



Climate Change and the Water-Energy-Agriculture Nexus in Central Asia

Scenario Report

Achim Maas, Gulzhamal Issayeva, Lukas Rüttinger and Atabek Umirbekov with contributions from Raul Daussa

Organised by



European Environment Agency



In cooperation with



With financial support of



Federal Foreign Office

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Produced with financial support of the Office of the Co-ordinator of Economic and Environmental Activities of the OSCE and the German Federal Foreign Office

Berlin, January 2012

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Executive Summary

Few expected the uprisings which swept across the Middle East in 2011, washing away multiple governments and resulting in escalating violence. At the core are, among other issues, deep socio-economic disparities, not the least resulting from fast increasing prices for basic commodities such as food and energy. Societies were disillusioned with governments which were unwilling or unable to solve these problems. Without early and substantive action, **Central Asia may face similar political upheaval due to the impacts of climate change on the water-energy-agriculture nexus.**

This is the key finding of a scenario-building process on the impacts of climate change in Central Asia. This paper reports on a workshop with experts and regional stakeholders, which was conducted in November 2011 in Dushanbe. The workshop focused on developing scenarios on how the interaction of climate change, political stability and economic growth may impact the agriculture-water-energy nexus. In addition, it aimed at developing recommendations. It is part of a project launched by the Organisation for Security and Co-operation in Europe (OSCE) at the Chairmanship conference in Bucharest in October 2009 and jointly implemented with the European Environment Agency (EEA). The workshop in Central Asia was financially supported by the German Federal Foreign Office.

As **Central Asia is warming faster than the global average**, climate change will hit the region sooner and harder than other areas. Invariably, across all four scenarios developed in the workshop, **action has to be taken in the coming decade starting now**. If action is delayed, climate change impacts will converge with resource exhaustion and growing regional and global demands for water, food and energy. Social and political structures will become brittle, and events such as severe droughts and other natural disasters can catalyse crisis. Though strong economic growth may mitigate some of the risks, this will only make the region more dependent on imports and thus on other countries. Furthermore, growth based on fossil fuels is not sustainable, as these resources will inevitably be exhausted. Without a viable substitute, first economic and, subsequently, political crisis will occur.

In assessing the different risks and challenges all scenarios provide, the participants identified **six priority areas for action**. They include (1) **early adaptation** to climate change and (2) **transition to a green economy** with a focus of increased resource efficiency. Achieving this will require (3) **investment in education, information dissemination, research** and further (4) **supporting civil society development**. All of this needs to be embedded in a framework of (5) **strengthened regional integration** and (6) **improved good governance**.

Implementing these recommendations requires developing a systemic and comprehensive step-by-step approach. In light of the limited results of Durban, **follow-up activities on the national, bilateral and regional levels are urgently needed** to operationalise each of the priority areas.

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List of Abbreviations

CAEC	Central Asian Economic Community
CAREC	Regional Environmental Centre for Central Asia
CCS	Carbon Capture and Storage
CIS	Commonwealth of Independent States
EEA	European Environment Agency
EU	European Union
GEC	Global Energy Corporation
GHG	Greenhouse Gas
GMO	Genetically Modified Organism
IPCC	Intergovernmental Panel on Climate Change
OCEEA	OSCE Co-ordinator for Economic and Environmental Affairs of the OSCE
OSCE	Organisation for Security and Co-operation in Europe
STEEP	Social, Technological, Economic, Environmental, and Political Driving Forces
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNSC	United Nations Security Council
UNSG	United Nations Secretary-General

1 Introduction

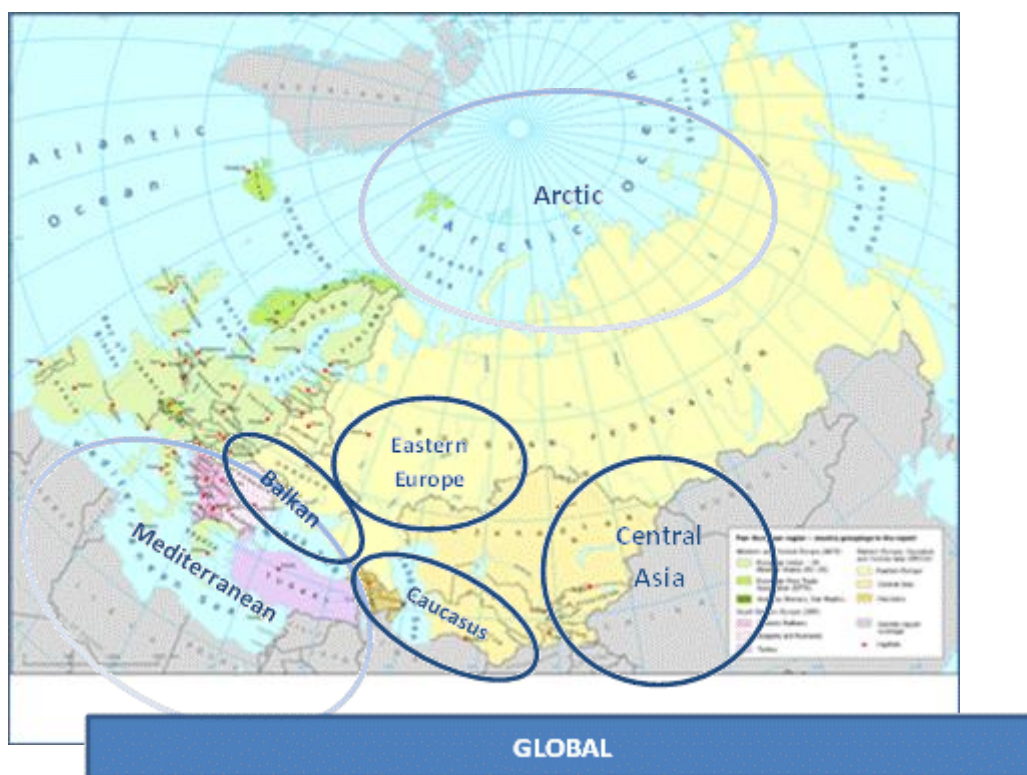
The 2007 Madrid Ministerial Declaration on Environment and Security (OSCE 2007) recognizes that “climate change is a long-term challenge” and acknowledges that “the United Nations climate process is the appropriate forum for negotiating future global action on climate change, and the Organisation for Security and Co-operation in Europe (OSCE), as a regional security organization under Chapter VIII of the United Nations (UN) Charter, has a complementary role to play within its mandate in addressing this challenge in its specific region.”

Launched in October 2009 at the Chairmanship conference in Bucharest, the Office of the Co-ordinator of OSCE Economic and Environmental Activities (OCEEA) established an extra-budgetary project to address the security implications of climate change in the OSCE region. The project is expected to end at the end of 2012. It is jointly implemented with the European Environment Agency (EEA) and aims to develop a better understanding of future perspectives, security and environmental risks as well as potentials for climate change impacts in OSCE regions. In addition, the goal is to raise awareness, develop recommendations for how to minimise risks and environmental impacts (early warnings) as well as how to promote co-operation among participating countries.

The project is divided into two main phases: First, conducting a scoping study on possible security implications of climate change in the OSCE region. Second, producing regional scenarios on and identifying how the OSCE could contribute to mitigating these challenges.

To this end, scenario workshops were planned in the following regions: South Eastern Europe, Eastern Europe, Caucasus and Central Asia, High North/Arctic, Mediterranean – see figure 1). After Eastern Europe and South East Europe, the scenario workshop on Central Asia was the third in series.

Figure 1: Overview of regions for scenario-building workshops¹



This paper reports on the scenario-building process in Central Asia. It presents the findings of a scenario-building workshop conducted on 14-16 November 2011 in Dushanbe, Tajikistan. The main objective of the workshop was to identify how climate change may affect the water-energy-agriculture nexus in Central Asia and how this may translate into security risks. In addition, the workshop aimed to raise awareness, support early warning mechanisms and to recommend measures for ensuring security and stability, as well as promoting co-operation in the region.

The guiding question of the workshop was:

→ What are the impacts of climate change on the water-energy-agriculture nexus in Central Asia until 2050?

The report is structured as follows:

- Chapter 2 briefly outlines the methodological background and actual implementation of the workshop.
- Chapter 3 provides an overview of the four developed scenarios and subsequently explores each of them individually, including their respective opportunities and challenges.

