



# Climate change in Central Asia. It's impacts, consequences and adaptation measures to them.

Environmental integration in EC Development Cooperation Seminar

Irina Goryunova

Climate Change and Sustainable Energy Program Manager

CAREC

[IGoryunova@carec.kz](mailto:IGoryunova@carec.kz)

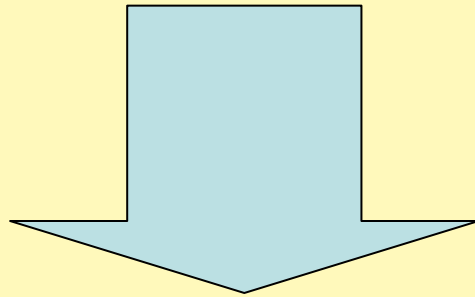
06-09 July 2009 - Almaty, Kazakhstan

THE REGIONAL ENVIRONMENTAL  
CENTRE FOR CENTRAL ASIA

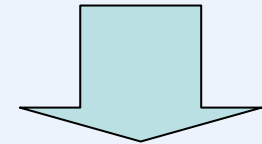
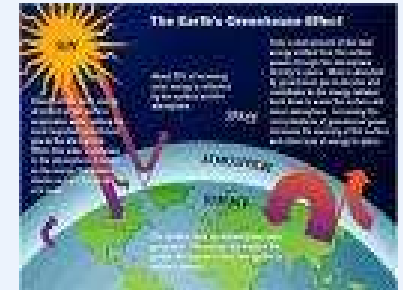


# Global problem at local level

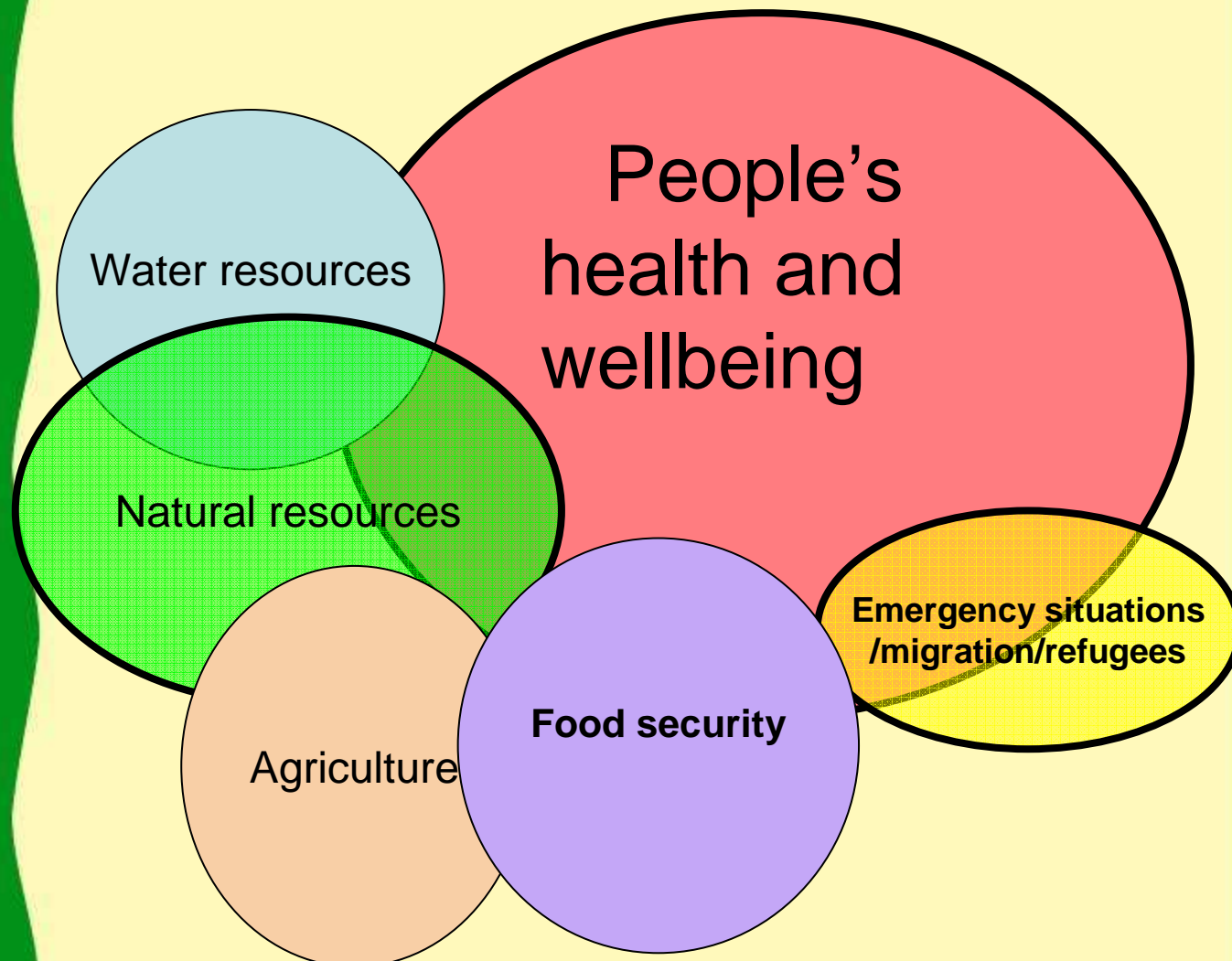
Climate change is global, though  
it's impacts are **regional and  
local...**



