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## CLIMATE CHANGE ADAPTATION AND RIVER BASIN MANAGEMENT IN THE DNIESTER

### Report of project meetings in Chisinau, Republic of Moldova 9-10 July 2013

#### Executive summary

On 10 July 2013 the launch event for the project “Climate change and security in the Dniester river basin” took place in Chisinau, Moldova. The launch was preceded by consultations with Moldova’s sectors and regions on Dniester climate change issues and priorities for adaptation; and followed by the seventh meeting of the Working Group on Flood Management and Climate Change Adaptation in the Dniester basin,

Consultations with the representatives of a wide range of sectors, agencies and areas in the Moldovan part of the Dniester basin on 9 July focused on the sectoral and subnational perspectives of adaptation to climate change. During interactive group exercises the participants jointly outlined vulnerable areas and sectors in the basin as well as discussed the prioritization of adaptation measures.

During the launch event for the new EU Instrument for Stability/ADA-funded project “Climate Change and Security in the Dniester River Basin” the representatives of national authorities, international and donor organisations welcomed the project, reflected on its plans and anticipated results, and got acquainted with the results of the ENVSEC’s preceding project “Reducing vulnerability to extreme floods and climate change in the Dniester river basin”. Representatives of Moldova’s mass media participated in the launch event and provided a significant media coverage of the discussion.

The Working Group on Flood Management and Climate Change Adaptation on 10 July discussed the project organisation and the substantive issues including the Concept of the strategic framework for adaptation to climate change in the Dniester basin and the initial prioritization of adaptation measures. The recent results of the preceding project (including the automated flow monitoring on the upper Dniester, flood risk modelling in the Dniester Delta area, and activities within the component on flood risk communication) were discussed in a greater detail. Parallel ongoing activities related to the adaptation to climate change, i.a. those implemented by UNDP, OECD, Eco-TIRAS and BIOTICA, were presented with a view of ensuring coordination and synergies.

The details of the meetings and discussions follow, the list of participants and meeting agendas can be found in Annexes 1 and 2.

## **Consultations with Moldova's sectoral and regional agencies and organisations on the elements of the Dniester basin strategic framework for adaptation**

9 July 2013

### **Opening**

Ms. Sonja Koeppel (UNECE) welcomed the participants and informed them about the objectives of the workshop.

### **Vulnerability of the Dniester river basin and adaptation measures**

Mr. Roman Corobov (Eco-TIRAS) gave an overview of the expected climate change impacts, vulnerabilities and possible adaptation measures in the Dniester basin. Ms. Hanna Plotnykova (OSCE) presented the results of stakeholder consultations held on 13-14 December 2012 in Kyiv, Ukraine which had helped to identify priority risks from climate change for water management and water-related sectors in the Dniester river basin as well as priority adaptation measures from Ukraine's perspective. The main climate change impacts and vulnerable water-related sectors as discussed in Kyiv are illustrated in a table and a graphical format used for the discussions (Annex 3), both consequently revised based on a discussion in Chisinau (please see below)..

Mr. Nickolai Denisov (Zoi environment network) presented a Concept of the strategic framework for adaptation in the Dniester basin. The framework considers the basin as a transboundary interconnected system and aims at helping coordinate the different plans of adaptation and integrated water management related to the Dniester (Annex 6). Once developed, the strategic framework will address the impacts of and vulnerability to climate change, suggest measures and priorities for adaptation and analyze potential funding implications and mechanisms.

### **Climate change adaptation strategies: international experience**

Mr. J. R. Olsen (Alliance for Global Water Adaptation, AGWA and US Army Corps of Engineers) presented AGWA's decision-support tool as well as the experience of AGWA in integrating climate adaptation into water management decisions. He provided two specific examples related to the management of the International Upper Great Lakes and the Coralville Reservoir under conditions of climate change and variability.

### **Moldova's policy and institutional framework in climate change adaptation**

Ms. Lilia Taranu (Climate Change Office of Moldova) presented Moldova's draft climate change adaptation strategy together with a list of planned activities and the implementation costs. The strategy aims to "*establish a strong enabling environment and clear direction for an effective and coherent climate change adaptation process to take place across all relevant sectors of the national economy*". The development of the strategy and some follow-up steps such as the development of adaptation plans is supported by UNDP with funding from the Austrian Development Agency. The EU-funded project "Support to Climate Change Mitigation and Adaptation in Russia and ENP Countries" (Clima East) will support the process by integrating adaptation into policies of different sectors and increasing adaptation capacity of the country. One of the recommendations of the Moldovan adaptation strategy is the establishment of an Emergency Centre between Moldova and Ukraine.

### **Development and implementation of the national plan of adaptation to climate change in Ukraine**

Ms. Iryna Trofimova informed that the 3<sup>rd</sup> edition of the National Adaptation Plan for Ukraine was in the process of development. The results of the previous plan of priority adaptation measures for 2012 were analysed in summer 2013. The activities in the plan focused on the establishment of the organizational and scientific background for development of the state adaptation policy, and included the development of methodological guidelines on adaptation on the regional level, research on analysis of climate change (temperature, precipitation and extreme events) and its impacts on water resources, agriculture and energy. The Ukrainian government was also organizing stakeholder workshops on the development of regional adaptation plans<sup>1</sup>.

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<sup>1</sup> Results of the workshops can be found at <http://www.seia.gov.ua/seia/control/main/uk/doccatalog/list?currDir=633566>. Further workshops on the development of adaptation plans for the selected oblasts are planned for September-October 2013 (<http://www.seia.gov.ua/seia/control/main/uk/publish/article/635525;jsessionid=014EEF855054D78294D57AF996AB9BB0.vapp12:1>).

Ms. Trofimova informed that there was currently no overall donor funding for the Ukrainian adaptation strategy and that each agency involved in adaptation will search for its own funding sources. Adaptation activities in Ukraine will be also supported by the Clima East Project in the areas of mitigating impacts of climate change on transportation, energy, agriculture and forest sectors; elaboration of relevant legislation in accordance with EU standards; and sharing practical and scientific experience. Ms. Iryna Trofimova concluded by highlighting the importance of including the outcomes of the Dniester project into the national adaptation plan in order to ensure their implementation.