¹ Figure provided by the European Environment Agency (EEA).

- Chapter 4 reviews the four scenarios in a comparative perspective and elaborates on which strategies were recommended by participants to address the challenges ahead.

2 Background: Climate Change and Security

This chapter is divided into three sections: the first section briefly outlines the links between climate change and security. A more substantial analysis is available in the Scoping Study commissioned by the OSCE (see Maas et al. 2010). The second section highlights the reasons for choosing a scenario approach. Finally, the third section will outline the background and implementation of the scenario workshop in Central Asia.

2.1 Climate Change and Security: An Overview

Many studies have identified climate change as a threat multiplier which may contribute to insecurities and destabilisation. Climate change particularly affects water availability and food security, but also energy security and economic development. Under certain conditions, this may lead to regional political instability and crisis (WBGU 2007). These issues, among others, were highlighted by the UN Secretary-General (UNSG 2009) and also in 2011 by the UN Security Council (UNSC 2011).

A particularly complex challenge is the water-food-energy nexus: water is essential not only for drinking, but also for food production and electricity generation, such as in the case of hydropower or when it is used as a coolant for power plants. Both agriculture and energy production are key economic sectors of many countries. Globally growing populations and increasing demand in food, energy and other resources converge with climate change impacts, thus aggravating the impact of the latter.

Analysts and researchers argue that changing water and food availability, shifting demography and the redefinition of territories and coastlines caused by climate change may intensify prevailing tensions and lead to new conflicts. Institutions investigating these issues have produced a vast body of studies and assessments (see e.g. WBGU 2007, Chatham House 2009, Smith/Vivekanda 2007, Halden 2007, Gleditsch/Nordås 2009).

Regional assessments are necessary to identify potential security implications. Despite regional variations, several overarching aspects of climate change can be identified:

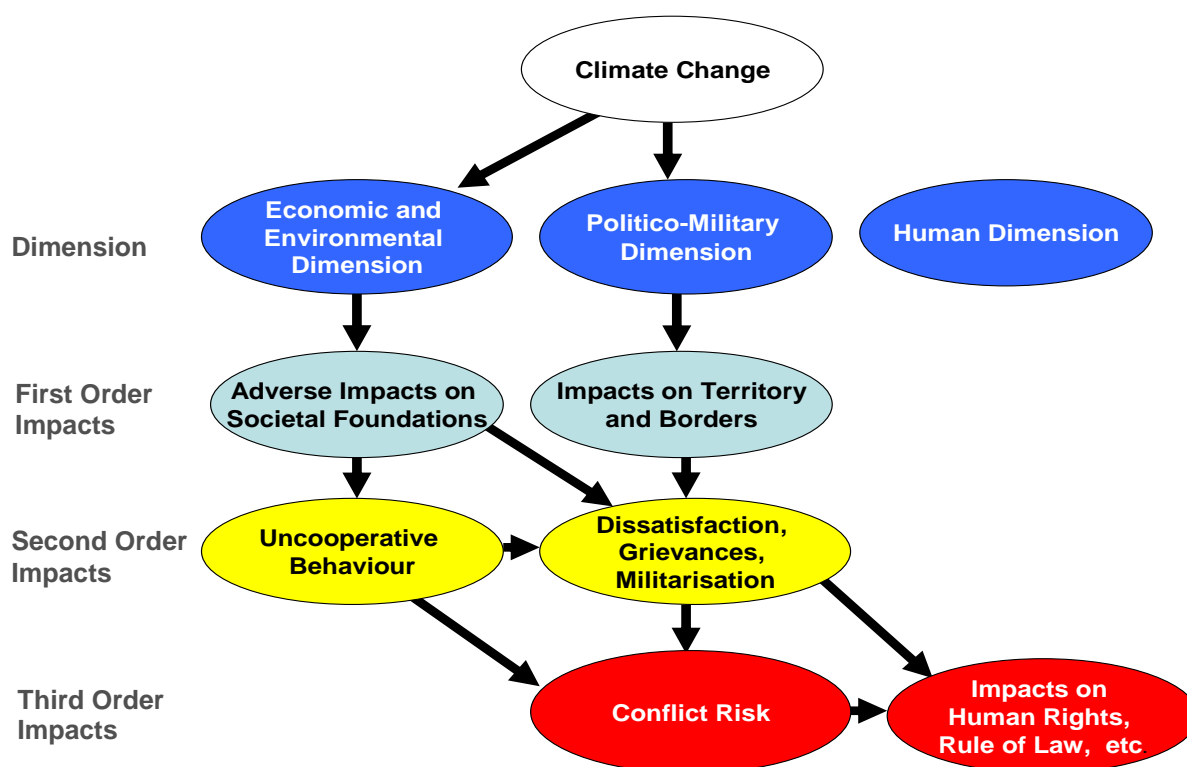
- Climate change is transforming basic conditions. Thus, history is becoming a bad reference for the future as the boundary conditions have changed. With this transformation, climate change is altering the livelihood foundations of societies.
- Climate change rarely results in direct security threats. It is rather the complex interaction of different forces and factors leading to increased insecurity. For example, global warming affects local harvests which in turn lead to food

insecurity and unemployment. Thus, climate change increases insecurity through a number of interacting impacts.

- Finally, current climate change is taking place in times of rapid global change such as high population growth, rising energy and food demand, emerging new technologies, and shifts in political power on the regional and international level. These changes could amplify potential security risks (see also chapter 4 on megatrends).

The OSCE identifies three dimensions of security: the economic and environmental dimension, the politico-military dimension, and the human dimension. A scoping study commissioned by the Office of the Co-ordinator for Economic and Environmental Affairs (OCEEA) identified different pathways, how climate change may affect the dimensions of security:

Figure 2: Impacts of Climate on OSCE Security Dimensions



Source: Maas et al. 2010

However, this conceptual model needs to be grounded in more detailed regional analysis. Though climate change impacts are already visible today (see e.g. UNSG 2009), it is necessary to look into the future and identify preventive measures.

2.2 Scenarios as Policy Guidance

The general trends of climate change can be identified, yet a large degree of uncertainty remains: predictions of future greenhouse gas emission levels are based on assumptions about expected socio-economic development and the scope of measures taken to reduce emissions. The typical source of such predictions is a report published by the IPCC in 2001, containing four main families of emission scenarios. Each scenario assumes a different path of population growth, economic development, and fuel intensity, resulting in different expected greenhouse gas concentrations. The range of outcomes from the differing scenarios, then, paints a picture of the severity of climate change under different conditions (Nakicenovic and Swart 2001). The emission scenarios should be considered conservative estimates, as actual emissions since 2001 have risen much more rapidly than in the scenarios (Raupach et al. 2007). They also do not account for potential *tipping points* – feedback loops in the climate system like melting permafrost or savannisation of the Amazon basin that would lead to more rapid and substantial warming.

Therefore, on regional and local scales, climate predictions typically consist of a range of possible outcomes, and mitigation and adaptation efforts have to be designed in light of these uncertainties (Dessai et al. 2009).

Another key challenge is the interaction of climate with other global trends, such as population growth, escalating energy demands, depletion of groundwater resources, soil exhaustion, urbanisation, and change in consumption patterns (see EEA 2010). The combination of these trends is creating a set of interlocking challenges (Lee 2009). The interlocking challenges are exemplified in the case of biofuel production, which may provide a more carbon-friendly type of fuel, but simultaneously takes up agricultural land needed for food production. These interlinked challenges may exceed the capacities of societies unless there is strong and sufficient early action (cf. Leggewie/Welzer 2009). These are also the challenges, which may lead to possible security implications as a result of climate change, as has been discussed at the UN level (see above section).

Consequently, the likelihood of regional destabilisation and armed conflicts depends on given socio-economic and political circumstances, as well as interactions with other regional and global developments. For example, global and regional governance, international and national institutions, globalisation, and open markets play a significant role in the mediation of resource scarcities and therefore in the prevention of resource competition. Given the high level of uncertainty with regard to the pace of climate change, its impacts on agricultural systems, as well as uncertainties related to global change and the regional capacity to adapt, a scenario approach was chosen as a tool for gaining insight into the range of possible future risks.

