EUWI
EU WATER INITIATIVE

EAP Task Force

OECD
BETTER POLICIES FOR BETTER LIVES

"IMPROVING THE ENVIRONMENTAL QUALITY OF THE BLACK SEA THROUGH BETTER WASTE WATER TREATMENT & CLIMATE CHANGE ADAPTATION OF THE WATER SECTOR IN MOLDOVA"

1st EUWI NPD, Chisinau, Moldova, 23 March 2012

Content

A. Terms of Reference

Objectives of the project

The ultimate objective of the project sponsored by the EC (DG ENV) and OECD/EAP Task Force is to improve the water quality of the Black Sea basin, and health situation in Moldova and downstream (see Appendix).

The more immediate objectives of the project are:

- to strengthen Moldova's capacity to adapt its water policies and infrastructures to climate change, with a focus on water quality; and
- to propose a business model which will make sanitation sustainable in rural areas, villages and small urban settlements in Moldova.

Scope of work

- **Task 1:**

Assess the impact of climate change on water supply sources and WSS systems. The objective of this task is to assess the impact of climate change on the availability and quality of water supply sources in Moldova, as well as on WSS infrastructure, and to develop recommendations for key climate change adaptation measures.

- **Task 2:**

Analyze selected adaptation measures and propose a feasible adaptation strategy. The objective of this task is to further analyze selected adaptation measures from the reference scenario, and to develop a financially sustainable adaptation strategy for the water supply and sanitation sector.

- **Task 3:**

Develop a viable business model for rural sanitation. The Contractor will propose a sustainable business model for operation, maintenance and financing of sanitation systems in small towns and rural settlements in Moldova outside the service area of existing water utilities (apacanals) not covered by the regionalization project. This could include alternative technologies, organizations, or revenue streams.

Project period, time schedule

- 11 month
- February 2012 – December 2012

Meeting 1	Kick off meeting	Q1
Meeting 2/3/4		Q2/3/4
Task 1		Q 1/2
Task 3		Q 1/2
Report 1		End Q2
Task 2		Q 3/4
Report 2		Q 4

Work schedule

Work schedule

No.	Phase/Activity	2012											
		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
		0	1	2	3	4	5	6	7	8	9	10	11
1	**Inception Phase**												
	Inception Mission												
	Organisation of team												
	Review main data and document												
	Elaborate working plan												
	Organize the 1st policy dialogue meeting, establish of SG												
2	**Implementation Phase**												
Task 1 - Assess the impact of climate change on water sources and WSS systems													
	Asses impact of climate change on WSS												
	Compile adaption measures to address climate changes impact/risks on WSS.												
	Propose reforms on existing economic instruments												
	Organize the 2nd policy dialogue meeting												
	Report 1 on the impacts of climate change on water resources and WSS												
Task 2 - Analyse selected adaptation measures and propose a feasible adaptation strategy													
	Inventory of adaptation costs, categories etc.												
	Inventory of financing sources												
	Elaborate adaptation strategy												
	Organize the 3rd policy dialogue meeting												
	Report 1 on the proposed adaptation strategy												
Task 3 - Develop a viable business model for rural sanitation													
	Analyse relevant aspect of rural sanitation												
	Elaborate a business model												
	Conduct reality check												
	Organize the 4th policy dialogue meeting												
	Report 2 on business model												
Reporting													
	Draft Report 1 on the impacts of climate change on water resources and WSS												
	Draft Report 2 on business model												
	Final versions of the report												

Focused action

Continous action

Potential action

Duration of Task

Contacts

- **Project management**

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- **Project implementation**

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B. Task 1: Assess the impact of climate change on water supply sources and WSS systems

Task 1: Assess the impact of climate change on water supply sources and WSS systems (1)

ToR requirements and proposed actions

Step 1: Inventory and collection of available data and information

- identify data sources on the impact of climate change on water availability and quality in the main water supply sources in Moldova, (surface water, water in shallow wells, and groundwater;
- impact on WSS systems throughout the country.

Develop a reference scenario that focuses on the:

– impact on water supply and sanitation infrastructures (due to changes in water quality and availability, flood patterns, etc.);

– consequence for water supply and sanitation services (level and quality of WSS services delivered to the Moldovan population.

– consequences for water quality and health

Task 1: Assess the impact of climate change on water supply sources and WSS systems (2)

ToR requirements and proposed actions

Step 2: Inventory of possible adaptation measures

- inventory of adaptation measures, in line with the risks identified in Step 1 with a focus on:
  - water quality of the rivers downstream and on links between water and health
  - use of economic instruments
  - implement low cost options,
  - allocate the resources where they are most needed,
  - generate additional revenues from water abstraction fees,
  - water supply and sanitation services.

A Policy Dialogue meeting to discuss impacts and possible adaptation measures

Other activities/reports in the field of climate change

- Human Development Report 2011, UNDP, 2011
- National Adaptation Strategy for the Republic of Moldova, UNDP, draft 2011
- Disaster and Climate Risk Reduction Project, UNDP Moldova and Civil Protection and Emergency Situations Service, Ministry of Interior, Government of Moldova.
- June, 2011Environmental Outlook 2050 -OECD, 2012
- Second National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change, UNEP, GEF, MEnv, 2009
- Adapting to Climate Change in Europe and Central Asia Background Paper on Water Supply and Sanitation – World Bank, 2008
- Disaster Risk Management and Climate Change Adaptation in Europe and Central Asia, World Bank
- Reducing the Vulnerability of Moldova's Agricultural Systems to Climate Change, World Bank, Draft 2011
- Action Programme to Improve Transboundary Cooperation and Sustainable Management of the Dniester River Basin (Dniester – III)

Collected info and data is being processed, launch of additional data collection

What is climate change

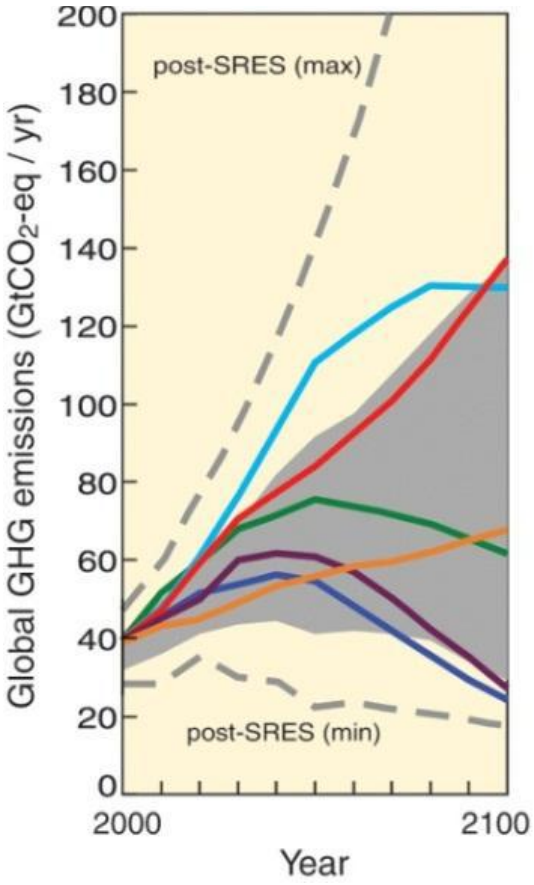
“a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” 1)