**...therefore, actions should be  
made taking into account the  
geographical and climatic  
characteristics of the region.**



# Consequences of climate change will impact on everyone



***Active national policy consistent with the principles of Sustainable Development Strategy is important to tackle the CC adverse impacts!***

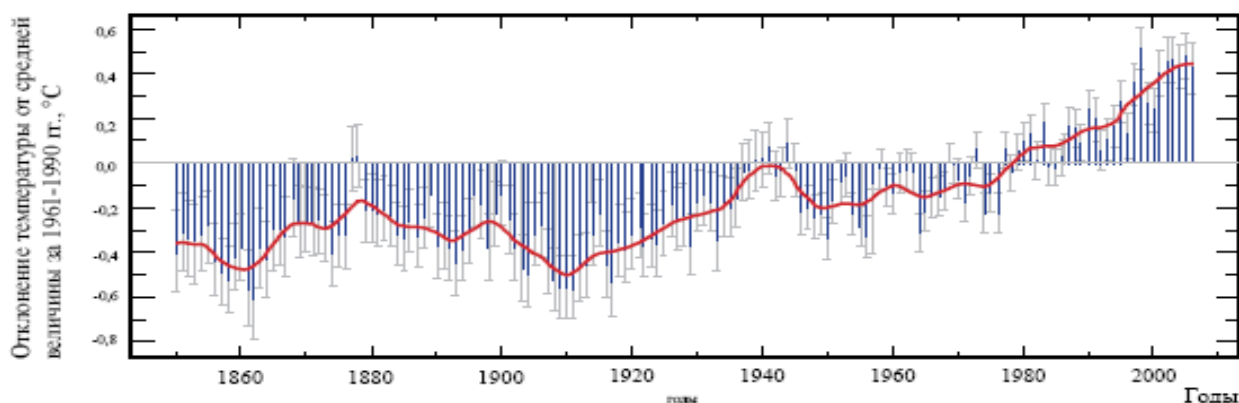
# Some most popular misunderstandings about the CC

*1. Anthropogenic factor is not proved as the reason of global warming ...*

The global Climate change is scientifically proved, man's impact researched and proved to have influence in the IPCC reports (The 4<sup>th</sup> IPCC Report, 2007, National Communications to UNFCCC)



Рис. 1



**Surface air annual deviation, 1850 - 2006**

Source: World meteorological organization (WMO), 2007.

