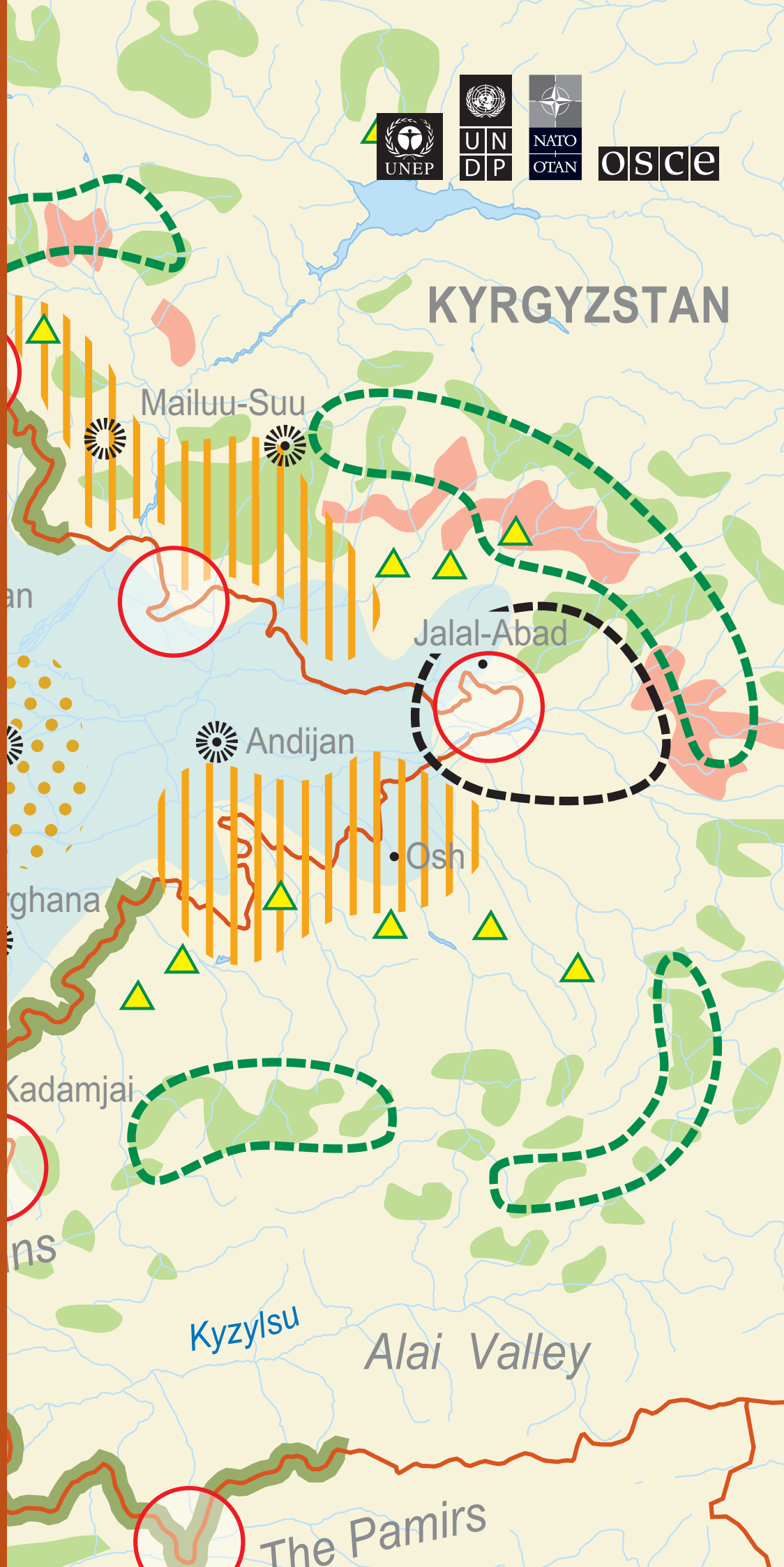


Environment and Security

Transforming risks into cooperation

Central Asia
Ferghana / Osh / Khujand area



The **United Nations Development Programme** is the UN's Global Development Network, advocating for change and connecting countries to knowledge, experience and resources to help people build a better life. It operates in 166 countries, working with them on responses to global and national development challenges. As they develop local capacity, the countries draw on the UNDP people and its wide range of partners. The UNDP network links and co-ordinates global and national efforts to achieve the Millennium Development Goals.

The **United Nations Environment Programme**, as the world's leading intergovernmental environmental organization, is the authoritative source of knowledge on the current state of, and trends shaping the global environment. The mission of UNEP is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.

With 55 participating states, the **Organization for Security and Co-operation in Europe** is a pre-eminent instrument for early warning, conflict prevention, conflict management and post-conflict rehabilitation in continental Europe, the Caucasus, Central Asia and North America. Since its beginnings in 1973, the OSCE has taken a comprehensive view of security, including through the protection and promotion of human rights and fundamental freedoms, economic and environmental co-operation, and political dialogue.

The **North Atlantic Treaty Organization** embodies the transatlantic link that binds Europe and North America in a unique defence and security alliance. In response to recent changes in the overall security environment, NATO took on new fundamental tasks. These include addressing both instability caused by regional and ethnic conflicts within Europe and threats emanating from beyond the Euro-Atlantic area. NATO's 'Security Through Science' programme brings scientists together to work on new security issues of concern to NATO, Partner and Mediterranean Dialogue countries.

The views expressed in this publication are those of the authors and do not necessarily reflect those of the United Nations, the Organization for Security and Co-operation in Europe, or of the North Atlantic Treaty Organization. The designations employed and the presentations do not imply the expression of any opinion on the part of the three agencies concerning the legal status of any country, territory, city or area of its authority, or delineation of its frontiers and boundaries.

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Preface

In the debate on what role the environment plays in causing or resolving conflict, the partnership of international organizations working on the 'Environment and Security' initiative takes a pragmatic position. In focusing on participatory assessments and targeted follow-up activities in conflict-prone areas, we believe that we can promote environmentally sustainable development and peace on the ground.

In this context, we are very happy to present an in-depth assessment of the situation in the Ferghana Valley – a region where environment and security linkages are both evident and challenging. Recent political developments in Kyrgyzstan and tragic events in Uzbekistan have once again put the Ferghana Valley in the centre of global attention. The landslide that in spring 2005 threatened radioactive waste dumps at Mailuu-Suu in Kyrgyzstan in the upper part of the Ferghana Valley offered fresh reminders of how

environmental problems can easily acquire regional and security dimensions. Environmental degradation can aggravate social tensions or awaken otherwise dormant conflict-generating forces. At the same time, cooperation for better environmental governance in complex socio-political settings can help build confidence and improve relations between communities that share common resources.

This assessment has been produced upon the request of the countries of the Ferghana Valley – Kyrgyzstan, Tajikistan, and Uzbekistan – and has widely benefited from their inputs. It shows how the 'Environment and Security' initiative has helped identify both environmental threats to regional security and opportunities for cross-border dialogue. We hope that this assessment will contribute to a better understanding of linkages between environment and security, as well as strengthen the environmental dimension of conflict prevention efforts in this crucial part of Central Asia.

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Ferghana is a small country, abounding in grain and fruits.

Ferghana is situated in the fifth climate and at the limit of settled habitation. It is girt round by mountains except on the west.

Introduction

Environment and security in the Ferghana valley

Central Asia stands at the crossroads between Asia, Europe and the Middle East. Osh, Kokand, Ferghana and Khujand are names that bring to mind the ancient Silk Road. This publication focuses on the Ferghana – Osh – Khujand area (also referred to below as the Ferghana valley). The Ferghana valley is the most fertile, densely populated region in the whole of Central Asia and retains, in some respects, the importance it enjoyed when it was a stage along the ancient Silk Road. At present the valley straddles three countries – Kyrgyzstan, Tajikistan and Uzbekistan – which emerged as sovereign states after the collapse of the Soviet Union. This report takes the link between environment and security as the starting point for its consideration of the Ferghana valley.

The report is the result of an in-depth assessment of major issues and areas of concern (environment-security hotspots) in the Ferghana valley carried out by the Environment and Security initiative (ENVSEC) in 2004-5. The assessment aims to identify needs and pave the way for further work resolving specific problems. It also seeks to draw the attention of regional and international audiences to identified problems. It also aims to develop cooperation and actions to address the problems facing this complex, dynamic part of Central Asia.

The report draws on several different sources, in particular:

- academic research, reports by international and local organizations working in Central Asia on relevant issues, articles published in different media;

- information held by ENVSEC agencies and partners, not least the UNDP Preventive Development Programme (early warning component) and the Swisspeace early warning project (FAST) database;
- ENVSEC field work and consultations, including the UNEP-UNDP-OSCE mission to capitals in August-September 2004, field work by UNEP, OSCE, NATO, the Italian Ministry of the Environment and local counterparts in November-December 2004, and final consultations in Osh in December 2004 involving representatives of Kyrgyzstan, Tajikistan and Uzbekistan;
- feedback received from the various countries on the background report prepared by ENVSEC in November 2004 and on the elements of the ENVSEC Ferghana valley work programme presented in Osh.

After presenting the Environment and Security initiative, we will introduce the theoretical background used for examining the links between security and environment. The following chapter is an analysis of the overall political and economical framework in Central Asia, pointing out the main trends affecting the security situation in the Ferghana valley. The next chapter describes the regional situation and discusses various clusters of issues that make up the environment and security dimension of the Ferghana valley. The final chapter contains an attempt at a more long-term outlook and an introduction to the work programme that the ENVSEC initiative will be implementing in the area in 2005-7.

About the Environment and Security initiative

Acknowledging the multifaceted character of environmental sources of human insecurity, four organizations with different mandates, expertise, and networks — the Organization for Security and Cooperation in Europe (OSCE), the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the North Atlantic Treaty Organization (NATO) — joined together to form the Environment and Security initiative (ENVSEC).

Among the various forms of interaction between environment and security, ENVSEC seeks to identify and map situations in which environmental problems threaten to generate tensions (left-hand circle in the diagram) – between communities, countries or regions, where for example:

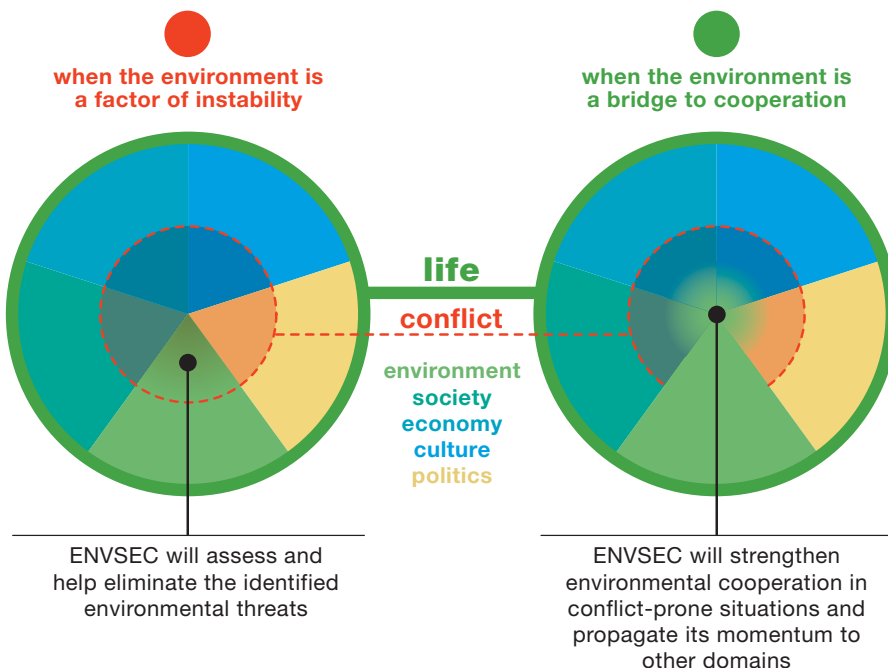
- Water or air pollution in one community is a source of insecurity in another;
- Allocation or use of land resources creates instability between neighbouring regions;

- The environment and natural resources can be (perceived as) a means of control and persuasion exerted by one country or community over another (upstream-downstream relations)

At the same time (right-hand circle in the diagram) ENVSEC looks at situations where environmental cooperation may help build a common understanding of other more general issues. For example, joint collection of data or management of a transboundary nature reserve will not immediately reduce insecurity per se, but may help to build trust and strengthen cooperation. Ultimately, it is believed that transboundary environmental cooperation can contribute to peace building (Conca and Dabelko, 2003).

By providing a framework for cooperation on local and transboundary environmental issues, ENVSEC seeks to promote mutual confidence and peace. It builds on the combined

two facets of the environment and security



strengths and field presence of the lead organizations to fulfil three key functions: assessing vulnerability, and monitoring environment and security linkages; building capacity and developing institutions; and developing, implementing, and advocating integration of environmental and security concerns and priorities in international and national policy-making.

ENVSEC assessment work focuses on identifying environmental sources of insecurity and opportunities for cooperation. It attempts to find areas for priority action by partner organizations and affected communities. ENVSEC uses regional approach because a multilateral perspective is needed to address many potential sources of environmental conflict and threats to human security.

The pilot phase of the initiative in 2003 assessed environmental threats in Central Asia and South-Eastern Europe, two regions where environmental concerns have clear security implications. The Southern Caucasus joined in 2004, and we look forward to welcoming Eastern Europe as well as the Circumpolar Arctic in 2005-2006. In each region work starts by identifying, through consultation with national and regional stakeholders, priority environment and security issues and situations. The subsequent stage moves to the local level in the regions and countries, with specific hotspots being assessed and inter-agency intervention designed for the following years. This is exactly the stage that ENVSEC has reached with the Ferghana valley in Central Asia.

ENVSEC is governed by a Memorandum of Understanding signed by UNEP, UNDP and OSCE in 2003, as well as an agreement on association with NATO through its Public Diplomacy Division. A Programme Management Unit located at UNEP in Geneva coordinates all operations, fund-raising and reporting for the initiative. The ENVSEC Management Board, consisting of senior members of the respective organizations, approves strategic guidelines and allocation of funds.

National Governments are strongly represented in the ENVSEC process through partnerships with all the founding organizations. Ministries of Foreign Affairs and Ministries of the Environment firmly endorsed the ENVSEC approach at the Fifth Environment for Europe ministerial conference in Kyiv in 2003, at OSCE Economic Fora and Ministerial

Environment and Security Initiative: Today's priorities and future challenges



MAP BY VIKTOR NOVIKOV AND PHILIPPE REKACEWICZ - UNEP/GRID-ARENDAL - APRIL 2005

Councils and at other international and regional meetings such as the Environment for Europe ministerial meeting for EECCA countries in Tbilisi in 2004.

Regular links with national Governments are maintained through UNDP and OSCE networks of country missions and through National Focal Points appointed by the Governments, typically representing Ministries of Foreign Affairs and the Environment. During implementation of specific projects, national inter-sectoral working groups can be established in host countries. Through regular briefings for senior government officials, ENVSEC activities are also coordinated with ongoing policy processes, including the implementation of the Environmental Strategy for Eastern Europe, Caucasus and Central Asia (EECCA) launched in Kyiv in 2003 (UNECE 2003).

Academic community and civil society organizations are involved in national and regional scoping consultations, and take part in country working groups and specific project activities. At an international level ENVSEC maintains links with research and policy organizations with relevant expertise.

Understanding links between environment and security

The links between *environment* and *security* are the focus of debate in international policy circles as well as in the academic community. This report is based on a specific, conflict-oriented approach to the concept of environmental security and focuses on identifying linkages between environmental degradation and conflict in a given region.

Modern conflicts are complex, unfolding on several levels. Researchers emphasize that various forms of stress may engender insecurity whereas other factors promote security for individuals and groups (see table below).

Although still very broad in its scope, the table below underlines the need to look at the problems and issues that decrease the resilience of groups and societies and make them more vulnerable to threats, including the threat of violent conflict. Empirically it has been difficult to demonstrate that either poverty or environmental factors, in and by themselves, are strong determinants of conflict. However, recent research (Ohlsson, 2000) shows that *loss of livelihoods* is the common denominator for many of the internal conflicts of the last decades.

Ohlsson argues that “while poverty may be a near-endemic condition in certain societies, loss of livelihoods marks a rapid transition from a previous stable condition of relative

Livelihood Definition

A livelihood comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living.

Source: Chambers and Conway, 1992

welfare into a condition of poverty or destitution”. *It is the rapid process of change resulting in a sudden fall into poverty that creates the potential for livelihood conflicts.*

There are many possible causes for loss of livelihood in the contemporary world though they are mostly related to job scarcity, population growth and environmental degradation of key resources such as water and arable land. *Environmental scarcities of these two assets constitute a special case of growing importance.* Although roughly half the world’s population now lives in cities, agriculture is still by far the largest single source of livelihoods and income.

The rapid negative changes associated with the loss of livelihoods *undermine the resilience of societies* – their capacity to absorb shocks – and increase vulnerability to

Security-Promoting Mechanisms versus Insecurity-Promoting Mechanisms		
System	Security-Promoting Mechanisms	Insecurity-Promoting Mechanisms
Economic	Wealth Welfare Policies	Poverty Inequality
Political	Law Legitimate force	Corruption Unlawful use of force
Cultural	Social identity Justice	Discrimination Injustice
Demographic	Low birth rate Urbanization	High birth rate Rapid population flows
Ecological	Life support Raw materials	Scarcity Diseases

Source: Dabelko et al., 2000. in Maltais et al., 2003

tension and even violent conflict. But not all forms of tension and conflict turn violent.

The Swiss Environment and Conflicts Project¹ studied the conditions that allow social conflicts to cross the threshold of violence and concluded that *environmentally-induced conflicts result in violence only if and when some of the following five key situations coincide:*

- **Inevitable environmental conditions.** Group survival is dependent on degraded resources for which no substitutes are apparent and eventually the group faces an inevitable and therefore desperate environmental situation;
- **Lack of regulatory mechanisms and poor state performance.** When a political system is incapable of producing certain social and political conditions, it becomes impossible to achieve goals such as sustainable use of resources. This shortcoming is either due to a lack of state outputs regarding resource management and livelihood security or to disruption of social institutions designed to regulate access to resources;
- **Instrumentalising the environment.** Dominant players use or manipulate the environment to serve specific group interests, making environmental discrimination an (ideological) issue of group identity;
- **Opportunities to build organizations and find allies.** Players organize themselves along political lines – often behind a strong leader – and gain allies either from groups affected by similar problems, from certain (fraternizing) factions of the elite, or from foreign groups such as IGOs;
- **Spillover from a historic conflict.** Environmental discrimination occurs within the context of an existing (historic) conflict structure and, as a result, the conflict receives new impetus.
(Source: after Baechler, 1999: 32-33 in Maltais et al., 2003).

The Swiss research team also found that violent conflicts that are partly caused by environmental degradation are more likely to occur in *marginal vulnerable areas, typically arid plains, mountain areas with highland-lowland interactions, and transnational river basins* (Baechler, 1999). Moreover, environmentally induced conflicts are more likely to happen at *intra-state* rather than interstate level.

After looking at the conditions that make violent, environmentally-induced conflict possible, and considering which regions are structurally more vulnerable to conflict, attention must focus on the *patterns of causation behind violent conflict*.

Research carried out in Switzerland and Canada² noted that the typical causal pathway to conflict involves:

- **Dependency** on natural capital;
- **Environmental scarcity** arising either when the quality and quantity of renewable resources decreases (*supply-induced scarcity*), the population increases (*demand-induced scarcity*), and/or when resource access becomes more unequal (*structural scarcity*) (Homer-Dixon, 1999). Environmental scarcity, in turn, can produce five types of social effects: *constrained agricultural productivity; constrained economic productivity; migration of affected people; greater segmentation of society, usually along existing ethnic cleavages; and disruption of institutions, especially the state* (in Marais et al., 2003: 14);
- **Environmental discrimination** in terms of *unequal access to natural resources, is a key mechanism since it causes marginalization of a group*, which in turn stimulates population movement (Baechler, 1998, 1999). Degradation of renewable resources and population growth that cause unequal access to resources may lead to a situation of *resource capture* in which elites gain control over scarce resources. This phenomenon is often related to a modernization and development process with uneven distributive implications (Baechler, 1998, 1999).
- **Ecological marginalization** when unequal resource access and population growth combine to drive further degradation of renewable resources.