Addressing these different possibilities and alternative developments calls for a scenario approach, which allows for identifying and assessing the impacts of different decisions. Scenarios are a process of illustrating how changes might occur. It may support organisations handling uncertainties, trace possible pathways of future events and prepare for what would could be otherwise unexpected crises. As such they are

risk management tools, intended to help decision-making by identifying promising pathways.

Scenarios work effectively when they answer a single or a set of key questions for its ultimate beneficiaries. Climate scenarios focus on the ways in which environmental changes shift basic conditions (cf. GBN 2007). In order to be most useful, they should focus on potential pathways leading to negative change instead of focusing on an emergency situation – such as an energy crisis – itself. These potential adverse alterations will not be the result of just one changing factor (e.g. rise in air temperature), but are more likely results of a combination of environmental changes that impact a critically vulnerable part of a system, be it ecological, economic, political or infrastructural.

2.3 Scenarios for Central Asia: Workshop Implementation and Background

At the beginning of the series of scenario workshops, the OSCE commissioned a desk-based scoping study on the possible security implications of climate change in the OSCE region (Maas et al. 2010, Scoping Study hereafter). Based on the initial Scoping Study, the subsequent scenario workshops were designed.

For each workshop, a specific background paper was produced focusing on a guiding question. For Central Asia, this guiding question was:

→ What are the impacts of climate change on the water-energy-agriculture nexus in Central Asia from now until 2050?

The background paper (Fritzsche et al. 2011) served as starting point for discussion at the scenario workshop. The background paper is available in English and Russian on the OSCE website.²

The scenario workshop itself was designed to be exploratory and stakeholder-driven. It consisted of a mixture of plenary and working groups and was divided into five phases which served the following purposes:

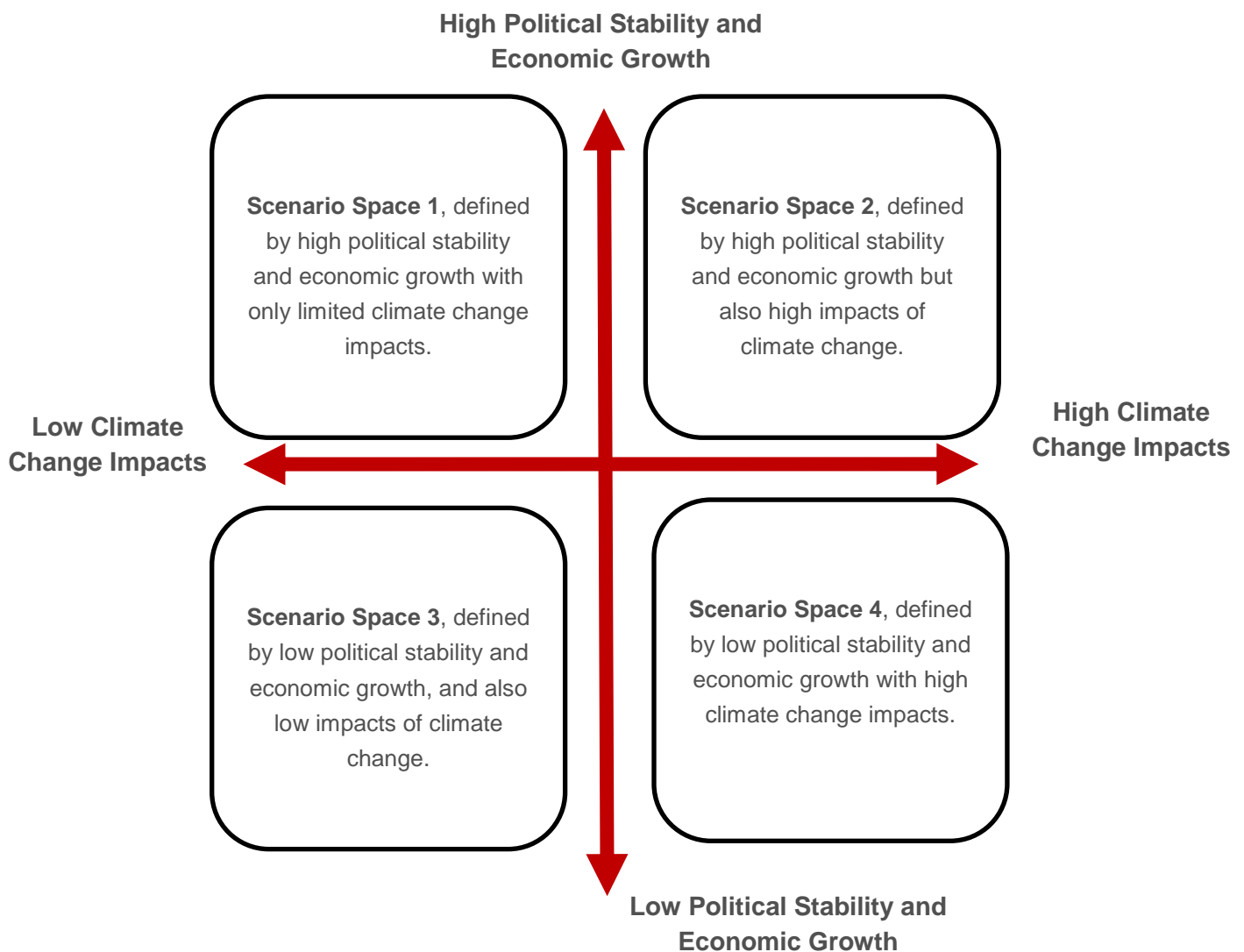
- **Phase 1** focused on identifying driving forces. These are key factors which will have a decisive impact in the future. Some driving forces are quite predictable, such as demographic trends: they are easily recognisable and are somewhat inert, i.e. they are difficult to change. Being predictable, they are easy to understand and coping strategies can be devised. More important, therefore, are uncertain factors, which are less predictable but may have a decisive

² See <http://www.osce.org/eea/climatechange>.

impact as well. They are thus called the “axis of uncertainty”, as a range of possible outcomes are plausible. One of the driving forces the workshop focused on was the impact of climate change, whereby high climate impacts also implied low adaptive capacity. A second important driving force was identified via participant deliberations during the workshop: the combination of political stability and economic growth.³

- **Phase 2** focused on developing a scenario framework. The axes of uncertainties were combined to identify which developments are possible and plausible in Central Asia. Particularly, the possible antithetic developments were further outlined and defined. This resulted in four different scenario spaces, which are highlighted in figure 3:

Figure 3 Scenario Spaces for Central Asia



³ See Annex 2 for the agenda and for details of sessions and discussion.

Each of the four scenario spaces was subsequently developed and discussed by one working group during the workshop in phase 3.

- **Phase 3** focused on playing out the scenarios with a time horizon of 2050. Participants outlined how Central Asia may look in 2050 against the background of high and low climate change impacts, as well as high and low political stability and economic growth.
- Subsequently, participants developed a timeline from the present year (2011) to 2050 in an effort to identify trends and outline how a certain scenario develops and becomes possible.
- **Phase 4** focused on analysing the challenges and opportunities each scenario may pose for Central Asia and if it requires either action or may serve as an entry point for innovative policies.
- **Phase 5** finally focused on translating the findings of the scenario exercise into strategies and recommendations. Particular emphasis was given to identifying strategies which are robust across all four scenarios and thus would be most viable.

The workshop itself was preceded by a roundtable on climate change in the region, where participants had the opportunity to share insights and knowledge from their respective work and country. In addition to representatives from governmental and non-governmental sectors in Central Asia, international experts were also invited to the workshop to provide an additional perspective on the region.

The full agenda, including the list of participants, is provided in the annex to this report.

3 Scenarios for Central Asia

The following chapter outlines the four scenarios developed during the Dushanbe workshop on 14-16 November 2011. All scenarios are structured the same way: first, the situation in 2050 is described. Then, the timeline and major events and processes leading to this situation are detailed. Finally, key challenges for the water-energy-agriculture nexus as well as opportunities, if identified, are explored. Given the different composition of the working groups, there are deviations from this structure where appropriate.

Figure 4 on the following page summarise the key aspects of all four scenarios, based on the scenario framework outlined in chapter 2.