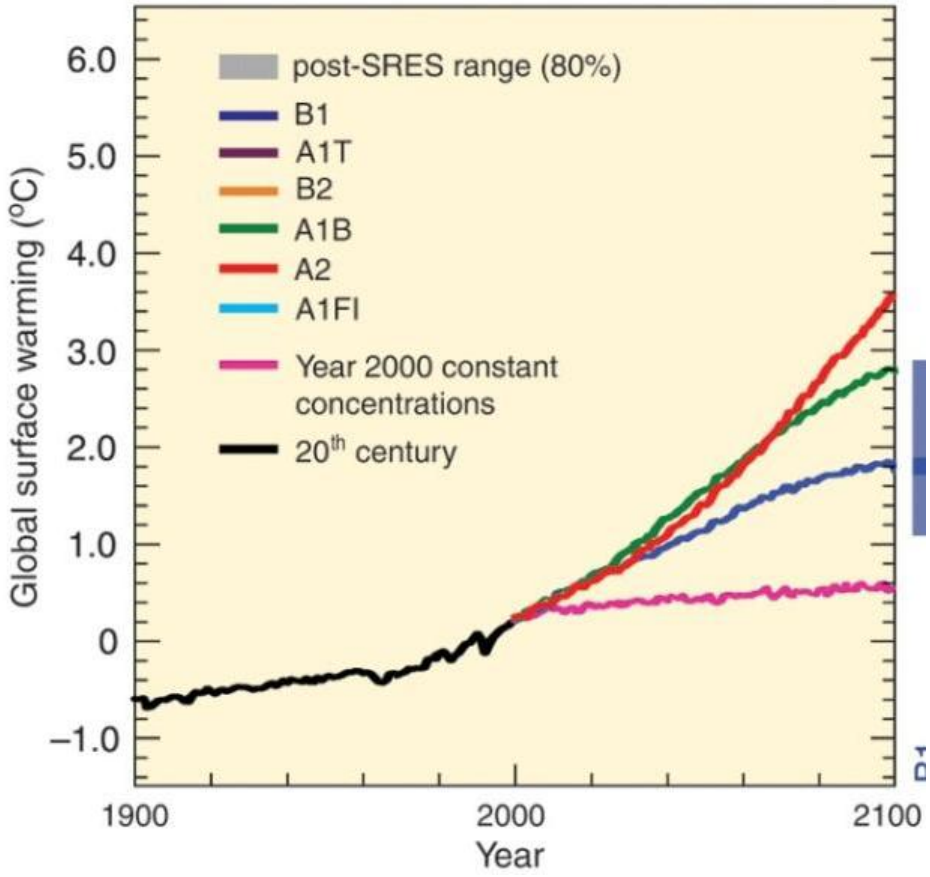
Climate change is caused by greenhouse gases (GHGs). These gases allow solar radiation from the sun to travel through the atmosphere but prevent the reflected heat from escaping back into space. This causes the earth’s temperature to rise.

The EU has defined dangerous climate change as an increase in 2°C of average global temperatures. Since 1900, global temperatures have risen by 0,7°C and are continuing to rise at an estimated rate of 0,2°C per decade.

1) United Nations Framework Convention on Climate Change

Greenhouse gas (GHG) emission and estimated global surface warming 2000 to 2100



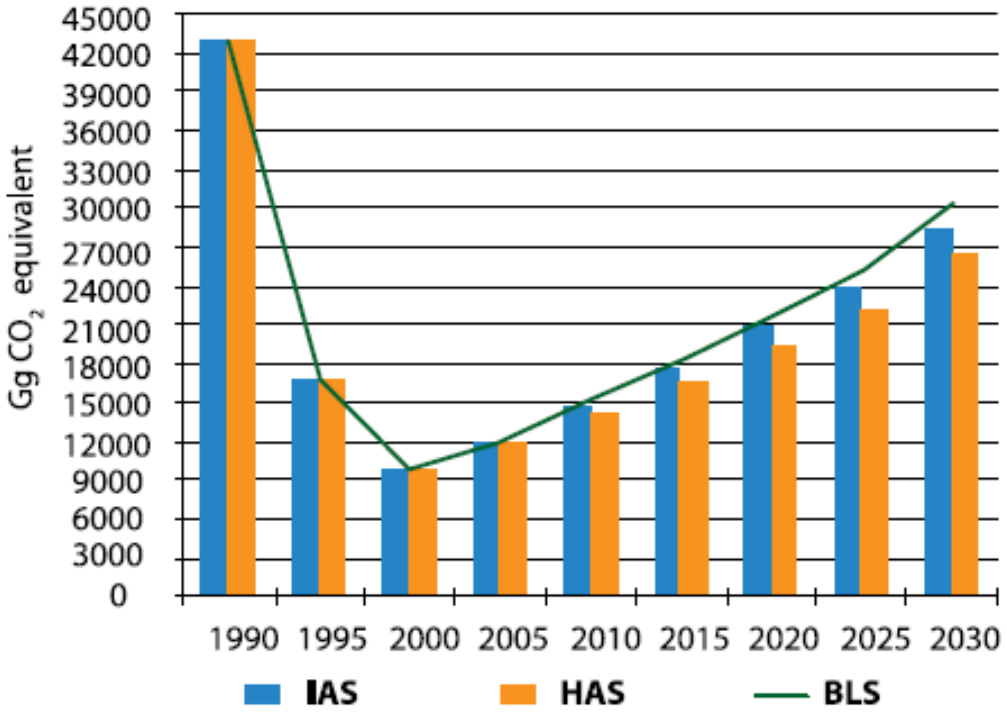


for SRES scenarios

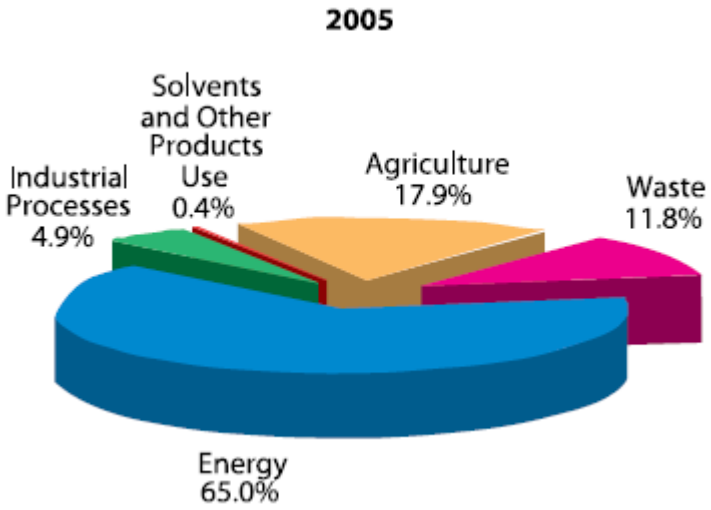
Quelle: IPCC AR4

Greenhouse gas (GHG) emission in Moldova

Projections of GHG emission



Sectoral breakdown of GHG emission



Quelle: Second National Communication, 2009

Impact of climate change on water resources and consequences (1)

- **Quantity of water, accessibility**
  - Availability of water decreases or varies seasonally
  - Competition for available water resources will intensify - drinking purposes, agriculture, industry
- **Quality of water, health impact**
  - Chemical, microbiological, physical character of water is influenced mainly by the hydrological cycle (evaporation, clouds, percipitation, rivers, soils...)
  - Changes in the amounts or patterns of precipitation will change the route and residence time of water in the watershed – affecting/changing quality.
  - Water can become unsuitable for drinking purpose or require additional treatment
  - Water-borne diseases (faeces, pathogene viruses/bacteria) during floods (e.g overload of sanitation devices)
  - Water-related/based diseases, spread of diseases through insect habitat in water (malaria) etc.
  - Water-washed diseases: through inadequate personal hygiene through inaccessibility of water (e.g. typhus)

Impact of climate change on water resources and consequences (2)

- **Water service**
  - Damage on WSS infrastructure through floods – limited/intermittent service
  - General deterioration of the system – decreasing quality and reliability
  - Interrupted supply due to capacity limits