THE REGIONAL ENVIRONMENTAL  
CENTRE FOR CENTRAL ASIA



# Some most popular misunderstandings about climate change

**2. Economic development of the country is more important...**

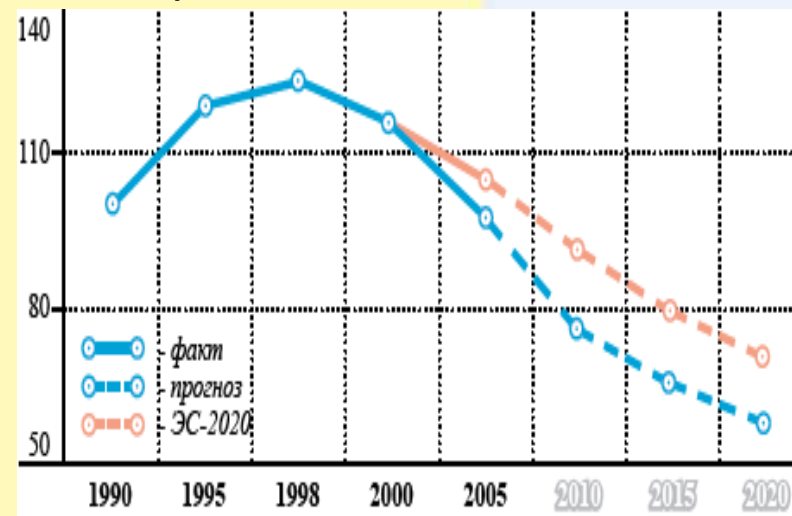
**Economic development today is possible without increase of GHGs emissions thanks to introduction and use of RESs and increase of energy efficiency**



## Energy intensity in countries

Source: Источник: Ministry of Industry and Energy of Russia

**Dynamics of the specific energy intensity GDP and energy saving potential (average in countries)**



CENTRE FOR CENTRAL ASIA



# Some most popular misunderstandings about the CC

*3. Warming is good – will lead to saving in heating season, the crop capacity of the fields and livestock population increase...*

1. “Heat waves” will negatively influence on the functioning of the heat absorption systems; expenses on air cooling will increase; will have adverse impact on people’s health;
2. According to Kazakh National Research Institute, because of the increase of the warm period in Kazakhstan for 27- 57 days, the shear volume in sheep breeding sector will decrease for 11- 19 %; yearling breeding will decrease for up to 20-26%; the spring wheat capacity of the fields will drop up to 44-51%; of winter wheat - up to 12-35 %;
3. Heat loss: dilapidation of distribution pipeline, lack of up-to-date materials and technologies, inadequacy of some economic and legal norms and regulations in the sphere of housing and communal services;
4. Agrogeography : the type of soil is more important than the temperature;



## Some most popular misunderstandings about the CC

*4. Kyoto Protocol is not effective and weak, the period is too short*

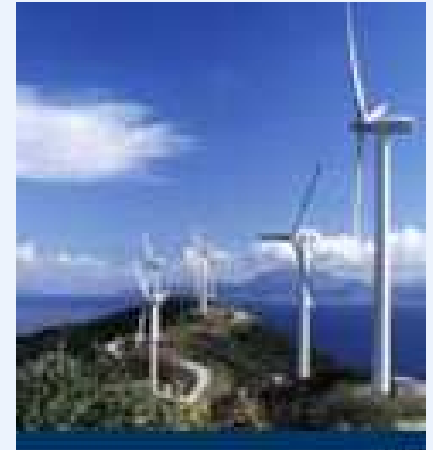
1. Kyoto Protocol – aims to solve environmental problems with the use of market mechanism/economic instruments;
2. Targeted emission reduction by 2012 – 5,2%. Risk: GHGs emission of the Non-annex I countries will exceed the reductions by Annex I countries;
3. Kyoto Protocol is a successful start that made countries develop a “green development” policies, strategies, GHGs monitoring improvement, new regulations;
4. “post-Kyoto” agreement is going to be more radical and long-term;



## Some most popular misunderstandings about the CC

*5. Global warming is impossible to stop: the molecules of GHGs in the atmosphere are resident and, will stay up to 50 years!*

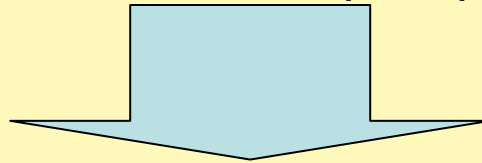
1. UNFCCC implies the GHGs reduction via reduction of the fossil fuel consumption - shift to RESs, decrease of production and transmission losses, afforestation;
2. Mineral/fossil fuel – nonrenewable resources – shift to renewable energy sources inevitable;