Figure 4: Scenario Matrix**High Political Stability and Economic Growth****Scenario 1: Green horizons with brown clouds**

- Two groups of countries emerged, the one focusing on green economies and democracy ("greens"), the other on fossil fuel-based developments and authoritarianism ("browns").
- Within the groups there is strong cooperation, but between them tensions exist, in particular over transboundary waters.
- Though there are scarcities, there are no crises with regard to water, food and energy due to improved resource use and efficiency, until fossil fuels run out and the browns face crisis.

Scenario 2: Through hardships to the stars

- States and societies realize the need to act on climate change, switching to renewable energies and increased resource efficiency.
- Cooperation across the region became a necessity to cope with impacts of climate change.
- Central Asia could avert the worst impacts, but becomes dependent on imports for many basic commodities as the water-food-energy nexus is severely impacted.

Scenario 3: Back to the future

- Migration and development trends reverse: People migrate to rural areas and settle for lower development to achieve self-sufficiency, leading to decentralisation.
- Resource degradation and exhaustion leads to economic crisis, new taxes and crippling costs.
- Energy crises are particularly rampant, while water and food scarcity is high, but not as extreme.

Scenario 4: A lot of thinking and talking, but no action...

- Governments take action far too late, leading to severe food, water and energy crises, but also severe health issues; high emigration and mortality rates lead to declining populations.
- Crime, corruption, violent conflict and revolutions occur, leading to years of political turmoil and creating zones of state failure while the region as a whole experiences cultural decay.
- Following coups, new governments cooperate and try to mitigate the crises, but can do so only limitedly.

Low Political Stability and Economic Growth

Low Climate Change Impacts

High Climate Change Impacts

3.1 Scenario 1: Green Horizons with Brown Clouds

In this scenario, climate change impacts remained low while political stability and economic growth were high.

Summary: The Year 2050

By 2050, the Central Asian countries continued to diverge politically and economically. Two distinct groups of countries emerged. Each group shares distinct political and economic features.

The first group has the principals of focusing on a *green growth* path, i.e. a low-to-zero emission economy with the invention of new, environmentally friendly technologies (*clean tech*). The intensity of agriculture in terms of water use, fertilizers and other aspects was reduced and a competitive export industry developed. Good governance and efficient public service delivery lead to positive environmental developments in the region and also a vibrant civil society with strong environmental non-governmental organizations (NGOs). As consequence, these countries became known as “the Greens”.

The second group, nicknamed “the Browns”, continued to focus on conventional economic development with emphasis on fossil fuels and intensive agriculture. As climate change impacts remained relatively small, there was in the eyes of the “Browns” no apparent need to change economic modes; climate change became by 2050 an almost forgotten issue. Degradation of land resources continued accordingly and less emphasis was placed on clean technologies – leading also to increased environmental problems.

The two different political and economic models lead to recognizable tensions between the countries in the region and created new geopolitical realities – including polarization and new conflict lines between them on political, economic and environmental issues. However, it also highlights that political stability and economic growth, despite difficulties, can be achieved in a sustainable and less sustainable way.

Timeline

2011-2020: The decade began with the achievement of a strong agreement to curb greenhouse gas emissions. This was of critical importance to keep climate change impacts relatively low through the coming decades. In parallel, green movements grew in several Central Asian countries, leading to the rise of green/environmental parties. Presidential elections were peaceful and candidates also proposed green growth-oriented reforms, leading to their designation as the “first green presidents” of Central Asia.

Geopolitical realities also changed: the United States of America (USA) and the European Union (EU) withdrew their troops from Afghanistan, removing the need for

military transport infrastructure in Central Asia. Gradually, the political and economic interest of the USA and the EU wither and both powers fade into the background.

Instead, China and Russia increasingly competed with each other for influence in the region. China's hunger for resources, including fossil fuels from Central Asia, continued to grow. The intensified research on carbon capture and storage (CCS) allowed for continued fossil fuel-based growth without compromising climate change. Russia considered China, however, to be encroaching on its near abroad and thus feared the loss of influence in the region. In addition, Turkey takes an increasingly assertive role in the region.

By the end of the decade, with climate crises apparently being solved and no major disaster, some Central Asian countries continued with a heavily fossil fuel-reliant economy – facilitated by China's increasing demand for such resources and its support for these countries.

2021-2030: Green economic development further accelerated in three of the Central Asian countries, leading to a “gold rush” as abundant renewable energy resources were used and savings from energy efficiency freed up resources. Investing further in education and experiencing sustainable economic prosperity, parliaments and political parties became empowered and the countries overall more liberalized and relaxed in their politics.

In 2025, regional cooperation between the “green countries”, which engaged in a green growth-pathway, reached a new height as negotiations for a common customs union began and finally a Central Asian Economic Community (CAEC) emerged. Disagreement with the “Browns” on fundamental economic development principles and objectives prevent all five countries from co-operation.

However, mid-decade a set of extreme natural disasters occur with crippling effects on the economies in the region. The coping capacities of humanitarian aid are exceeded due to the remoteness of many affected areas. In addition, disorganized aid agencies cannot respond to the crisis leading to political turbulences and riots against inefficient governments. Economic development suffers a setback and internal tensions within countries nearly reach a boiling point. Political structures in the “Browns” become more authoritarian and official positions like presidencies are handed to family members instead of being decided by free elections.

2031-2040: With sustainable green economic development having become the cornerstone for the upsurge in prosperity, environmental authorities become more independent and further strengthened; they should serve as guardians. In the meantime, e-governmental and decentralized decision-making, supported by a strong civil society, lead to further democratization and participation by large parts of the population.

Evolving from the CAEC, the “green countries” begin to spearhead further political integration by starting discussion on levels of integration similar to the European Union. Some individuals even call for their unification.

Though the world is on track to limit the global warming rate to 2°C, Central Asia still warms at a considerably faster rate. In the mid-2030s, a five-year drought occurs, devastating agricultural sectors across the region. The “greens” endured the drought relatively unscathed, as resource efficiency and conservation – including advanced agricultural techniques, such as drop irrigation and other water saving measures – diminished adverse impacts on the countries. The “browns”, in contrast, having continued with a business-as-usual economic pathway, were relatively more affected, with food insecurity and loss of jobs and income more rampant.

Clashes between “green” upstream countries – whose green growth path include strong and continued reliance on hydropower as a renewable energy source – and the “brown” downstream countries escalate, bringing the two blocs of countries to the brink of war. Yet, the intervention of China and an agreement on a mutual defense alliance with the “brown countries” prevent the worst, though border incidents continued.

2041-2050 and beyond: Despite the long drought in the 2030s, climate change impacts are handled with relative ease due to effective institutions. Renewable energy use has increased beyond 50 per cent in the “Greens”, and economic integration and cooperation is comparable to the European Union in 2010. With large parts of Central Asia being remediated and kept in pristine condition, multiple areas are selected as “human heritage” sites by the UN Education, Scientific and Cultural Organisation (UNESCO).

In the “brown countries”, however, fossil fuel production begins not only to decline and become exhausted. The majority of countries have moved to a low- or zero-emission pathway, leading to less and less interest in purchasing fossil fuels. The combination of collapsing prices and falling production creates economic crises, and escalating debts with ailing political structures. Having no interest in collapsing states next door and in need of regional allies, China bails out and supports the countries; without this external support and major changes, however, their political and economic prospects are gloomy.

Analysis: Challenges and Opportunities

In reviewing the scenario, a set of key challenges could be identified: (1) The dependence on fossil fuels and export markets is a burden for the countries; (2) climate change, even if limited, will still negatively impact agricultural productivity and hydropower; (3) natural disasters may create abrupt shocks which challenge governance structures. Together, these challenges may create food and energy crises, and drive conflict within and between countries. This may be aggravated by countries’ diverging mind sets.

At the same time, key opportunities emerge from possible disasters and crises, as they provide an entry point for new policies and increase demands for innovation and new technologies to cope with the changes – such as shifts from fossil fuels to renewable energies to avoid dependencies or adopting new agricultural production techniques following a food crisis. Similarly, large events may trigger mentality changes, while a successful climate regime provides access to necessary (adaptation) funds.

3.2 Scenario 2: Through Hardships to the Stars

In this scenario, climate change impacts were high, but political stability and economic growth were also high.

Summary: The Year 2050

The impacts of climate change unfolded rapidly, leading to continued water scarcity, land degradation and escalating numbers of natural disasters.