Most dominant climate drivers for water availability

- Precipitation (mean and events)
- Temperature (ambient and water)
- Evapotransiration

Effect of most dominant climate drivers for water availability (1)

- **Ambient temperature**

  Increase
  – Increased evaporation and evapotranspiration (driver for hydrological cycle)
  – reduced water availability (supply).
  – Salinization, eutrophication of surface water resources.
  – Lower groundwater tables.
  – Increased demand

- **Surface water temperature**

  Increase
  – Reductions in dissolved oxygen content and self-purification capacity.
  – Deterioration in water quality including algal blooms that impair color, odor, taste and purity of water supplies.
  – increased phosporus from sediments
  – Increased evaporation and evapotranspiration

Effect of most dominant climate drivers for water availability (2)

- **Precipitation**

Increase

– Increased average runoff leading to decreased water quality, including microbial and chemical pollutants to water resources,
– increase in incidence of pathogens resistant to chlorination

Decrease

– Reduced water availability (supply)

Greater variability and extreme events

– Flooding
  - Difficulty of flood control and reservoir utilization during the flooding season
  - Increased turbidity in rivers (erosion)
  - Pollutants will be introduced
  - Percipitation events vs. infiltration capacity
– Drought
  - decreased water volume, water stress etc.
  - recharge rate (shallow wells vs. aquifers)
  - Reduced dilution capacity (higher pollutant concentration) in discharge systems

Climate in Moldova

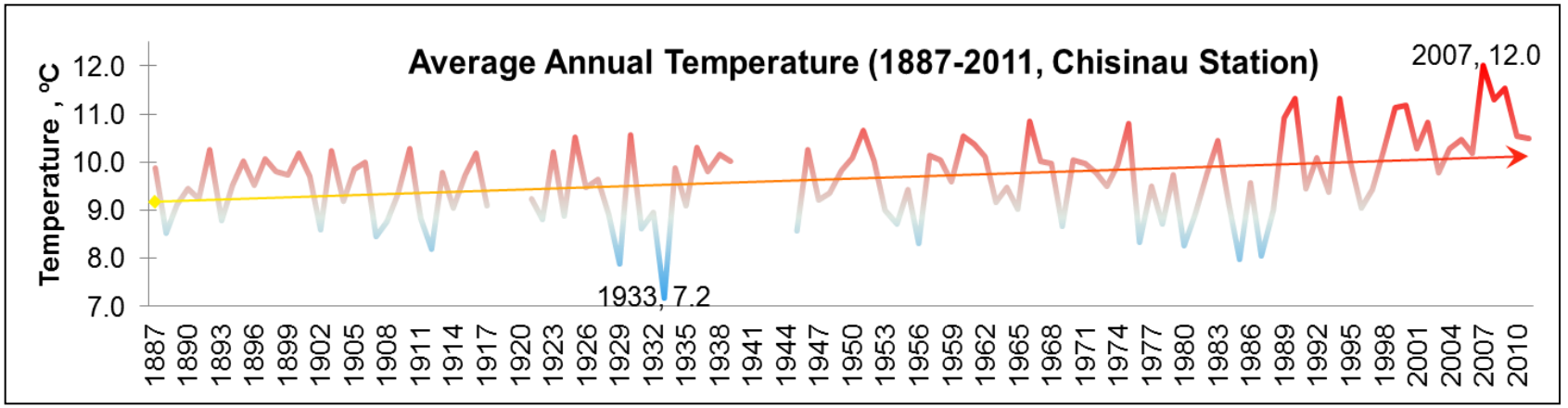
- **Moderate continental climate**
  - Relatively short, mild winters, little snow
  - Long summers, frequently hot and dry
  - High annual and seasonal variabilities and regionally uneven distribution
- **Precipitation:**
  - Most dry year: 279 mm/year (1896)
  - Most humid: 777 mm/year (1933)
- Average **multiannual temperature**:
  - 9.3 °C in the North (Briceni)
  - 9.5 °C in the Center (Chisinau) and
  - 10.1 °C in the South (Cahul)
- Annual **average wind speed** varies over the territory from 2.5 to 4.5 m/s

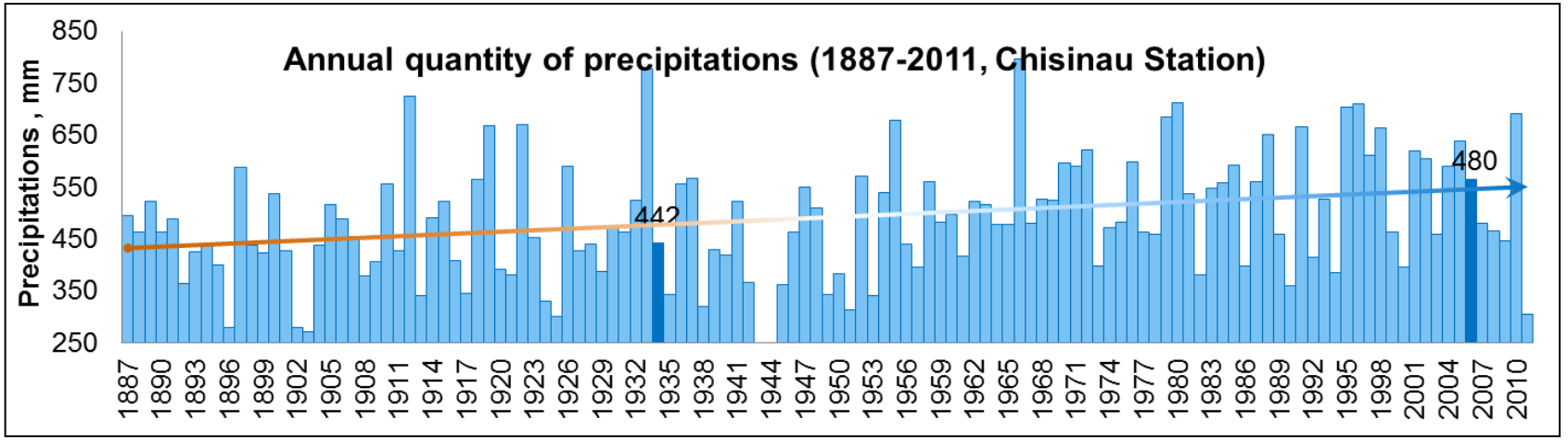
Trends in climate change globally and in Europe

- The **global** (land and ocean) **average temperature** up to 2007 was 0.8 ºC above the 1850 -1899 level (reference level). The average for land surfaces was 1ºC higher.
- **Europe** has warmed more than the global average. As of 2007, the European annual average temperature was 1.2ºC above the reference level. Eight of the 12 years between 1996 and 2007 were among the 12 warmest years since 1850.
- In **Europe**, annual precipitation in the 20th century showed 10 - 40% increase in the northern Europe and a decrease (up to 20%) in some parts of southern Europe, in comparison to the reference level.
- Mean **winter precipitation** has increased in most of western and northern Europe (20 to 40%); southern and parts of central Europe were characterized by drier winters;
- Increased precipitation is projected in winter in Northern Europe, whereas many other parts may experience dryer summers. However there are uncertainties regarding the magnitude and geographical details of the changes.