Failing to meet the challenges related to the rapid negative changes associated with livelihood losses can fuel conflicts at community level and create an opportunity for political forces to build on the grievances of society and mobilize popular support which may under certain conditions become violent. More specifically, unscrupulous leaders will generally find it easier to mobilize people who have suffered a sudden drop in expectations, due to the loss of their family's livelihood, and must accept a much more lowly situation in society than they thought they deserved.



When looking at the processes behind conflict it is essential to identify players with an incentive for violence. They need to access resources that facilitate mobilization and expansion of violence. *What is critical is not whether people actually have a reason to commit violence, but what enables them to carry it out under particular circumstances.* In their research, Collier and Hoeffler (2001) argue that conflict may be explained either by *grievance* or by *greed*. They conclude that if we want to understand the causes of contemporary civil wars we should focus less on explanations based on grievances and look instead at the greed of those who have an interest in using violence to achieve their goals. Even when people have reasons to be unhappy about their situation, this does not mean that their discontent escalates into violence. There should

be someone able to extract 'economic' profit in order for violence to occur. Access to specific natural resources is a factor that can motivate actors to use violence as means of control (diamonds, oil, timber wars).

But society is not powerless when confronted with conflict. It has ways of dealing with it. Institutions, particularly political institutions and civil society, can work to defuse conflict situations or they can fuel discontent through poor governance, corruption and inefficiency. Finally, regional and global factors can increase or decrease the possibility of conflict. When a variety of these factors are at work, there will be windows of vulnerability, moments when events such as elections, or even natural disasters, can trigger hostility or even full-scale violence.

The Saikhan River commonly known as the Water of Khujand, comes into the country from the northeast, flows westward through it and after passing along the north of Khujand and the south of Fanakat, now known as Shahrukhiya, turns directly north and goes to Turkistan. It does not join any sea but sinks into the sands.

Regional context

The situation of the Ferghana valley can only be understood within the broader context of the three countries – Kyrgyzstan, Tajikistan and Uzbekistan – which meet in the valley. In this chapter we will look at some of the overall trends characterizing Central Asia since the end of the Soviet Union.

Political and security factors

With the collapse of the Soviet Union the newly independent states of Central Asia had to face several major challenges, in particular the *creation of a national identity*. Although the Soviet Union had already promoted a sense of national identity and distinctiveness, national agendas developed further after independence, making the *defence of perceived national interest* a reflex response when dealing with regional issues. Central Asian states have consequently preferred bilateral, case-by-case solutions so far. This has exacerbated competition between regional players and reduced the impact of regional cooperation institutions and initiatives. On the other hand case-by-case mechanisms have also prevented interstate crises from escalating into open violent conflict.

With independence it was also necessary to determine and stabilize the *complex national borders* inherited from tsarist and Soviet administrations. The presence of seven enclaves³ in the Ferghana valley increases the complexity of the border question. Though states have generally solved the main questions, within the Ferghana valley there are still several unresolved questions related to border delimitation and demarcation.

Several factors have heightened Central Asian regimes' sense of insecurity: armed incursions by opposition groups harboured by neighbouring countries; penetration by transnational organized crime networks (drugs, arms, human trafficking); the alleged success of radical Islamic organizations such as the Hizb-ut-Tahrir or Bayot ("Oath"), mainly in specific areas of the Ferghana valley. *Stability and security are consequently high on the political agenda*. Central Asian states, their main neighbours and the US share a similar interest in security. The "war on terrorism"

that followed the US-led intervention in Afghanistan has added to this concern.

The states of Central Asia have mainly joined multilateral regional organizations such as the Central Asia Cooperation⁴, the CIS Collective Security Treaty and the Shanghai Cooperation Organization to strengthen cooperation in the fight against terrorism, extremism and trans-border organized crime but also to promote economic cooperation and trade. At the same time the legitimate need to establish state control over national territory and the security agenda outlined above encouraged states in the region to pursue unilateral policies, with increased militarization of border areas such as the one in the Ferghana area. Establishing checkpoints has already prompted armed violence in 2002–3 in the Batken (Kyrgyzstan) and Isfara (Tajikistan) regions, after which the authorities had to back off (Oxford Analytica, Daily Brief, 14.01.2005).

Central Asian states are multicultural countries, each with its own national minorities in other states (including China)⁵. Managing minorities is not only an issue of concern within states but also between them. *The international borders between sovereign states, following independence, not only hinder the ordinary flow of goods and people, but also contribute to shaping or at least reinforcing ethnic identity*. Language and alphabet⁶ policies and changes not only affect the relations of minorities with the titular state, but also contribute to the fragmentation process affecting present-day Central Asia.

Islam has for a long time been part of the Central Asian culture. Under Russian imperial and later Soviet rule Islam was in many ways isolated from Islamic development in the rest of the world. Official policies on Islam changed over time, from efforts to undermine it to a more accommodating stance, with officially approved clerics, after World War II. The result of Soviet policies was secularisation to a significant extent, although this was coupled with a popular identification with Islam as somewhat more of an ethnic/identity determinant than an indicator of religious belief or practice. After independence, both the new states and society groups have used Islam as a vector of

Osh has a fine climate, an abundance of running waters and a most beautiful spring season. Many traditions have their rise in its excellencies.

strengthening identities, both national identities and – for many opposition groups – political identities too. Hence Islam has at present a double role: as a stabilizing factor as well as a mobilizing factor since opposition groups have used Islam to channel grievances.

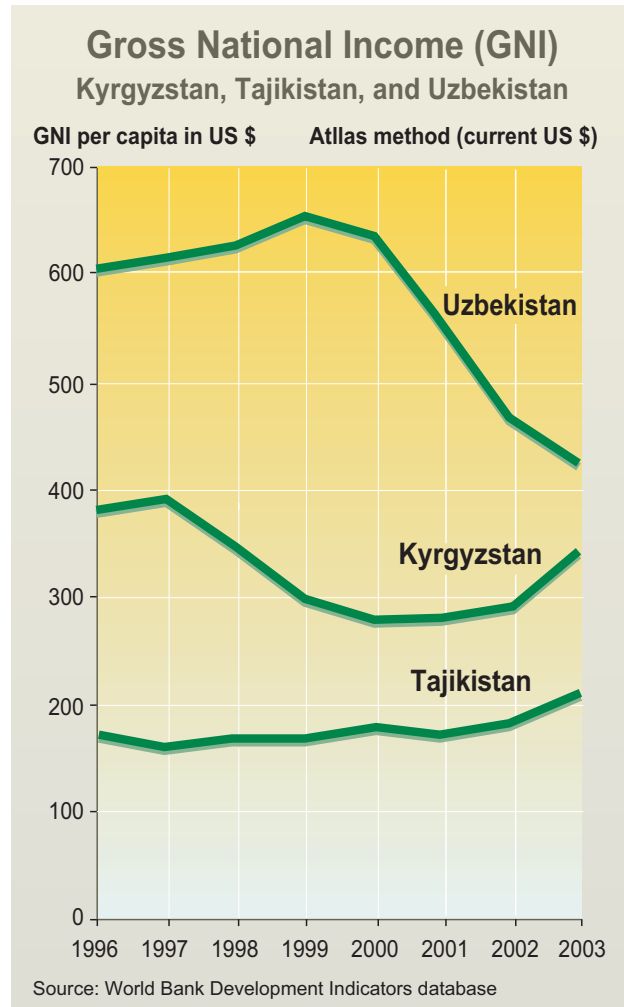
Finally *political transition and change* is an issue of concern. Central Asian countries are still governed by leadership with a common background and socialization. This has played a positive role in averting crises and overcoming tensions. But centralized politics means interstate relations depend a great deal on personal relations within and between central government circles and makes the issue of political change extremely sensitive, as was evident during recent events in Kyrgyzstan in 2005.

Economic factors

The rationale of the common Soviet market and economic system has disappeared, forcing Central Asian states to find their own position in the global market without the support of a redistributive economy. Their geographical position, landlocked between two economic and political “giants” – China and Russia – makes their task difficult, especially for poor countries. The five countries are differently endowed in terms of natural resources, Kazakhstan and Turkmenistan benefiting the most from their large energy resources (oil and gas). *Control of such reserves and their transport* is a key factor in the interest of neighbouring states (Russia, the Caucasus, Iran, Afghanistan and China) and global players such as the US.

Though there is nominal support for economic reform, practical implementation of such policies has varied from one country to the next, and within individual countries from one region to another. The picture is the same for issues such as land privatization. This phenomenon has contributed to increased political, cultural and economic *fragmentation of a region* formerly characterized by considerable integration in a larger market, with a single set of (Soviet) laws and regulations and the redistributive benefits of the Soviet economy.

Central Asia produces raw materials that need to be transported over long distances to reach markets, local ones being limited in size and purchasing power. Creating national borders and levying customs duty makes trade and transport expensive and difficult. *Restrictive border management* policies and practices, combined with legal

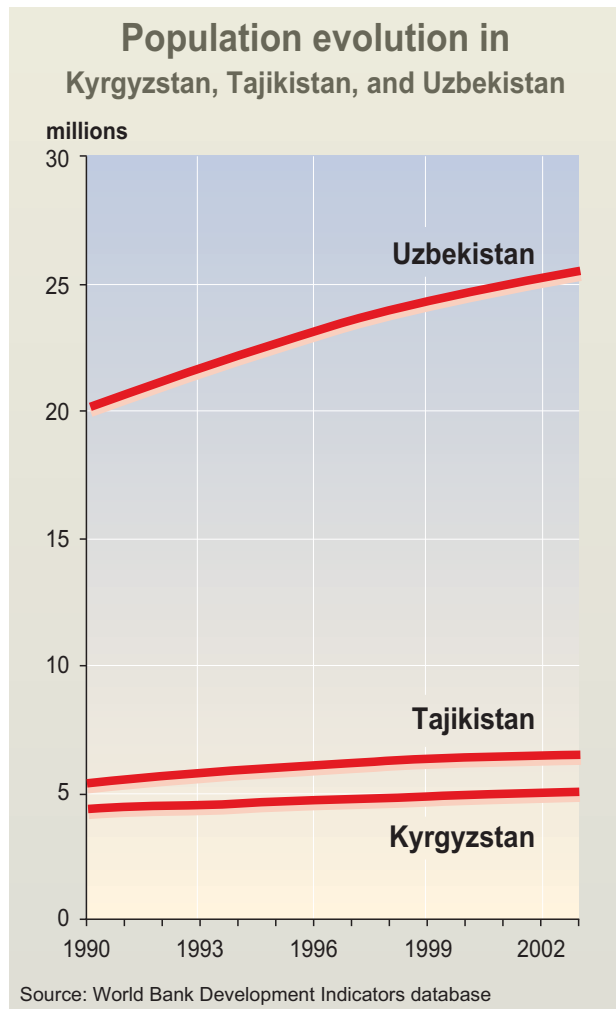


and illegal levies and duties, have a negative impact on trade and living conditions in areas such as the Fergana valley. Such practices favour harassment, corruption and smuggling⁷ and strain relations between the population and border forces. Interstate customs agreements have so far been ineffective.

All three economies are *predominantly agricultural*. Agriculture employs 67% of the labour force in Tajikistan, 53% in Kyrgyzstan and 45% in Uzbekistan⁸. They all rely on primary exports (gold, aluminium, cotton), exposing them to fluctuating world prices. Heavy reliance on cotton production (see the next chapter) and other crops means their *economies depend a great deal on seasonal climate and weather conditions, and the availability of arable land and adequate amounts of water for irrigation* (see discussion in next chapter).

The Andijan torrent goes to Andijan after having traversed the suburbs of Osh. Orchards lie along both its banks; all the Osh gardens overlook it. Their violets are very fine; they have running waters and in spring are most beautiful with the blossoming of many tulips and roses.

A very beautiful stone, with wavy red and white patterns, was found in the Bara Koh in Umar Shaikh Mirza's latter days. Knife handles, clasps for belts and many other things are made from it. For climate and for pleasantness, no township in all Farghana equals Osh.



Output by the Central Asian economies dropped sharply after independence with a subsequent fall in living conditions. Poverty is widespread, especially in rural areas. Communal services⁹ have broken down in many areas. For example several parts of the Ferghana valley, including cities such as Andijan, Ferghana, Osh and Khujand, suffer regular power and gas cuts, straining relations between the population and local authorities, increasingly the focus of local protest. Only recently has the economy in some countries shown signs of improving, but high GDP growth rates have not helped to reduce poverty and social inequality¹⁰. The economic crisis that followed independence exacerbated economic disparities between urban and rural areas and between regions, contributing to *greater horizontal inequality* between population groups and regions. With several sub-state regions becoming increasingly marginalized there is a risk they will turn into "incubators of conflict" (ICG 2001).

Unemployment (both forced and voluntary) is high in all three countries especially among young people and in marginalized regions. OCHA estimates that unemployment is probably running at about 10%-20% for Kyrgyzstan, 30% in Tajikistan and 30%-40% in Uzbekistan. The job market is steadily deteriorating. Moreover, in all three countries almost half the population is under the age of 17 and will soon be joining the workforce drastically increasing unemployment¹¹.

Widespread poverty and unemployment have prompted substantial *internal migration* from marginalized rural areas to urban areas (particularly capital cities). A second coping mechanism has been the high level of *labour migration* to Russia. This mainly concerns men. It has worked as a major safety valve for the region, especially for Tajikistan, Kyrgyzstan and more recently Uzbekistan.

If we now look at the mechanisms fostering insecurity discussed above it will come as no surprise that the current situation in Central Asia displays all the factors that encourage insecurity.

The period following independence proved a major challenge for the newly created states. Deprived of Moscow's human and financial resources the governments of the various countries had to cope with an accumulation of negative forces: rapid decline in the living conditions of large segments of the population, with a dramatic increase in poverty, unemployment, insecurity and inequality; breakdown of communal and state services; enforcement of restrictive border regulations impacting negatively on regional economies; emigration of key minorities and the development of labour migration as a survival mechanism for whole regions. This process has gone hand-in-hand with high birth rates and increased economical and/or political marginalization of groups (ethnic minorities) and regions. Central Asian economies continue to depend on extraction of raw materials and agriculture (especially the cotton monoculture inherited from the Soviet epoch). The significance of land and water has increased considerably. Most jobs in industry and other trades have collapsed or pay very little. In many cases agriculture is now the main source of income. Under such circumstances we may observe that all the factors listed in the table as fostering insecurity (see 'Understanding Links between Environment and Security' above) are on the increase.

Ferghana / Osh / Khujand: Issues and problem spots

The Environment and Security consultations in Ashgabat in 2003 pinpointed the Ferghana valley as an area of significant concern in Central Asia (UNEP, UNDP, OSCE 2003). The map below shows the priority geographic areas and thematic issues for possible ENVSEC action.

ENVSEC teams spent the whole of 2004 investigating the situation in the Ferghana valley remotely through desk study, and meetings and discussions, and directly through field visits and work on concrete environment and security hotspots.



THE MAP DOES NOT IMPLY THE EXPRESSION OF ANY OPINION ON THE PART OF THE AGENCIES CONCERNING THE LEGAL STATUS OF ANY COUNTRY, TERRITORY, CITY OR AREA OF ITS AUTHORITY, OR DELINEATION OF ITS FRONTIERS AND BOUNDARIES.

Results to date suggest that we can identify three main groups of issues as relevant to environmental and security issues in the region:

- access to and quality of natural resources (primarily water and land, but also forest and more generally biodiversity resources);
- existing or potential pollution from industrial facilities, hazardous and radioactive waste sites; and
- cross-cutting issues such as natural disasters, climate change, public health, environmental governance, public participation and access to information.



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MAP BY VIKTOR NOVIKOV AND PHILIPPE REKACEWICZ - UNEP/GRID-ARENDA - APRIL 2005

The Ferghana valley

The Ferghana valley is an intermountain depression in Central Asia, between the mountain systems of the Tien-Shan in the north and the Gissar-Alai in the south. The valley is approximately 300 km long and up to 70 km wide, forming an area of 22,000 sq km. Its position makes it a separate geographic zone.

Although the valley forms a single, continuous geographic unit, it is politically very divided. At present it encompasses three provinces of Kyrgyzstan – Osh and Jalal-Abad, and the recently created Batken – three provinces of Uzbekistan – Andijan, Ferghana and Namangan in the centre – and the Sogd (formerly Leninabad) Province in Tajikistan, at the south-western end of the Valley.

When the Russian Empire absorbed the valley in 1874, it remained a single administrative unit, its territory staying much as it had been under the Kokand Khanate.

Ethnic divisions were not the primary means of demarcation. The 1917 revolution and the subsequent formation of the USSR led to considerable changes in Central Asia. In 1924 new administrative borders were introduced dividing the region, creating “national” republics that contained large populations of non-titular nationalities: Uzbeks in Kyrgyzstan, Tajiks in Uzbekistan and so forth. When these populations existed in large enough numbers outside their own “national” republics, they won some degree of autonomy. With the collapse of the Soviet Union, the largely administrative dividing lines became international borders.

The Ferghana valley forms the backbone of agriculture in Central Asia. Some 45% of the irrigation areas of the Syr-Darya basin are located in the valley.

Source: Goudie, 1996.

In the mountains round Ferghana are excellent summer pastures. There and nowhere else grows the tabalghū, a tree with red bark. They make staves and bird-cages of it; they scrape it into arrows. It is an excellent wood and because of its rarity is carried to distant places. There are turquoise and iron mines in these mountains.

Andijan produces much grain, fruits in abundance, excellent grapes and melons. So many they are that in the melon season it is not customary to sell them out at the fields. There are no pears better than those of Andijan.

Andijanis are all Türks; everyone in town or bazar knows Türkī. The speech of the people resembles the literary language.

In the analysis below we will try to assess general patterns and trends as well as enumerating and prioritizing specific locations and issues that can be considered problem areas or 'environment-security hotspots' from an environmental and conflict-related perspective.

We will pay particular attention to the subnational level, in particular vulnerable marginal land such as arid plains, mountain areas with highland-lowland interactions and transnational river basins.

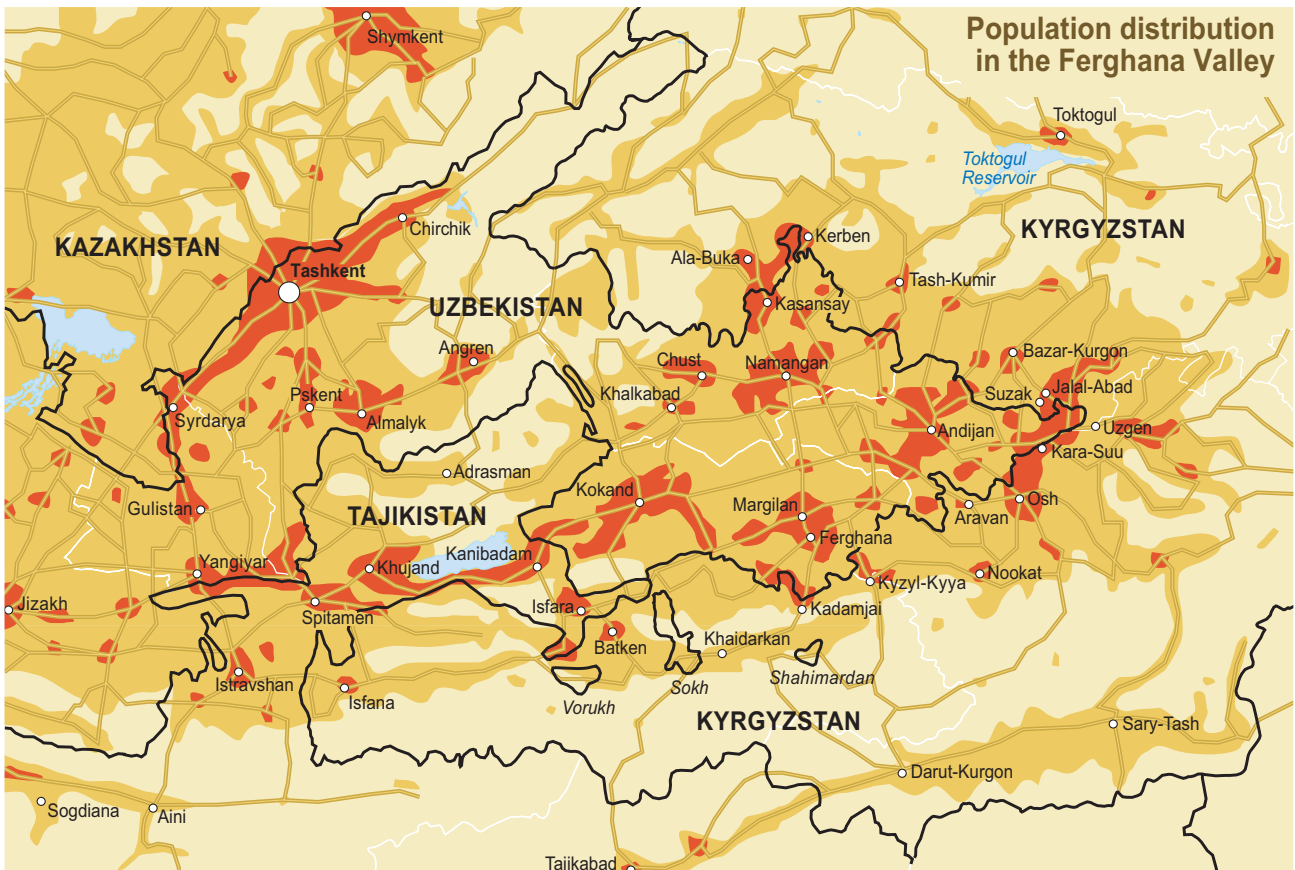
Population of the Ferghana valley

Given the importance of agriculture for the whole Ferghana basin, natural resources such as land and water have historically been among the most important factors in the region's development. The size of the population depending

on these resources is consequently a key political, security and environmental issue.