Fortunately, economic growth and political stability have been high and countries can mitigate impacts if they strongly invested in more resource productivity. This includes intensive agriculture and the use of genetically modified organisms (GMO), but that create food safety.

Also, mitigating climate impacts led to more resource imports, but thus increased dependency on foreign countries. Furthermore, renewable energy sources – particular solar and wind power – were developed, to compensate for declining fossil fuels and hydropower. Shortages remained the norm, but crises were avoided.

Politically, cooperation increasingly became a necessity for exchange of energy and other goods. High economic growth within the region fostered migration, but people generally stayed within the Central Asian countries. However, as many basic commodities needed to be imported, Central Asia is much more dependent on foreign countries, but this time as importer and not as exporter.

Timeline

The scenario went through three phases until 2050, with phase 1 beginning in 2012:

Phase I, roughly 2012-2020: In the coming years, demand for resources as a consequence of higher economic growth continued. But resource use remains ineffective, and pollution and degradation of natural resources continue. In particular, energy resources, such as fossil fuels, decline rapidly due to misuse and exhaustion looms on the horizon. Similarly, little attention is paid to the unfolding impacts of climate change and few adaptation measures are planned or executed.

Phase II, roughly 2020-2035: Economic growth in multiple sectors continues rapidly throughout the second phase, lifting people out of poverty. However, climate change impacts become ever more recognizable and significant, and they start to negatively affect economies.

As a consequence, resource shortages begin to emerge on a regular basis, affecting in particular access to food, water, and energy. All these resources increasingly need to be imported from neighbouring regions, which is possible due to the increased prosperity resulting from economic growth. However, the energy scarcity is partly mitigated by increased use of nuclear power.

Very slowly, societies start to recognize the need to address environmental concerns and climate impacts. This not only includes increased adaptation efforts, but also limiting climate change. Strong political momentum for green economies emerges. This includes in particular investments in education, research and innovation.

Still, in the latter stages of phase II, climate impacts start to reach critical levels and risks significantly increase. Natural disasters occur on an increasingly larger and regular scale, while the risk of contagious diseases and health problems increase as well.

Phase III, roughly 2035 and beyond: The need to cope with climate impacts and regional environmental change leads to improved regional cooperation – the countries become increasingly dependent on one another and recognize the need for cooperation. Pushing green technological advances, ingenuity and innovation makes Central Asia an exporter of technology knowledge. Strengthened investment in education also empowers civil society.

Enhanced regional cooperation and the beneficial economic situation attracted the interest of foreign countries, leading to improved investment opportunities and improved political conditions within regional organizations, such as the Commonwealth of Independent States (CIS). Migration within the region increases also with the new economic opportunities, while outmigration considerably diminishes.

The adaptation efforts and other policy measures initiated in the previous phase begin to show effect, as the worst climate impacts can be mitigated. The prudent combination of adaptation and economic growth made Central Asia considerably wealthier than it was in 2011. Indeed, Central Asian countries achieved a development level comparable to other industrialized and high-income countries, making adaptation efforts affordable.

Yet, given the degraded resource base impacting food and energy security, Central Asia is also far more dependent on foreign countries and global markets for satisfying basic needs. Furthermore, the need to make use of all available means to increase food security resulted in the application of intensive agriculture and genetically modified organisms (GMOs), which supported achieving food sufficiency, but not food security, as food safety remains challenged.

Analysis: Challenges and Opportunities

The major challenges of this scenario are the high impacts of climate change as a combination of declining and degrading water resources, energy carriers, land and biodiversity. This happens against the background of inefficient resource use and the absence of regional cooperation, which magnifies the impacts of climate change.

However, climate change's massive challenges create strong incentives and opportunities for regional cooperation. They provide an opportunity to trigger technological innovation and improved resource use and efficiency, and reinvigorate civil society as current governments can no longer continue with a political and economic "business-as-usual" model. Also, key opportunities include attracting foreign

investments by providing good conditions for them, as well as harnessing migration and population growth.

3.3 Scenario 3: Back to the Future

This scenario is defined by low impacts of climate change, but also political instability and economic crisis.

Summary: The Year 2050

Migration and development trends have reversed by 2050. Costs of housing, food and energy strongly increased, as did tariffs and social services, education and health care. At the same time, a new environmental tax system created additional burdens. As a consequence, people decided to move out of urban areas and back into the country side, reversing the long rural-to-urban migration trend.

Choosing a lifestyle focusing on local self-sufficiency, people settled for lower, but affordable and thus achievable levels of economic development and consumption. This became possible by applying new, more resource-efficient technologies and innovations in agriculture as well as green technologies, though their application remains limited. New information technologies are widely used in particular by civil society and NGOs, which play an important role across Central Asia.

Despite these efforts in self-sufficiency, the region has become dependent on external assistance. The general economic make-up has not changed much either, with the economies strongly relying on natural resource exports.

The high costs of resources resulted in part from their scarcity. Political tensions emerged particularly over water issues between countries and neighbouring regions. Globally, China emerged as one of the most powerful countries. In parallel, the “Global Energy Corporation” (GEC), a new global, privately-owned corporation, has emerged which dominates the global energy markets. In contrast to old energy corporations, the GEC is based on renewable energies and in particular biomass, instead of fossil fuels.

Timeline

2011-2020: In the coming decade, resource use remained ineffective and unsustainable. Regional coordination was missing. External investments increased in the region and became quite high compared to earlier times, yet there was only low investment in environmental issues. Concurrently, resource demands continue to soar.

Urbanisation continued throughout the period and peaked around 2020. Resource extraction and use was maximized around the same time. In parallel, water scarcity became an ever-increasing challenge for the Central Asian countries.

2021-2030: With declining resources, external investment into the region fell as well and quite rapidly, negatively impacting the region’s economies. Return to agriculture is

increasingly seen as alternative, and small-scale green technologies are developed and implemented. Particular European and East Asian countries export technologies to Central Asia. As resources, in particular water, start to decline, political tensions between countries began to emerge as well.

During the 2020s, information technology advanced and rapidly became more ubiquitous throughout the region. This gave civil society and NGOs new tools and instruments, leading to their further empowerment. In particular, the green movement, which is focused on sustainable and resource-conserving approaches, substantially grows in these years and beyond.

2031-2040 and beyond: Resource availability rapidly declined, and by 2035 reached new peaks, not only in Central Asia. Revenues from resource exports are no longer available. Costs for public services like health and education increases and fees are levied. In addition, new taxes are introduced particularly in urban areas to generate funds. The combination of both put heavy burdens on livelihoods, and especially the poorest parts of the population suffer under excessive costs.

By 2040, severe resource shortages emerge on a global level while demands increase further, soon leading to a resource crisis. Energy shortages emerge and in their wake the Global Energy Corporation (GEC) is formed. Central Asia is not spared; it experiences an accelerated economic downturn making those countries dependent on assistance from international financial institutions. China emerges as one of the global powers in these years.

Costs of living increase dramatically in cities as resource prices escalate. As fees and taxes are also high people start to move to rural areas again. Ultimately, the rural population outnumbers the urban population, leading to deserted cities.

Focusing on self-sufficiency and small-scale agriculture, people readily accept an allegedly lower level of development for more security. Resource efficiency and innovative agricultural technologies are becoming increasingly important. At 2050, green economies emerge in the Central Asia countries.

Analysis: Challenges and Opportunities

Though climate change remained limited, reliance on natural resources and their ultimate depletion while demands continue to rise is one of the key challenges in this scenario.

In particular, the scarcity of water for drinking and agriculture, as well as the reduction of cultivated land lead to reduced agricultural outputs – creating food and water insecurity. As fossil fuels diminish, energy scarcities emerge, especially as hydropower becomes less viable. Health problems emerge, too. Together, these developments lead to regional instability, political tensions and conflict as Central Asia muddles through.

3.4 Scenario 4: A Lot of Talking and Thinking, but No Action...

This scenario is defined by high impacts of climate change, but also political instability and economic crisis.

Summary: The Year 2050

Central Asia suffers severely from a compound crisis: Water, food and energy are scarce. Natural resources are depleted, droughts lead to crop failure, and electricity generation from hydropower is often not possible. Natural disasters continue to hit Central Asia and the health status of large parts of the population is bad with epidemics spreading through the region. Hunger and poverty are widespread.