Quelle: *European Environmental Assessment (EEA, 2008).*

Climate change trends in Moldova (1)





Source: Analyze by Inessa Galitschi based on data of Chisinau meteorological station

Climate change trends in Moldova (2)

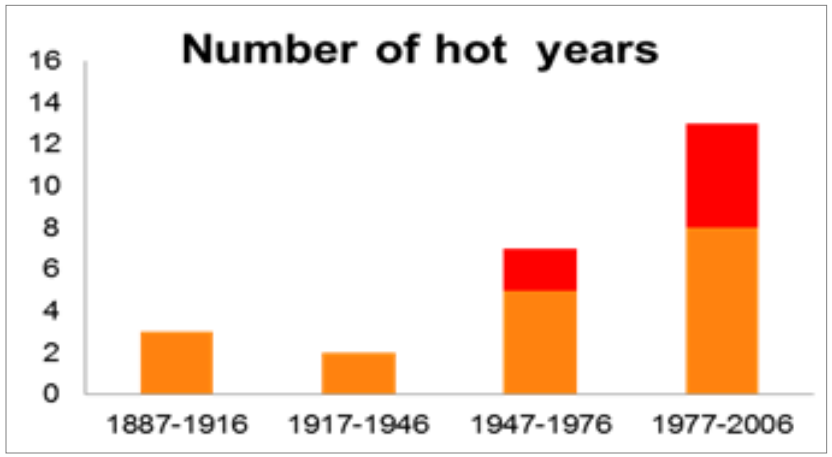
Period	Average air temperature	Period	Rainfall amount
1886-1960	+0.5 °C	1891-1960	↑ 8 %
1960-2007	+0.5 °C	1960-2007	↑ 3 %
Summary:			
1886-2007	**+1.0 °C**	**1891-2007**	↑ **11 %**

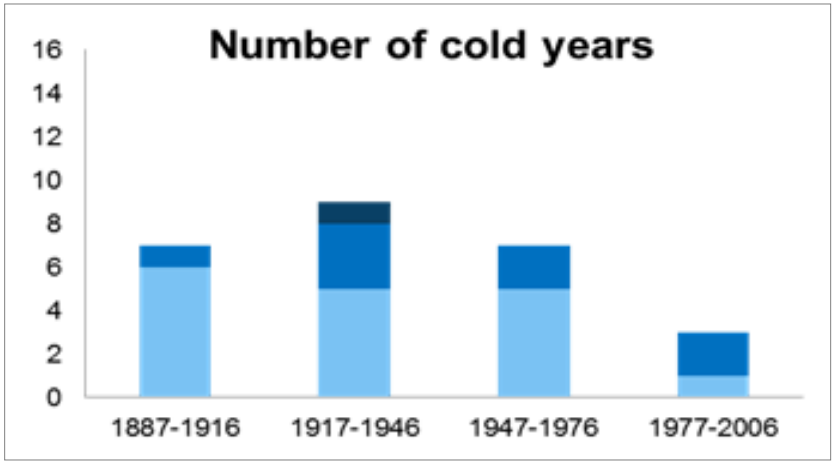
Quelle: *I. Boian, Presentation for the Workshop: Decreasing the vulnerability of the agricultural systems in the Republic of Moldova to climate change – operationalization of the agenda on climate change*

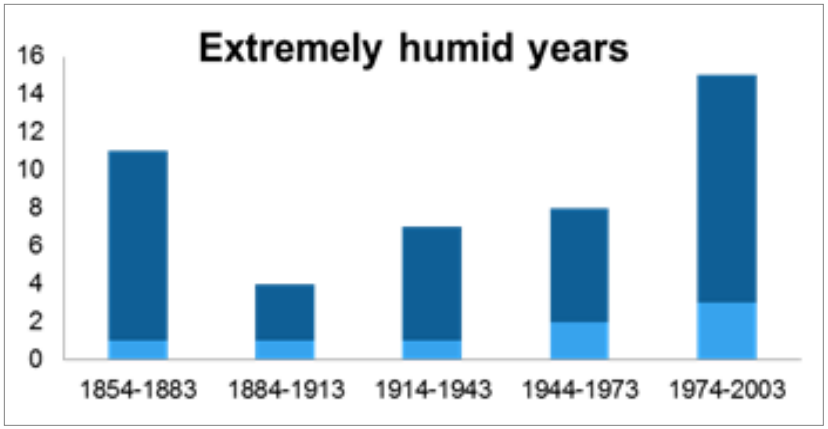
Climate change vs. Climate variability

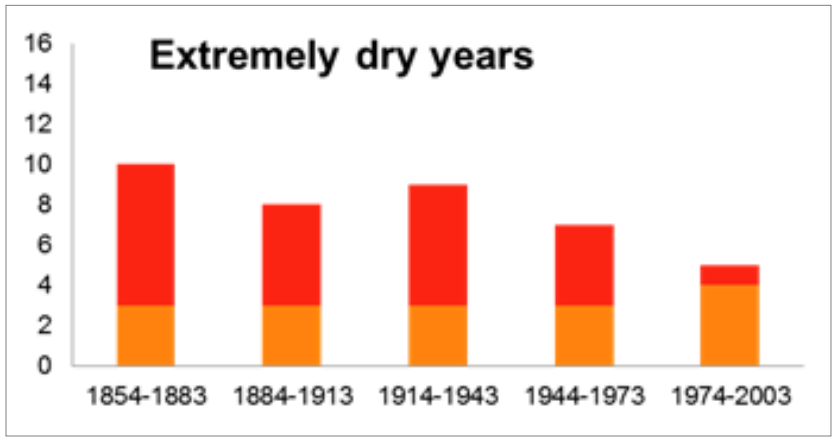
- Climate change involves small, gradual and continuous changes with special/regional trends and directions
- Climate variability is the most dangerous component of climate change, which reflects both: frequency, number and amplitude of different weather anomalies, as well as heavy rains, droughts, storms, heat and cold waves including early autumns and late spring frosts.
- Taking into account geographical location of Moldova, which is very sensitive to different weather anomalies, the evident increase of climate variability becomes the most dangerous aspect of climate change.
- Records on the frequency of the major group of weather anomalies were collected and analyzed.

Number of extreme years in Moldova according to temperature (1854-2006)/ precipitations (1854-2003) data