The Ferghana valley is the most populous area in Central Asia, with about 20% of the total population. According to estimates it is home to over 10 million people. The Ferghana territories account for 50% of Kyrgyzstan's population, 31% of Tajikistan's population and 27% of Uzbekistan's inhabitants (although Uzbek territory only accounts for 4.3% of the total area). In absolute terms, over 6 million Uzbek, 2 million Kyrgyz, and 1.5 million Tajik inhabit the valley.

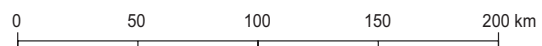
Population density is extremely high in the Uzbek part of the valley (200-500 persons per sq km) compared to the Tajik (70 per sq km) or Kyrgyz parts (20-40 per sq km). High population densities increase the risk of depletion of natural resources and thus of competition and even conflict



Population distribution in the Ferghana Valley

Population density

- Densely populated areas (50 to 500 inhabitants per km²)
- Moderately populated areas (3 to 50 inhabitants per km²)
- Scarcely populated areas (up to 3 inhabitants per km²)



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Andijan has good hunting and fowling; its pheasants grow so surprisingly fat that rumour has it four people could not finish one they were eating with its stew.

for their control. The *strong population growth* observed in Ferghana valley countries makes the situation worse. OCHA (2003) cites an annual population *growth rate of 1.5%-2%*. Between 1959 and 1989 the population of the Aral basin states increased by 140% and is expected to increase by a further 30% by 2020 (O'Hara, 2002).

Rural overpopulation and an increasingly young population put the whole region under demographic pressure now and in the future. This situation is aggravated by the lack of jobs and economic opportunities in general, especially in marginalized areas.

At the same time, countries like Kyrgyzstan are undergoing a process in which *only the main urban areas and marginalized areas are registering substantial population growth* (Batken: 1,7%, Osh: 2.1%, Bishkek: 3.7% in 1998, UNDP 2001). Interestingly, *the share of rural population grew here to 65.2%* in 1999. This probably reflects the internal migration processes affecting the least developed areas, especially the small towns where the viability of whole regions depended on single enterprises.

The Osh and Jalal-Abad provinces are major centres for cotton production and processing, hydro-electrical power

Batken

Batken is a region of special concern established in 1999 after the incursions of the IMU from three former districts of the Osh oblast. It is among the poorest regions of Kyrgyzstan (Asian Development Bank estimates that more than 80% of the population lives below the poverty line; annual income is 30% of the national average), combining the highest ratio of unemployment and one of the highest population growth rates (1.7%). It has a complex political geography with numerous border crossings. Three big enclaves are located in Batken: Sokh (Uzbekistan), Vorukh (Tajikistan) and Shahimardan (Uzbekistan). Transport of goods and persons depends on the political climate and relations at the border. In view of these characteristics the International Crisis Group defined the Batken province as an "incubator of conflict" in 2001.

and extraction of oil and gas. Jalal-Abad is becoming an important industrial centre, whereas Osh is facing industrial decline, though it is still a key staging post on the transport routes from the Ferghana valley to Tajikistan and China.

Population density in the Ferghana Valley provinces

Inhabitants per km²



Sources: National census and population statistics

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The Andijan torrent goes to Andijan after having traversed the suburbs of Osh. Orchards lie along both its banks; all the Osh gardens overlook it. Their violets are very fine; they have running waters and in spring are most beautiful with the blossoming of many tulips and roses.

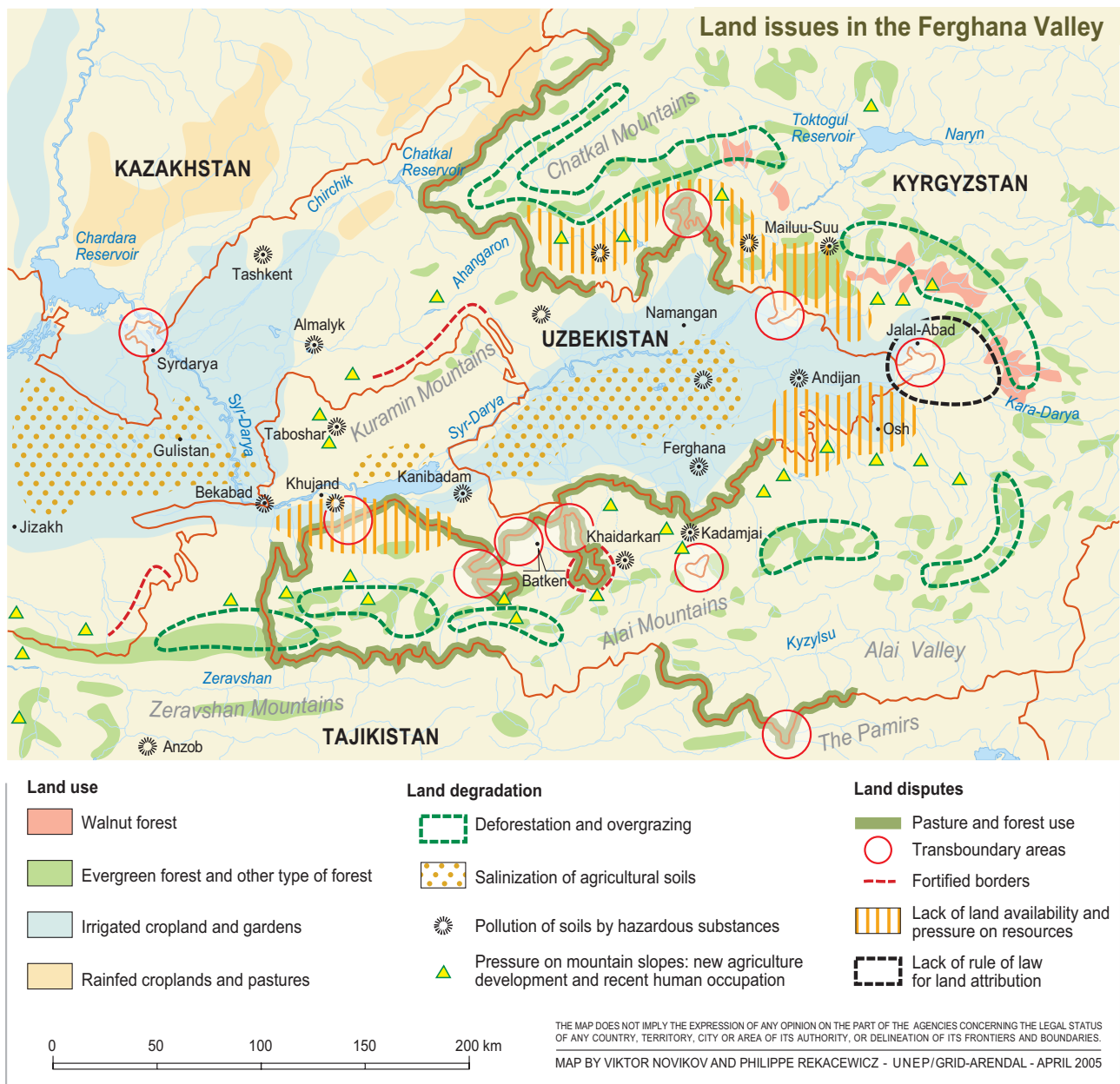
Natural resources: land and biodiversity

As we have already seen, the Ferghana valley has very high population densities for geographic and historical reasons. One of the first questions when dealing with land must consequently be the issue of its availability.

High demographic pressure on limited land resources coincides with a lack of jobs and economic prospects – especially in marginalized areas but increasingly in the irrigated areas of Uzbekistan too (due to the problems affecting the Uzbek cotton sector). These factors are triggering population movements to the main urban centres and to relatively less populated rural areas in the region.

mentioned before, scope for finding alternative sources of income by migrating to other regions at varying distances from home has acted as a key safety valve for the whole region. However it is increasingly apparent that local people are losing the battle against deteriorating economic conditions and are voicing their discontent more openly. In Kyrgyzstan in 2005 this culminated in civil unrest and political changes starting in Osh and Jalal-Abad, two major cities in the Kyrgyz part of the Ferghana valley.

The Osh and Jalal-Abad provinces and the surrounding hills and mountains are centres of local migration. The mountain slopes of the Batken province are attracting migrants from neighbouring Tajikistan.



Osh has a fine climate, an abundance of running waters and a most beautiful spring season. Many traditions have their rise in its excellencies.

Enclaves and border areas are consequently areas of concern regarding land-related tensions. The complex, problematic demarcation of borders between Tajikistan and Kyrgyzstan further confuses the attribution of land. The *border region around Isfara in Tajikistan* and the *Suzak district in Kyrgyzstan* are typical of this situation. In Isfara (more precisely in the *Kok-Tash – Batken province – and Shorsu, near Isfara*), the situation has escalated to open conflict between ethnic Kyrgyz and Tajiks. A similar situation has arisen in the *Arka and Kistakuz region* (see also section on water), where Tajiks have acquired land in Kyrgyzstan, after rising groundwater flooded their own land. Kyrgyz officials often expressed concern about overpopulation of parts of Uzbekistan and Tajikistan bordering on Kyrgyzstan, and the corresponding pressure placed on its own land¹². There is particular concern about the situation around the *Kairakkum reservoir* where pressure on land is increasing (see next section for details).

Land mines exist along Uzbek borders, and are considered necessary by the government of Uzbekistan for national security. In some cases mined areas are marked by signs, but the overall lack of information about their location, fencing or visible marking on the ground have led to a number of human and animal fatalities or severe injuries.

Highlands are usually marginal areas with limited capacity for supporting a large population living on agriculture¹³. Local migration to these areas adds to pressure on limited resources in places already hampered by high birth rates. Under such conditions increasing numbers of people must compete for dwindling resources, which in turn often means increasing tension and conflict for their control.

Another example of this type of problem is *deforestation and use of pasture*. In the Tien-Shan, Alai and Pamir areas and the Turkestan mountain ranges the problem of land degradation is particularly acute. The need for timber for fuel or building leads to deforestation and hence land degradation. Transboundary incursions for wood and wildlife affect all the three countries¹⁴.

Forests are also coming under pressure in the border areas around Isfara, in the Vorukh enclave (in the Batken province, Kyrgyzstan) and in Gantchi, in the Sogd province of Tajikistan, where the inhabitants of the enclaves are often accused by their neighbours of illegal logging. Here again these border areas are some of the main hotspots for environmentally related tension. Furthermore there is an ethnic dimension to such tension, disputes usually involving groups from different ethnic communities.

Similar problems also affect *pasture in the mountain areas of Kerben* (Jalal-Abad province, Kyrgyzstan). Disputes caused by badly defined regulations for the use of pasture¹⁵ in border areas or simply by competition between different local groups are frequent along the borders between Kyrgyzstan (where most of the pasture is located), Uzbekistan and Tajikistan.

The two land categories – forest (especially walnut forests) and pasture – seem to display many of the requisites for environmentally induced conflicts leading to violence. The inhabitants of such areas depend to a large extent on resources under pressure from rising population. The consequences of local overpopulation such as lower per capita availability of productive agricultural land and further impoverishment of upland areas have an immediate negative impact on their livelihoods. In such a context the mechanisms for regulating and preventing the conflicts are of vital importance.

Limited land availability has another impact: because of population pressure and scarce resources *all available land is used for agricultural purposes*, including areas rich in endemic and endangered species. Moreover a range of factors – pipelines, roads and electrical power lines in areas of fragile biodiversity, intensive use of recreational resources (including hunting and mountaineering), mining and processing industries – contribute to reducing biodiversity in the region.

Finally, since independence, Central Asian states have introduced agricultural and land reforms designed to boost output and diversify agricultural production. In practice the various reform programmes also mean *different legal regimes for accessing land and regulating water management at a local level in the three basin states*. This situation further complicates problems at a sub-state level.

Protected areas

Protected areas, established in representative and unique ecosystems, once proved very effective for preserving and monitoring biodiversity. Recently, however, the integrated network of protected areas has been split into fragmented patches. Its effectiveness has significantly decreased. Political borders turn out to be limiting factors for natural habitats. Some protected areas have been devastated by armed conflict (Romit, in Tajikistan). Others have failed to preserve their biodiversity because of increasing fragmentation of ecosystems and obstacles in the path of animal migration.

A very beautiful stone, with wavy red and white patterns, was found in the Bara Koh in Umar Shaikh Mirza's latter days. Knife handles, clasps for belts and many other things are made from it. For climate and for pleasantness, no township in all Farghana equals Osh.

ENVSEC CASE STUDY

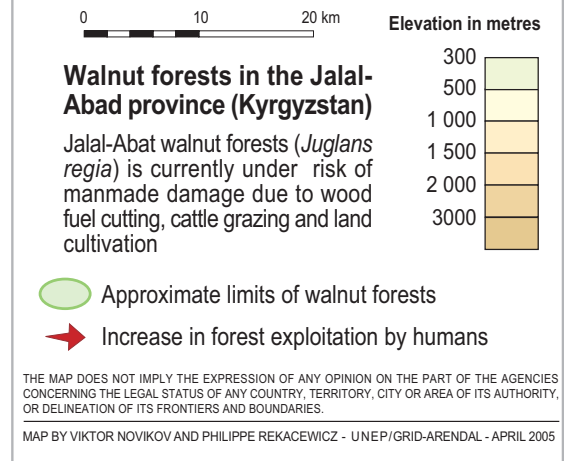
Disappearance of walnut forests in the Jalal-Abad Province, Kyrgyzstan

One part of the Ferghana valley affected by deforestation is the province of Jalal-Abad, in south Kyrgyzstan, where the main walnut forests are located, covering 33,000 hectares.

The walnut forests are remnants of Central Asia's Tertiary era subtropical forests. They are located primarily on the northern slopes of the Ferghana and Chatkal ranges of the Tien Shan, and on the southern slopes of the Gissar and Darvaz ranges in Tajikistan. The forests are a remarkable combination of walnut (*Juglans regia*), reaching 20 metres in height, and fruit trees such as wild apple (*Malus*) and prune (*Prunus*) (Krever and al. 1998).

It is estimated that in Jalal-Abad Province there are already some 10,000 households in the wooded area and their number is increasing steadily. Many villages are overpopulated.

In December 2004, an ENVSEC field assessment mission visited the Arstanbob community the population of which has increased three-fold over the last 10 years. Small collective farms such as Achi have to sustain numbers of households exceeding available natural resources. (Achi forestry is home to 12,300 people in 2,500 households. Out of 14,500 hectare total area, 800 hectares are under walnut forests.) Increasing population pressure combined with the lack of access to alternative sources of energy drive villagers to overexploit the walnut forests' wood stocks. Long cold winters force people to cut down trees for fuel. Poverty is another important force driving deforestation, with people cutting down trees and collecting plant produce for sale. Finally unsustainable agricultural practices cause severe damage to walnut forests. Grazing animals trample down young trees (Achi population owns over 30,000 heads of cattle), and farmers clear forest to plant crops.



Deforestation in turn contributes to greater vulnerability to natural hazards such as erosion, mudflows and landslides.

Source: ENVSEC field visits - Natural Resources Track

Isfara has running waters, beautiful little gardens and many fruit-trees although for the most part, its orchards produce almonds. Its people are all Persian-speaking Sarts. In the hills some two miles to the south of the town, is a piece of rock, known as the Mirror Stone. It is some 10 arm-lengths long, as high as a man in parts, up to his waist in others. Everything is reflected by it as by a mirror

To the west of Andijan is Marghilan, a fine township full of good things. Its apricots and pomegranates are most excellent. One sort of pomegranate, they call the Great Seed; its sweetness has a little of the pleasant flavour of an overripe apricot and it may be thought better than the Semnan pomegranate. They dry another kind of apricot and after stoning, stuff it with almonds. They call it sabhani, and it is very palatable. The hunting and fowling of Marghilan are good: white deer are had close by.

A vital natural resource: water

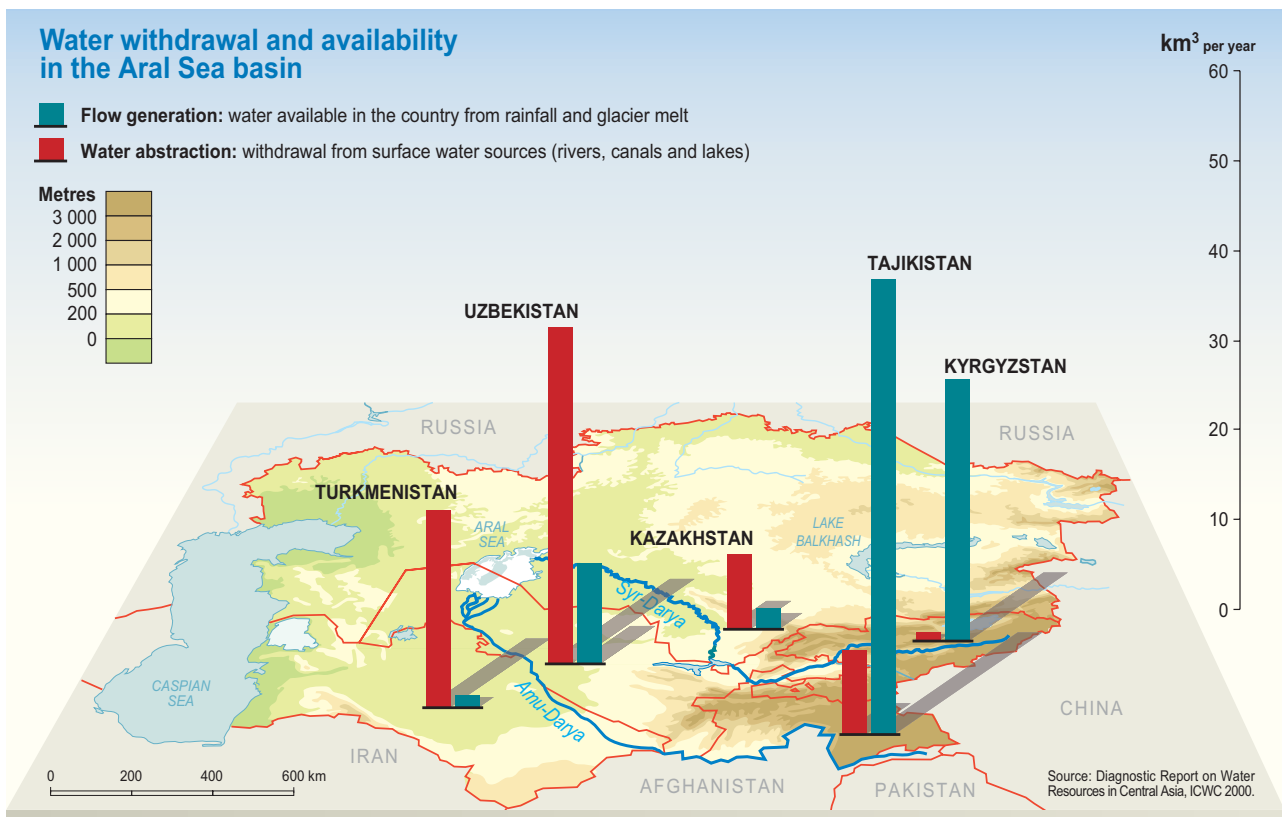
Central Asian context of water management

Agriculture is a mainstay of Central Asia’s economy. With the economic crisis following independence it has become even more important. Agriculture being almost entirely dependent on irrigation, access to water is of strategic importance. Two major tributaries – the Naryn and the Kara-Darya – both originating in Kyrgyzstan, join to form the Syr-Darya, one of the two large rivers serving the Aral Sea basin and the key water resource for the whole Ferghana valley. With a length of 2,200 km it originates in the Tien Shan mountain of Kyrgyzstan, passes through Tajikistan, Uzbekistan and South Kazakhstan and flows into the Aral.

