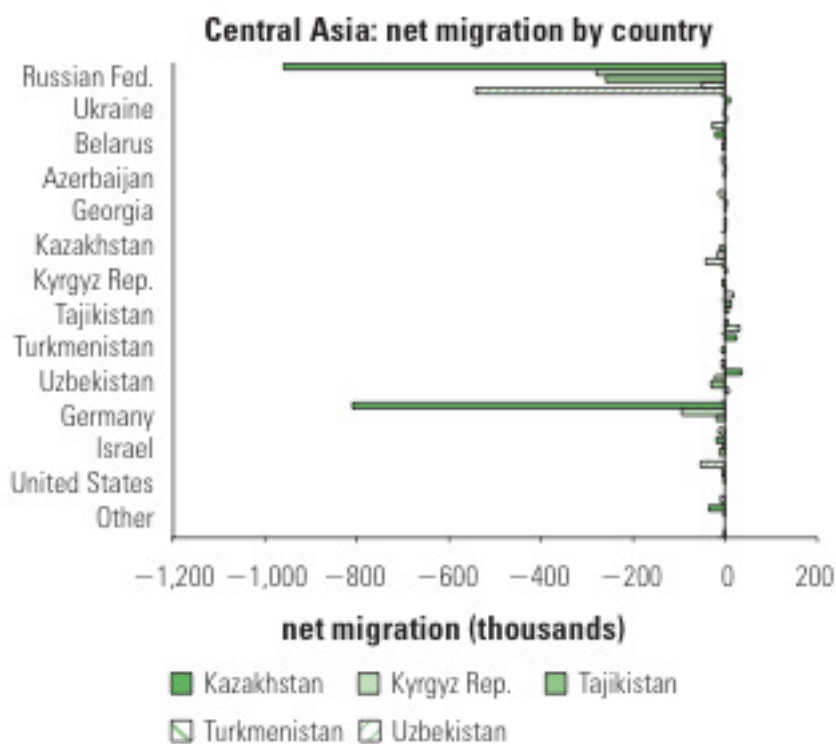


Figure 13: Net Migration by country in Central Asia (Source: World Bank, website)

Data on internal movements are scarce, but the role of these migration flows should not be underestimated: a study commissioned by IOM in 2005 found that internal displacements were very important in Central Asia, and sometimes ‘compounded by human rights abuse among the population, as well as by intolerance and discrimination towards migrant and minority groups’ (IOM 2005). It is estimated that about half of the total migrants population has moved internally. Among those, population surveys conducted by the International Planned Parenthood Federation found out that 16 % listed ecological reasons as the main drivers for their displacement. Those reasons included mudslides and landslides, floods, hazardous waste, and desertification (particularly around the Aral Sea). UNHCR estimates that about 250,000 people have been forced to leave their homes in the region because of environmental disasters. Suliainanova mentions the following examples: ‘over 100,000 persons were displaced during the 1980s and 1990s because of the environmental disaster in the Aral Sea region.³⁶ In addition, over 161,000 persons³⁷ were forced to leave the Semipalatinsk area, a nuclear testing site.³⁸ In Kyrgyzstan, at least 17,000 people had to migrate between 1992 and 1997 because of landslides, mudflows, floods and earthquakes’.

If one looks at the historical development of international migration patterns, three different phases can be distinguished: a phase where political motivations were predominant, after the collapse of the USSR and the civil unrest that followed; then a phase where economic motives were predominant, with many looking for better job opportunities in Russia, Germany, and increasingly in the US; and finally a phase where the motivations were mostly ecological, this phase being associated with internal migration.

Finally, it should also be mentioned that Central Asia is also increasingly a region of transit migration, with migrants from Asia en route to Europe or the US.

3.2. Main migration patterns, trends, and networks

Data on migration, and especially internal migration, tend to be scarce in the region. The following information should therefore be taken with caution.

Kazakhstan

The UN Population Division estimates there are about 2,500,000 immigrants in Kazakhstan, representing 16.9 % of the total population. 16,000 of them are refugees. The migration rate is very negative, with an annual average of 120,000 people leaving the country every year.