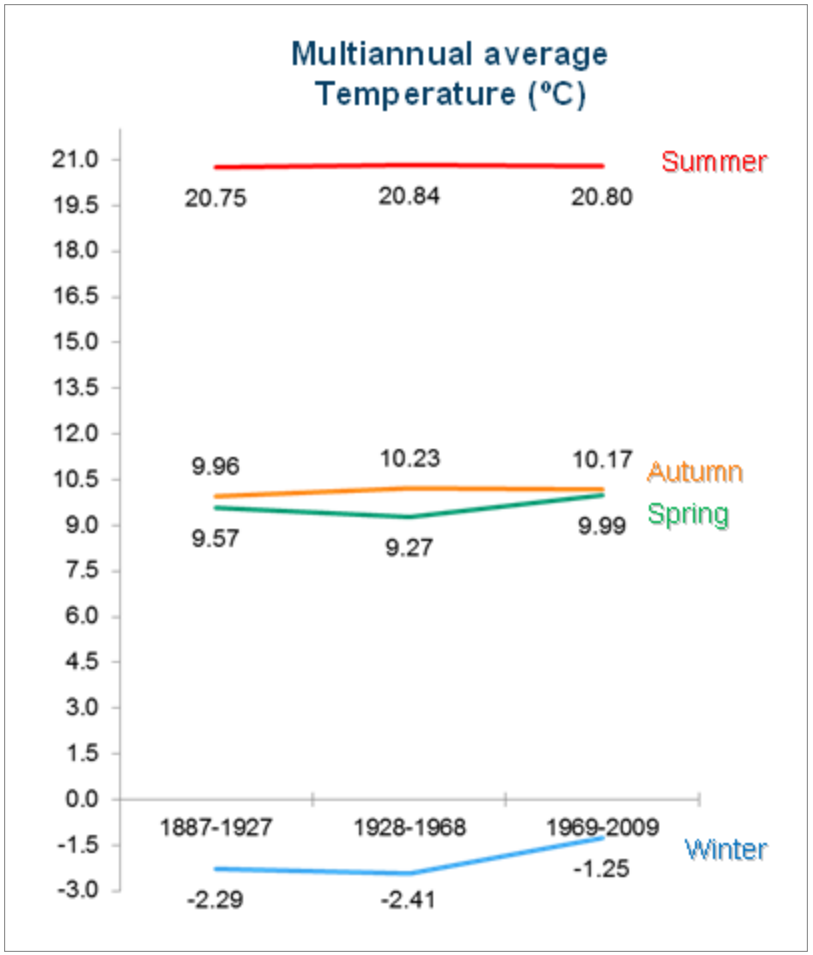


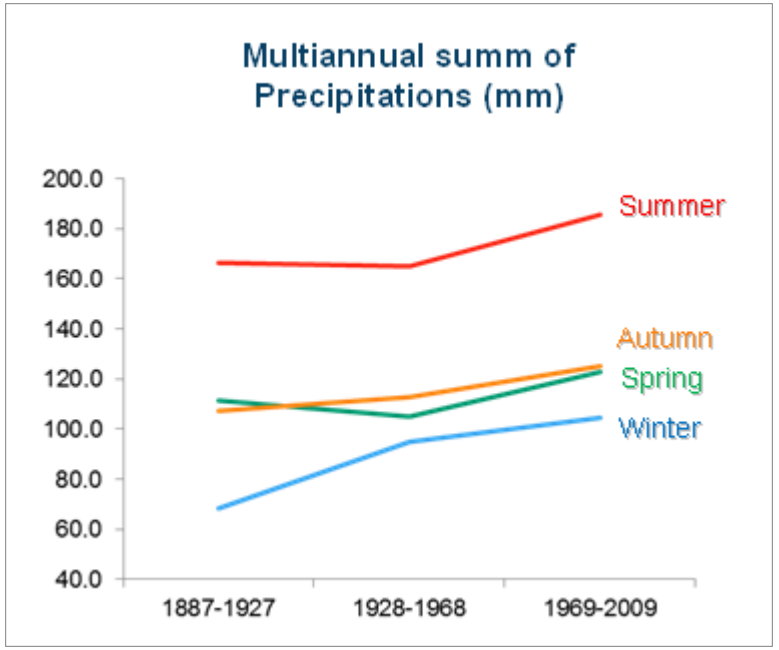




Source: Analyze by Inessa Galitschi based on data of Chisinau meteorological station

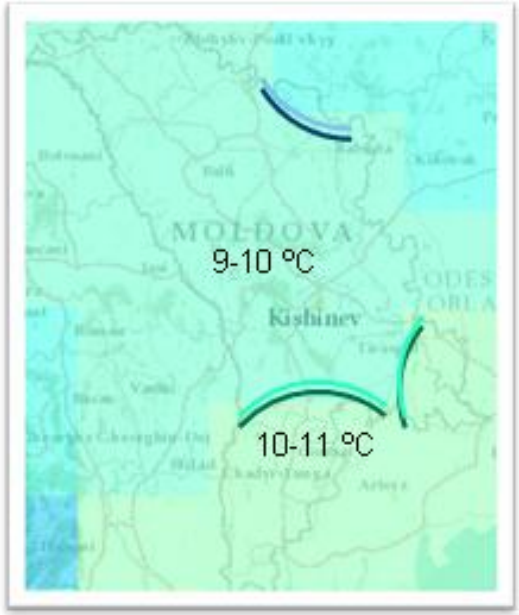
Trends at seasonal level in Moldova





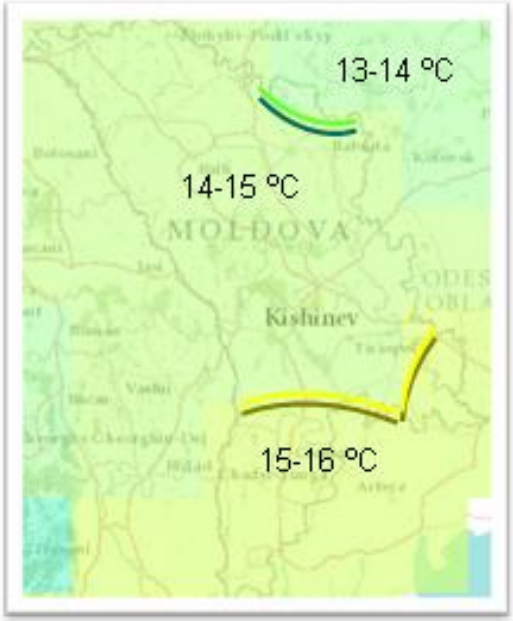
Source: Analyze by Inessa Galitschi based on data of Chisinau meteorological station

Temperature projections for Moldova

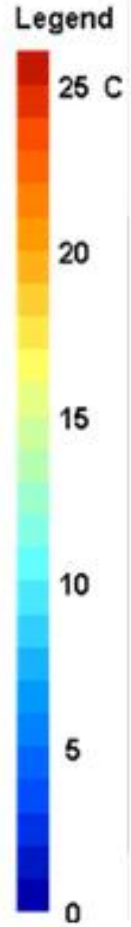


1951-2002

Mid century (2050s)