In principle the mountains of Central Asia are rich in water. Countries may be considered to be suffering from high water-scarcity when their annual per capita water supply is less than 1,000 cubic metres. On this basis the situation in Central Asia varies a great deal between up and downstream countries, and between regions inside individual countries. The annual natural internal renewable water resources per

capita are of the order of 700 cubic metres in Uzbekistan and 200 cubic metres in Turkmenistan. The situation is clearly critical. In contrast the figures for the other countries are 4,000 cubic metres in Kazakhstan, 11,000 cubic metres in Tajikistan, and 10,000 cubic metres in Kyrgyzstan (rounded-up data from WRI, 1998: 305). Hence, the water crisis in Central Asia is currently¹⁷ not a crisis of quantity but of distribution and use. Although Afghanistan, Tajikistan and Kyrgyzstan are the countries furthest upstream in the Aral Sea basin, water withdrawals for these three countries totals 17%. The picture for downstream states (Uzbekistan, Kazakhstan and Turkmenistan) is exactly the opposite. Uzbekistan withdraws 52% of the total, followed by Turkmenistan (20%) and Kazakhstan (10%).

The chart shows that water consumption is clearly not balanced. Whereas irrigation was practised for over 2,000 years in the river basin, it was only under Soviet rule that water was diverted from the river on a large scale thanks to an extensive irrigation infrastructure comprising diversion and storage dams, canals, distributaries and pumping stations, enabling irrigated cultivation of cotton, fodder, wheat, fruit and vegetables.



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The withdrawal of water for irrigated agriculture has caused a social and environmental crisis in the Aral Sea basin. By 1991 the level of the Aral Sea had fallen by about 15 metres, its surface area had been halved and its volume reduced by two-thirds (Weinthal, 2004: 87). Drying up of the sea has been accompanied by a wide range of other environmental, economic and social problems in the basin. The problems precipitated by this crisis have aggravated the social and economic difficulties caused by the collapse of the Soviet Union.

Following the break-up of the Soviet Union the interests of upstream countries and regions within them collided with those of their downstream neighbours. In the complex situation inherited by the newly created Central Asian states, *98% of Turkmenistan's water supply and 91% of Uzbekistan's originate outside their borders*, and the use of water for irrigation impinges on the quality and quantity of water available to

downstream users. Consequently the benefits of cooperation are highly *asymmetrical* and unevenly distributed among water users (Weinthal, 2004: 93). In the new situation created by independence and the loss of Moscow as an external enforcer, individual states could no longer trust the others to continue cooperating on water. Predictably states (especially those downstream, which are economically and militarily more powerful than the upstream ones) while formally adhering to previously reconfirmed agreements (cf. discussion in the box above) have chosen to adopt bilateral ad-hoc solutions to mitigate the recurrent disputes over water and energy instead of negotiating a new multipartite, multisectoral agreement suited to the new circumstances (see explanation of the process facilitated by the World Bank below).

The problems related to the water-energy nexus along the Syr-Darya have already caused several incidents since inde-

The water-energy nexus

In the 1960s diversion of water for irrigation from the Syr-Darya river was so extensive (about 30 bn cubic metres) that in dry years with lower flows demand for irrigation exceeded the total flow in the river. This led to the construction of the multi-year storage reservoir in Kyrgyzstan on the Naryn river, the main tributary of Syr-Darya. It stores water in wet years and releases it during dry years to facilitate irrigated farming downstream. This reservoir was also fitted with hydroelectric generator sets for producing electricity when water was being released. Four more reservoirs with limited pondage were built downstream, also on the Naryn river, to produce electricity using the water released from Toktogul.

Under protocol of 1984¹⁸, in a normal year 75% of the annual discharge from the reservoir was to be made in summer (April-September) and discharges in winter (October-March) at 180 cubic metres per second should not exceed the remaining 25%. Surplus electricity generated in summer was fed into the Central Asian power system for use by Uzbek and south Kazakh regions. As the Kyrgyz region lacked any significant fossil fuel resources, they were transferred from the Uzbek and Kazakh regions to enable Kyrgyzstan to meet its winter demand for electricity and heating. Independence put this arrangement under considerable strain. Fossil fuel prices quickly rose to world price levels and payments were often demanded in hard currency. Customers soon switched from

expensive heating powered by fossil fuel to electrical heating, increasing demand for winter electricity. Kyrgyzstan could not afford to import fossil fuels and started increasing winter discharges of water to meet winter power demands and reducing summer releases to store water for the following winter. In 1990-2000 summer releases dropped to 45% of annual discharge and winter releases increased to 55%.

In February 1992, in an effort to solve the problem of the conflicting (international) claims on the water, Central Asian states signed an agreement to maintain and adhere to Soviet-era arrangements. This, as well as other agreements¹⁹ for the release of water and exchange of electricity and fossil fuels, proved ineffective and could not halt the Toktogul operation's increasing focus on power production. The issue of compensating Kyrgyzstan for water storage services remains open. Moreover, even when agreed summer discharges are made, the supply of fossil fuels often falls short of agreed quantities, forcing Kyrgyzstan to increase winter discharges. In wet years downstream states do not need the agreed volumes of summer discharges and this affects the export of electricity and the compensating quantities of fossil fuel transfers to Kyrgyzstan. The latter is thus exposed to a serious risk in terms of timing for meeting its winter demand for heat and power.

Source: after World Bank, 2004

pendence. In 1993, 1998, 2001 and 2004-2005 Kyrgyzstan was blamed for releasing too much water from the Toktogul dam during winter and not enough during summer. Farmers in Uzbekistan and south Kazakhstan faced irrigation water shortages in summer. Frozen waterways and canals, unable to handle the larger volume of water in winter, either caused flooding of towns such as Kyzyl-Orda in Kazakhstan and of arable land or wastefully diverted water into the Arnaysay depression, creating a system of lakes covering 2,000 sq km and raising the level of groundwater²⁰.

If we look at the water versus energy equation, Kazakhstan and Uzbekistan have managed to hammer out agreements with Kyrgyzstan and Tajikistan to swap fossil fuels for water. However the terms of trade in water-for-fuel swaps are problematic prompting recurrent crises over payment for water or fuel. The question of paying for management and main-

tenance of the parts of the system that benefit more than one republic has also become a major political issue.

Several interstate bodies have been set up since 1992 to deal with the issue of water management at a regional level, including the Interstate Commission for Water Cooperation with its Syr-Darya and Amu-Darya Water Basin Authorities. However disputes about water allocations show that interstate bodies still cannot solve critical issues, often lacking the necessary political backing of the highest spheres of the relevant governments (see Gely and Muller, 2002).

For example although the Aral Sea Basin Programme is administered by a council of deputy prime ministers, and the International Fund for Saving the Aral Sea is governed rotatingly by the presidents of the five Central Asian countries – a solution that should guarantee a high level of po-



<p>Polluted water bodies</p> <ul style="list-style-type: none"> Rivers and canals Lakes Groundwater Areas under threat of flood and of pollution due to mismanagement of upstream water reservoirs and hazardous waste storage sites 	<p>Impact</p> <ul style="list-style-type: none"> Former bed of the Aral Sea, uncovered area entirely desertified and saline Areas directly affected by the consequences of the shrinkage of the Aral Sea (toxic salts), leading to salinization and desertification Migration from environmentally degraded areas 	<p>Concerns for the future and potential areas of tension</p> <ul style="list-style-type: none"> Areas of intensive and inefficient irrigated agriculture practices with potential to sterilize soil and threaten human health Projected water infrastructure or management plans with conflict or international dimension
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The fowling and hunting of Akhsi are very good indeed; white deer abound in the waste on the Akhsi side of the Saikün; in the jungle on the Andijan side, abundant and well-fed bucks and does, pheasant and hare are had.

litical commitment – in practice the issue of water as well as overall environmental management is left largely up to bilateral relations between individual states. In Central Asia the ASBP and IFAS should provide a basis for joint policies and actions. At a national level the various ministries should be able to integrate the actions of the interstate bodies into national policies, strategies and programmes. But the real ability of ministries to fulfil the task is often overestimated. At a provincial level the involvement of local government, the private sector, and civil society organizations and institutions is needed to translate policies and programmes into action and provide feedback. Civil society is often an important vector for parties directly concerned by water issues to express their views. The actual decision-making process often ignores this aspect of participation, despite attempts by some interstate organizations such as IFAS or ISDC to create public advisory bodies drawing on NGOs.

International organisations such as the World Bank are increasingly engaged in facilitating high-level discussions and negotiations among the Central Asian states on the issue of the water-energy nexus. If the current process of establishing a “water-energy consortium” is successful, the water and energy concerns of the states may finally be integrated into a single, long-term regional policy and operational framework. But the limited prospects for adequate outside investment in a deal of this nature may hinder negotiations.

The Ferghana valley

Water is a basic production resource for agriculture. Competition for scarce water resources has been recognised as a potential source of international conflict. Individual nations and the international system as a whole have nevertheless learnt to manage this threat. Previous research (Klötzli, 1994) identified three main Central Asian regions where incidents over water use occur regularly: the *Amu-Darya delta*, the *Zeravshan valley*, and the *Ferghana valley*.

Water wars

Research into the prospect of “water wars” shows that a war has never been fought for water. Only a handful of minor water “skirmishes” can be identified for the past century, while over the same period 145 water-related treaties were signed. However, it should be noted that “there is ample evidence that the lack of clean fresh-water has led to occasionally intense political instability and that, on a small scale, acute violence can result.”

Source: Wolf, 1998

However in the case of the Zeravshan and Ferghana valleys, despite the very local character of conflicts, the presence of international borders and/or the implication of communities belonging to another ethnic group have loaded the conflict with a transborder and/or ethnic dimension.

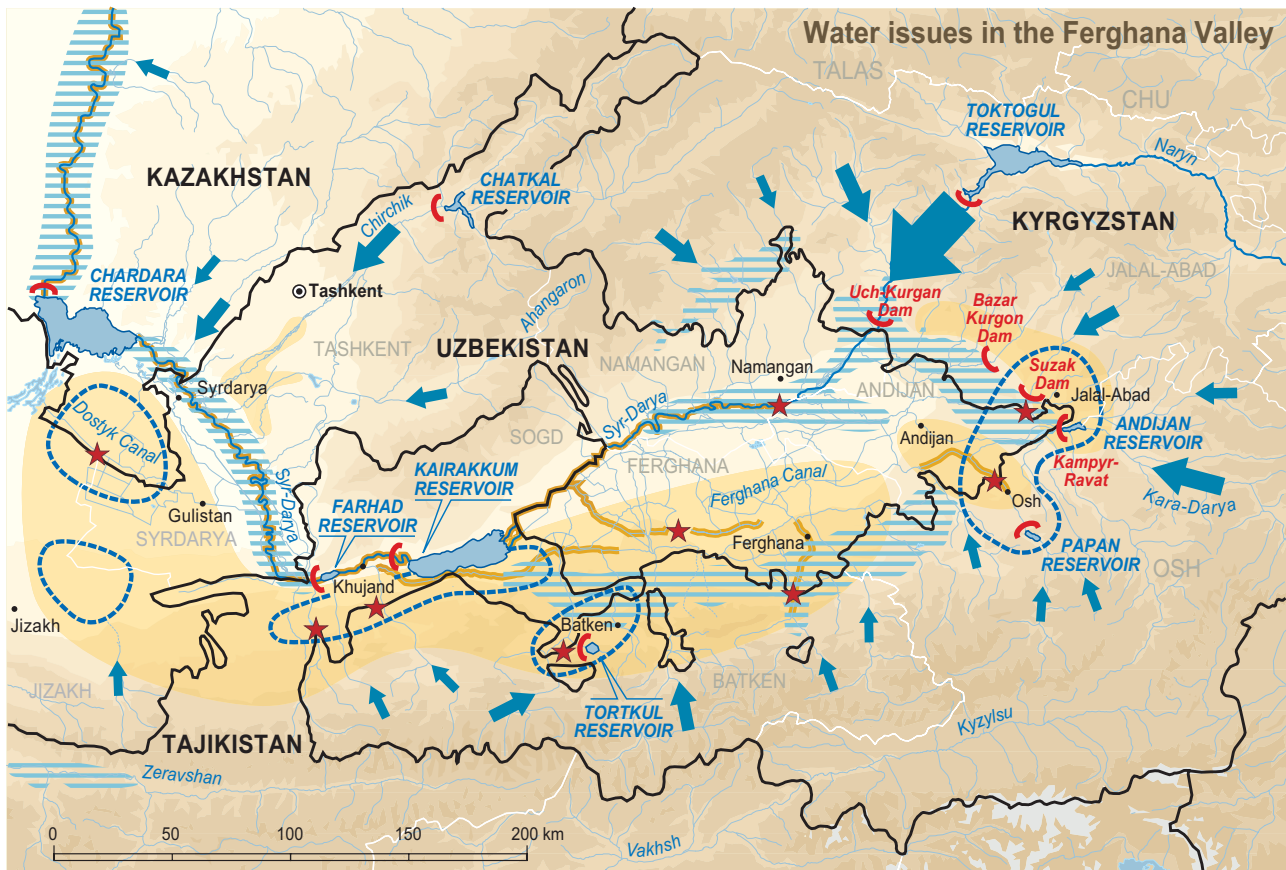
As discussed above, the tensions related to management of water from the Toktogul reservoir have strained relations between Uzbekistan, Kazakhstan and Kyrgyzstan to the point that Kyrgyz troops were deployed in summer 2000 and 2001 (drought years) to protect the reservoir and water release operations. On the other hand the constant involvement of interstate bodies, multilateral organizations, international financial organizations and key regional players is a guarantee that enough pressure and resources are brought to bear on the problem to find a peaceful solution acceptable to the Central Asian states.

There is now growing overall consensus that water scarcity as such will not cause wars between nations. But there is also a growing conviction that water scarcity exacerbates the underlying conditions that fuel livelihood conflicts, particularly while countries are going through the crucial transition period between dependence on agriculture and a modern society, based on urban economic growth. These findings apply to Central Asia where, as we have seen, states have been able to find pragmatic solutions to water-related disputes. There is greater cause for concern at a sub-state level.

On the basis of the results of earlier studies, ENVSEC observations during 2004 field visits and consultations in Osh, the water question in the Ferghana area hinges on three main categories of issue: *water availability and access to water; water quality; rising groundwater and waterlogging*.

Research (Savoskul et al. 2003) points out that the area affected by salinization and waterlogging has increased over the last decade from roughly 25% to 50% of all irrigated land. At present 31% of irrigated land has a water table within 2 metres of the surface and 28% of irrigated land suffers from moderate to high salinity levels, resulting in a 20%-30% drop in crop yield. Soil contamination linked to irrigated agriculture (contamination by pesticides, nitrates and strontium) is an issue in the whole central part of the Ferghana valley where the highest soil salinity is observed.

The problems of secondary salinization and agriculture-related pollution are not new, being clearly linked to the spread of irrigation systems and the construction of large dams along the Syr-Darya (and Amu-Darya) in 1965-85. During this period the Soviet “government devoted more



Water infrastructure

- Main reservoirs
- Irrigation canal network
- Large and poorly maintained dams, possibly under threat of collapse. Regulation of transboundary rivers by reservoirs.

Water quality and availability

- Poor water quality (pollution from agricultural sources, industrial effluents and untreated municipal wastewater discharge) or difficult access to water for drinking and agricultural use due to pollution and damage of infrastructure (water intakes, canals, drains)
- High level of pollution

Water circulation and movement

- Areas sensitive to flooding
- Ground water table raise with impact on human activities (land loss)
- Runoff: the size of arrows is proportional to the volume of the water flow

Disputes

- Recorded tensions and conflicts due to water share and allocations

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attention to installing collector-drainage networks to cope with the growing problems of rising groundwater levels, waterlogging and secondary salinization. However, this increased return drainage flows into rivers, substantially worsening their quality” (Micklin, 2000: 34).

The widespread use of mineral fertilizers and pesticides also contributed to pollution of water resources through return flows from irrigated fields. Water salinization and the associated deterioration in the quality of drinking water affect Kanibadam in Tajikistan’s Sogd province – a town

on one of the main irrigation channels – and the Kairakkum reservoir.

Another related problem is pollution of drinking water resources by organic waste, a problem usually linked to the breakdown of local drinking water infrastructures, as in the case of *Osh city and towns in the Uzbek Ferghana region*. It may also be due to a complete lack of infrastructure as with *Gantchi in Sogd, Tajikistan*, where the water used by the downstream Tajik settlement is polluted by waste from Kyrgyz communities upstream. Such cases of pollution are often a threat to

the health of local people (as with the recent epidemics in the Batken and Osh provinces, respectively hit by typhoid and hepatitis). They may also fuel upstream-downstream tension between communities easily split along ethnic lines.

Moreover because of the high density of waterways crossing the Ferghana valley, the area is at risk from pollution caused by spills or other accidents related to industrial activities or dangerous wastes (see the section on industry and waste below).

The rising level of groundwater is a problem in areas around reservoirs, especially around the *Kampyr-Ravat (Andijan)* reservoir in South Kyrgyzstan. In the Kara-Suu and Uzgen districts of Kyrgyzstan, as well as the neighbouring villages of the Kurgan-Tepe district across the border in Uzbekistan, it is estimated that 250 homes have been severely damaged and up to 1,000 hectares of arable land lost, highlighting the transboundary nature of the problem. In the Osh province of Kyrgyzstan more than 185 settlements have been affected. Rising groundwater causes destruction of topsoil, the disappearance of flora and crops once found in the area, and poor health among the population of affected villages²¹. A similar situation prevails around and downstream from the *Papan reservoir*. The problem also acquires an additional interstate dimension. For one thing, several reservoirs located in Kyrgyzstan cater primarily for Uzbekistan's agricultural needs. Secondly the damage extends far down into the Uzbek part of the valley (affecting even the city of Andijan). Waterlogging downstream from large reservoirs such as Toktogul is causing increasing problems between states, with the Uzbek authorities building intermediate reservoirs and canals to capture and divert excess flow.

The rising level of the water table around the Kairakkum reservoir in Tajikistan is also a source of concern. In the border areas of *Arka and Kistakuz*, the rising water level is driving Tajiks to resettle on higher Kyrgyz land, with the associated problems of land access described in the preceding section.

In the same area (*Arka and Kistakuz*) there was already tension between Kyrgyz and Tajiks due to the use of irrigation without proper drainage by the Kyrgyz and subsequent waterlogging of Tajik farmland. In the *Isfara-Batken* areas tensions over water and land rights are not new. In July 1989 a longstanding dispute between Tajiks and Kyrgyz came to a head over land and water rights (Weinthal, 2004:90). In *Kara-Bak*, a village in the Batken province, water saturation has rendered some 300 hectares of land unusable²².

Several factors are related to the situations mentioned above. In parallel to improving irrigation conditions and agricultural performance, huge Soviet irrigation schemes also caused higher water use, soil erosion, rising groundwater levels, waterlogging, secondary salinization, and, often in the long term, lower yields. Construction planners and contractors tended to underestimate such consequences, or even neglected the need to install proper drainage facilities in the drive to maximize the extent of new irrigation to sustain the influx of state funds (Micklin 2000:33).

Irrigation in Central Asia

In the Soviet era extensive irrigation infrastructures were developed along the Syr-Darya (and Amu-Darya) basin. The period between 1950 and 1985 saw the construction of reservoirs, irrigation canals, pumping stations and field canals, resulting in most of the water in the rivers being diverted for irrigation. The irrigation infrastructure supported the cultivation of cotton, wheat, fodder, fruit, vegetables and rice in the arid steppe areas. It enabled the expansion of irrigated areas during this period by 150% in the Amu-Darya basin and 130% in the Syr-Darya basin.

Large numbers of people moved to the area to work on farms. By 1999 agriculture accounted for 11% of GDP in Kazakhstan, 29% in Tajikistan, 27% in Turkmenistan, 33% in Uzbekistan, and 38% in Kyrgyzstan. The total agricultural area in the Syr-Darya basin amounted to 3.4 m hectares, 56% of which was in Uzbekistan, and 24% in south Kazakhstan.