### **Prioritization of climate change impacts and development of adaptation measures for different levels, locations and sectors in Moldova: group discussion**

Split into four groups, the participants discussed the major vulnerabilities in the basin as well as potential adaptation measures. The results of the discussion are presented in Annex 4, where the tabular and graphical summaries of the vulnerability study and the consultations in Kyiv in December 2012 are updated based on the discussion in Chisinau. On the institutional level it was concluded that resolving the issues will require a stronger cooperation between the various state agencies (e.g. the Emergency Service and Apelle Moldovei) as well as with the civil society. The Transnistrian region of Moldova should be involved too.

### **Launch of the new project “Climate Change and Security in the Dniester River Basin” 10 July 2013**

During the launch event representatives of national authorities (Mr. Lazar Chirica, Deputy Minister of Environment of the Republic of Moldova; Mr. Anatoliy Prokopenko, Ukrainian Hydrometeorological Centre and Mr. Valeriy Babchuk, State Agency of Water Resources of Ukraine), international organisations (Amb. Jennifer Leigh Brush, OSCE Mission to Moldova; Amb. Madina Jarbussynova, OSCE Project Coordinator in Ukraine; Nicola Harrington-Buhay, UN Resident Coordinator in Moldova) and the representatives of the donor Governments and organisations (Henno Putnik, EU Delegation to the Republic of Moldova and Gerhard Schaumberger, Austrian Development Agency) welcomed the new EU-/ADA-funded project “Climate Change and Security in the Dniester River Basin”.

The launch event was moderated by Mr. Leonid Kalashnyk (OSCE).

Mr. Gherman Bejenaru (State Hydrometeorological Service of the Republic of Moldova) and Mr. Valeriy Babchuk presented the results of the previous project “Reducing vulnerability to extreme floods and climate change in the Dniester river basin”.

Mr. Sonja Koeppel (UNECE) described planned activities within the new project.

Representatives of mass media participated in launch event which led to extensive media coverage (please see Annex 5).

## **Seventh meeting of the Working Group on Flood Management and Climate Change Adaptation**

10 July 2013

### **Introduction and reconfirmation of nominations to the Working Group**

The relevant authorities of Moldova and Ukraine (Ministries of the Environment, Water Agencies, Hydrometeorological Services) were asked to provide new nominations for the transboundary working group of the project. Mr. Lazar Chirica, Deputy Minister of the Environment, Moldova emphasized that a national project working group comprising both officials and experts should be established.

### **Development of a strategic framework for basin adaptation for the Dniester basin**

Mr. Nickolai Denisov (Zoi environment network) reiterated the earlier presented Concept of the strategic framework for adaptation to climate change in the Dniester river basin (Annex 6). In the discussion that followed, ECO-TIRAS shared its opinion that the strategic framework should be based on the ecosystem management approach and that a transboundary perspective should be a priority both for the framework and for the project in general. Ms. Maria Nagornii, Moldova's Ministry of the Environment, emphasized that the framework should be consistent with national legislation developments in the relevant fields. Mr. Yurii Nabivanets, Ukraine's Hydrometeorological Institute, observed that sectoral consultations in Moldova and Ukraine showed that the majority of participants agreed with general directions in adaptation to climate change in the Dniester river basin, whereas the further focus of the project should be the prioritization of activities towards their practical implementation. Ms. Viktoria Boyko, Ukrainian Hydrometeorological Centre, stated that one of the priorities for the new project should be the continuation of automating flow monitoring in the basin to ensure the early warning about flood risks, and the establishment of the web platform for the interagency and inter-state data exchange. Mr. Lazar Chirica also supported the afore-mentioned suggestion and added that water-level monitoring should be complemented by capacities for in-situ measurement of the river flow, particularly important during flash floods (e.g. in Palanca). Mr. Gherman Bejenaru, State Hydrometeorological Service of Moldova, suggested that information exchange should include data from tributaries. Mr. Gennadiy Syrodoev, Institute of Ecology and Geography of Moldova, proposed that the Dniester GIS can be used for data exchange purposes. Ms. Sonja Koeppel invited the participants to submit to the project coordinator by the end of August 2013 their further concrete suggestions for the content of the strategic framework as well as for practical adaptation measures to be included and implemented within the project.

### **Cooperation with other international and national projects and activities**

#### *UNDP climate change related projects in Moldova*

Ms. Nadja Vettters (UNDP) informed the meeting about UNDP's projects in Moldova such as on disaster risk reduction, focused on regional and local risk management, early warning, emergency response (e.g. reacting to events similar to the drought in 2012) and sustaining lives. With funding from ADA UNDP plans to further support the adaptation process in Moldova including the activities of the National Climate Office, the preparation of the National adaptation plan as well as capacity-building for policy-makers and practitioners. UNDP has contributed to the establishment of the first in Moldova Orhei National Park which will support community development and the protection of natural resources. In addition UNDP is involved in EU's Clima East project, and plans to revitalize the inter-governmental working group on the development of an adaptation strategy. In the discussion, the Working Group on Flood Management and Climate Change Adaptation underlined that coordination between different projects is crucial for achieving fruitful results.

#### *ECO-TIRAS climate change projects*

Mr. Ilya Trombitskyi informed the meeting about the Black Sea Trust project on transboundary cooperation and climate change adaptation which includes public awareness, cooperation between the NGO and the scientific communities, the publication of the book "Climate change adaptation policies", and the development of recommendations to adapt to climate change and reduce flood risks. In another project funded by Finland, ECO-TIRAS is assessing in much greater detail climate change vulnerability in the Moldovan part of the Dniester River basin (including Transnistria) and elaborating adaptation measures. The results of the project will include a scientific monograph and a stakeholder workshop. Although this project is focused only on the Moldovan part, it will use the results of the project "Reducing vulnerability to extreme floods and climate change in the Dniester river basin" and its findings will be useful for the EU-ADA-funded activities. Eco-TIRAS has also started activities on transferring experience in integrated water

management to the Republic of Belarus, focusing on the establishment of an NGO network similar to Eco-TIRAS and organizing a conference on climate change.