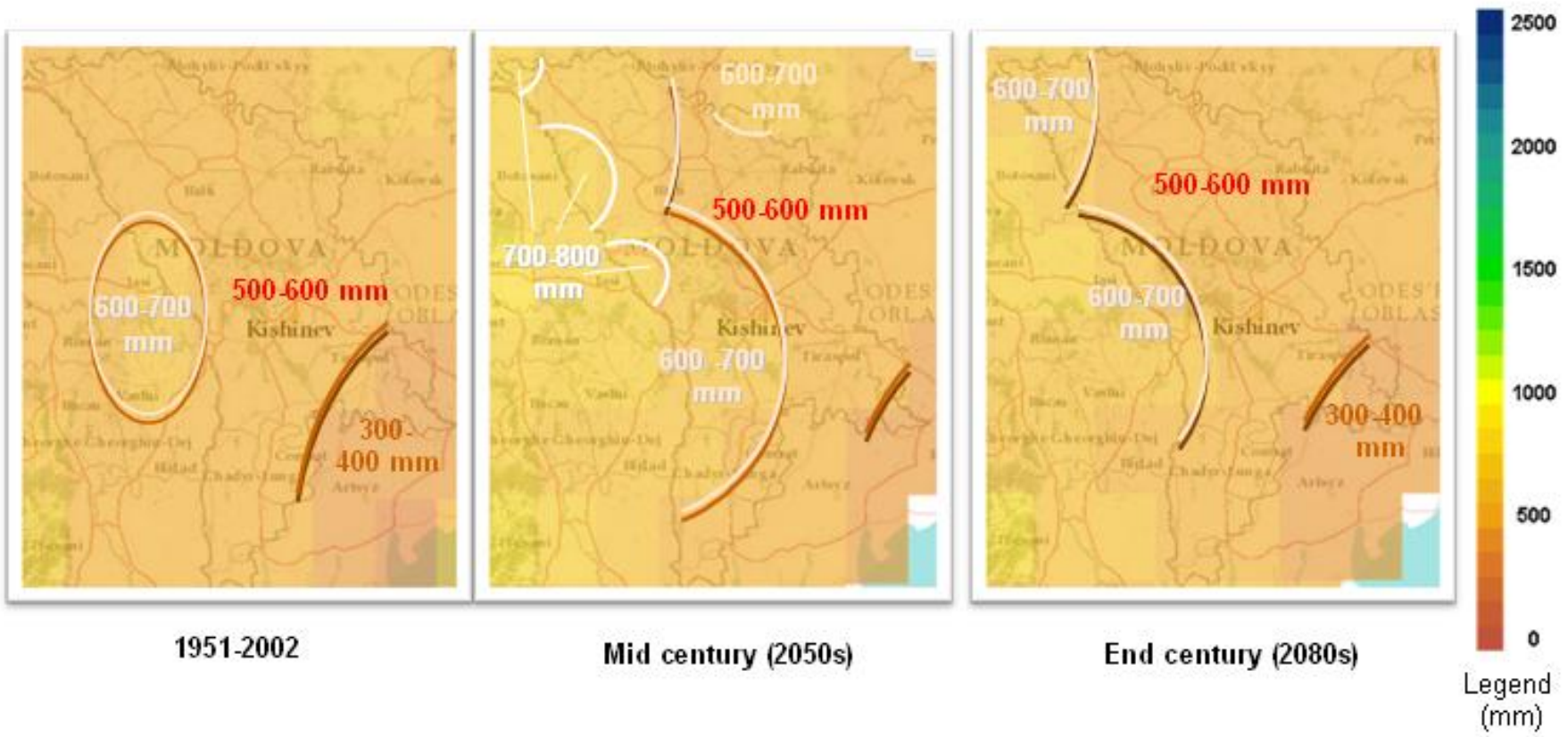


End century (2080s)



Source: www.climatewiz.org

Precipitation projections for Moldova



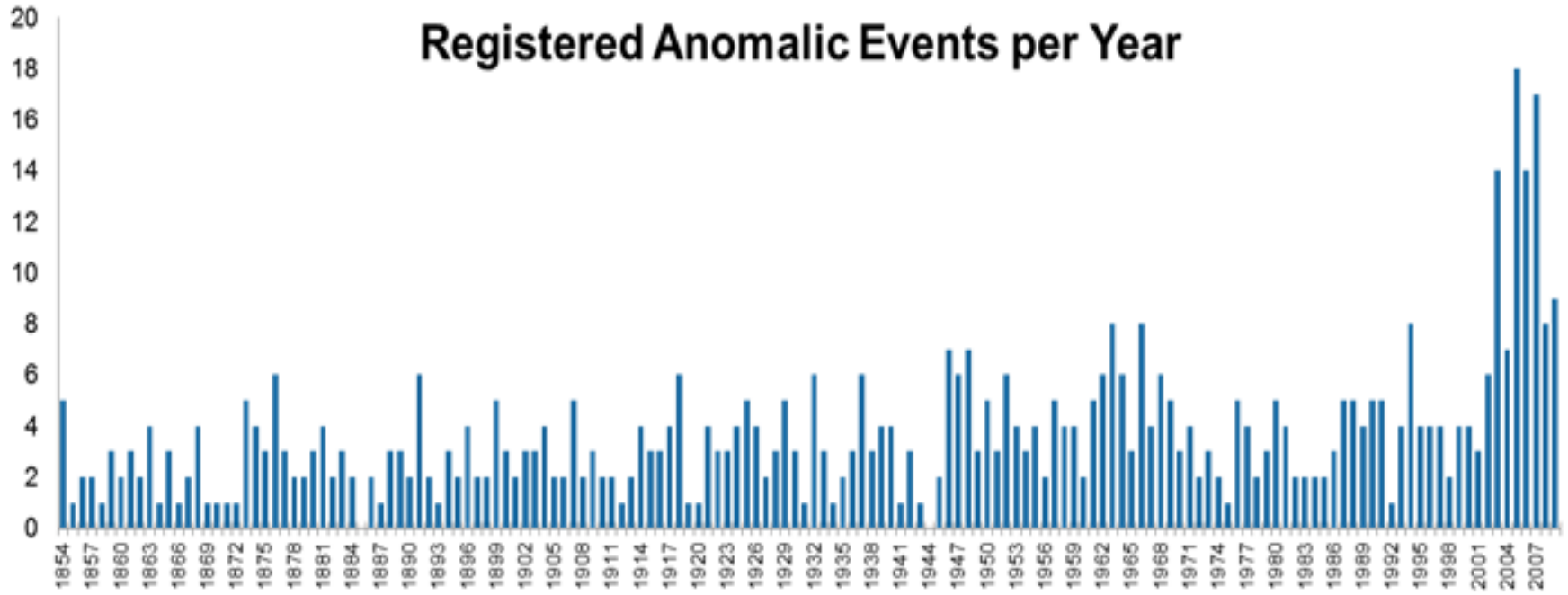
Source: www.climatewiz.org

Disaster matrix by ECA countries

Country	Flood	Land slides	Drought	Extreme temperature	Wind storm	Wild fire	Wave / surge
Albania	X	X	X	X	X	X	
Armenia	X	X	X		X		
Azerbaijan	X	X	X				
Belarus	X			X	X		
Bosnia and Herzegovina	X	X	X		X	X	
Bulgaria	X	X	X	X	X	X	
Croatia	X		X	X	X	X	
Czech Republic	X	X		X	X		
Estonia	X	X		X	X		
FY Republic of Macedonia	X	X	X	X	X	X	
Georgia	X	X	X		X		
Hungary	X		X	X	X		
Kazakhstan	X	X		X	X	X	
Kyrgyz Republic	X	X		X	X		
Latvia	X			X	X		
Lithuania	X		X	X	X		
Moldova	X	X	X	X	X		
Poland	X			X	X	X	
Romania	X	X	X	X	X		
Russian Federation	X	X	X	X	X	X	X
Serbia	X			X	X	X	
Slovak Republic	X			X	X	X	
Montenegro	X			X	X	X	
Slovenia	X	X		X			
Tajikistan	X	X	X		X		
Turkey	X	X		X	X	X	
Turkmenistan	X						
Ukraine	X	X		X	X		
Uzbekistan	X	X	X				

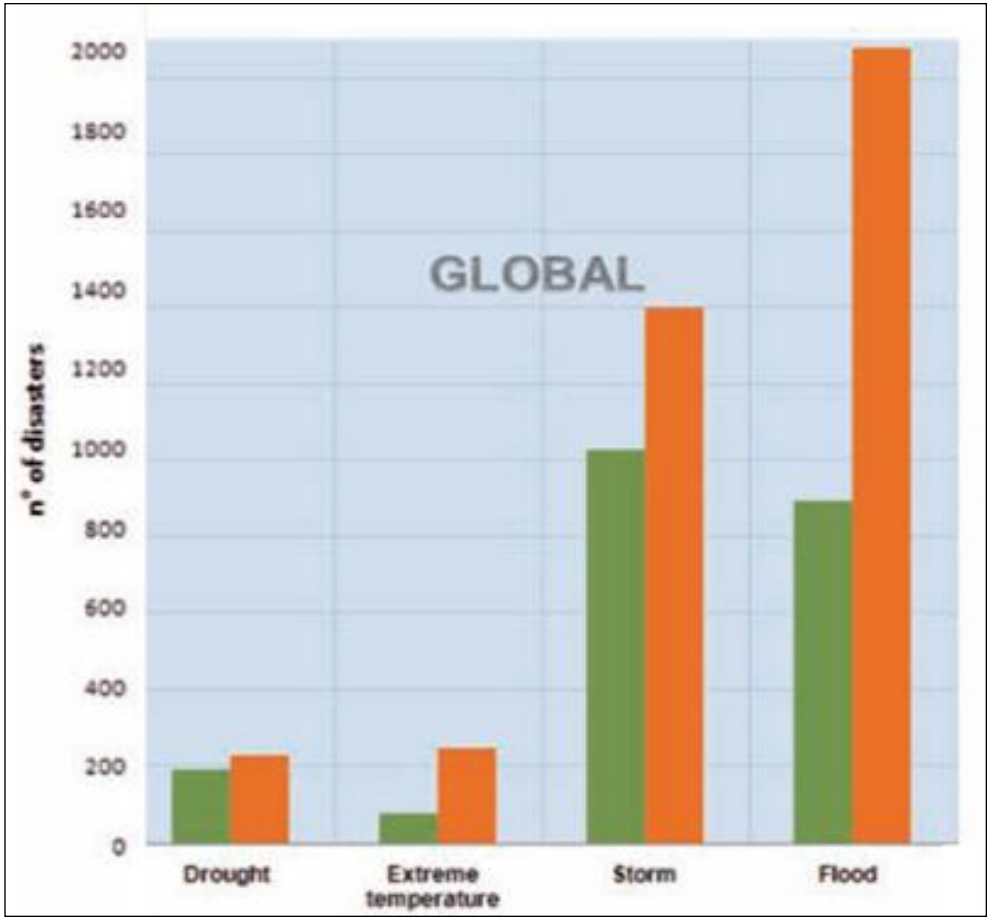
Quelle: *EM-DAT 2008 and Pusch "Preventable Losses: Saving Lives and Property through Hazard Risk Management"; 2004.*