Cotton accounts for nearly 20%–40% of exports. Central Asia is the world's third largest cotton producer. In 2000 about 35% of irrigated land was devoted to cotton cultivation, 30% to wheat, 12% to fruit and vegetables, 9% to fodder, 5% to rice and 9% to other minor crops. Cotton, fodder, fruit and vegetables are the economically viable crops. The area given over to wheat is increasing due to the republics' food self-sufficiency concerns.

Irrigation is inefficient. Water use is as high as 12,900 cubic metres per hectare and only 21% of this is effectively used. The remaining 79% is lost, mostly from unlined canals on and between farms. This compares with about 60% losses in developing countries.

Source: World Bank, 2004:3

In the period since independence the lack of funds and a clear picture of responsibility for maintaining the system led to gradual degradation of the existing irrigation and drainage infrastructure. The result is further damage to the soil and loss of top quality arable land.

Finally, in the period following independence, new land was allocated to production in response to the pressure of population growth. The newly developed land is often in marginal areas, notably the slopes of Kyrgyz border provinces (Batken, Osh, Jalal-Abad). The land is often irrigated

ENVSEC CASE STUDY
Floods in the Spitamen district, Tajikistan

During the ENVSEC field-mission assessments in September and December 2004, the authorities in the Spitamen district, in Tajikistan’s Sogd province, mentioned that floods by the river Aksu, which forms in neighbouring Kyrgyzstan, regularly endanger Tajik arable land downstream and villages along the river.

The sudden release of water is thought to be linked to the development of more than 1,000 hectares of rice paddies on higher ground in Kyrgyzstan. The local authorities pointed out the lack of a proper drainage infrastructure (the existing infrastructure was not designed to handle the extra flow) and inadequate control by the Kyrgyz authorities, allegedly unable to enforce proper construction standards and to influence the choice of cultivated crops by the local population. Plans for a dam to protect Tajik land from excess water have been discussed.

However local water experts suggest that increased water levels in spring in recent years may also be due to the increased and rapid ice and snow melt caused by a warmer climate in the highland watersheds. Spitamen is still a security issue, because the Tajik communities are convinced upstream Kyrgyz communities are responsible for the flooding.



Rising water levels in the Spitamen district (Tajikistan)
 Reduced crop yields and increased soil erosion; tension between Kyrgyz and Tajik communities due to use of water from Aksuu river and episodes of flooding.

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Source: ENVSEC field visits - Natural Resources Track

without provision of a proper drainage system and sown with water-consuming rice, exacerbating rising groundwater levels lower down the slopes. As the affected areas are usually in another state – Tajikistan or Uzbekistan – these local issues quickly turn into transboundary problems (see case study in the box).

The *border regions* between Kyrgyzstan, Tajikistan and Uzbekistan (including the enclaves) are also particularly prone to *water availability and access to water* problems, the irrigation infrastructure having been built when the borders were only administrative divisions. Irrigation channels now pass through the territory of two or even three states. *Disputes over water availability, though local in scale, reach beyond the area.* For example the border for the Kirki Dong and Kampyr-Ravat (Andijan) reservoirs has still not been settled since border demarcation between Uzbekistan and Kyrgyzstan has yet to be completed.

Water allocation disputes easily take on an ethnic dimension too. In Kyrgyzstan, the Uzbek population is concentrated mainly in the South, in Osh, Jalal-Abad, and the Kara-Suu, Aravan and Suzak districts. The Sogd province of Tajikistan harbours a large Uzbek minority. Under these circumstances disputes among local communities over water or land may quickly mobilize communities through networks rooted in ethnic solidarity.

The Aravan, Uzgen and Kara-Suu districts in Kyrgyzstan are regularly the scene of disputes over water allocation. The same happens in the Batken province, specifically in the villages of *Samarkandek, Ak-Say and Ak-Tatyr* (tension between Tajik and Kyrgyz communities) and in the *Leilek, Batken and Kadamjai districts* (tension between Kyrgyz, Uzbek and Tajik villages).

There is another dimension to the issue of water allocation. Tension over the availability or allocation of water is also frequent in mono-ethnic and non-border districts such as the *Ala Buka district* in Jalal-Abad (Kyrgyzstan) or the *Asht district*, in the Sogd province (Tajikistan) where tension mainly arises between local communities, and district and regional authorities. Such conflict is related to the emergence of numerous small private plots since independence. This development has significant implications for water use, especially in Tajikistan and Kyrgyzstan where the number of individual farmers is proportionally higher than in Uzbekistan. Water authorities have consequently

lost their former counterparts, the collective farms. With so many players the authorities' task is almost impossible. It is very difficult to calculate water allotments for small units, irrigation and drainage systems not having been designed to serve small-scale farms. This is why local water authorities favour the creation of water user associations. Analysts point out that the water allocated to private plots is generally quite inadequate, so households compete for water with individuals and groups diverting water to their own plots (O'Hara, 2002). Water allocation has also an elite dimension. Local elites with access to land also manage to obtain better access to water than small farmers.

The question of allocating water quotas is particularly sensitive in Uzbekistan, where available water is not evenly distributed between users. Not only do upstream provinces allegedly take more water than others downstream. But also Uzbek legislation still gives large collective farms priority access to water. Private farmers, who count as secondary users, depend on the collective farms for their access to water²³. The situation is exacerbated by the government's preference for cash crops and its quota system for cotton and wheat. At the same time, government prices for such crops tend to be much lower than their open market value, impacting on the viability of independent farming.

Agriculture in Uzbekistan

In Uzbekistan, agriculture accounts for 33% of GDP, 60% of foreign exchange receipts and 45% of the employment. The government follows the objectives of stabilizing cotton export revenues, achieving wheat self-sufficiency, and keeping food prices low. In pursuit of these the government controls production, planting, procurement and pricing of the produce. Farmers get low prices. The government, through state monopolies, handles input supply and marketing. It bans exports of products like cereals and livestock and imports through state monopolies products like sugar and vegetable oils. About 20% of the farm areas have been privatised but are still subject to control of production, pricing and procurement. Prices of livestock, fruit and vegetables have been liberalized. While agricultural production has been stabilized, incentives for efficiency improvement remain low.

Source: World Bank, 2004:3

Kasani's water comes from Akhisi in the same way that Andijan's water comes from Osh. Kasani has excellent air and beautiful little gardens. As these gardens all lie along the bed of the

river people call them the "fine front of the coat". Kasani's and the people of Osh have a rivalry about whose town is more beautiful and has a better climate.

Industrial activities and hazardous waste

The Soviet development model for Central Asia was based on building large-scale irrigation schemes enabling the region to become a major cotton producer and expanding the mining and processing industry (oil and gas, chemicals, textile). Major industrial sites were built with towns to accommodate technicians and workers. Industrial operations in the region paid limited attention to the environment or public health, resulting in the accumulation of pollutants in the local environment.

With independence and the end of the planned economy that unified the Soviet market, most of these plants had to compete on the international market without the necessary experience or assets, leading to a drastic reduction in operations. Many of the trained technical staff left for

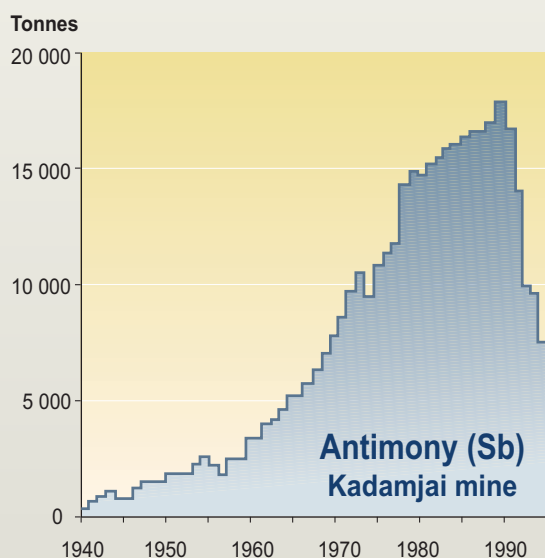
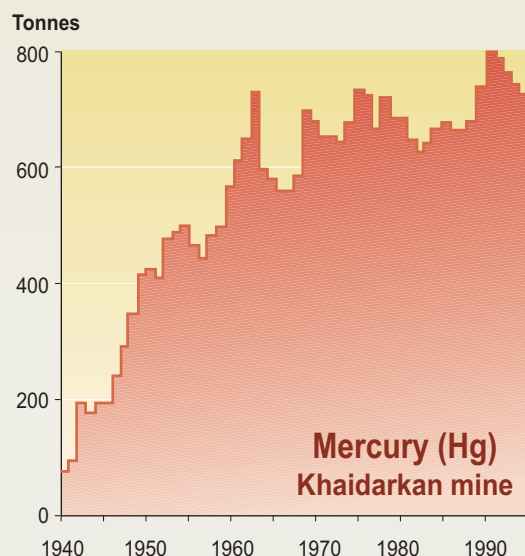
Russia. Over the years industrial and mining towns have lost a large proportion of their population. However a few facilities have maintained and even developed operations. They remain very important sources of employment and hard currency, but also pollution²⁴.

The Soviet Union used the Ferghana valley as one of its main sources of metal and uranium ore, exploring some 50 deposits in the area.

Consequently it is not only active industrial facilities that constitute a threat to the environment and often to security as well. The legacy of past operations, particularly in mining, is also a hazard, frequently a greater one. There is also the possibility that production may start again at old locations



Metal production in the South Kyrgyz mines of the Ferghana Valley



Source: Bogdetsky, 2001: Mining Industry and Sustainable Development in Kyrgyzstan

or new operations develop. Uranium mining, for instance, may resume at sites that have been closed down and gold mining may start again in Kyrgyzstan.

Because of their vulnerability to natural hazards, previous history of accidents and their position along water courses and in the vicinity of town and cities in transboundary areas, tailing dumps at both active and closed mining enterprises constitute a risk. Incidents have been reported where flooding has washed off tailing dams at the *uranium treatment plant in Mailuu-Suu*²⁵, Kyrgyzstan or waste storage at the *lead treatment plant in Sumsar*. Accidents and natural disasters could thus affect a population far beyond people living in the immediate vicinity of a plant or deposit. Over and above the immediate destruction, such events could displace large groups of people and affect the livelihood of host regions.

Before analysing specific locations we wish to mention another important aspect, the perception of risk in relation to industrial accidents with environmental and health consequences. It is common knowledge that a perceived risk can be as powerful a trigger for insecurity as a real threat, all the more so when official information suffers from a widespread lack of credibility. Accordingly, even when an incident's measurable consequences may be limited, it is still necessary to deal with hazards as they are perceived by the general public. This is particularly true of such emotionally loaded concerns as radioactive pollution; a small-scale accident at a uranium mining facility, with little real impact, may well create large-scale public anxiety (Chernobyl effect), distrust of local produce (agricultural output from neighbouring areas) and perhaps even displacement of people for purely psychological reasons. The effect will be amplified if the hazard crosses borders. (This is just one reason why Uzbekistan is so concerned about securing uranium waste on land occupied by its upstream neighbours. It is worried that doubts about the "cleanliness" of its main agricultural area, the Ferghana valley, could be

Cumulative risks from Kyrgyz mines threatening the Ferghana valley

Site	Man-Induced Risks	Natural Disaster Risks	Cumulative	Transboundary Risk
Mailuu-Suu	high	high	high	high
Sumsar	high	medium-high	high	high
Shekaftar	high	high	high	medium
Kan	high	medium-high	high	high
Kadamjai	high	medium-high	high	high
Khaidarkan	medium	medium-high	medium-high	medium
Kyzylzhar	low-medium	medium	medium	medium
Tyoo-Moyun	low	medium	low	medium

Source: after Djenchuraev, 1999: 84; updated on the basis of ENVSEC consultations in 2004

disastrous for the country²⁶.) *Although perceptions may not reflect reality the actions taken in response to those perceptions will have real consequences.*

To continue with uranium mining, tailing dams at *Mailuu-Suu* (Kyrgyzstan), *Shekaftar and Sumsar* (Kyrgyzstan)²⁷, at the Charkesar mine (in Uzbekistan), and in the complex in around *Khujand (Chkalovsk, Adrasman and Taboshar)* in Tajikistan's Sogd province have traditionally been the focus of concern. Many tailing dumps, as well as mud storage areas, were built directly on the flood plains of rivers. In some cases protection dams were washed away and radionuclides and heavy metals entered the rivers and

reservoirs. (For example there are signs of high radioactivity levels in reeds in the Kairakkum reservoir²⁸.) Landslides may push the contents of dumps into rivers. In Adrasman and Chkalovsk open tailing dumps are exposed to wind and water erosion, and to floods and landslides. Field visits to tailing ponds by local and international experts organized by ENVSEC have confirmed the low level of protection with respect to continuous as well as accidental pollution.

The Kyrgyz government has done a great deal to draw the international community's attention to the problems of Mailuu Suu and has managed to obtain World Bank funding to carry out feasibility studies and mitigation work on-site.

ENVSEC CASE STUDY

Radioactive waste in Taboshar, Tajikistan

The Taboshar uranium mining site stands on the southern edge of the Kuramin Mountains, close to the Uzbek-Tajik border. Having worked from 1949 to 1965, it is now a huge assembly of non-operational uranium ore extraction and production facilities and tailings spread over 400 hectares. The town of Taboshar, with its 12,000 inhabitants, is only a few kilometres away.

The site consists of the non-rehabilitated open mine, dismantled production buildings and three tailings sites storing 10 m tonnes of low grade processed uranium ore. Tailings are exposed to wind and water erosion and easily accessible to people and grazing animals. A school and a few farms stand in the middle of the former mining area.

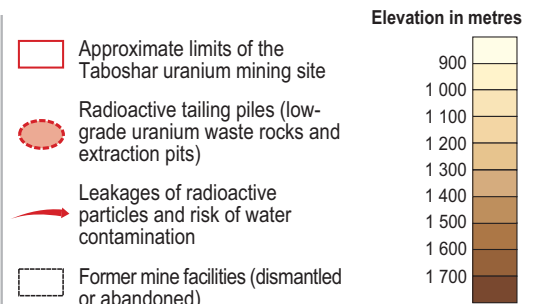
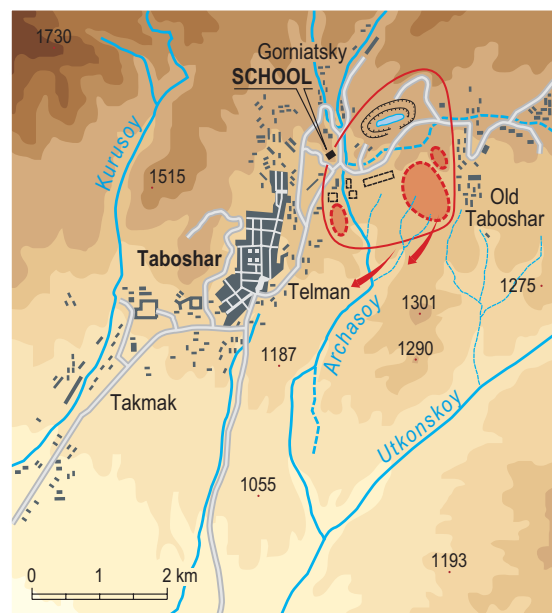
The average radiation background around and on the top tailings is 10 times the normal background value (90 µR/h to 120 µR/h).

There are many signs of scavenging for metal and removal of tailing materials for construction purposes. Gardens and farming land are located close to the radioactive tailing pile, and a local irrigation canal literally crosses the foothills of the tailing site prior to being used by farmers and local people downstream.

Lack of awareness and poverty drives people to use this contaminated area. Moreover easy access and grazing of domestic (sheep, cows) and wild (rodents) animals may introduce radioactive pollutants and heavy metals into the food chain and affect humans and the environment.

Radioactive particles from badly managed abandoned sites are exposed to the air and can be transported by the strong winds prevalent in this area to densely populated areas. Water erosion by heavy rainfall and leaching

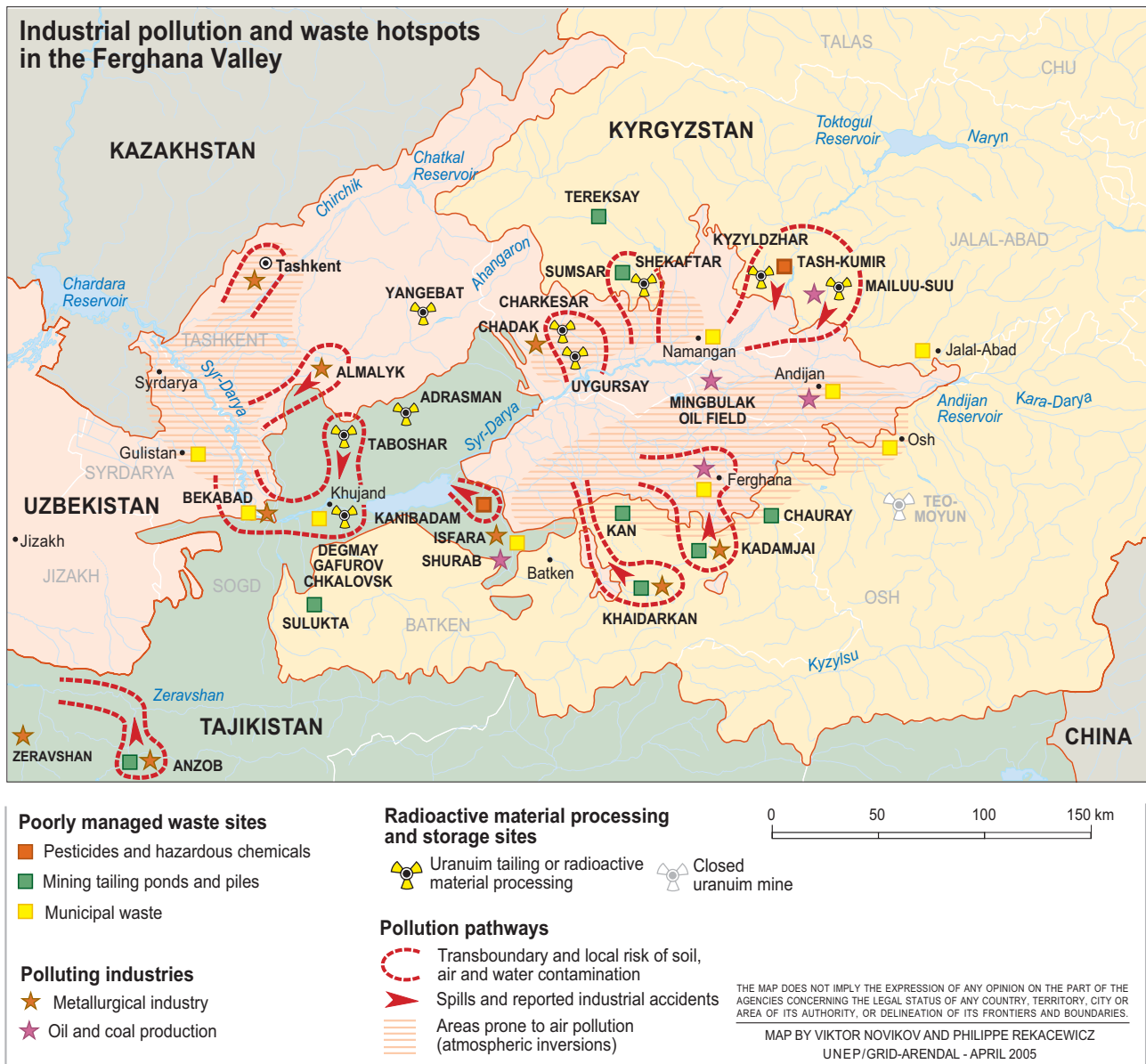
Radioactive waste in Taboshar



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of materials to groundwater carries radioactive pollutants into irrigation systems and rivers.

Source: ENVSEC field visits – Uranium Mining and Processing Track



Tajikistan recently started making overtures to international bodies on the issue of radioactive waste deposits. Uzbekistan has so far been slower to raise international awareness of the issue of uranium mining waste on its own territory compared with facilities in Kyrgyzstan (see above), although it does recognize the threat from both (State Committee, 2002: 106-107; Goldstein and Makarov, 1999)²⁹.