#### *Transition to High-value Agriculture*

Mr. Gary Merkley, Mott Mac Donald, informed the meeting about the project “Transition to High-value Agriculture”/ Irrigation Sector Reform Project funded by the Millennium Challenge Corporation of the United States. The project foresees two main directions, namely irrigation and river basin management development, and includes several components such as the improvement of legislation, the creation of three common platforms for decision-support, training, hydrological surveys, the establishment of the Dniester basin district committee in Moldova and the development of the Dniester basin district management plan. In addition, 11 locations were selected for the improvement of irrigation (6 of which are located along the Dniester). The Working group inquired if there would be opportunities to share project-derived data among Moldova’s organizations, and some participants suggested including Transnistria into the irrigation component since there were no selected irrigation sites in that region.

#### *BIOTICA*

Mr. Alexei Andreev informed the meeting about the project implemented by BIOTICA which aims to introduce water and ecosystems management in the Ramsar site “Lower Dniester” as a model for maintaining a wetland of international importance and improving the local water supply. The project foresees the regulation of water regime in the Talmazy wetland area; the background study for the first regulated fish nursery at lake Turunchuk; the amelioration of river banks and related public awareness; the establishment of NATURA-2000 sites in Transnistria; raising public awareness about national and international legislation; and the improvement of water supply in Talmazy village of Moldova.

### **Flood management activities: monitoring, information and communication**

#### *Automated flow monitoring on the upper Dniester*

Mr. Stanislav Solonika, Dniester-Prut Basin Management Authority, Ukraine, presented the progress of automating flow monitoring in the upper Dniester, focusing on the newly established posts on at Zalischyky and Halych on the upper Dniester. The posts were installed in December 2012 in the framework of the project “Reducing vulnerability to extreme floods and climate change” and had been working in test mode by the time of the meeting. The working group indicated the need for further work on automating the monitoring, i.e. increasing the number of automated posts. Where such posts are located close to the existing meteorological stations, the two should be connected to improve the forecasting of extreme events. The Dniester-Prut Basin Management Authority uses the obtained data for the management of the water reservoirs and transfers data to relevant stakeholders for early warning. The data is also used by interdepartmental and intergovernmental groups which make decisions on flood protection. Moldovan representatives put forward in the discussion that for the time being the data reach Moldova late. The working group underlined the importance of universal and convenient access to data for the countries, organisations and project participants. It was also suggested to link the data from the current and future automated monitoring to the Dniester geoinformation system.

#### *Flood risk modelling in the Dniester Delta area*

Mr. Gherman Bejenaru informed the meeting about flood risk modelling in the Dniester Delta, where the relevant background data are being collected at the moment (i.a. overcoming such difficulties as the lack of topographic maps for a part of the study area). To-date a primary digital elevation model of 10-meter resolution was developed, accompanied by information on infrastructure and landcover. The next steps will include cross-section data survey to build the bathymetry of the river channel and the field verification of the height of protection dykes.

#### *Flood risk communication (assessment of status quo and preliminary findings, communication workshop, local plans)*

Mr. Vitaliy Mutaf, Emergency Service of Moldova’s Ministry of Interior, informed about the study of flood communication practices in the Dniester basin on the local, national and transboundary levels in Moldova and Ukraine. The workshop on the topic was held on 27-28 May 2013 in Lviv (Ukraine), where the participants discussed in-depth the current practices, needs and the relevant international experience, identified priority areas in the basin the most affected by floods and the least served with flood communication capacities, and developed priority measures for improving flood communication in the selected communities of the basin. In the discussion Mr. Yurii Nabivanets suggested that using the

experience from the Ukrainian part of the Tisza river basin in Ukraine may give additional ideas and inspiration.

#### *WMO activities*

WMO is developing a field demonstration project on transboundary flood management in the Dniester basin building on the previous project work by ENVSEC. The project foresees further modelling and mapping of extreme flood risks; fostering the real-time exchange of data and information, transboundary flood forecasting and early warning; and the promotion and strengthening of the use of flood information to enable basin authorities and population to effectively respond to flood risks at the different levels. If implemented, the project will be coordinated with the Working Group

#### **Conclusions**

The following conclusions have been made following the presentations and discussions:

- working group members who wish to do so will send to UNECE and OSCE comments on the draft Concept for the strategic framework for basin adaptation and potential adaptation measures to be implemented through the project by end of August 2013;.
- the Ministries of the Environment of Moldova and Ukraine will send their official nominations for the Working group to OSCE by end of August 2013;
- the terms of reference for local consultants will be developed in the second half of 2013, and such consultants will be recruited according to the rules of the recruiting international organizations;
- the draft framework for basin adaptation will be developed in the second half of 2013;
- the next meeting of the Working Group on Flood Management and Climate Change Adaptation will be held in December 2013 in Kiev, Ukraine.

## AGENDA

### CLIMATE CHANGE AND RIVER BASIN MANAGEMENT IN THE DNIESTER

#### Consultations with Moldova's sectoral and regional agencies and organisations on the elements of the Dniester basin strategic framework for adaptation

*Business Center «LeRoi», Chisinau, 29 Sfatul Tarii St.  
9 July 2013*

#### **09.30-10.00 Registration and coffee break**

#### **10.00 – 10.15: Item 1: Opening**

- Welcome and aims of the workshop (*S. Koepfel, UNECE*)

#### **10.15-11.15: Item 2: Vulnerability of the Dniester river basin and adaptation measures**

- Overview of Dniester basin expected climate change impacts and vulnerability, possible adaptation measures for the Dniester and modalities for their implementation (*R. Corobov, ECO-TIRAS*)
- Initial ideas and the results of stakeholder consultations in Ukraine (*H. Plotnykova, OSCE*)
- The draft concept of the strategic framework for adaptation (*N. Denisov, ENVSEC*)