Extreme events in Moldova



Source: Analyze by Inessa Galitschi based on data of Chisinau meteorological station

Trends in extreme events in the World



- Increasing trend of the extreme events on Global level. The most frequent are floods and windstorms. Their frequency has shown a striking worldwide increasing trend in the last two decades.

- A 2008 European Environment Agency (EEA) report also shows that the average number of annual disastrous weather- and climate-related events in Europe increased by about 65% between 1998 and 2007.

Number of extreme weather disaster globally, 1980-1994 and 1995-2008.

Source: EM-DAT, 2009.

Water sources and water supply in Moldova

- **Surface water**
  - Rivers as Dniester, Pruth other smaller rivers and springs
  - 35% of the population use it as source for potable water
- **Sub-surface water**
  - Wells/springs (112.000) and artesian wells (3.000)
  - 65% of the population use it as source for potable water
  - Main source for 100% of rural and 30% of urban population
- **Centralized water supply systems**
  - All towns and municipalities
  - 65% of rural settlements
  - 50% of the centralized systems in satisfactory condition
- **44%** of Moldova's population **does not have access** to safe drinking water

Source: National Adaptation Strategy for the Republic of Moldova, UNDP, draft 2011 and Second National Communication, 2009

Major natural desaster in Moldova

Major natural disasters in Moldova, 1994-2010

Year	Disaster	Affected people	Estimated Damages ($'000)
August 1994	Flood	25.000	300.000
November 1994	Storm	25.580	
July 1997	Flood	2.244	50.000
March 1999	Flood	1.713	4.000
May 2000	Drought		
November 2000	Storm	2.600.000	31.600
June 2002	Flood	500	832
August 2005	Flood	6.500	7.752
January 2006	Extreme temperature		
2007	Drought	210.394	406.000
July 2008	Flood	4,000	

Source: EM-DAT[1]

Example shallow wells during the drought 2007

Settlements	Rayons	Number of existing shallow wells	Number of completely dried up wells	% of impacted of drought shallow wells
Bocancea Schit	Singerei	7 колодцев	7	100%
Cioropcani	Унгень	189	60	32%
Copanca	Causeni	35	35	100%.
Onitcani	Criuleni	14	14	100%.
Bulhac	Riscani	31	15	48,4%
Dolinnoe	Criuleni	100	78	78%
Tirnova	Donduseni	493	251	51%
Tintareni	Anenii Noi	110	110	100%
Scorteni	Telenesti	129	119	92%
Mirnoe	Taraclia	15	12	80%
Ecaterinovca	Cimislia	37	30	81%
Ghindesti	Floresti	85	70	82%
Costesti	Ialoveni	420	270	64%

- The maximum temperature in the summer of 2007 reached 41.5°C (21 July 2007)
- In the summer of 2007 the number of days with maximum air temperature of 30°C 3-4 times higher than in average.
- Significant deficit of precipitation.
- A similar regime of temperature and precipitation was observed in year 1946.

Source: Feasibility Study, Techno consulting&design SRL, contractor of WB PIU

Climate change and implication for Moldova's water sector

- **Effects of climate change**
  - Growth of precipitation
  - Extreme events (e.g. floods/droughts)
  - Surface water will be diminished by 16-20% already in the 2020s (NHDR 2009/10)
  - 16% of water resources are withdrawn (70% in 1990)

- **Implications** (as generally described before)
  - Quantity of water, accessibility
  - Quality of water, health impact
  - Water service

Status of utilities in Moldova

- **Low revenues and high investment needs**
  - No cost-recovery
  - Underinvestment
- **Inefficient systems**
  - Oversized systems
  - Overstaffed utilities vs. lack of experts
  - Technical condition (losses, energy consumption etc.)
  - Service quality
- **Decentralization of systems**
  - Not sufficiently prepared operators
- **Resistance to reforms**
  - Outstanding legal reforms (e.g. allowing new business models, PSP etc.)
  - Strategies and implementation plans partly missing

Potential adaptation measures (1)

- **Flood/drought control**
  - Adapt dam/dyke management plan (meteorologically steered), to cut peak runoffs and to balance low runoff with peak demand.
  - Adapt dam/dyke maintenance (avoid bursting of existing dams and thereby floods)
  - Develop flood management plans (new dams, determine flooding areas...)
  - Collection and use of rain water
  - Controlled infiltration of rain water (reduce runoff)
- **Introduce integrated water management**
  - Consideration of all types of users (agriculture, industry, domestic...)
  - Coordination among all users
  - Develop a water resource management plan for MD based on climate projection
- **Protection of water resources**
  - Land use management
  - Land-surface management (forestation)

Potential adaptation measures (2)

- **Adaptation of infrastructure**
  - Adapt planning guidelines to climate projection (e.g. capacities of treatment plants...)
  - Protection of plants from floods
  - Avoid constructions in steep slops (land slides and damage of WSS systems)
  - Efficient water use (minimizing water losses)
  - Improved maintanance of infrastructure
  - Improve change water treatment processes
- **Demand management**
  - Loss reduction
  - Water metering, billing systems
- Increase generally too low **sanitation coverage**, reformulation of action plans, using low-cost technologies
- Develop **emergency plans**
  - How to act in case of problems
  - Emergency supply for population

Issues to be investigated/analyzed, data to be collected

To assess **how much WSS is exposed to climate change** the following correlations will be investigated and the respective data collected and analyzed:

- Precipitation – River runoff/ground water levels
- River runoff/ground water levels – water quality (analysis of floods and droughts)
- River runoff – ground water level (assumption of impact, recharge rate)
- Temperature – runoff/ground water tables, water quality
- Health-data on water borne diseases – correlation with extreme events (floods, droughts), runoffs and water quality

Data is specified – provision requested from the MEnv

D. Task 2: Analyse selected adaptation measures and propose a feasible adaptation strategy

Task 2: Analyse selected adaptation measures and propose a feasible adaptation strategy

ToR requirements and proposed actions

- further analyse selected adaptation measures from the reference scenario
- develop a financially sustainable adaptation strategy for the water supply and sanitation sector with focus a on:
- inventory of the preferred adaptation measures costs
- inventory of the possible sources of finance

A Policy Dialogue meeting/conference to discuss scenario(s) and policy responses/adaptation strategy

Analyse selected adaptation measures from the reference scenario

- Reference scenario is developed during Task 1
- Task 2 builds on Task 1 through the analysis of the selected adaptation measures (for WSS Sector) from the reference scenario recommended in Task 1.
- This will entail the preparation of cost estimates for the preferred adaptation measures (for the WSS Sector), including:
  - Capital, operating and maintenance costs of proposed facilities, and infrastructure. The magnitude of the costs will be presented. They will also be presented in chronological order, as dictated by priority, including all years of implementation of operation. Finally, recurring capital and operating and maintenance costs will be presented, since some investments will need to occur more than once in order to be effective
  - Cost of non-investment projects - technical assistance and capacity development, public relations and education, as well as scientific projects will be identified and costed.