Apart from activities related to uranium mining and their hazardous wastes, there are three main centres of concern in Kyrgyzstan: the *antimony and mercury mining and processing plants of Kadamjai and Khaidarkan and the ore plant in the Sumsar Valley*³⁰. The soil is contaminated with heavy metals (as with the Kan Ore management plant)³¹ and

other toxic substances. Moreover mercury has been stolen from the Khaidarkan plant on several occasions. Some 150 kg of this highly toxic metal seem to have found an illegal market in the area. The Uzbek authorities also see the Kadamjai antimony plant as a transboundary problem.

In Tajikistan, chemical and textile industries around *Isfara* and the chemical waste deposit of *Kanibadam* have been identified as hotspots in the Sogd province. The *Kanibadam toxic waste deposit* (for obsolete pesticides) potentially represents a similar situation to the radioactive tailing dumps described above, with unprotected deposits vulnerable to natural hazards, located in the vicinity of a border, waterway and town. During the preliminary ENVSEC mission in

ENVSEC CASE STUDY

Risk of transboundary pollution from Kadamjai Industrial Area, Kyrgyzstan

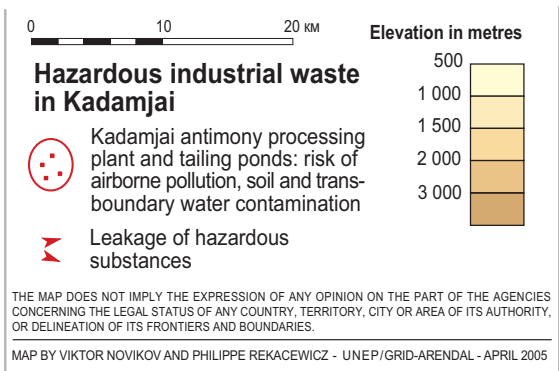
The Kadamjai antimony plant in Southern Kyrgyzstan stands close to the Uzbek border and very near the town of the same name. Antimony production started here in the 1940s using local ore deposits. The plant annually consumes 200,000 tonnes of ore. In 2000-3, the annual production of antimony was 1,500-2,500 tonnes a year. With gradual depletion of the antimony content of local ore, raw materials are now purchased from Russia and Tajikistan.

Ore waste dumps are exposed to erosion – by rain and wind – resulting in contamination of soil and water resources by pollutants. Worse still an earthquake could cause a dam to collapse. Hydrometallurgy process tails are collected in a series of tailing ponds four to seven km away from the plant. The seven tailings account for a total area of 56,000 sq metres.

Tailing ponds have protective coverage at the bottom and sides, but several of them are leaking due to cracks in the bottom lining and inadequate maintenance. Leaks of aggressive substances affect and endanger soil and water resources and pose a high risk of contamination (sulphuric acid, sodium sulphide, sodium carbonate, arsenic, antimony, lead, copper, manganese, iron) for the environment and local people.

Particle emission is another problem. According to information provided by the plant’s management, a significant proportion of the Kadamjai population is exposed to airborne pollution (wind blown substances from waste tailings and industrial emissions).

The industry has plans for site rehabilitation and reconstruction (new protective coverage, consolidation of dams, new



drainage systems), but no funding has so far been forthcoming to implement environmental mitigation plans.

Source: ENVSEC field visits – Industrial Facilities and Hazardous Waste TrackTrack

September 2004 the Tajik authorities acknowledged that the Kanibadam deposit was a risk for regional security.

In Uzbekistan, the *Bekabad metallurgy plant, industrial activity in the city of Ferghana and the Almalyk metallurgy plant*³² have been identified among key problem activities. In particular Tajikistan considers the Bekabad and Almalyk plants to be a transboundary problem. But in practice Tajikistan prefers not to overplay its hand with respect to this plant for fear of laying itself open to criticism by the Uzbek authorities regarding the pollution caused by the Tajikistan Aluminium smelter in Tursunzade.

Turning our attention to oil and gas operations, soil con-

tamination has been observed near oil facilities, notably the Mingbulak oil field in Uzbekistan, the production plants in Andijan and Ferghana cities in Uzbekistan, and at the oil refinery in Jalal-Abad.

Even though past spills and accidents have created tensions between the countries of the region³³, officials do not consistently regard environmental pollution by existing facilities as a security problem. *Only in a very few cases has industrial activity become a security issue.* The fact that the activities giving rise to environmental concern are often essential to the economy too – as with regions such as Batken – certainly contributes to the cautious approach to industrial pollution and associated issues generally adopted by the various countries.

However Tajikistan and Uzbekistan have signed agreements on pollutant emissions from the Tajik Aluminium plant and the Uzbek Bekabad's metallurgy and cement plants in an effort to manage risks associated with transboundary environmental pollution. This suggests that the two countries have understood the connection between environmental stress and security (UNDP 2003). For a number of years Uzbekistan has had a joint commission with Kyrgyzstan, primarily to deal with Mailuu-Suu. In 2004 the Environment Ministries of Kyrgyzstan and Tajikistan adopted an agreement on overall cooperation on environmental security. In all the countries Ministries of Emergency Situations systematically assess the risks associated with industrial accidents and draw up their respective emergency plans. However these are still ad-hoc arrangements without any regional framework for systematic monitoring, communication and intervention to deal with the issues related to transboundary industrial pollution as a comprehensive whole.

Cross-cutting issues

Natural Disasters

Central Asia is a disaster-prone area, exposed to various natural hazards such as floods, droughts, avalanches, rock-slides and earthquakes. It is also vulnerable to man-made disasters related to industrial activity and the radioactive or chemical dumps inherited from the Soviet period.

Natural Disasters in the Ferghana valley

The most destructive natural disasters of the past 10 years include: torrential rain and an earthquake in Osh and Jalal-Abad in 1992 which destroyed 51,000 hectares of agricultural lands and affected 20,000 people (US\$ 31 m direct damage); heavy rainfall in 1993 (US\$ 21 m economic losses); large-scale landslides and mudflows in 1994 and 2004 in the Osh and Jalal-Abad provinces, which killed more than 200 people and made a further 30,000 homeless; a glacial lake outburst flood in 1998 (Shahimardan), which killed more than 100 people and caused damage in Kyrgyzstan and Uzbekistan; widespread floods in Jalal-Abad in 1998, caused by torrential rains, which damaged an estimated 1,200 homes and public buildings (US\$ 240 m direct damage); floods and mudflows in the Tajik part of the Ferghana valley in 1999, 2002 and 2004, which led to widespread damage.

Source: official national data; UNECE, 2000

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 man-made hazards.

According to estimates by OCHA, natural disasters have killed about 2,500 people and affected some 5.5 million others (nearly 10% of the total population) in Central Asia over the past decade. The incidence of natural disasters involving casualties among inhabitants settled in risk-prone areas has been rising in recent years due to the increase in extreme weather events and inadequate preparedness.

In the Ferghana valley alone, between 1994 and 2004, the cumulative damage from natural disasters amounted to more than US\$ 300 m, with more than 500 people killed and tens of thousands affected³⁴. The regions most frequently hit by natural disasters in the Ferghana valley are the *Jalal-Abad and Osh provinces (Kyrgyzstan), the Sogd province (Tajikistan) and the Ferghana province (Uzbekistan)*. On average, approximately 80% of all the disasters (mostly hydro-meteorological hazards) occur between April and August.

Many disasters, such as glacial lake outflow floods³⁵, earthquakes³⁶, mudflows and floods³⁷ are transboundary in nature. They can affect security and livelihoods directly and indirectly. An example is the 1998 Shahimardan stone-mud-ice flood, which occurred when a high mountain glacial lake in the Alai Mountains of Kyrgyzstan released a huge volume of water, sweeping away homes, bridges, roads and other infrastructure in the Ferghana valley and severely affected both Kyrgyz and Uzbek territory (IRCF, UNECE).

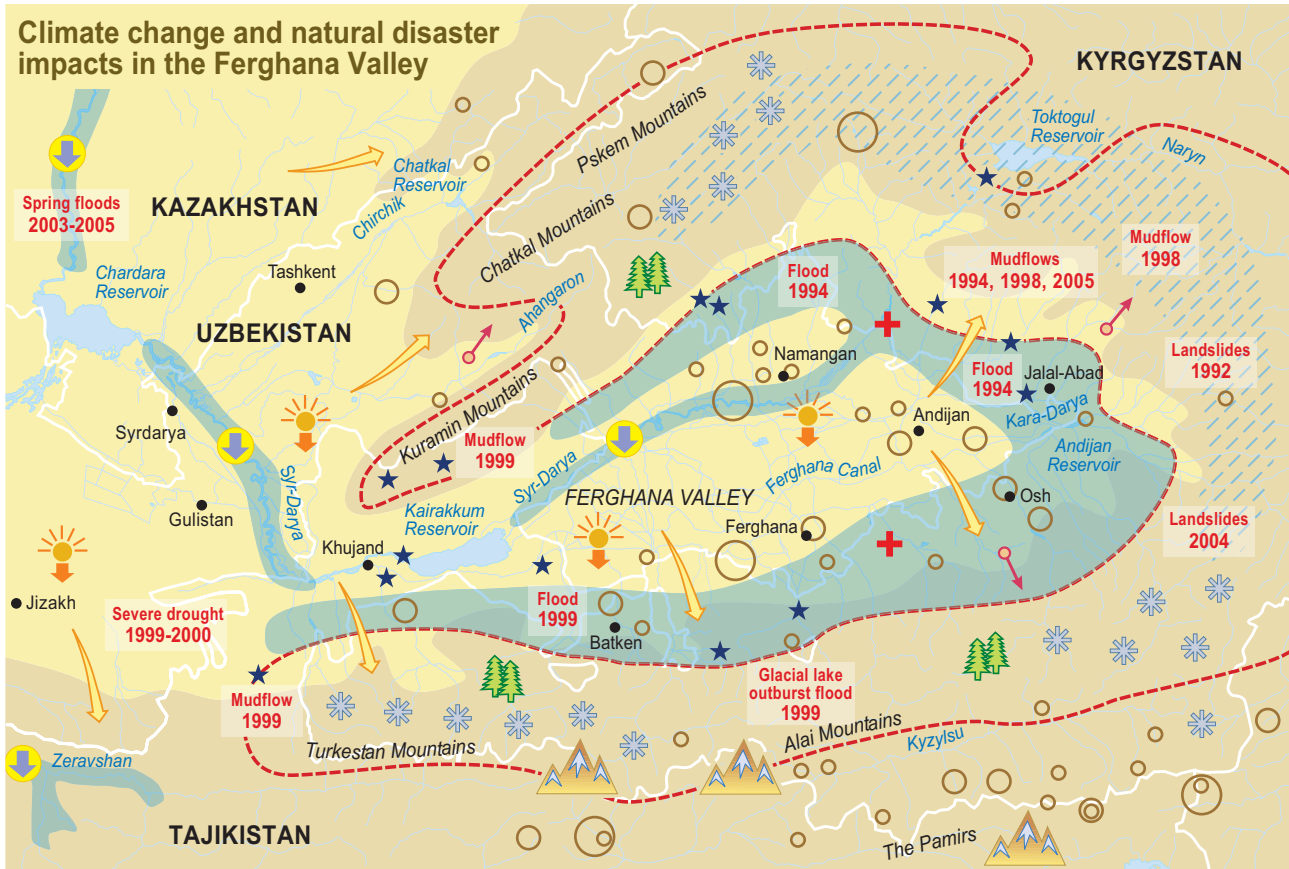
The poor who make up the majority of the Ferghana valley's population, are most vulnerable to disasters and largely affected by them. Most of the rural poor depend on river flows for agriculture and their domestic water supply. They consequently live close to the riverbanks. Floods directly affect their security, impacting on settlements and livelihood.

As we have already seen, natural disasters may be a serious threat to sensitive industrial plants and waste deposits. Major disasters affecting these facilities could have dramatic consequences for the livelihoods of large areas.

Thus even though natural disasters usually call for solidarity and cooperation, such events may strain relations between neighbouring states, especially if one party can blame another for taking inadequate preventive measures (always assuming they were possible).

On the other hand events of this sort (and the need to prevent them) offer a genuine opportunity for cooperation between the relevant authorities, notably the three Ministries of Emergency Situations. Involving local authorities,

disaster response institutions and the communities in the areas at risk can further enhance the benefits of cooperation, particularly for industrial sites or radioactive waste deposits with a high risk of transboundary pollution.



Topography

- Lowlands and piedmont areas
- Mountainous regions (above 1 500 metres)

Hydrometeorological hazards

- Risk of flooding
- Risk of mudflows and landslides
- Torrential rainfalls
- Impact of high temperatures and drought on food production and health

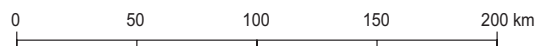
Mudflow 1999 Major recent natural disasters and year of event

Essential earthquakes

Earthquake epicenters depicted from the instrumental records

Magnitude on Richter scale

- 7 to 8
- 6 to 7
- 5 to 6



Potential impacts of climate change

- Desertification (deserts, semi-arid, and arid lands expansion)
- Changes in productivity and elevational shift in alpine biodiversity
- Increase in health vulnerability
- Spread of malaria to higher altitudes
- Rapid melting of glaciers and ice caps
- Changes in snow cover, permafrost, and intensification of snow melt
- Reduction of summer river flow

Infrastructure under threat of destruction from natural disasters

- Industrial sites, dams and irrigation networks

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Khujand is one of the ancient towns. Fruit grows well there; its pomegranates are renowned for their excellence. People talk of a Khujand pomegranate as they do of a Samarkand. Khujand stands on high ground; the Saikun River flows past it on the north at the distance of about an arrow's flight.

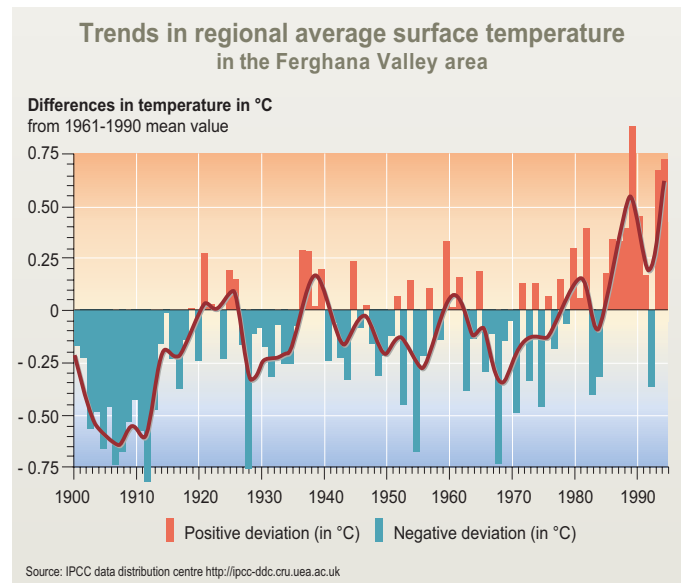
To the north of both the town and the river lies a mountain range called Manoghal, where it is said there are turquoise and other mines and many snakes. The hunting and fowling-grounds of Khujand are first-rate; white deer, buck and doe, pheasant and hare are all very plentiful. The climate is very malarious; in autumn there is much fever. People remark it about that the very sparrows get fever and say that the cause of the malaria is the mountain range on the north.

Impact of global climate change

One factor that must be considered when looking at the region in terms of the links between environment and security is the impact of the *global climate change* on Central Asia in general and the Ferghana valley in particular.

By modifying the livelihoods of people, climate change may have an important security dimension especially in conjunction with other aggravating factors. In the Ferghana valley it is likely that climate change-induced impacts will primarily affect sectors related to water and agriculture.

Even though overall climate scenarios for Asia are far from achieving subregional precision, they offer a basis for assessing the potential impacts of climate change and appropriate policies and counter-measures. The major impact of climate change in arid and semi-arid



Climate change scenarios for Central Asia

On the basis of the magnitude and severity of the projected global warming we may draw up scenarios (2030-60) related to the environment and security in the South-Eastern mountainous part of Central Asia.

The least favourable scenario would be hotter and drier, with extreme temperatures, severe drought, initially increased water flow followed by severe water shortages, rapid spread of deserts in lowlands and medium-altitude mountains, and a steep decline in the productivity of vital natural grasslands. This would lead to diminished ecosystem services, increased susceptibility to extreme events, erosion, and direct impacts on economic sectors and human health. Without adequate adaptation measures, food and agricultural production would be severely jeopardized. Valuable alpine ecosystems, including genetic resources and endangered species, would suffer increasing pressure; some of them could be lost. The massive degradation of mountain glaciers would severely compromise further development of Central Asia. Inequality, tension and conflict are likely consequences of resource scarcity, environmental deterioration and migration imposed by severe climatic changes. With

problems becoming prevalent, the likelihood of regional disputes over scarce, vital resources would increase.

A warm and wet scenario would in general be *mildly damaging*. In this case temperatures would increase slightly, with an even increase in precipitation, and year-to-year weather variability falling short of critical levels. Water resources according to some forecasts would go on declining but, in general, the water supply to the population and economy would not be threatened. The consequences of natural disasters would increase, affecting vulnerable communities (especially the rural poor) and some regions at levels higher than under present climatic conditions. There would be no significant change in food production and agriculture, although an overall decline is possible. Existing disputes over natural resources are unlikely to be reduced under this scenario.

Under both scenarios, timely adequate adaptation measures would reduce the vulnerability of economy, population and ecosystems to climate change.

Source: Novikov, 2004

Kand-i-badam (Village of the Almond) is a dependency of Khujand; though it is not a full-fledged township, it is close to one. Its almonds are excellent, hence its name.

Asia is likely to be a significant shortage of water associated with significant increase in surface air temperature (IPCC, 2001). Rising populations and high population densities in fertile areas, such as the Ferghana valley, will increase the pressures on the availability and quality of water. The agricultural sector, which constitutes the backbone of the regional economy, would clearly be affected by a reduction in water availability.

In the long run most climatic projections suggest a high temperature increase in the Syr-Darya Basin ranging from 2°C to 3°C-5°C (moderate scenario), and in excess of 5°C-6°C (worst case scenario) by the end of the century (assessments by Uzbek and Tajik Hydro-meteorological Services). The impact on the Syr-Darya basin in general, and the Ferghana valley in particular, will range from minor to severe. Water shortages and problems with quality, already an issue in the Ferghana valley (see section on water, above), are unlikely to improve. Land conditions may worsen as desert areas expand, and land claims will gain additional force (see land section). Potential decreases in food production (rice, cereals) and possible spread of vector-borne and infectious diseases will affect vulnerable population groups, primarily the poor, elderly and children.

Finally, there is every cause for concern that the frequency and intensity of extreme weather events and the impact of natural disasters is increasing worldwide (for specific impacts within the Ferghana valley please see sections on industrial activities and hazardous waste, and natural disasters above).

Public health

As mentioned in the section on water, *outbreaks of water-related diseases* (typhoid fever, malaria and hepatitis) have recently been registered in several parts of the Ferghana valley, affecting all three countries. Two points should be noted. State borders have little effect restricting the spread of disease. Outbreaks of this sort (such as typhoid near Tajik-Kyrgyz border) thus contribute to tension in the same way as chemical pollution.

Secondly, with regard to all the problems examined here, hazards with a clear, immediate impact on health (radioactive waste, toxic chemicals, air pollution, etc.) cause the greatest public anxiety and attract the most attention. Public health is consequently an important factor when prioritizing environmental threats to security.

Threat of criminal action

Mention should be made of the issue of imaginary military action and terrorist acts potentially directed against critical infrastructures whose failure could have dramatic environmental consequences. Examples are dams (Papan in the Osh province, Toktogul reservoir but also Lake Sarez in Tajikistan) or transport networks (such as railroads). Clearly a successful attack on this type of target could have a disastrous effect on large parts of the area.

Even more worrying are criminal attacks on sensitive industrial sites and recurrent thefts of quicksilver from the Khaidarkan mercury plant, which demonstrate how easy it is to overcome local security measures.

Environmental dialogue and access to information

For all the issues above, there is the need and the potential to strengthen cooperation between the various institutions involved, both state and otherwise.

Whereas cooperation among national authorities has in many cases been rather successful (for example with respect to national environmental ministries, meteorological agencies, emergency response bodies), local cross-border cooperation and dialogue between similar bodies is limited. For example, since the late 1990s there has been no systematic mechanism that would enable local environmental authorities from different countries in the Ferghana valley to regularly address common issues. Similar problems exist for local mass media organisations and NGOs; these groups usually have more opportunity to interact through informal networks, but are hindered by the same cross-border communication difficulties as the local authorities and the rest of the population.

Furthermore, inside their own countries both groups still face challenges accessing reliable up-to-date information from official sources – not least because state and especially local authorities lack the resources to collect and disseminate it³⁸.