#### **11.15 – 11.30 Coffee break**

#### **11.30 – 12.30 Climate change adaptation strategies: international experience**

*J. R. Olsen, Alliance for Global Water Adaptation and Institute for Water Resources  
U.S. Army Corps of Engineers*

#### **12.30-13.30 Lunch break**

#### **13.30 – 15.00: Item 3: Moldova's policy and institutional framework in climate change adaptation**

- Plans and developments in the Republic of Moldova: the Moldovan adaptation strategy (*L. Taranu, Climate Change office, Ministry of Environment, Republic of Moldova*)
- Development and implementation of national plan of adaptation to climate change in Ukraine (*I. Trofimova, State Environmental Investment Agency, Ukraine*)
- Roundtable of plans and activities in climate change impacts and adaptation by representatives of different regions and sectors

#### **15.00 – 15.20 Coffee break**

#### **15.20-17.00 Item 4: Prioritization of climate change impacts and development of adaptation measures for different levels, locations and sectors: group discussion**

#### **17.00-18.00 Conclusions**

Presentation of the results of discussion in groups and discussions of further plans and activities  
Closing of the workshop

#### **18.00-19.00 Dinner**

## **Seventh meeting of the Working Group on on Flood Management and Climate Change Adaptation**

10 July 2013

### **9.00-10.30: Launch event for the new project**

Opening words/ speeches by representatives of the two countries, international organizations and donors  
Presentation of the new project by UNECE representative  
Questions and answers

### **10.30-11.00 Coffee break and press conference**

### **11.00-11.15: Item 1: Formation of the group, introduction**

### **11.15-13.00: Item 2: Discussion of the new project: Development of a strategic framework for basin adaptation for the Dniester basin**

- Overall discussion of the new project
- Development of a strategic framework
- Elaboration of the implementation plan
- Implementation of some measures

### **13.00-14.00 Lunch break**

### **14.00-15.00: Item 3: Cooperation with other international and national projects and activities**

- Nadja Vettors: UNDP climate change related projects in Moldova
- Ilya Trombitsky: ECO-TIRAs climate change projects
- Gary Merkley, Millennium Challenge Corporation: Moldova Irrigation sector reform activity IRIGARE
- Alexej Andreev, BIOTICA: Lower Dniester wetlands projects

### **15.00-16.00: Item 4: Flood management activities: monitoring, information and communication**

- Automated flow monitoring on the upper Dniester (*S. Soloninka, Dniester-Prut Basin Board on Water Management and N. Denisov, UNEP / Zoi*)
- Flood risk modelling in the Dniester Delta area (*G. Bejenaru, State Hydrometeorological Service, and N. Denisov, UNEP / Zoi*)

### **16.00-16.20 Coffee break**

### **16.20-17.30: Item 4: Flood management activities: monitoring, information and communication (continuation)**

- Flood risk communication (assessment of status quo and preliminary findings, communication workshop, local plans) (*V. Mutaf, Service of Civil Defence and Emergency Situations and N. Denisov, UNEP / Zoi*)
- WMO activities
- Discussion

### **17.30-18.00: Item 5: Summary and closing**

### **19.00-22.00 – Dinner in the restaurant**



**LIST OF PARTICIPANTS**  
(in Russian)

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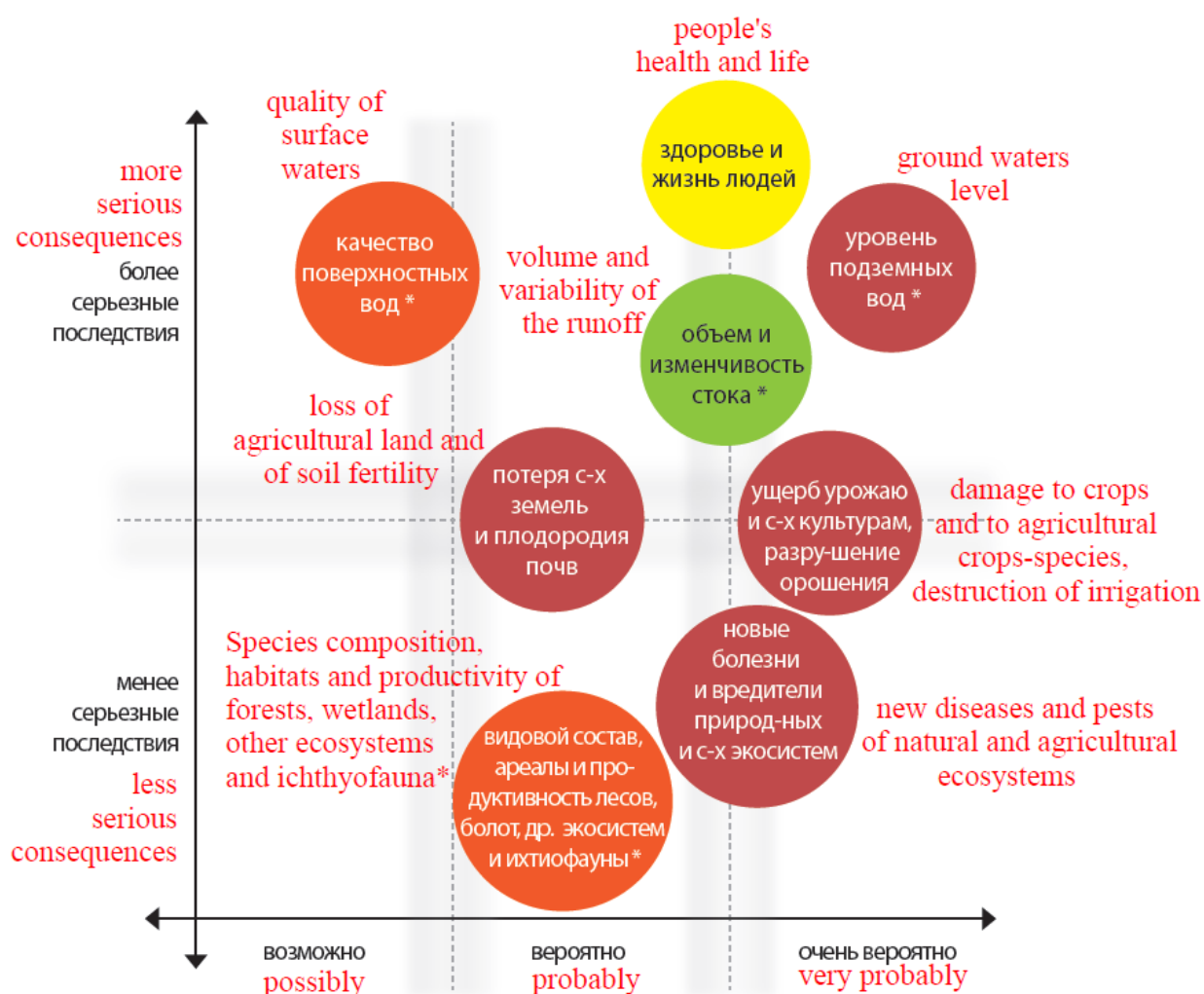
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**MAIN CLIMATE CHANGE IMPACTS AND VULNERABLE WATER-RELATED SECTORS**  
**Results of consultations in Kyiv, Ukraine, December 2012**