Develop financially sustainable adaptation strategy for WSS sector

- Based upon the Reference Scenario developed in Task 1, the strategy will focus on:
  - minimising the negative effects of climate related risks on WSS, economy, environment, and well-being and health of Moldova's population, with minimum cost.
  - improve the environmental quality of the Dniester and Prut rivers downstream (and hence the environmental quality of the Black Sea).
- Review of Second National Communication Moldova and other reports.
- Review win-win capital investment projects in the mid-term Investment plan (OECD, 2011)

Inventory of the costs of preferred adaptation measures

- Inventory of the preferred adaptation measures costs; cost categories (capital, operation and maintenance) and characteristics (order of magnitude, recurrence, time line)
- These costs will be used to assess the financial feasibility and sustainability.

Inventory of possible sources of finance

- In order to complete a full assessment, in addition to the costs of preferred adaptation measures, an inventory of the possible sources of finance will be prepared.
- Three ultimate sources of finance will be considered: revenues from user tariffs, taxes and public budgets, and transfers from international cooperation (3Ts).
- The strategy will consider alternative tariff structures and levels (taking account of affordability constraints), develop a rationale for accessing national budgetary funds and other domestic sources of finance, and explore opportunities to access climate-related and other international sources of finance.

E. Task 3: Develop a viable business model for rural sanitation

Task 3: Develop a viable business model for rural sanitation

ToR requirements and proposed actions

- Propose a sustainable business model for operation, maintenance and financing of sanitation systems in small towns and rural settlements in Moldova outside the service area of existing water utilities (apacanals) not covered by the regionalisation project with focus on:
  - options as small private operators servicing several neighbouring villages, inter-municipal cooperation to operate sanitation (or WSS) systems, etc.
  - consideration of alternative technologies, organisations (e.g. to generate economies of scope and scale and/or to address the capacity gap), or revenue streams.
- Adaptation needs in the context of climate change will be factored in.
- Attention will be paid to the drivers for reform and capacity needs.
- Conduct a reality check of proposed alternative models with mayors/heads of local communities in 2-3 selected localities (rayons, or clusters of neighbouring settlements)
- Discuss alternative options at a policy conference in Moldova

Actions performed and plans for the next months (1)

Actions already performed:

- The current situation was reviewed from interviews and existing reports (UNDP, ApaSan, GIZ[1)] reports, information on EBRD financed project, EU Policy Support Program Inception Report);
- The Action Plan 2010-2015 For the implementation of the WSS Sector Strategy and policies in the water supply and sanitation sector in the Republic of Moldova prepared under OECD support also contains several actions related to the problem, namely:
  - A-0.3.4: Identify and promote sustainable business models in the WSS sector.
  - A-1.1.1 Conduct study on regionalization of WSS Sector
  - plus some win-win capital investment projects
- Existing business models and their usefulness for inter-communal co-operation were reviewed;
- Studies on business models existing in other countries were launched;
- Initial interest is shown by some municipalities in Cahul Rayon to co-operate in deeper analysis and testing the applicability of the proposed models.

1) project “Modernization of Local Public Services in the Republic of Moldova”

Actions performed and plans for the next months (2)

Plans for next month:

- Complete studies on business models existing in WSS in other countries;
- Prepare report summarizing the review of current business models, existing constraints and lessons from other countries;
- Visit 3-4 interested municipalities to present initial findings, launch discussion among Mayors (bilateral or in the formal of Round table discussion);

Existing business models and their usefulness for inter-communal cooperation (1)

Based on interviews, experience of local consultants and reviewed reports, several business models existing in Moldova have been identified for providing water and wastewater services. The following business models exist in Moldova and their usefulness for the inter-communal cooperation is presented below:

Business model	Usefulness for inter-communal cooperation
State enterprise	Example: Apa Nord Due to its nature, not useful for inter-communal cooperation
Municipal enterprise	This a basic model used for providing water and wastewater services. No space for inter-communal co-operation. No corporate governance is applied in this model.

Existing business models and their usefulness for inter-communal cooperation (2)

Business model	Usefulness for inter-communal cooperation
Joint stock company (S.A.)	Examples: Chişinău, Florești , Hînceşti. In all cases 100% of shares are owned by one municipality. Since they could be owned by more than one, this model is useful for inter-communal cooperation
Limited Liability Companies (S.R.L.)	Similar to S.A. and existing in some towns and localities. Since such a company could go bankrupt, usually this model is used for private owners of water infrastructure. Thus, the usefulness for inter-communal cooperation is limited. Could be used in combination with concession.

Existing business models and its usefulness for inter-communal cooperation (3)

Business model	Usefulness for inter-communal cooperation
Individual enterprise (physical person)	Used when a physical person provides services. Could be used in combination with concession.
Associations of Water Consumers (co-operatives)	Used for organizing population to address water supply problems. Model was tested by ApaSan under SDC support and has limited use (lessons learned from ApaSan efforts) narrowed to one municipality.

Alternative business models (1)

The acute need for a sustainable business model for sanitation:

- most of rural WWTPs built before 1992 are not operational;
- need to build on spot sanitation for at least public buildings in rural areas (e.g. schools)
- need to build sewerage system in villages with piped water consumption over 90-110 lcd

Alternative business models used in other countries in Europe that are potentially applicable in Moldova have been identified:

Approach towards creating **municipal associations and regional operators (including PSP)**: Austria, France, Romania, Poland and other countries;

- Usefulness for situation in Moldova: The problem is the lack of regulation in Moldova regarding single-purpose (or multiple-purpose) inter-municipal associations.
- Existing associations are organized towards representative and lobbying functions and act rather as NGOs
- While in the sample countries mentioned above, inter-municipal associations are treated as (and have the legal basis of) a local government and local government task and duties can be transferred to the association.

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Alternative business models (2)

Approach towards **establishing a common PIU** (Project Implementation Unit) to manage investment projects and provide some services (laboratory, design, consulting and similar services, benchmarking, GIS/hydraulic modeling and leakage detection) for members: Montenegro, Poland

- Usefulness for situation in Moldova: This approach is theoretically possible in Moldova, however requires sustainable funding for the PIU. It could be tested when a larger investment project is implemented.

Concession

- There are limited examples of concession models in Moldova and this approach requires development of local government capacity to prepare good concession contracts. The model could be used if it is attractive to the potential private operator (not always the case).

Prerequisites for inter-communal co-operation (1)

The following prerequisites have been identified for inter-communal co-operation:

- Existing plans for capital investments, especially co-financed from grants, which cover neighboring localities;
- Or at least from some studies (for example, pre-feasibility study) it is evident that there will be a need to develop a water or wastewater network (or related infrastructure) which will cover more than one locality/municipality:
  - Water at source (water wells, artesian wells) in some localities is of poor quality and cannot be treated at a reasonable cost;
  - There is no suitable space for water supply or WWTP facilities (and treated wastewater discharge) in some localities;
  - The (pre-)feasibility study or similar document presents the economic inefficiency of small water supply or wastewater facilities – there is a need to present real numbers, not a general principle of economies of scale;

Prerequisites for inter-communal co-operation (2)

- Possible, the use of over-capacity of existing infrastructure in some localities (however this situation often applies for a town being a rayon center, which means that co-operation between town and rural municipalities has to be established);
- Service standards are imposed on all service providers, thus they need to conduct testing, establish or sub-contract a laboratory, do chlorination/flushing of the network. Then small localities will find that they are not able to preform services when working separately, as this would be too expensive;

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