This lack of a dialogue reduces scope for efficiently promoting understanding of issues and solutions, which is particularly important for environment and security issues, with their high charge in terms of 'perception'.

Conclusions and outlook

The Ferghana valley environment and prospects for conflict

In only a few cases is the scarcity of renewable resources a factor in interstate conflicts. But by limiting the productivity of agriculture and the economy as a whole, encouraging migration and social segmentation, and sapping the power of the state, such scarcity can contribute to diffuse, persistent, subnational civil violence. Scarcity often plays an indirect role in violence, influencing the political and economic character of social systems. The following table summarizes these arguments:

If we use the perspectives suggested in the table above to look at post-independence Central Asia it is apparent that the region as a whole has been largely stable, with the exception of the civil conflict in Tajikistan. For the last 10 years forecasts have claimed that the Ferghana valley was on the verge of an explosion, yet it has not experienced any major conflicts (apart from the violent clashes involving the Meshketian Turks in Ferghana during the early Perestroika, the 1990 Osh and Uzgen clashes and the IMU incursions in 1999 and 2000).

Summary of links between environment and security		
	Description	Trends/examples in the Ferghana area
Necessary conditions for environmentally-induced conflicts	<p>Scarcity of regulatory mechanisms and poor state performance</p> <p>Dependency on scarce natural resources</p> <p>Instrumentalising the environment</p> <p>Opportunities to build organizations and find allies</p> <p>Spillover from a historic conflict</p>	<p>Ineffective interstate agreements on water-sharing due to lack of political will. Breakdown of communal services, limited state resources to repair infrastructure</p> <p>Downstream countries highly dependent on upstream ones for water supply. Water and land are strategic resources both for states (cotton as a source of hard currency) and subnational areas (increased importance of agriculture for survival)</p> <p>For reasons related to history and complex population patterns, dominant players can easily use or manipulate the environment to serve specific group interests, making environmental questions an ethnic issue</p> <p>State control over the region has been strengthened over the years. This is both a source of stability (control of opposition) and instability (local actors mobilized by grievances)</p> <p>Only in certain regions, at sub-state level, is there a record of local (violent) disputes though often with potential for inter-ethnic and/or cross-boundary implications.</p>
Vulnerable locations	<p>Transnational river basins</p> <p>Marginal vulnerable areas, at intrastate level</p> <p>Areas directly impacted by environment degradation (pollution, waterlogging)</p> <p>Densely populated areas where access to key resources becomes an issue of survival</p> <p>Arid plains, mountain areas with high-land-lowland interaction</p>	<p>Syr-Darya basin</p> <p>Lowlands; irrigated areas in Uzbekistan</p> <p>Pollution and waste hotspots and areas, waterlogged areas, degradation of land and forests</p> <p>Low-land (especially Uzbek) part of the valley, enclaves and areas squeezed between borders, forest areas in Kyrgyzstan</p> <p>Uplands and hills (Kyrgyzstan), enclaves</p>

The overall stability of the region can probably be linked to an *underestimation of the restraining factors* such as the persistence in Central Asia of pre-Russian, pre-modern conservatism, especially concerning the *legitimacy of power*. The legitimacy of the dominant social order and system of government is a critical variable affecting the emergence of violent civil conflict. In the hierarchical societies of Central Asia, only a strong – and thus pervasive – state is a legitimate state. The *capacity of the population to endure protracted economic crisis* has been grossly underestimated. *Islam* is not only used by radical neo-fundamentalist organizations to create a conflictual environment. It is also a strong element of stability and restraint. Central Asian countries are still governed by leadership with a common background and socialization, making it easier to find ad-hoc solutions in times of crisis. Finally, social institutions such as the prominence of *informal social networks* (clans) and the *family unit* have been a powerful force for social control and restraint.

However since independence the influence of several *factors contributing to insecurity* has increased:

- High population densities in the irrigated lowlands of Tajikistan and Uzbekistan, combined with high birth rate reducing these regions' capacity to absorb excess labour and feed the increasing population;
- Limited economic productivity in the Ferghana area, high levels of unemployment especially for young people and a lack of alternative sources of income, adding to the number of people with grievances. Migration (rural-rural, rural-urban or to other CIS countries) has so far acted as a major safety valve;
- Gradual demarcation of state borders in the Ferghana valley and tighter border controls, combined with stricter visa regimes, limiting the circulation of goods and persons and placing an additional restraint on the region's economic activity;
- Infrastructure degradation (especially the irrigation infrastructure of key importance to the agricultural sector), combined with resource scarcity, contributing to keener competition for resources between social groups. This situation also speeds up group segmentation along kinship lines;
- Worsening living conditions for the majority of the population in the Ferghana region, the post-independence

period only having benefited a fraction of the population, contributing to a widespread sense of social inequality and injustice;

- Varying rates of economic development between states, and above all within individual states, strengthening horizontal inequality at a subregional level;
- Overall decline in state performance delivering services since independence.

With population growth, rising average demand for resources and persistent inequality in access to resources, scarcity will severely affect an environmentally sensitive region such as the Ferghana valley, *increasing the area's vulnerability to conflict*.

Focusing more specifically on the role of environmental factors in the region's vulnerability to tension and conflict, the map summarizes the main results and trends presented in this report.

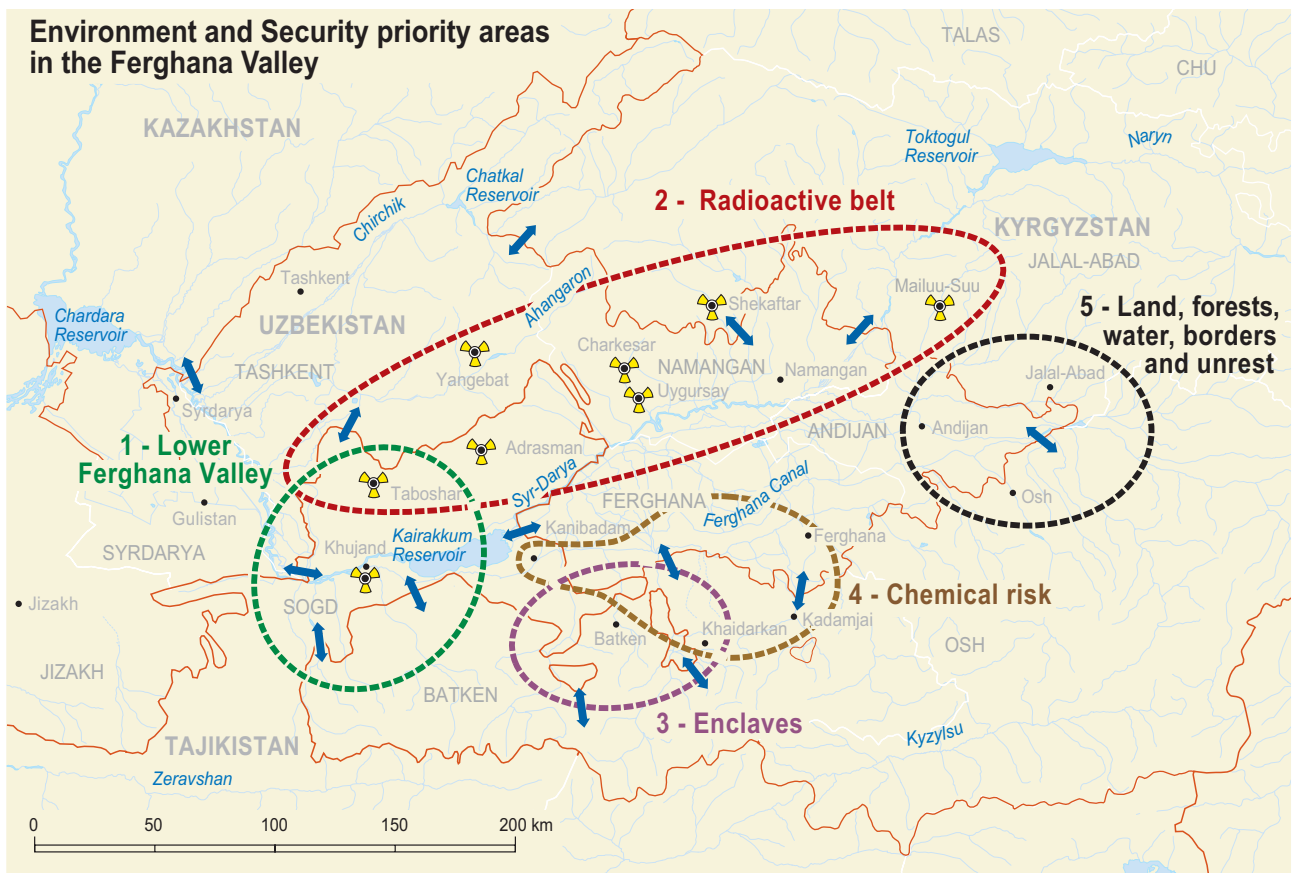
In view of the worsening living conditions, declining livelihoods, increasing land shortages caused by high demographic pressure, and the bleak economic outlook for the Ferghana valley, large segments of the population are migrating in search of a better future. Local migration (migration within the region) is a key phenomenon. Not only are people migrating to regional centres such as Osh and Jalal-Abad in South Kyrgyzstan. There is also substantial migration³⁹ from the lowlands towards the hills and mountain regions surrounding the Ferghana valley. The pressure placed on natural resources by the rapid influx of population in these already marginal lands is changing the relation between low and highlands. More importantly competition for scarce local resources between established populations and newcomers can easily and rapidly escalate into violent conflict. If threatened by ecological marginalization, people living in these areas would most probably mobilize along ethnic lines.







In the irrigated plains, *the enclaves and border regions are the focus of concern*. Tighter border controls (particularly the Uzbek border) are disrupting legal trade and economic activity (and encouraging smuggling). And new state borders are adding a transnational dimension to local disputes and complicating the search for solutions.

Establishing international borders has made access to water resources and upkeep of the water infrastructure an extremely complex issue. Tension and even localized violent clashes over access to water are recurrent along the borders of Kyrgyzstan, Uzbekistan and Tajikistan. However tension over access to water is also common in mono-ethnic and non-border communities, where disputes often have an elite dimension and mostly involve local communities and district or regional authorities. Disputes and tension between collective farms and private farmers will become more frequent especially if authorities continue their policy of supporting collective farms.

Deforestation and overuse of pasture are issues of growing concern, which may degenerate into a security problem, particularly in border areas and enclaves.

Badly maintained radioactive dumps and tailing containments, and several working industrial facilities constitute environmental hotspots. *In a few cases national and regional authorities, and the general public, see pollution as a major issue and a security threat.* The fact that the activities giving rise to environmental concern are often essential to the economy too certainly contributes to the cautious approach to industrial pollution generally adopted by the various



<p> 1 - Lower Ferghana Valley Water regulation, radioactive waste management, water table rise and local disputes, soil degradation (salinization)</p> <p> 2 - Radioactive belt Poor radioactive waste management and risk of transboundary pollution (air, water, food chain)</p> <p> 3 - Enclaves Border, land and water disputes, presence of land-mines (making agriculture and cattle grazing dangerous), deforestation</p>	<p> 4 - Industrial pollution and chemical risk Risk of transboundary pollution due to poorly managed industrial and chemicals disposal sites</p> <p> 5 - Land, forests, water, borders and unrest Land degradation and deforestation, water reservoirs and regulation, border and land disputes, recent civil unrest</p> <p> Opportunities for transboundary cooperation</p>
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THE MAP DOES NOT IMPLY THE EXPRESSION OF ANY OPINION ON THE PART OF THE AGENCIES CONCERNING THE LEGAL STATUS OF ANY COUNTRY, TERRITORY, CITY OR AREA OF ITS AUTHORITY, OR DELINEATION OF ITS FRONTIERS AND BOUNDARIES.
MAP BY VIKTOR NOVIKOV AND PHILIPPE REKACEWICZ - UNEP/GRID-ARENDAL - APRIL 2005

countries. *At the same time, these issues are recurrent, straining relations between neighbours* (as in the case of Tursunzade vs. Bekabad- Almalyk).

The states sharing the Ferghana area are clearly interdependent. Spills and pollution rarely affect only one country. In certain cases the authorities of the region have drawn up agreements and/or case-by-case mechanisms to regulate issues pertaining to the risks and problems caused by transboundary industrial pollution. However there is still no region-wide framework for systematic monitoring, communication and intervention in response to transboundary industrial pollution.

Tailing dumps and industries are *exposed to natural hazards*. Moreover they are often located near rivers and/or main irrigation channels, in the vicinity of towns and cities. Major disasters affecting the plants listed above would, directly or indirectly (by causing panic and public outcry), have long-term dramatic consequences for the livelihoods of large areas. Over and above the immediate destruction such an event could displace large groups of people also affecting the livelihoods of the host areas. Prevention also offers an opportunity for developing cooperation between provinces and states potentially affected by an accident or disaster.

Climate change is likely to be a pressing and complex environmental issue for Central Asia in the coming 30-50 years (especially if the worst-case scenarios presented in several studies really occur). The *lack of effective policies and institutions* to address impacts further complicates the situation and *increases vulnerability* to climate change. The relevant states are not prepared for such changes. This could in turn *undermine the region's ability to resist conflict* related to land, water and food security.

Public health is still on the policy and public agenda. Environment-security concerns include the consequences for public health of pollution, accidents and transboundary epidemics caused by environmental factors.

Strategic infrastructures such as large dams could be at risk from terrorist attacks with environmental effects. Even more worrying are possibilities of criminal attacks on sensitive industrial sites, various incidents having shown how easy it is to overcome local security measures.

Finally, lack of dialogue between local governments as well as non-governmental and media institutions across state borders reduces scope for efficiently promoting understanding of issues and solutions. This is particularly

important for environment and security issues, with their high charge in terms of 'perception'.

The road ahead for ENVSEC

A recent review of cases of environmental cooperation has outlined that studies warning of environmentally induced conflict typically end with highly generalized recommendations for environmental cooperation, but lack any analysis of the mechanisms by which such cooperation could be expected to forestall violence or support the chances for peace (Conca and Dabelko, 2003: 3).

With the present assessment the ENVSEC initiative seeks to achieve two complementary aims:

- in cooperation with the countries and communities, to systematize and present to a wider audience an account of environmental issues in the Ferghana valley that require priority action from the security viewpoint;
- to trigger – or even help implement – some of the actions by designing and starting concrete projects and processes.

The first such process has been the assessment itself, including a major regional event in Osh in December 2004. The Osh workshop not only critically reviewed assessment material and conclusions from the international field missions, but also gave the various stakeholders an opportunity to agree on priority issues to be addressed from an environment and security perspective. This is the first step towards building "shared collective security identities" which make conflict inconceivable. Furthermore the Osh meeting gave participants a chance to plan and discuss a package of activities that will now address various concerns, namely the ENVSEC work programme for the Ferghana valley.

The work programme encompasses the issues and clusters already discussed in the report: natural resources, industrial pollution and waste, and cross-cutting concerns. It also sets out to reinforce supporting institutions such as local environmental authorities, civil society and the mass media – not least to promote transboundary cooperation between them. All in all work will move closer to the field – closer to local sites and the communities coping with hazards. It will also taken on a more long-term perspective. Assessments will be carried out for very specific issues and situations, and support provided for improved local management of related environmental risks with a security component.

In the *natural resource cluster*, UNDP will contribute to improved transboundary management of land and water resources in the Upper Syr-Darya basin. Work will range from a

joint transboundary assessment to setting up demonstration projects in local communities. Cooperation will be strengthened between ENVSEC and specific parallel initiatives in the land and water sector (for example the Swiss-financed Integrated Water Resources Management in the Ferghana valley) as well as work of the International Fund for Saving the Aral Sea.

In the *industrial and waste cluster*, with the support of the Italian Ministry of the Environment and Italian industry, ENVSEC will make a detailed analysis of environmental and health risks at four industrial sites: the Khaidarkan and Kadamjai mining and processing plants in Kyrgyzstan, the Ferghana oil refinery in Uzbekistan, and the Kanibadam dump for obsolete pesticides in Tajikistan. The project will also help improve organization of risk management in local industry. Under the leadership of NATO's Security Through Science partners and in coordination with IAEA, ENVSEC will also help strengthen local analytical capacities for radiation measurement, and then carry out a detailed risk assessment at selected uranium mining sites such as Shekaftar (Kyrgyzstan), Degmay and Taboshar (Tajikistan), and Yangebati (Uzbekistan).

Addressing *cross-cutting concerns*, UNDP will help authorities and local communities to improve management of risks

related to natural disasters such as landslides, mudflows, floods and drought. To increase the impact of work, participants have agreed that these initiatives should be linked to those undertaken on industrial locations and radioactive wastes sites. The project will map out hazards in greater detail than is currently available (looking, among others, at possible impacts on industrial facilities), and then contribute to greater local preparedness. As with other local projects, results if successful can be transferred to other locations. Safety of dams is another possible dimension of ENVSEC interest yet to be investigated.

In our view ENVSEC contributes significant added value by *strengthening institutions and transboundary dialogue and cooperation*. Accordingly, in addition to working with local communities and industry, we will involve key players such as Government, civil society and mass media.

Governments have always been ENVSEC's primary counterparts and we will continue to rely on a network of national focal points from both the Environmental and Foreign Affairs parts of the administrations. Following the success of the first meeting of provincial environmental committees from Kyrgyzstan, Tajikistan and Uzbekistan in Osh in 2004, ENVSEC will continue to support such meetings and a transboundary dialogue between local environmental authorities in general

Facilitating dialogue among environmental authorities of the Ferghana valley provinces

One important outcome of ENVSEC consultations in Osh in December 2004 has been the re-establishment of a dialogue between environmental authorities from the provinces (oblasts) of the three countries constituting the Ferghana valley. Heads of environmental committees from the Batken, Osh and Jalal-Abad oblasts in Kyrgyzstan, Sogd oblast of Tajikistan, Andijan, Namangan and Ferghana provinces of Uzbekistan met for the first time after a long break in an event organised by ENVSEC on December 7, 2004 at Osh Public Environmental Information Centre.

Environmental authorities within the region every day face common problems and challenges. But also every day their managers experience difficulties and challenges of direct regular cross-border communication. The full-day meeting gave the participants a highly appreciated opportunity to discuss common issues face-to-face: and not only the ENVSEC assessment and work to follow, but also many other burning concerns shared by the neighbours.



This will hopefully give start to a strengthened collaborative network of local authorities, as well as institutions and individuals in the region altogether. The next series of meetings has been planned to take place in Tajikistan (Khujand) and Uzbekistan in 2005.

Source: UNEP, UNDP, OSCE, NATO, 2005

(not least through facilitating information exchange). This will also be a natural forum for discussing progress and priorities for the various ENVSEC operations.

In addition ENVSEC will provide assistance to the environmental committees by developing a web portal about the Ferghana valley. It will compile local environmental data and information obtained from the numerous ENVSEC projects, and serve as a common information platform to initiate regular information exchange.

The OSCE will continue to facilitate the establishment of local public outlets to promote public participation in deci-

sion-making on environmental and security issues, such as Aarhus centres positioned between the local Governments, *civil society and the general public*. A Public Environmental Information Centre was opened in Osh in 2004, and plans are underway for a similar centre in Khujand as well as possibly in the Uzbek part of the valley. The centres will also become natural platforms for disseminating ENVSEC information locally and stimulating feedback and support, for instance in connection with local projects such as assessment and management of industrial risks.

As before, UNDP and UNEP will encourage the involvement of local *mass media* in regional activities designed to

Summary of ENVSEC follow-up activities					
	Implementation		ENVSEC pillars		
	Leading organisation	Countries of operation	Assessment	Capacity building	Policy development
Addressing specific environment and security concerns					
Land and water resource management in the Upper Syr-Darya Basin	UNDP & GEF	KYR, TAJ, UZB	*	*	*
Rapid environment and health risk assessment of industrial facilities and hazardous waste sites	UNEP & MoE Italy	KYR, TAJ, UZB	*	*	
Uranium waste and tailings sites	NATO	KYR, TAJ, UZB	*	*	
Natural disaster preparedness for communities in high-risk districts	UNDP	KYR, TAJ, UZB	*	*	
Strengthening institutions and transboundary dialogue					
Support for dialogue between local (provincial) environmental authorities	OSCE, UNDP & UNEP	KYR, TAJ, UZB		*	*
Centres for public access to environmental information and involvement in decision-making	OSCE	KYR & TAJ, later UZB		*	*
Support for environmental journalism (regional festivals and training)	UNDP & UNEP	KYR, TAJ, UZB		*	*
Regional web-portal	UNDP & UNEP	KYR, TAJ, UZB		*	
Environment and conflict early warning system	UNDP	KYR & TAJ, later UZB	*		*

strengthen environmental reporting. The Fifth Central Asian Festival of Environmental Journalism will be held in Almaty in 2005. Much as the 2004 festival in Tashkent, it will be a good opportunity to highlight environment and security issues in the Ferghana valley. ENVSEC also plans to cooperate with local journalists on production once particular issues are ripe for increased public and media attention.