**Adaptation capacity**  
 Адаптационный потенциал:

- высокий high
- средний medium
- низкий low

\* в большей степени необходимы (согласованные) действия на бассейновом уровне

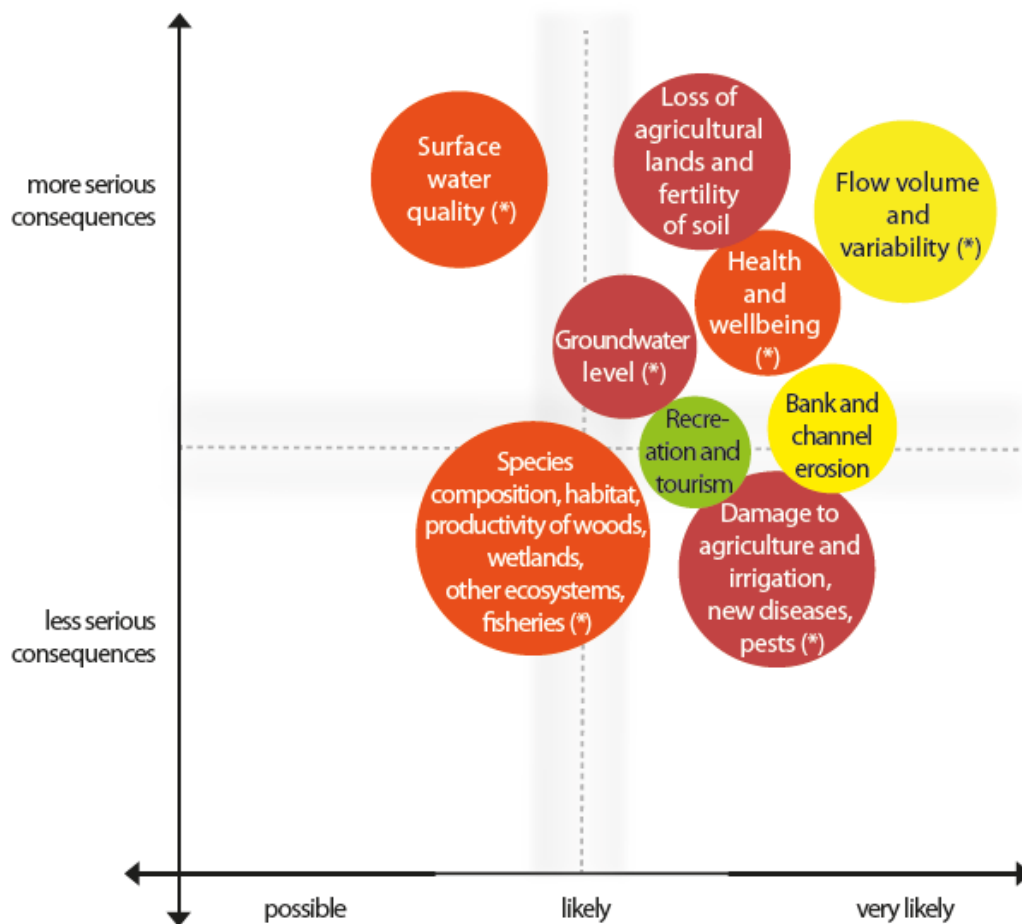
\* (concerted) actions are required to a greater extent at the basin level