Corruption and crime are rampant as people struggle to survive. Poppy and other drugs are grown as they need less water than other crops. Alcoholism and other drug abuse are on the rise, further degrading public health. Mortality rates increase and birth rates decline sharply, while people migrate out of the region in the hope of better lives elsewhere.

The countries suffer from violent conflicts and political instability, with rebellions and insurrections. The risk of state failure is clearly visible; some countries appear on the way to resemble Afghanistan or Somalia. Major states like China have expanded into the region, actively intervening in regional politics in an effort to create at least some stability.

Governments acted far too late on the critical situation. Genetically modified organisms (GMO), new resource-saving technologies, use of renewable energies, technological innovation such as nanotechnologies, as well as massively cutting greenhouse gases were all enacted. But this could only mitigate the disastrous situation, not prevent it.

Timeline

2011-2020: Water shortages and land degradation are already visible and become more substantial in the coming years. Several natural disasters occur as climate change unfolds. The degradation of natural resources continues leading to declining quality in food and drinking water.

Some attempts at adaptation efforts are made, but they are not really effective. Still, new hydropower plants are constructed to solve electricity shortages. Another key issue is high and continuing unemployment throughout the region, leading to increased labour migration.

2021-2030: Glaciers begin to retreat dramatically in the 2020s and droughts become more frequent, though at first melt water increases as does precipitation. Still, soil is rapidly degrading and water for irrigation becomes increasingly scarce during some months in the year. Many crops only grow at higher elevations.

Labour productivity is low. With economic growth remaining low and the additional impacts of climate change and resource degradation, poverty is widespread in Central Asia.

2031-2040: In the 2030s, water availability starts to reach extremely low points, making hydropower unfeasible and aggravating energy crises. Ground water levels decline as well. Furthermore, drinking water becomes scarce and is of decreasingly quality, having adverse health effects on the population. In addition, cardio-vascular diseases increase, epidemics spread throughout the region, and mortality rates raise while birth rates decline.

The population starts to shrink, as other health problems like drug use increase. At the same time, fossil fuel exhaustion accelerates, resulting in few substitutes and aggravating the energy crisis further. Economies stagnate or recess, resulting in increased poverty. Crime rates dramatically increase as a consequence. Governments try to cope with these conditions, but corruption is increasing as well.

The region becomes politically unstable and violent conflicts break out, including armed violence in the Ferghana Valley. Transboundary conflicts emerge between the countries over the little water which is left. Spreading to neighbouring countries, the conflicts lead to fierce tensions between the Central Asian countries and in particular with China and Russia. Labour emigration is joined by refugee streams. Finally, revolutions occur, washing away the ineffective governments and installing new ones trying to solve the problems when it is almost too late.

In an effort to find possible solutions to the resource crisis, technology investments are spurred in this decade. Water is increasingly re-used, waste recycled and energy efficiency are also improved, while renewable energies (particularly solar and wind power) are used to mitigate the energy shortages. Countries also begin to cooperate on a regional level, but only at a slow and insufficient rate. NGOs develop and civil society in general starts to play an increasingly active role in diminishing the adverse impacts of the existing situation as governments fail to address the challenges in a timely and appropriate way.

2041-2050 and beyond: With climate change unabated and fossil fuels becoming ever less available, combined water-food-energy crises emerge in Central Asia, leading to increased mortality rates and declining birth rates. GMOs are more widely used to increase food production as agricultural zones shifted. Culturally, the Central Asian societies start to degrade and even disintegrate, as conflicts and competitions intensify and plague all levels of society.

Increasingly, the Central Asian governments realize that they need to integrate more strongly into the global economy. Also, GHG are starting to fall as many countries in the world realize the dramatic impacts climate change is having, though crashing and recessing economies significantly contribute to resource reduction.

Analysis: Challenges and Opportunities

The key challenges for scenario 4 emerge from the size and rapidity of climate change impacts. These are joined by the depletion of natural resources, particularly fossil fuels as well as creating a multi-dimensional “crisis situation”, as several key sectors are simultaneously affected. With low political stability and economic growth, this can easily translate into violence, conflict and revolution, especially when governments act too slowly.

The combined pressures, however, create a strong incentive for regional cooperation and for alternative economic development paths – such as the utilization of renewable energy sources other than hydropower and energy efficiency.

3.5 Scenario Comparison and Review

Generally, **across all scenarios the water-energy-agriculture nexus will come under increasing stress** – even if climate change impacts remain low. In addition, natural resources, especially fossil fuels, will be exhausted over the next decades. Invariability, political tensions and even conflicts emerged across all scenarios, but to varying degrees of intensity and duration.

Interestingly, (sub-) regional cooperation occurred to solve problems, but often only after scarcities and crises emerged. This highlights that the Central Asian countries are too interdependent to solve the emerging threats on their own: either they cooperated or became dependent on external actors, such as China, as well as on imports from other countries, or loans from the international financial institutions.

A key role for overcoming challenges is also the transition to a green economy – in particular increasing resource efficiency, use of energy saving and renewable energies, as well as sustainable natural resource management – and using new technologies and innovation. Almost as a side effect, this has a strong empowering effect on civil society and NGOs.

Scenario 4 – “A lot of thinking and talking, but no action...” – may perhaps be considered the **worst case scenario**: crime, violent conflict, revolutions and resource crisis affect Central Asia. In the end they lead to regional cooperation and improved governance, but only after severe negative impacts and prolonged periods of instability.

None of the three other scenarios, however, constitute a “best case” development. On the contrary, they all identify particular challenges:

- In **scenario 1** (Green Horizons with Brown Clouds), two opposing political blocs within Central Asia form and two countries face significant challenges.
- In **scenario 2** (Through Hardships to the Stars), Central Asia can cope with climate impacts, but at the cost of dependency on imports and lower quality domestic products.
- In **scenario 3** (Back to the Future), the challenges exist in moving toward self-sufficiency and accepting lower levels of development, as well as suffering from an energy crisis.

Additionally, all three possible developments suffer in varying degrees from political tensions, scarcities and natural disasters.

Across all scenarios, the critical time space is between 2020 and 2040. In this time frame, climate effects start to become more significant. Resources such as fossil fuels become increasingly scarce and these developments collide with inefficient resource use and lack cooperative agreements. In all scenarios, the decade **2025-2035 was a transition period** – when the current Central Asia transformed into its new form, such as from non-cooperation to regional cooperation in scenarios 2 and 4.

This time frame is also defined by major natural disasters, such as droughts. Central Asia has difficulties coping with these adverse impacts, but after 2035 – aware that more disasters are coming – the countries are more prepared. Yet, these disasters serve as “shocks”, often triggering political developments and in some scenarios also tensions.

As a consequence, the preceding decade – **from now to 2020** – will be central to preparing for this transition period and preventing negative consequences.

4 Strategies and Recommendations

In the final stage of the workshop, the participants focused on developing “no-regret” measures: strategies and recommendations which are relevant and useful across all scenarios. Their aim is to harness the positive developments identifiable in all scenarios and to minimise risks. The recommendations and strategies can be clustered in the following six priority areas:

- **First, strengthen regional cooperation and integration:** International cooperation and integration within Central Asia must be strengthened. This is necessary to cope with the joint challenges and make best use of available resources. Ultimately, this should aim at (1) integrated natural resource management, (2) a customs union to improve economic development and growth, (3) developing a common legal basis and framework, and (4) a common position on regional security, including military, energy, water and food security aspects.
- **Second, adapt early:** Climate impacts will have serious impacts and require adaptation, even if a binding agreement on GHG can be achieved. It is necessary to engage early in comprehensive adaptation efforts. In particular this includes adapting ecosystems on the one hand, but also focusing on human capacities for adaptation. Adaptation programmes need to be coordinated and a joint regional strategy must be developed.

- **Third, strengthen civil society:** Non-governmental organisations are vital in overcoming emerging risks to water, food and energy security. Civil society needs to be further strengthened to support governmental agencies and societies at large to prepare for, adapt to and cope with climate impacts as well as possible resource scarcities.
- **Fourth, transition to a green economy:** The Central Asian countries must accelerate the transition to a sustainable green economy by adopting and implementing principles of green growth.
- **Five, improve education, information and research:** Public awareness for environmental issues must be improved through universal environmental education. This will be necessary to improve sustainability and resource efficiency. It will also be important to drive innovation and technology development forward and exchange relevant information and data across the region. Research on climate change and its impacts will be particularly necessary.
- **Six, improve good governance:** Finally, governments need to become more responsible and transparent to combat corruption. Societal involvement in decision-making processes needs to be improved in order to increase commitment and readiness to work toward a better region across all sectors and levels.