Finally, this assessment only constitutes a baseline whereas more long-term monitoring of developments in the environment and security field is needed for both international and the local audiences. ENVSEC will cooperate with existing conflict prevention and monitoring programmes to strengthen their environment and resource-oriented components for the benefit of forward-looking analysis, coupled with regular monitoring of environmental quality. Through the development of environmental indicators for an *early warning system* for social conflict, ENVSEC will improve the crisis prevention tools utilized in the Ferghana Valley. Involving the response side of the Governments at an early stage will develop the capabilities for coping with increased social tension, thereby reducing the risk of conflict situations. This will also provide input into ENVSEC projects in all the other clusters.

Clearly, the range of needs and issues outlined in this assessment far exceeds the capacities of any single organi-

zation or even cross-organizational venture. The concrete activities described above are only a subset of those that may and eventually will be carried out in the longer-term. For example one aspect of strengthening regional governance involves engaging the countries in more common work to implement key environmental conventions with a transboundary component. In this we expect greater cooperation between ENVSEC and the conventions' secretariats. It is vitally important that there should be tangible strategic cooperation with regional programmes and institutions such as the Regional Environmental Action Plan, the Regional Environmental Centre for Central Asia, the International Fund for Saving the Aral Sea, and its subordinate commissions.

One outcome that ENVSEC will hardly be able to deliver is to bring investment in real, physical infrastructure such as canals, dams, filters or sealing for tailing ponds. Here we hope that by confirming and highlighting new priorities and reconfirming old ones, we can help to interest larger institutions with the necessary capabilities and resources in making long-term capital investments.

All in all, we welcome any ideas that may strengthen ENVSEC's conclusions, approach and portfolio of actions – with the long-term aim of bringing greater security and a cleaner environment to the people of the Ferghana valley.

With care, three or four thousand men may be maintained by the revenues of Fergana.

Quotations in blue are taken and shortened from the “**Memoirs of Babur**” or **Babur-nama**, the work of the great-great-grandson of Timur (Tamerlane), Zahiruddin Muhammad Babur (1483-1530). Babur-nama is said to “rank with the Confessions of St. Augustine and Rousseau, and the memoirs of Gibbon and Newton”. Among other tales, it tells the story of the prince's struggle to assert and defend his claim to the throne of Samarkand

and the region of the Fergana valley. There is much on the political and military struggles at the end of 1490s, but also observations on the physical and human geography, the flora and fauna, nomads in their pastures and urban environments enriched by the architecture, music and Persian and Turkic literature. Translation by Daniel C. Waugh.

<http://depts.washington.edu/uwch/silkroad/texts/babur>

Notes

¹ The project, based at the Swiss Federal Institute of Technology, Zürich and the Swiss Foundation for Peace, analysed more than 40 cases of conflict, about half of which crossed the threshold of violent outcomes (Baechler, 1998, 1999)

² A research team at Toronto University, led by Thomas Homer-Dixon (1999)

³ The presence of seven enclaves located in the Ferghana valley increases the complexity of the border question. Several unsolved questions related to the border delimitation and demarcation processes are straining the relations between the Central Asian states. The situation has become even more difficult with the increased militarization of the borders in the Ferghana after the 1999 and 2000 military incursions by the Islamic Movement of Uzbekistan (IMU)

⁴ The Organisation of Central Asian Cooperation was created in 1994 under the name of Central Asian Economic Community or CAEC by Kazakhstan, Uzbekistan and Kyrgyzstan. Tajikistan joined the organization in 1998, and Russia in 2004

⁵ The presence of Uighur minorities is a sensitive issue for relations between China and Kazakhstan and Kyrgyzstan

⁶ The struggle over an official state language is a source of tension in the three countries. Political leaders are trying to establish the primacy of indigenous languages and reduce use of Russian as the region's lingua franca. Language will be an important factor in the separation of Central Asia into three linguistic regions and can aggravate regional cooperation. Among the countries of the Ferghana valley, Uzbekistan will mainly use its native language with Latin script (introduced in schools in 1996), Tajikistan will be subject to cultural influence from Iran, and Kyrgyzstan will retain the use of the Cyrillic alphabet within a Russian-dominated zone of communication (Apei and Skorsch, 2002)

⁷ For example closing of the border has fuelled a large illegal economy between Uzbekistan and Kyrgyzstan (smuggling of fuel and cotton from Uzbekistan)

⁸ Data for Kyrgyzstan: EIU (2001: 28), figures; provided by the Kyrgyz National Statistical Committee. Data for Tajikistan: IMF (2001); for Uzbekistan: EIU (2003: 47)

⁹ The states of the region have been unable to maintain the previous levels of investment in the social sector, especially in education and health

¹⁰ In recent years, Central Asia has experienced outstanding aggregate growth rates, among the highest within the CIS community. Yet the region suffers from serious poverty and inequality: up to 60% of the whole population of the Ferghana valley is defined as poor (OCHA 2003, FEWER 2001: 15)

¹¹ Official statistics in Kyrgyzstan suggest an unemployment rate of 3% for 2001, while the EIU suggests figures around 7-10%, multilateral agencies even 20%. (EIU, 2001: 13). At the same time, 41% of the Kyrgyzstan's population is under 17 and will soon be entering the workforce (source: ibidem). Unemployment in Tajikistan is officially reported at 2.3% in 2001 (source: ibid.) while ICG estimates unemployment to be over 30% (ICG, 2003). In Uzbekistan as little as 0.4% of the workforce is registered as unemployed, but according to UNICEF 57.9% of the 15-24 age group are without work. The Institute for Regional Studies in Bishkek reports that in the Uzbek part of the Ferghana valley as many as 35% of all able-bodied people under 25 were unemployed in 1999 (FEWER, 2001). Here too 44.3% of the population is under 17 and will soon be entering the labour force, pushing unemployment further up

¹² EIU ViewsWire, Kyrgyz Republic: Riot-torn region hopes for stability, 26 May 2003

¹³ One of the striking findings in Tajikistan and Uzbekistan is the paradoxical situation by which the populations living in productive lowlands such as the Ferghana valley are often the most vulnerable, whereas less productive, mountainous regions are wealthier. This is largely due to cotton, production of which is compulsory for lowland populations but yields a very poor return. In contrast non-cotton farmers in the highlands can grow whatever they want and benefit from the high price of goods in relatively short supply in local markets (due to the prevalence of cotton). In Tajikistan land reform has been very successful in non-cotton areas. In cotton-growing areas it has encountered obstacles

¹⁴ Addressing some of these concerns, a GEF-financed project on biodiversity conservation in Western Tien-Shan along the borders of Kazakhstan, Kyrgyzstan and Uzbekistan is implemented through the World Bank

¹⁵ During the Soviet era Uzbek and Tajik shepherds used to take their herds to Kyrgyzstan in summer (e.g.: Isfara to Leylek regions). This practice still continues but borders have restricted it. Shepherds must pay bribes and run the risk of their cattle being stolen when crossing borders. Many now have to stay in their country, putting a strain on the environment (not suitable for pasture), on herds and consequently on shepherds' living standards. The lack of control over new migratory patterns has also put an additional strain on veterinary controls, increasing the prevalence of animal-transmitted diseases such as brucellosis

¹⁶ Internal renewable water resources include the average annual flow of rivers and the recharge of groundwater generated from precipitation occurring within a country's borders

¹⁷ In the future this situation may change when looking among others at the local impact of global climate change

¹⁸ Protocol No. 413 of the Meeting of Scientific-Technical Council of the Ministry of Land Reclamation and Water Management of the USSR, held on February 7, 1984 in Moscow, provided water distribution limits for the Syr Darya river (PA Consortium Group and PA Consulting, 2002 : Wegerich, 2005)

¹⁹ Annual agreements as well as the Long Term Framework Agreement in March 1998

²⁰ See Sodik Muminov and Vladislav Poplavsky. "Uzbekistan's lakes: benefit or harm?" in (UNEP/GRID-Arendal, 2003) as well as coverage from ENVSEC media training in Tashkent in 2004 at <http://enrin.grida.no/mediatour.cfm?article=18>

²¹ Source: IRIN, available at <http://www.edcnews.se/Cases/KyrgyzGroundwater.html>

²² *ibid*

²³ Irrigation water is allocated among water basin authorities according to quotas decided by the Ministry of Agriculture and Water Resources of Uzbekistan. A board (inspectorate) at the Ministry is set to verify that water users respect the quotas, it can otherwise impose administrative sanctions

²⁴ For example the Tajik TadAZ aluminium smelter in Tursunzade, Tajikistan, is the biggest enterprise in the country (EBRD, 2003) and a strategic source of hard currency. The Uzbek copper smelter in Almalyk and a ferrous metallurgy plant in Bekabad are also important players in both export trade and local job creation. On the environmental aspects of these industries see Sodik Muminov and Vladislav Poplavsky, "To save what is left" in (UNEP/GRID-Arendal 2003a) and coverage from ENVSEC media training in Tashkent in 2004. Available at: <http://enrin.grida.no/mediatour.cfm?article=11>, <http://enrin.grida.no/mediatour.cfm?article=18>

²⁵ In 1958 tailing pond n° 7 in Mailuu-Suu broke, releasing about 600,000 cubic metres of radioactive materials into the river. The radioactive mudflow caused widespread destruction and contamination of huge areas. (Aleksei Ermolov, "Atomic strongholds of the Tien Shan" in (UNEP/GRID-Arendal, 2003; additional information can be found under Ferghana valley in (UNEP/GRID-Arendal, 2003a, available at <http://enrin.grida.no/mediatour2003/>). Most recently, on 13 April 2005, a landslide hit an area surrounding Mailuu-Suu, blocking the river (IRIN, available at <http://www.irinnews.org/report.asp?ReportID=46641&SelectRegion=Asia&SelectCountry=KYRGYZSTAN>)

²⁶ A similar example, but on a national scale, is the cyanide spill into a tributary of the Issyk-Kul lake in Kyrgyzstan on 20 May 1998. Panic ensued due to the lack of reliable public information on the impacts of these chemicals, how far they travel and possible effects on the health

of the lake. Local agriculture and tourism suffered losses. "Regardless of whether all these fears were warranted, the social and economic consequences of the panic were quite real" (Norlen, 2000)

²⁷ Three tailings ponds near the Sumsar River containing 4.5 m tonnes of radioactive uranium rock, lead, and toxic heavy metal salts have been partially eroded allowing a constant inflow of heavy metal pollutants. The Sanitation Authority of Kyrgyzstan reports that the river's manganese level is nine times higher and the cadmium content 320 times higher than the maximum permissible concentrations (neither of these elements can be flushed from the human body). There are eight radioactive waste dumps in Shekaftar, seven of which are located near apartment blocks. Sources: Daniil Kysh-tobayev, "Uranium Waste In Kyrgyzstan" ("Слово Кыргызстана", 01.07.1994) in Environmental Policy Review, Winter 1994, Vol. 8, No. 2, p. 15; "Radioactive spots on the map of Kyrgyzstan" ("Радиоактивные точки на карте Кыргызстана" – "Деловой мир", 03.06.1997) <http://www.nti.org/db/nisprofs/kyrgyz/waste.htm>

²⁸ Preliminary results of sampling by the Institute of Physics of the Tajik Academy of Science, 2004

²⁹ Following Uzbekistan's National Environmental Action Plan for 1999-2005, the State Committee for Nature Protection carries out rehabilitation work in the Charkesar area with UNDP's co-financing

³⁰ Sumsar Ore Management Authority mined and processed complex-ore: zinc, copper, lead and cadmium (Djenchuraev, 1999: 34)

³¹ This plant, on the border between Kyrgyzstan and Uzbekistan, mined lead and zinc ore from 1950 to 1971. The risks are in relation to its tailing impoundment which, according to Djenchuraev (1999: 28) has not been rehabilitated

³² The Almalyk plant is actually in the Tashkent region, however the pollution coming from this operation is a source of concern in the Tajik part of the Ferghana valley

³³ According to records of the State Committee for Environmental Protection and Forestry of Tajikistan, in 1992 Tajikistan evaluated the damage from an oil spill in Uzbekistan as 600,000 roubles. There was formal communication between the two countries. Pollution from oil production was named to ENVSEC as a concern by environmental authorities in Dushanbe

³⁴ Sources: ECHO and official national data

³⁵ There are many glaciers and glacial lakes in the high altitude areas. A recent study shows that in the mountains surrounding the Ferghana valley there are over 100 glacial lakes featuring potential outburst flood (GLOF) risks, and other dangerous situations, such

as landslide dam outburst floods (LDOFs). One example is the catastrophic flood in the Shohimardon valley (see the main text) that killed nearly 100 people and destroyed many households. In 1999, the Asht Valley of Northern Tajikistan was hit by an LDOF killing 19 people, and destroying or damaging several hundred houses and elements of infrastructure

³⁶ The mountain areas of Central Asia, including the Ferghana valley, are seismically active. National Seismological Networks recorded over 500 earthquakes of magnitude $M > 5$ during the period 1900-2000 only in Kyrgyzstan, mostly in the Ferghana valley and its mountains. Destructive earthquakes took place in Namangan, Andijan, Ferghana, Jalal-Abad, Isfara areas. Maximum seismic activity has been observed in the Chatkal, Alai, and Ferghana mountains, where 8-9 M events are possible (official national data)

Most territory of the Ferghana valley and adjacent mountains are vulnerable to earthquakes with many small and large settlements located in the epicentre zones of the potentially devastating earthquakes (Isfara, Jalal-Abad, Osh, Kara-balta, etc). Some 30 settlements are threatened by both strong earthquakes and resultant risks (mudslides, unstable ground нестабильные участки территории-поверхности, etc). The earthquakes ($M > 7$) that struck the Ferghana valley and adjacent mountain territory from 1911 onwards caused several thousands casualties and millions of dollars in economic loss (official national data)

³⁷ Mudflows and floods are sometimes considered as the most destructive natural events in the Ferghana valley. The high density of the river network, steep slopes and degraded soil cover increase mudflow risk, especially in the piedmont parts of the Ferghana valley. Mudflows are formed due to interaction of hydro-meteorological and geological factors: cloudbursts, rapid snow melting, steep slopes, easily washed grounds, etc. Almost all the piedmont territory of the Ferghana valley is vulnerable to mudflows, including radioactive waste sites. Over 1,000 river basins are estimated to hold from moderate to high mudflow risk. In spring 1998, in Tajikistan and Kyrgyzstan, torrential rains caused severe flooding with over 20,000 people affected and many buildings and elements of infrastructure destroyed. The years 2003 and 2004 also featured flooding events in many areas, including the Syr Darya delta. Winter ice and a failure to observe regional water use agreements triggered floods along the Syr Darya River in Kyzyl-Orda, Southern Kazakhstan in early 2004 (official national data)

³⁸ Kyrgyzstan and Tajikistan are parties to UNECE Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, but its full-scale implementation on the local level will require considerable resources and time

³⁹ Though reliable statistical data are not available, a range of anecdotal information confirm this trend

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WORLD RESOURCES INSTITUTE (1998). World Resources 1998-99: Environmental change and human health. Washington DC. Also used throughout the report are materials and communications from organizations and experts in the countries of the Ferghana valley provided to ENVSEC in the course of the in-depth assessment: before, during and after the pre-mission, field mission and Osh consultations in 2004, as well as via ENVSEC National Focal Points.

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Inkar Kadyrzhanova, UNDP Regional Centre, Bratislava
Gianluca Rampolla, OSCE Headquarters, Vienna
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Field mission in December 2004:

1. Natural Resources Track (Khujand – Spitamen – Kairakkum reservoir – Sokh – Shahimardan – Jalal-Abad – Osh)

Luigi de Martino, Graduate Institute for Development Studies, University of Geneva
Tatiana Volkova, Ministry of Ecology and Emergencies of Kyrgyzstan, Bishkek
Nurjan Djumabaev, GLIP, Bishkek
Turokul Murodov, State Committee for Nature Protection and Forestry of Tajikistan, Dushanbe
Iskander Ruziev, SIC ICWC, Tashkent

2. Industrial Facilities and Hazardous Waste Track (Khujand – Isfara / Shurab – Kanibadam – Bekabad – Khaidarkan – Kadamjai – Osh)

Bruno Frattini and Fabrizio Bucci, ICARO S.r.l., Cortona
Viktor Novikov, UNEP/GRID-Arendal
Kubanich-Bek Noruzbaev, Ministry of Ecology and Emergencies of Kyrgyzstan, Bishkek
Khaknazar Boboev, Ministry of Industry of Tajikistan, Dushanbe
Abdumanap Rahimov, State Committee for Nature Protection of Uzbekistan, Tashkent

3. Uranium Mining and Processing Track (Khujand – Chkalovsk / Gafurov – Taboshar – Mailuu Suu – Osh)

Peter P. Stegnar, Jožef Stefan Institute, Ljubljana
Gianluca Rampolla, OSCE Headquarters, Vienna
Philippe Rekacewicz, UNEP/GRID-Arendal, Arendal
Asankul Nurabaev, Ministry of Ecology and Emergencies of Kyrgyzstan, Bishkek
Khaidar Gulmahmadov, Presidential Administration of Tajikistan, Dushanbe
Shahlo Malikova, State Committee for Nature Protection of Uzbekistan, Tashkent

A list of participants at the Osh workshop is available at <http://www.envsec.org/>

List of abbreviations

ASBP	Aral Sea Basin Programme
ADB	Asian Development Bank
CIDA	Canadian International Development Agency
CIEL	Center for International Environmental Law
CIS	Commonwealth of Independent States
EBRD	European Bank for Reconstruction and Development
ECHO	European Community Humanitarian Office (Humanitarian Aid Department)
EECCA	Eastern Europe, the Caucasus and Central Asia
EIU	Economist Intelligence Unit
ENVSEC	Environment and Security initiative
FAST	Fr hanalyse von Spannungen und Tatsachenermittlung (early warning project of Swisspeace)
FEWER	Forum on Early Warning and Early Response
GEF	Global Environment Facility
GDP	Gross Domestic Product
GLOF	Glacial Lake Outburst Flood
GRID	Global Resource Information Database
IAEA	International Atomic Energy Agency
ICG	International Crisis Group
ICWC	Interstate Commission for Water Coordination
IDS	Institute of Development Studies
IFAS	International Fund for Saving the Aral Sea
IGO	Intergovernmental Organization
IMF	International Monetary Fund
IMU	Islamic Movement of Uzbekistan
IPCC	Intergovernmental Panel on Climate Change
IRCF	International Federation of Red Cross and Red Crescent Societies
IRIN	UN Integrated Regional Information Networks
ISDC	Interstate Sustainable Development Commission
LDOF	Landslide Dam Outburst Flood
MFA	Ministry of Foreign Affairs
MOE	Ministry of the Environment
NATO	North Atlantic Treaty Organization
NGO	Non-Governmental Organization
OCHA	UN Office for the Coordination of Humanitarian Affairs
OECD	Organization for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
REAP	Regional Environmental Action Plan for Central Asia
REC	Regional Environmental Centre
REHRA	Rapid Environment and Health Risk Assessment
ROE	UNEP's Regional Office for Europe
SDC	Swiss Development Cooperation
SEI	Stockholm Environmental Institute
SIC	Scientific Information Center
SIDA	Swedish International Development Cooperation Agency
SPECA	UN Special Programme for the Economies of Central Asia
Swisspeace	Swiss Foundation for Peace
UN	United Nations
UNDP	UN Development Programme
UNECE	UN Economic Commission for Europe
UNEP	UN Environment Programme
WHO	World Health Organization
WRI	World Resources Institute



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KAZAKHSTAN

Chardara Reservoir

Chatkal Reservoir

Chirchik

Tashkent

Ahangaron

Syrdarya

Almalyk

Kuramin Mountains

Gulistan

Taboshar

Syr-Darya

Bekabad

Khujand

Kanibadam

Zeravshan

Zeravshan Mountains

TAJIKISTAN

Batke