<b>Resources, most vulnerable to climate change, in the basin of Dniester</b>		
<b>Resource, Sector</b>	<b>Risk characteristic</b>	<b>Adaptation capacity</b>
<i>Human Resources</i>	The obvious poverty of most people, especially in rural areas, and the increasing stratification of the society. Deteriorating demographic situation caused by a negative natural population growth and the "aging" of the society against the increase in morbidity and mortality Decline in the quality of education and its incompatibility with modern needs of society and, above all, of the economy. Risks to life associated with extreme events.	Partially retained by the one, accumulated in previous years. For its maintenance it is necessary to make radical revision of the existing social and economic policies of the states
<i>Water Resources</i>	<i>High probability</i> of exposure to the consequences of climate change and variability, "the river is a product of climate." <i>The apparent</i> increasing of the mode <i>variability</i> and volumes of the Dniester runoff, especially in its middle and lower parts, which makes difficult its estimation and forecast; Disastrous ecological state of small rivers, often on the verge of extinction, reducing their contribution to the resources. Deterioration of surface water quality due to the temperature increase, decrease in runoff, anthropogenic pollution. <i>Very probable</i> continuation of the ground waters level decline due to the increase of the climate aridity, their intensive use and lack of adequate volumes and quality monitoring.	Quite sufficient, with the anticipated saving or 15% runoff growth in the case of the increasing of the water bodies number, with a competent runoff control by the reservoir and with a rigorous providing of the irreducible environmental runoff. Coordination between the water consumption and the presence of water resources.
<i>Forest Resources</i>	<i>The probable</i> change in the species composition and the change in the altitude limits of timber species (Carpathians), the disappearance of some water-loving species in the middle and lower parts of the Dniester. <i>A very probable</i> emergence of new diseases and pests. Ongoing unauthorized felling, often caused by high level of poverty.	<i>Carpathians</i> : Quite sufficient in the absence of human intervention. <i>Lower and Middle Dniester</i> : low, requires intensive afforestation.
<i>Ecosystems and wetlands</i>	<i>A very probable</i> decrease of biodiversity; replacement of primary successions and species with little productive secondary ones. <i>A very probable</i> reduction of the habitat of indigenous species due to habit area drying, water quality deterioration at higher temperatures and invasive of alien species. <i>A probable</i> shortfall of the runoff income in its distribution in the interests of a certain water user	Low, is now essentially reduced to autonomous adaptation.
<i>Ichthyofauna</i>	Reduction of the species composition and the increase of introduced species	Low, especially in low-lying downstream areas
<b>Economic sectors most vulnerable to climate change</b>		
<i>Agriculture</i>	<i>A very probable</i> increase of the climate aridity; the augmentation of the frequency and intensity of droughts and also of extreme weather-phenomena (frost, heavy rains, hail, rainless periods), especially in the middle and lower part of the basin. Almost complete destruction of the old irrigation system, combined with the possible shortfall of available water resources for irrigation. <i>A possible</i> deterioration of soil fertility due to a possible soil salinity increase, to water erosion and to landslides. <i>A probable</i> occurrence and invasion of new plants' pests and animals' diseases. <i>A probable</i> further depopulation of the village and reducing of the agriculture contribution to GDP.	Low in the Moldavian part of the basin due to the production reduction, depopulation of the village, migration of the rural population to cities and even abroad, destruction of large scale farm. The absence of public subsidies reduces the competitiveness of domestic production and export opportunities. Reduction of capacity and efficiency of agricultural science.
<i>Water supply and canalization</i>	<i>A probable</i> degradation of the ground waters level and drying up of wells and springs as the main sources of water in the village. Lack of proper diversification of water delivery. <i>A possible</i> shortage of available water resources in the lower part of the basin and the deterioration of water quality.	Low, under the present economic situation.
<i>Fisheries</i>	<i>A probable</i> change in the fish fauna, reduction of fish biodiversity and industrial catches due to the disappearance or reduction of the spawning grounds.	Medium, under the conditions of rigorous fishery supervision and maintenance of spring water pass during fish estrum.
<i>Infrastructure</i>	<i>A possible</i> deterioration due to both direct effects of climate change (for example, high summer temperatures or heavy rainfall), and the lack of material resources to maintain it.	Low, due to the obvious shortage of resources for its maintenance and improvement.

INTEGRATED RESULTS OF THE CONSULTATIONS IN MOLDOVA AND UKRAINE

**Impacts of climate change in the Dniester river basin**

(based on results of research and consultations undertaken in the basin)



Current adaptation potential:

- high
- medium
- low

Notes:

The asterisk (\*) means that (coordinated) basin-level actions are needed;

The size of spheres does not reflect relative importance of problems.



<b>SUMMARY OF CONSULTATIONS IN MOLDOVA AND UKRAINE</b>	
<b>Moldova</b>	<b>Ukraine</b>
<b>Adaptation measures</b>	
<b>Water resources</b>	
<ul style="list-style-type: none"> <li>- use ecosystem-based approach in water and all water-related sectors</li> <li>- proper management of water resources</li> <li>- development of the Dniester river basin management plan</li> <li>- decrease in water consumption</li> </ul>	
<b>Flow variability and volume &amp; floods</b>	
<ul style="list-style-type: none"> <li>- revision of operation rules for the Dniester hydropower plant</li> <li>- management of flow by reservoirs</li> <li>- more storage capacity to compensate for shifts in precipitation/regulation of storage capacity/active management of snow</li> <li>- proper flood defence by engineering constructions (use/restoration of current ones and creation of the new ones)</li> </ul>	
<ul style="list-style-type: none"> <li>- irrigation rehabilitation (creation of institutional mechanisms for river basin and other resources management (e.g. IRIGARE PROJECT))</li> <li>- development of rules for exploitation, management and regulation of water use from small rivers</li> <li>- increase of forest areas as well as improvement of the potential of other natural ecosystems (meadows, grasslands, wetlands)</li> </ul>	<ul style="list-style-type: none"> <li>- identification of flood-risk areas</li> <li>- legal control (regulation) of construction</li> <li>- state financing or state guarantees</li> <li>- monitoring, data exchange and prognosis system</li> <li>- basin-wide cooperation</li> </ul>
<b>Quality of surface waters</b>	
<ul style="list-style-type: none"> <li>- monitoring and data exchange<sup>2</sup></li> <li>- pollution control and elimination of its consequences</li> </ul>	
<ul style="list-style-type: none"> <li>- introduction of EU standards</li> <li>- diversification and water supply sources</li> <li>- sewage treatment*</li> <li>- regulation of ecological release and water flow *</li> <li>- regulation of human activities at water collection sites*</li> <li>- regulation of water release and withdraw</li> <li>- law enforcement on and creation and restoration of water protection zones and belts</li> <li>- increase of forest cover by law enforcement and development of mechanisms to transfer agricultural lands into forest areas (tax policy)</li> <li>- analysis of bottom sediments</li> </ul>	<ul style="list-style-type: none"> <li>- introduction of new technologies</li> <li>- construction and restoration of water sources and water pipes</li> </ul>
<b>Ground waters</b>	
<ul style="list-style-type: none"> <li>- reformation of land use sectors</li> <li>- joint monitoring</li> <li>- development of knowledge and experience in the sector on underground waters</li> </ul>	<ul style="list-style-type: none"> <li>- decrease in water consumption</li> <li>- introduction of new technologies</li> </ul>
<b>Agriculture</b>	