# Participation of Central Asian countries in global processes on CC to combat and mitigate CC impacts

The Earth Summit in Rio de Janeiro (1992 ) – participation of CA countries



Participation of all CA countries in **key Multilateral Environmental Agreements** in CC sphere :

- Vienna Convention on for the protection of the ozone layer
- Montreal Protocol on substances that deplete the ozone layer
- The United Nations Framework Convention on Climate Change
- Kyoto Protocol
- The UN Convention on biological diversity
- The UN Convention to combat desertification

**Show the intention of CA countries to participate in the international activities in the sphere of environmental, economic and energy security!**

## Overview of the UNFCCC and Kyoto mechanisms in countries

CA countries	First National Communication to the UNFCCC Secretariat	Second National Communication to the UNFCCC Secretariat	Kyoto Protocol Annex/ Kyoto mechanisms available
Kazakhstan	05 November 1998	04 June 2009	Annex I CO/JI
Kyrgyzstan	31 MARCH 2003	01 December 2008	Non-annex I M4P/CDM
Tajikistan	08 October 2002	31 December 2008	Non-annex I M4P/CDM
Turkmenistan	11 November 2000, Addendum 08 November 2006	-----	Non-annex I M4P/CDM
Uzbekistan	22 October 1999	03 December 2008	Non-annex I M4P/CDM

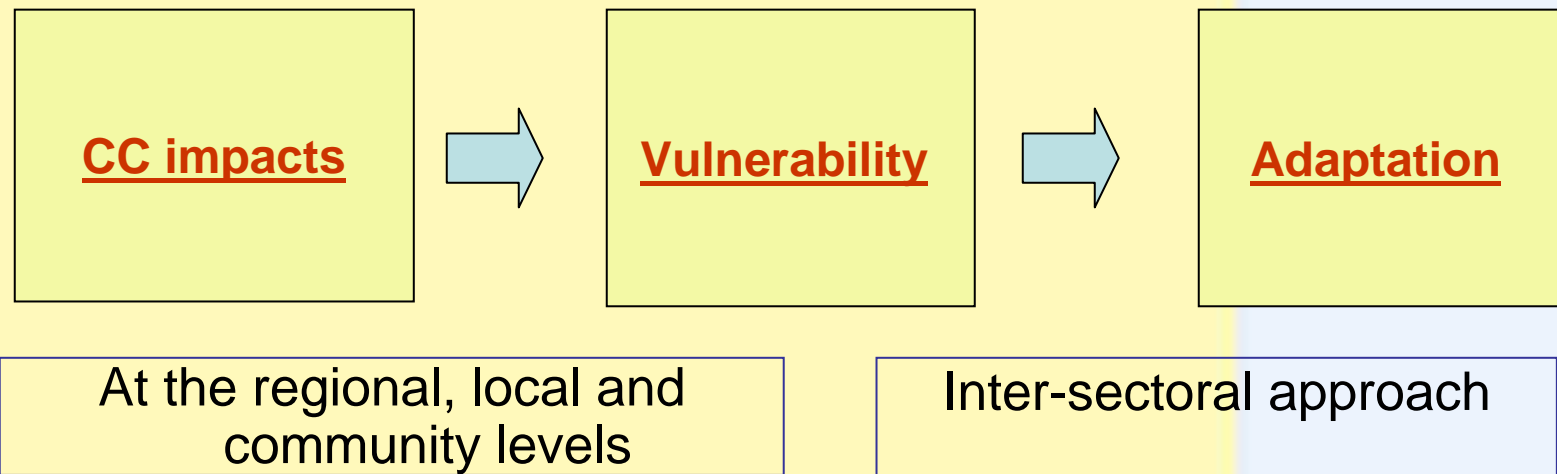
# Action at the national level:

## Major strategic documents on sustainable development and environmental protection, e.g. Kazakhstan

- 1999 National Strategy and Action Plan on Conservation and Sustainable Use of Biodiversity
- 2000 Concept of development and management of the especially protected natural territories until 2030
- 2002 Programme on Drinking Water for 2002–2010
- 2003 Programme for Poverty Reduction 2003–2005
- 2003 Strategy of innovative industrial development until 2015
- 2003 Concept of ecological safety for 2004–2015
- 2005 Programme for combating desertification for 2005-2015
- 2006 Strategy of territorial development until 2015
- 2006 Concept of transition to Sustainable Development for the period 2007–2024 (CTSD)
- 2008 draft law on energy efficiency
- 2009 Law on support of the Renewable Energy Sources Use
- **PLANNED:** draft strategy on decrease GHGs emissions till 2020 and 2050

# CC Adaptation as the way out

**Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities**  
(from UNFCCC glossary)



# Adaptation to climate change as the way out

## Adaptation:

- An integral part of Sustainable development
- Can be applied almost in every sector of economy, including agriculture and water sector
- Purpose more than one objective, demands intersectoral cooperation,
- The following issues need to be solved:
  - » Methodological
  - » Resources, technological
  - » Financial
  - » Educational
  - » Capacity building

## Cooperation is needed between:

- Ministry of Environmental Protection
- Designated National authorities on CMD/JI
- Ministry of Energy and Mineral Recourses
- Ministry of Economic Affairs and Budget planning
- Ministry of Agriculture
- Ministry of Health Care
- Ministry of Emergencies
- Ministry of Education
- Ministry of Finance
- Municipalities
- Social Entrepreneurial Partnership (PPP)
- NGOs
- Private Sector/business
- Hydrometeorological centers
- State Committee on Architecture and Construction
- Universities / Scientific research centers
- Agencies on Technology transfer
- Energy centers
- Media

## Existing Barriers and policy instruments available

<b>Барьеры / Barriers</b>	<b>Рычаги/ Instruments</b>
<p><b>Регуляторные / Regulatory</b></p> <p>Напр., конфликт с существующими нормами, устаревшими стандартами, СНИПами, недостаток подзаконных актов; E.g., conflict with existing regulations, outdated norms and standards, lack of by-laws;</p>	<p><b>Нормы и Стандарты/ Norms and Standards</b></p>
<p><b>Финансовые / Financial</b></p> <p>Например, недостаток финансовых механизмов, стимулирующих внедрение ВИЭ, мер по адаптации и повышению энергоэффективности; E.g., lack of financial incentives to implement RECs, adaptation and energy efficiency measures;</p>	<p><b>Материальные стимулы/ Economic Incentives</b></p>
<p><b>Прикладные / Applied</b></p> <p>Напр., ограниченное производство и поставки техники, материалов, дороговизна; E.g., constraints in the manufacturing and supply, high cost;</p>	<p><b>Налаживание производства, благоприятная налоговая политика/ Manufacturing development, favorable tax policy</b></p>
<p><b>Научные / Scientific</b></p> <p>Напр., отсутствие достаточного научного обоснования, информации; E.g., lack of reliable scientific info, proofs;</p>	<p><b>Исследования/ Research</b></p>
<p><b>Социальные / Social</b></p> <p>Напр., отсутствие осведомленности и понимания проблемы среды широкой общественности; E.g., lack of awareness and understanding of the issue among general public</p>	<p><b>Кампании по повышению осведомленности/ Awareness raising campaigns</b></p>

# Other policy mechanisms possible

## **Regulatory**

- Promotion of environmental responsibility among business sector
- Promotion of “green” public transportation
- Development of “eco-design” requirements for the building construction
- Development of “eco-design” requirements for the goods
- Regulate the use of combined use of heat and power

## **Scientific**

- Invest in research
- Fund low carbon R&D
- Promote Environmental academic courses

## **Financial incentives**

- Taxation of private cars in accordance with their pollution level
- Providing grants to households and business to increase EE and reduce GHGs emissions
- Reducing VAT on energy saving materials