The 1990s saw the emigration of many Russians and Volga Germans. This process had begun in the 1970s, but accelerated in the 1990s. This migration flow had a big impact on the country's demography, it gave autochthonous Kazakhs a majority in the country. This trend was reinforced by ethnic Kazakh migration from China, Mongolia and Russia. By contrast, in 1989, ethnic Kazakhs were a minority in their own country, making up only 40 % of the whole population.

Kyrgyzstan

The UN Population Division estimates there are about 288,000 immigrants in Kyrgyzstan, representing 5.5 % of the total population. Only 4,000 of them are refugees, four times less than in Kazakhstan. The migration rate is negative, with an annual average of 15,000 people leaving the country every year.

Kyrgyzstan used to be populated by an important population of ethnic Germans. Most of them left between 1991 and 1996, following a return programme implemented by the German government. The Russian population of the country has also been divided by two after the

collapse of USSR. The Kyrgyz population is heavily affected by poverty, and many Kyrgyz fled to Russia. Thousands of them also work in Kazakhstan, mostly in tobacco plantations, enduring very tough labour conditions. The United States is an increasingly popular destination amongst Kyrgyz emigrants.

Tajikistan

The UN Population Division estimates there are about 306,000 immigrants in Tajikistan, representing 4.7 % of the total population. Only 3,000 of them are refugees. The migration rate is very negative, with an annual average of 69,000 people leaving the country every year, which represents more than 1% of the population annually.

Tajikistan's migration flows were heavily affected by the civil war that outburst after independence. Sulaiymanova notes that 'UNHCR estimates that 600,000 refugees were displaced within Tajikistan as a result of the civil war that killed at least 20,000 people. Over 60,000 Tajik refugees fled to Afghanistan, and another 13,000 sought refuge in Kyrgyzstan. By 1996, almost all internally displaced Tajik refugees returned to their homes. Seventy five percent of Tajik refugees who fled to Afghanistan also have returned. Over 74,000 Meskhetians fled from the Ferghana valley in 1989 because of serious outbreaks of ethnic violence. Two-thirds of them found asylum in Azerbaijan, while the remaining group moved to Russia' Another important pattern, as in all former Soviet republics, was the massive exodus of Russians that followed the collapse of USSR : the Russian population of Tajikistan was divided by two over the 1990s.

3.3. Migration policies

Migration policies tend to be very similar in the three selected countries, which have all ratified the 1951 Geneva Convention and its 1967 Protocol. Kyrgyzstan and Tajikistan have ratified the 1990 International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families in the 2000s.

The immigration policies of the three countries aim to maintain the current levels of immigration, with Kazakhstan trying to increase the inflows of high-skilled migrants. Both Kyrgyzstan and Kazakhstan have implemented policies to ease the integration of citizens not originating from the country. Regarding emigration policies, all three countries try to encourage the return of their citizens who have emigrated. While Kazakhstan has

implemented to discourage emigration, Kyrgyzstan and Tajikistan haven't, Kyrgyzstan aiming at maintaining the current levels of emigration flows.

Overall, the positive role of immigration is widely acknowledged, despite some human rights abuses, while emigration is associated with economic difficulties and environmental changes, especially in the case of internal displacement, for which very little data exist.

Conclusion

Despite the three countries sharing a common history and many similar patterns, they all face different challenges in terms of environmental change, migration patterns and economic situations.

All three countries face acute environmental problems and important migration flows, especially internally. Previous studies show that these displacements are heavily linked with environmental changes. These changes include mudslides and landslides, floods, hazardous waste and desertification.

The choice of the Aral Sea and the Ferghana Valley as regions where to conduct the case-studies therefore appears fully justified and pertinent: both are consistently quoted amongst the major environmental hotspots of the region, and both regions are impacted by internal displacements. The largest of these displacement is the one associated with the drying up of the Aral Sea, while the Ferghana Valley gather most of the environmental problems abovementioned. Furthermore, the choice to study the Ferghana Valley from both the Tajik and Kyrgyz perspective should allow for a comparative overview of the way two neighbouring countries, with different policies and demographic patterns, address a similar environmental problems.

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