<sup>2</sup> \* – basin level

<ul style="list-style-type: none"> <li>- improvement of soil fertility, crop rotation</li> <li>- introduction of advanced technologies and good practises</li> <li>- phytosanitary control</li> </ul>	
<ul style="list-style-type: none"> <li>- improvement and differentiation of irrigation systems</li> <li>- flood and erosion preventing activities</li> <li>- restoration of forest belts</li> <li>- introduction of biological protection</li> <li>- active participation of government in providing insurance for risks and losses</li> </ul>	<ul style="list-style-type: none"> <li>- selection of crops and forest species to adapt to flash floods</li> <li>- veterinary, ecological and sanitary control of fish production</li> <li>- legal control (regulation) of land-use and crops rotation</li> </ul>
<b>Health and wellbeing<sup>3</sup></b>	
<ul style="list-style-type: none"> <li>- improvement of people's living standards to support health life style incl. good quality of water and goods</li> <li>- improvement of and investment into health care system (infrastructure (e.g. in cities to deal with extreme cold, currently inadequate), personal, new technologies)</li> <li>- development of early warning system incl. the one on the basin level (e.g. of floods in Ukraine (mentioned by one of the groups), currently does not function well) to respond to extreme events on time and on the appropriate level having required facilities for that</li> </ul>	
<ul style="list-style-type: none"> <li>- sanitary-epidemiological monitoring</li> <li>- raising awareness and informing;</li> <li>- development of water pipes in rural areas</li> <li>- risk management to minimize technological disasters</li> </ul>	<ul style="list-style-type: none"> <li>- finance social programmes</li> <li>- improve insurance coverage and mechanisms</li> </ul>
<b>Ecosystems and species</b>	
<ul style="list-style-type: none"> <li>- strengthening the system of protected areas</li> </ul>	
<ul style="list-style-type: none"> <li>- physical creation of ecological network, especially in transboundary areas</li> <li>- regulation of natural resources use /enforcement implementation</li> </ul> <p><i>Measures to prevent side erosion, change of river beds and ecosystem degradation (these process are caused by frequent fluctuations of water level)</i></p> <ul style="list-style-type: none"> <li>- regulation of water release from reservoirs</li> <li>- enforcement of banks</li> <li>- establishment of river bed peninsulas (прирусловая шпора) at the eroded areas</li> <li>- development of forest-protection belts to strengthen the banks</li> <li>- ban on gravel extraction</li> </ul>	<ul style="list-style-type: none"> <li>- flow management</li> <li>- restoration of ecosystems</li> <li>- environmentally-minded management of forests</li> </ul>
<b>Tourism</b> <i>(mentioned by both countries; however, measures were proposed only in Ukraine)</i>	
	<ul style="list-style-type: none"> <li>- tax reduction</li> <li>- investment in transport infrastructure</li> </ul>
<b>Fires</b> <i>(mentioned by Ukraine)</i>	
	<ul style="list-style-type: none"> <li>- forest management (clearing)</li> <li>- land melioration</li> </ul>

<sup>3</sup> This sector is connected to the sector of water quality (mentioned by one of the Moldavian groups)

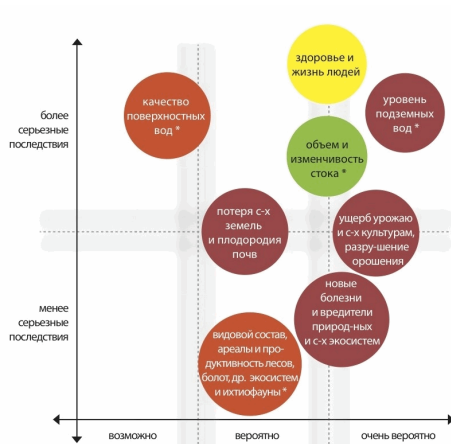
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# THE DNIESTER RIVER BASIN

## Strategic framework for transboundary adaptation for climate change<sup>4</sup>

### CONCEPT NOTE for discussion



## 1. Aims and rationale

The strategic framework for basin adaptation to climate change is a tool to help the riparian countries which share the Dniester river basin to:

- see and manage the basin as a **single** [eco]system in the context of a changing climate and other pressures on water resources;
- implement their international obligations such as those under UNFCCC and UNECE Water Convention;
- as much as possible align national adaptation plans, integrated management plans for the national sub-basins, and other **similar instruments** with each other's needs and realities and the cross-border dimension;
- find **synergies** among those plans and activities to benefit the countries and the basin as a whole, e.g. increase effectiveness of adaptation by locating measures where they have the optimum effect and try to avoid '**unilateral adaptation**' to the detriment of other riparian states;
- substantiate and prioritize **investment needs** for improved basin management transboundary adaptation from national public and private sources and international support mechanisms;
- contribute to improving river basin management and transboundary cooperation in general;

Once developed, the strategic framework should become **part** of and can contribute to a **broader approach** to the integrated management of the shared basin including the strategic

<sup>4</sup> The concept note was prepared by Nikolai Denisov, Zoï environment network and Sonja Koepfel, UNECE, Geneva, as an input to the project *Climate Change and Security in the Dniester River Basin*. The project is implemented by UNECE and OSCE in the framework of the Environment and Security initiative with the support from the European Commission and Austrian Development Cooperation.

planning and future activities under the recently signed **Dniester Basin Treaty**<sup>5</sup> (not yet in force) and the future River Basin Commission for the Dniester.

## 2. The contents

As the strategic tool, the framework will include an overall **objective**, a set of **principles**, and agreed-upon and prioritised **actions**, primarily in the domains of water and environment management, with the purpose to address the likely / anticipated impacts of climate change on the **basin level**. Adaptation measures on other levels (national, local, sectoral) will be considered only insofar they contribute to the 'health' and adaptation of the basin as a whole.

Since **integrated water resources management** usually supports climate change adaptation as well, many of the proposed measures such as ecosystem restoration, pollution prevention or improvements in water efficiency will at the same time promote climate change adaptation and improved basin management in general.