# *Climate Change in Kazakhstan: reality and anticipations*

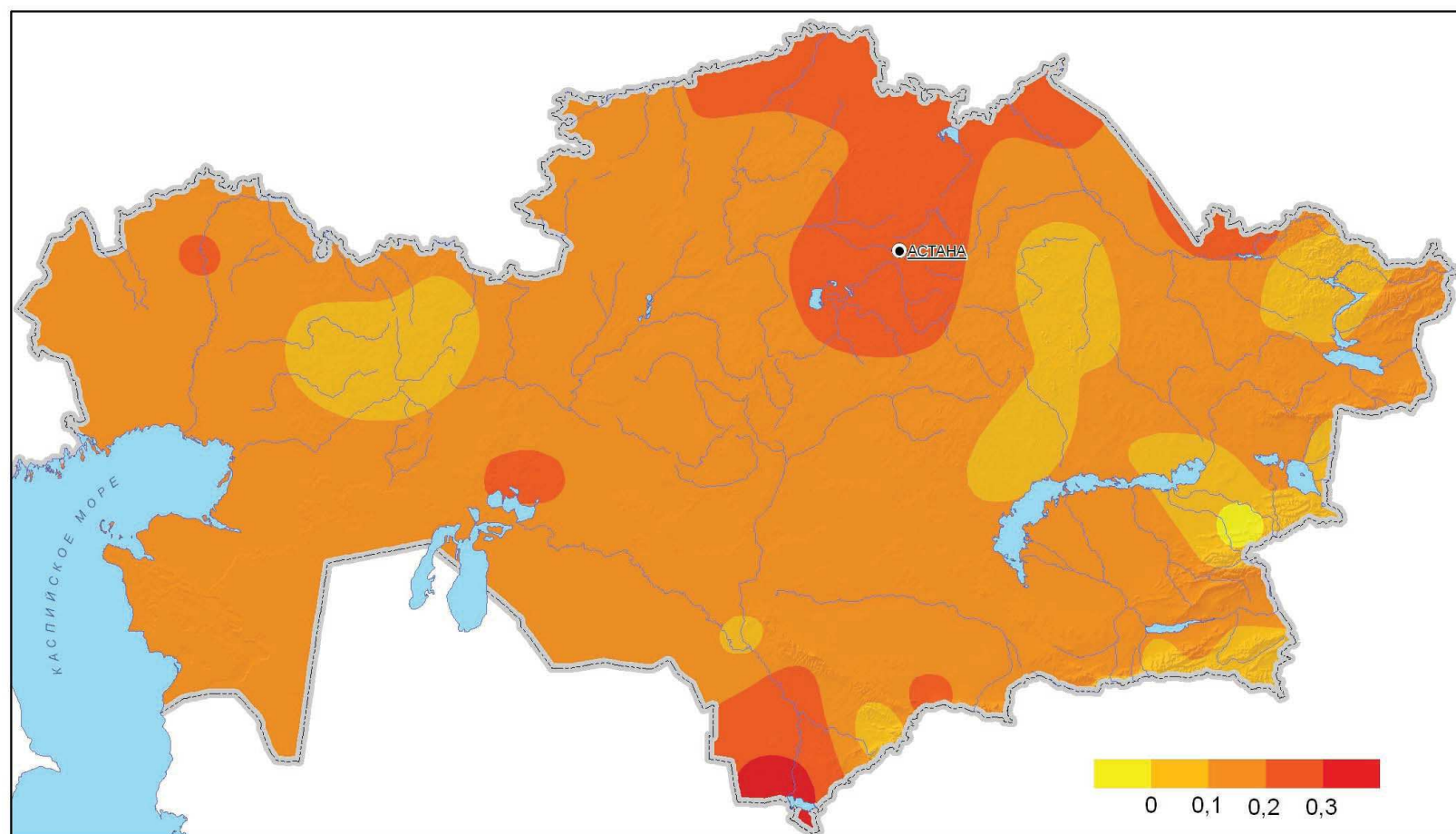
Map of Central Asia



(Resource: National Communications to UNFCCC)

- Semiarid to arid country with a temperate climate (2,717,300 square kilometers)
- Average annual air temperatures increase during 1894-1997 was 1.3°C
- Expected increase in average air temperature is approximately +1.4°C by 2030 to +4.6 °C by 2085
- 450 km northward migration of humidity zones