Implementing these recommendations requires developing a systemic and comprehensive step-by-step approach. Especially critical is the coming decade from 2012 to 2020 to prepare for the coming challenges, particularly in light of recent political developments: During the December 2011 climate negotiations, it was agreed that a comprehensive agreement on climate mitigation should enter into force by 2020 (UNFCCC 2011) – and not directly after the end of the first commitment period of the Kyoto Protocol in 2012. Furthermore, on 13 December 2011, Canada decided to withdraw from the Kyoto Protocol (BBC 2011).

Against this background, it appears unlikely that a strong climate mitigation agreement will be in place to prevent the severe impacts of climate change. Adaptation and increasing green economic development such as heightened resource efficiency then require new urgency. It also calls for follow-up activities on the national, bilateral and regional level to further elaborate and operationalize the priority areas identified above. With the Rio +20 Summit in mid 2012 focusing on the green economy in the context of poverty eradication as one key theme, the upcoming months provide a significant political window of opportunity.

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Annex 1: Lists of Participants

First Name	Family Name	Organisation	Country
Payzkhan	KHOJAKHMETOV	National Hydrological and Meteorological Service	Kazakhstan
Zufar	TOKPAYEV	Scientific research institute of ecology and climate	Kazakhstan
Alexander	PEYTCHEV	OSCE Office in Astana	Kazakhstan
Evgenia	PETROVA	National Hydrological and Meteorological Service	Kazakhstan
Lyudmila	SHABANOVA	"GREEN BRIDGE", Env. Centre for Info and Analysis	Kazakhstan
Zamzagul	TLEUBAYEVA	Ministry of Environmental Protection	Kazakhstan
Zarina	LIGAY	OSCE Office in Astana	Kazakhstan
Dilbar	ZAYNUTDINOVA	"Armon" NGO	Uzbekistan
Jens	RASMUSSEN	OSCE Project Coordinator's Office in Uzbekistan	Uzbekistan
Alexey	JAVORONOK	"Armon" NGO	Uzbekistan
Alexey	KOBZEV	Ecoforum	Uzbekistan
Natalya	SHIVALDOVA	NGO "Ekomaktab"	Uzbekistan
Anvar	KADIROV	Ecoforum Council	Uzbekistan
Dmitry	PRUDSTSIKH	Aarhus Centre in Khujand	Tajikistan
Munira	RAKHMATULLAEVA	Aarhus Centre in Kurgan Tubae	Tajikistan
Svetlana	BLAGOVESHENSKAYA	Academy of Sciences	Tajikistan
Bozor	RAKHMONOV	State Committee on Environment Protection	Tajikistan
Haqnazar	BOBOEV	Ministry of Energy and Industry	Tajikistan
Lutfia	MANSURSHOEVA	Governmental Committee on Emergency	Tajikistan
Umidjon	ULUGOV	"Youth of XXI century" NGO	Tajikistan
Bakhtiyor	RAKHIMOV	"Youth EcoCentre" NGO	Tajikistan
Alikhon	LATIFI	Tajikistan Ecological NGO Club	Tajikistan
Marc	FUMAGALI	International Alert	Tajikistan
Bakhrom	MAMADALIEV	OO "Tabiati Toza"	Tajikistan
Helga	LERKELUND	NGO „LITTLE EARTH“	Tajikistan
Tahmina	KAMAROVA	CAREC	Tajikistan
Djalil	BUZRUKOV	Intergov. Comm. on Sust. Dev. of Aral Sea	Tajikistan
Davlatbek	DAVLATOV	PO CAMP Kuhiston	Tajikistan
Giuseppe	BONATI	CESVI Tajikistan	Tajikistan
Malika	BABADJANOVA	CAREC	Tajikistan
Kanybek	ISABAEV	Aarhus Centre in Osh	Kyrgyzstan
Narynbek	MYRSALIEV	Azon centre	Kyrgyzstan
Andrey	PODREZOV	Kyrgyz-Russian University	Kyrgyzstan
Nurzat	ABDYRASULOVA	Civic Environmental Foundation UNISON	Kyrgyzstan
Achim	PHILIP MAAS	Adelphi Research	Germany
Lukas	RUETTINGER	Adelphi Research	Germany
Atabek	UMIRBEKOV	CAREC	Kazakhstan
Gulzhamal	ISSAYEVA	CAREC	Kazakhstan
Raul	DAUSSA	OSCE OCEEA	Spain
Milan	CHRENKO	European Environmental Agency	Slovak Republic
Muhabbat	KAMAROVA	OSCE Office in Tajikistan	Tajikistan
Firuza	HOJIEVA	OSCE Office in Tajikistan	Tajikistan

Annex 2: Agenda

Workshop and Roundtable Agenda Dushanbe 14-16 November

Monday 14 November 2011

Roundtable 'Water Management and Land degradation in Central Asia'

Time	Session	Mode
08:45-09:15	Transfer from Hotel	Bus
09:15-09:30	Arrival and Registration	Plenary
09:30-09:35	Welcome and opening remarks	Plenary
09:35-10:00	Tour de table introductions	Plenary
10:00-11:30	Country reports presentations	Plenary
11:30-11:45	Break	
11:45-12:25	Discussion on key drivers	Plenary
12:25-12:30	Closing remarks	Plenary
12:30-13:30	Lunch	

Workshop "Climate Change Impacts on the Water-Energy-Agriculture-Nexus and security in Central Asia"

Time	Session	Mode
14:30-14.40	Welcome	Plenary
14.40-15.20	Imagining a different world – presentation and video	Plenary
15.20-15.40	Agenda and expectations	Plenary
15.40-16.00	Break	
16.00-16.10	Plenary Presentation – What are driving	Plenary

	forces?	
16.10-16.30	Discussion – List of driving forces	Plenary
17.30-18.30	Driving forces – Predetermined elements and critical uncertainties	Plenary
18:30 – 20:30	Dinner Reception	
20:30 – 21.00	Transfer to Hotel	Bus

Tuesday 15 November 2011

Time	Session	Mode
09:00-09:30	Transfer from Hotel	Bus
9.30-9.45	Introduction + Agenda	Plenary
9.45-11.00	Scenario framework – Axis of uncertainty Part 1	Working Groups + Plenary
11.00-11.15	Break	
11.15-12.15	Scenario framework – Axis of uncertainty Part 2	Working Groups
12.15-13.15	Lunch	
13.15-14.15	Scenario framework – Scenario matrix	Working Groups
14.15-14.30	Plenary Presentation Climate Change and Security	Plenary
14.30-14.45	Break	
14.45-16.15	Scenario development – the year 2050	Working Groups
16.15-16.30	Break	
16.30-18.15	Scenario development – how did we get there?	Working Groups
18:30- 19.15	Transfer to Hotel	Bus

Wednesday 16 November 2011

Time	Session	Mode
08:30-09:00	Transfer from Hotel	Bus
9.00-9.15	Introduction + Agenda	Plenary
9.15-10.15	Scenario presentation	Plenary
10.15-10.30	Break	
10.30-12.30	Scenario analysis – challenges and opportunities	Working Groups
12.30-13.30	Lunch	
13.30-14.15	Presentation of challenges and opportunities	Plenary
14.15-15.00	Strategy development	Working Groups
15.00-15.30	Break	
15.30-16.45	Finding robust strategies	Working Groups
16:45-17.45	Presentation of robust strategies + Discussion	Plenary
17.45-18.15	Feedback + Farewell	Plenary
18:30- 19.00	Transfer to Hotel	Bus

Annex 3: Summary of Evaluations

At the end of the workshop, an evaluation sheet was distributed to the participants. Below are the results of the questionnaire (translated from Russian). Due to fractions and rounding, results given in percentages may not add up to 100%. In addition, some participants may not have provided answers to all evaluation questions.