Like any other similar adaptation strategy, the framework for basin adaptation **will include** measures for the prevention of specific impacts and risks, for improving resilience of the basin to climate change, as well as for the necessary preparation, reaction and recovery actions. On a more concrete level the various structural and non-structural adaptation measures (regulatory, economic, policy, institutional, behavioural, managerial, engineering, ecosystem-based) will address the specific issues and sectors as well as the particularly vulnerable ecosystems and parts of the basin. The basin adaptation framework **will distinguish** between:

- **no- and low-regret** measures from which the basin will benefit no matter how serious the changes of the climatic conditions are or will be; and
- **risk-specific** measures, the initiation and implementation of which is triggered by a certain level of actual or anticipated change in the climatic system (and the related anticipated risk to the basin).

To initiate and eventually implement the latter, the strategic framework will reflect the trade-offs between the anticipated risks and the measures necessary to avert it, with the respective '**turning / tipping points**' in climatic and other trends that could trigger the particular sets of adaptation measures, and the needs to continuously monitor the specific trends.

As much as possible the strategic framework will be linked to national adaptation strategies and plans, as well as **other mechanisms** of the national, local, basin-related or cross-border management and planning. Some of the proposed basin-level measures will likely already be parts of such mechanisms, in these cases the framework will point to these connections and look for synergies and ways for a harmonised or joint action. Otherwise the framework will focus on gaps from the basin perspective not yet addressed by other processes.

The **end 'product'** will be a middle-size (ca. 50 pages) well-readable and well-illustrated publication in key languages of the basin, detailing:

- the context and the background for climate adaptation in the basin, including links to other processes such as national adaptation strategies, policies and plans;
- anticipated climate-change related trends, risks, impacts and vulnerabilities in the basin;

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<sup>5</sup> The bilateral Treaty on Cooperation on the Conservation and Sustainable Development of the Dniester River Basin, signed by Moldova and Ukraine in Rome in November 2012.

- proposed and prioritised measures for basin adaptation and the analysis of possible mechanisms for their implementation.

The background / technical materials elaborated during the development of the framework will complement the framework document (and will typically be made available on-line).

### 3. The process

The development of the strategic framework requires both **analytical work** and a highly **consultative / participatory** process.

An adaptation strategy needs a solid analytical basis, starting with the likely **regional climate trends** [typically derived from ‘down-scaling’ the outputs of trusted global models and scenarios such as those used by IPCC]. A basin-specific analysis of **impacts** and **vulnerability** is further required to link those trends with specific resources, sectors and areas<sup>6</sup>. In the case of the Dniester basin, a large part of such an analysis was already performed in 2011-13 in the framework of the project *Reducing vulnerability to extreme floods and climate change in the Dniester river basin*<sup>7</sup>.

Further development of the strategic framework for adaptation in the Dniester basin will be done in a highly participatory way through securing **multi-stakeholder** interest, inputs and coordination within the countries, and through promoting the true cross-border character of the process. **Consultations** on climate change impacts, sectoral vulnerabilities and the proposed adaptation measures will be held with a broad range of sectors, groups and communities in the basin countries, complemented through continuous **cross-border ‘fertilisation’** and review of the framework in the process of its development. The resulting framework will be a **guiding but non-binding document**, accepted and endorsed (although not necessarily formally approved) by Moldova and Ukraine. It is also expected that it will form a part of the strategic agenda of the future Dniester River Basin Commission.

The strategic framework will be **broadly communicated** within and outside the basin, and should be brought to the **attention** of the appropriate **policy level** in the countries to ensure coordination with other processes. In particular it is expected that some of the principles and measures contained in the framework will be **‘mainstreamed’** in official documents such as the national climate change adaptation strategies and plans, sub-basin management plans in Moldova and Ukraine, and basin-wide management instruments to be developed in the future under the Dniester Basin Treaty.

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<sup>6</sup> One should bear in mind that models and scenarios by no means provide the whole range of likely or even possible climate trends. No matter how much and serious the analytical work has been, there will remain significant uncertainty about the ‘actual’ future climate in the basin, hence the results of vulnerability analysis should be taken with care and as starting points and ‘range boundaries’ for developing robust sets of measures able to respond to a broad set of possible climate changes, ideally through inter-related alternative ‘adaptation pathways’.

<sup>7</sup> See e.g. Krakovskaya S. et al. *Task 1. Assessment and forecasting of climate change in the Dniester river basin. Task 2. Assessment of the impact of climate change on Dniester water resources*. Report to UNECE. Kyiv, 2012. (in Russian); Corobov, R. and N. Zakorchevna. *Assessment of vulnerability of the Dniester river basin to climate change. Report and an executive summary for UNECE*. Chisinau, 2012. Corobov, R. et al. *Assessment of Climate Change Vulnerability at the Local Level: A Case Study of the Dniester River Basin (Moldova)*. In: *The Scientific World Journal*, Vol. 2013

# Annex

## Counterparts for the development of the strategic framework

National environmental and water authorities (key counterparts)

Sectoral agencies, regional / local authorities within the basin, academia, NGOs

Basin-level coordination mechanisms and institutions (e.g. commissions, treaty secretariats and constituencies, governmental plenipotentiaries for water cooperation)

Relevant international and regional organisations (including the UN, the EU etc.)

## Provisional table of contents of the strategic framework for basin adaptation

### FOREWORD

Introduction (the basin, environmental issues, policy context, future of basin cooperation)

Objective of the strategic framework

Climate change in the basin (main trends, findings and uncertainties)

Impacts and vulnerabilities (issues, vulnerable resources, sectors, and areas / hot-spots)

General principles of adaptation at the transboundary level

Adaptation priorities (analysis, feedback from countries and stakeholders, turning points)

Hierarchy of the proposed adaptation measures (levels, timing, linkages, costs)

The road to implementation (policy and institutional analysis, resource options)

### CONCLUSIONS

ANNEXES (technical information, underlying studies, meeting reports; primarily on-line)

## Selected references on methodology

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