## Annual distribution of linear trend coefficient of the surface air, Kazakhstan, 1936-2005, °C/10 years



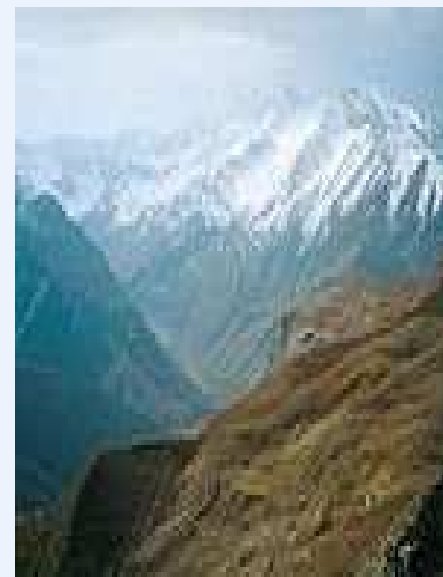
Source: Kazakhstan's Second National Communication to UNFCCC, 2009

THE REGIONAL ENVIRONMENTAL  
CENTRE FOR CENTRAL ASIA



## **Climate Change: Major Trends**

- Overall increase of seasonal and annual temperatures
- Overall increase of precipitations in winter time and constant amounts of precipitations in summer time (in some parts). Precipitation increase doesn't compensate the increase of air temperatures.
- A negative trend of total average annual precipitation 17 mm/100 years for the period 1894-1997. Increase by 2-24% can be expected by 2050-2070.
- Increased variability of rainfalls, when storms alternate with droughts, affects the lands.
- In summer time, intensive rainfalls do not moisten the soils as part of water just streams down but high temperatures contribute to its rapid vaporization.
- Kazakhstan's natural ecosystems and soils are naturally fragile, threatened by extensive agriculture, monocrop agricultural production, soil salinization, extractive industries, deforestation, forest fires, overgrazing, and other stresses.



*Kazakhstan's Second National Communication to UNFCCC, 2009*

THE REGIONAL ENVIRONMENTAL  
CENTRE FOR CENTRAL ASIA



## ***Problems associated with CC in CA region***

- **Water resources – scarcity increase and quality of drinking water decrease**
- **Glaciers – melting acceleration**
- **Agriculture -  
Crop yielding reduction**
- **Increase of the risk of dangerous and extreme hydro-meteorological weather events**
- **Increase of risks associated with food and energy safety**
- **Public Health – increase of risks of thermal stresses and infectious and parasitogenic diseases**
- **Ecosystems – destruction of fragile mountain ecosystems**



## Assessment of key sectors' vulnerability to climate change effects in arid and semi arid zones of Asia

Food	Biodiversity	Water resources	Human health	Settlements
High vulnerability	Moderate vulnerability	High vulnerability	Moderate vulnerability	Moderate vulnerability

*Resource: National Human Development Report. Kazakhstan, 2008*

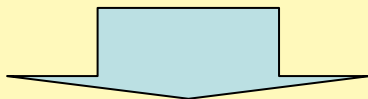


**UNDP Community Based Adaptation Program in Kazakhstan concludes that global climate change has the potential to exacerbate the following impacts:**

- Increased crop water stress and drought risk;
- Increased risk of agricultural pests and diseases;
- Decreased capacity of grazing lands – sheep production decrease;
- Increased risk of damage from increasingly intense weather events;
- Changing crop growing characteristics, leading to declining grain quality.



Threat to food security



Policy response: intensification of grain production, expansion of areas under cultivation

***Agricultural  
Sector:  
challenges***



## Various projects implementation (international donor assistance):

### ➤ Community-based adaptation

For example:

- Development of artificial (seeded) pastures;
- Rehabilitation of natural rangeland ecosystems;
- Stabilization of slope-wash erosion by using phyto-melioration approaches;
- Introduction of pasture rotation methods and local livestock movement, using RESs;
- Reduction of land degradation pressures on increasingly erosive ecosystems;
- Fostering local institutions for cooperative community management and utilization of natural resources;
- Changing cropping patterns (favorable conditions for cotton growing)
- Awareness-raising campaigns