1. General

1.1 How did you find the workshop overall?

Excellent:	Good:	Satisfactory:	Poor:
11	16	0	0
41%	59%	0%	0%

1.2 How did you find the preparation for the workshop / information received in good time?

Excellent:	Good:	Satisfactory:	Poor:
9	16	2	0
33%	59%	7%	0%

1.3. What were your expectations of this workshop?

- An in-depth exploration of adaptation to climate change and its impact on water, land and energy resources;
- Learning and experiencing developing scenarios on the influence of climate change upon the economy, policies, ecosystems, etc;
- Drafting strategies and action plans; finding recommendations for future planning through 2050, and practical applications of such strategies and plans;
- Regional and national networking: sharing opinions, practices and information exchange with relevant actors and other environmental NGOs;
- Evaluation and comparison of accumulated expert knowledge;
- Analysis of examples by neighbouring countries and more academic format,
- Delivery of final documents on identified tasks

1.4 Has this workshop met your expectations?

Yes:	More:	Less:	No:
5	20	1	0
19 %	77%	4%	0%

Multitude of area specialists were presented

Diversification of opinions helped to identify weaknesses

Superior preparation and time coordination

Increased knowledge and skills

Relevance of the workshop agenda

Active discussions and exchange of opinions

Team work and close cooperation with leading experts

Networking, building communication bridges and information exchange

Enabled to elaborate strategies at the local level

Possibility to apply planning measures at national level

Issues of climate change impact were covered

Mechanisms, stimulating analytical thinking for elaboration of development scenarios in the CA region, were extensively presented

There was no possibility to discuss the level of preparedness of CA counties for climate change implications

2. Objectives

2.1 In general, do you consider the objectives of the workshop clear?

Excellent:	Good:	Satisfactory:	Poor:
3	19	3	1
12%	73%	12%	4%

2.2 Do you consider the background materials useful?

Excellent:	Good:	Satisfactory:	Poor:
7	16	3	0
27%	62%	12% <ul style="list-style-type: none"> • Interesting for future reference • Delay in distribution 	0%

3. Workshop contents and programme?

3.1 General relevance of contents of scenario development exercise

Excellent:	Good:	Satisfactory:	Poor:
7	18	1	0
27%	69%	4%	0%

3.2 Are the topics and discussions on the workshop relevant to your day-to-day work?

Excellent:	Good:	Satisfactory:	Poor:
10	14	1	1
38%	54%	4%	4%

3.3 Usefulness of presentations?

Excellent:	Good:	Satisfactory:	Poor:
10	14	2	0
38%	54%	8%	0%

3.4 Usefulness of the working sessions?

Excellent:	Good:	Satisfactory:	Poor:
12	10	3	0
48%	40%	12%	0%

3.5 If topics and discussions are relevant, in what areas and for what purpose?

- For qualified preparation of specialists and ecologists undergoing bachelor and master studies
- Important for economics and science for purposes of adaptation to climate change
- For the implementation of the Astana initiative in the Asia-Europe partnership framework
- In the sphere of social economic development, including agriculture, water management, etc.
- In all spheres for conduction of ecology works *in loco*

4. Workshop method

4.1 Was the scenario development method useful for you to generate new insight?

Excellent:	Good:	Satisfactory:	Poor:
9	13	1	0
39%	57%	4%	0%

4.2 Was the scenario development method useful for you to build understanding?

Excellent:	Good:	Satisfactory:	Poor:
11	12	1	0

46%	50%	4%	0%
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4.3 Was the scenario development method useful for you to have structured conversation with other participants?

Excellent:	Good:	Satisfactory:	Poor:
15	10	0	0
60%	40%	0%	0%

4.4 Can you give an example of insights you developed?

- Success determines the synthesis of general and specific programmes and purposes upon achievement of the result
- A better understanding of possible implications and climate change impact on various branches of the ecosystem
- Increased skills in working with scenarios (as a new technique of tackling climate change impacts), determining regional strategies, analysing threats and risks, forecasting and prognosis for the future
- Possible methods of reaction to problems and actuality evaluation on the basis of collective insight
- Enhanced knowledge on global and regional organizations, civil society institutions dealing with climate change issues
- Increased awareness on measures, necessary for elevating climate change issues to governmental and international level
- Better understanding of the complex ecological situation in the Central Asian region

5. Organisational Aspects

5.1 Travel arrangements prior to workshop

Excellent:	Good:	Satisfactory:	Poor:
14	8	0	0
64%	36%	0%	0%

5.2 Secretariat support

Excellent:	Good:	Satisfactory:	Poor:
16	8	0%	0%

67%	33%	0%	0%
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5.3 Working Conditions during the workshop (conference room, facilities, equipment, etc.)

Excellent:	Good:	Satisfactory:	Poor:
16	8	1	0
64%	32%	4%	0%

5.4 Conveniences of the location

Excellent:	Good:	Satisfactory:	Poor:
14	8	1	1
58%	33%	4%	4%

6. Time allocation

6.1 Length of the workshop:

Too short:	Fine:	Too long:
0	22	2
0%	92%	8%

6.2 Length of time allocated to driving forces:

Too short:	Fine:	Too long:
1	20	3
4%	83%	13%

6.3 Length of time allocated to scenario logic and story line:

Too short:	Fine:	Too long:
2	20	4
8%	77%	15%

6.4 Length of time allocated to analysis:

Too short:	Fine:	Too long:
2	19	3
8%	79%	13%

6.5 Length of time allocated to country level experience

Too short:	Fine:	Too long:
7	15	0
32%	68%	0%

6.6 Length of lunch breaks:

Too short:	Fine:	Too long:
0	23	2
0%	92%	8%

6.7 Length of coffee breaks:

Too short:	Fine:	Too long:
0	24	1
0%	96%	4%

6.8 Time for networking:

Too short:	Fine:	Too long:
4	20	1
16%	80%	4%

7. Positive aspect of the workshop:

- Networking and opinion exchange at the regional level, building communication bridges with potential partners
- Uncovering views and ideas of experts from abroad
- Possibility to discover future trends and thus manage/review the overall strategy of the home organization

- High-level facilitation by trainers
- New insights about environmental security in Central Asia
- Group discussions and teamwork, presentations
- New visions on water resource management and possible future situations
- Variety of factors covered (economy, politics, social life, etc)
- Interactive discussions of the working program, development of scenarios
- Co-authorship of real future scenarios and collective responsibility for making an appropriate choice in climate change adaptation
- Concise and coherent program

8. Please cite the most important issues which were dealt with during the workshop. How do these affect your day-to-day work?

- Climate change and security preservation in Central Asia, climate change and political security
- Situation development strategies in energy, agriculture, water resources in light of climate change up to 2050
- Cooperation both at regional and international level, joint action and swift reaction
- Methodologies for building scenarios
- Identifying restraints in strategy implementation and solutions
- Clear picture of existing problems, climate change implications in the region
- Introduction of ecologically safe production
- Involvement of civil society in responding to climate change (inspired a participant to publish a paper)
- Application of complex approaches in solving particular problems, multisided thinking
- Detailed presentations on climate change impacts and forecasts through 2050
- Basing on the knowledge acquired drafting/reviewing an overall strategy of the home organization (inspired a participant to do so)

9. Would you be interested in continuing your participation to explore one of the options above?

Yes	No
24	0
100%	0%

10. What suggestions would you like to make to the organisers?

- More examples from the region's countries. It is important to create the possibility to present activities at national level.
- A longer time frame for the workshop would be desirable
- Focus on concrete results and output from workshop

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- Name plates for all participants (especially facilitators and organizers)
 - Preparation of practical implementation per country with participation of state structures, civil society and other stakeholders
 - Familiarisation with strategies of other countries, pro and con
 - Gender issues
 - Raising preparedness to emergency situations and their deterrence
 - Systematisation of approaches, selection of best scenarios
 - Participation in development of concrete programs on adaptation to climate change at regional and national levels, cooperation on water
 - Moderators shall clearly deliver the tasks and assignments to groups
 - Higher involvement from the agencies in Tashkent on climate change and support similar activities therein
 - Venue of the workshop could have been the same as the accommodation venue
 - Making a graphical illustration of the sequences/steps within the workshop
 - The topic and methodology of the workshop could have been elaborated in a clearer manner

Any other comments

Very thankful for the interesting, useful, efficient and informative seminar and the coordinators for their stellar work in organizing this event.