## Agricultural Sector: responses



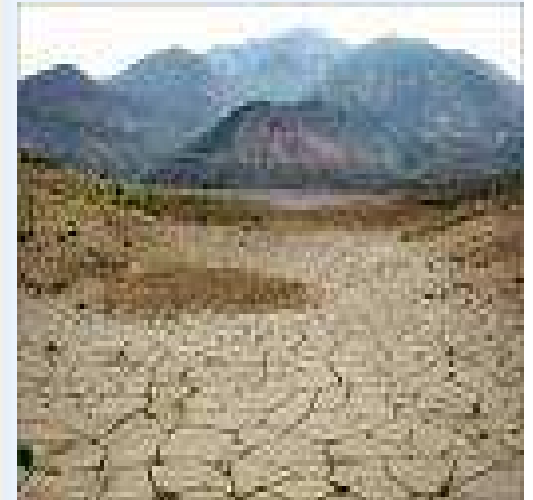
**Kazakh scientific research institute of ecology and climate states that the temperature increase results in:**

- melting glaciers;
- change of the hydrographic regime of open water;
- drinking water shortage;
- drinking water quality decrease;
- irrigation problems;
- hydroelectricity production shortage



Intensified by constrained political  
transboundary water issues

***Water Sector:  
Challenges***

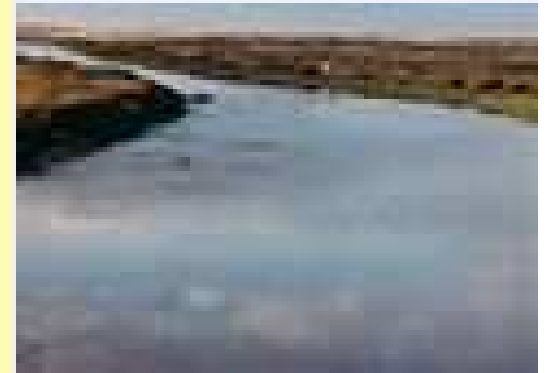




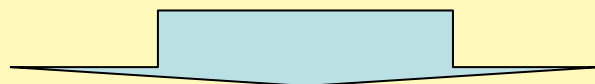
## Structures and non-structural measures

- Introduction of integrated water-management (river-basin approach)
- Promotion of cross-sector interaction among all related stakeholders
- Development of more efficient water infrastructure
- Awareness-raising campaigns
- Promotion of mini hydropower generation
- Various projects implementation (international donor assistance)

## *Water Sector: Responses*



- Ratified on March 28, 2009
- Kazakhstan – Annex I country



- Shift from dependency on fossil fuels to renewable energy resources development
- GHG inventory included in National statistical reporting - monitoring improvement
- Laws on energy efficiency and energy saving are submitted for approval to the Government
- Attraction of BATs to the country

Energy/industrial  
sectors

Kyoto Protocol



# Political and legislative frameworks for adaptation measures implementation

- *Concept of Transition to Sustainable Development for the period of 2007-2024 (2006)*
- *Concept of Ecological Safety for 2004-2015 (2003)*
- *Programme to combat desertification for 2005–2015 (2005)*
- *Programme on rural development for 2004–2010*
- *Programme for fish conservation and fishery development for 2004–2006*
- *Kazakh Forests Programme for 2004–2006*
- *Concept for Development and Management of Protected Areas till 2030.*
- *Concept of Development of Water Sector and Water Management Policy until 2010*
- *The Strategy of Development of Water Sector and Water Management Policy until 2025 (now under development)*

- **A separate National Strategy or Program (and Action Plan) on climate change adaptation should be elaborated and adopted!**

**Actions to be  
taken to  
mainstream  
adaptation into  
national policy  
agenda**

## How Kazakhstan can benefit from the Program?

- Integration of climate change adaptation goals and measures into the existing Sustainable development strategy
- Promotion of implementation of renewable energy technologies, attracting the investments of private sector and technology transfer
- Promotion and speeding up of Kyoto mechanisms
- Improvement of the existing national system of climate observation (monitoring network, data interpretation) to receive reliable data so vital in decision-making process
- Promotion of awareness raising campaigns on climate change and associated risks for wide public, business sector and governmental authorities.

***Thank you for your attention!***

[IGoryunova@carec.kz](mailto:IGoryunova@carec.kz)

THE REGIONAL ENVIRONMENTAL  
CENTRE FOR CENTRAL ASIA

